Types and characteristics of urban and peri-urban blue spaces having an impact on human mental health and wellbeing

A report of the EKLIPSE Expert Working Group on Biodiversity and Mental Health to provide recommendations for the conservation, planning, design, and management of urban green and blue infrastructures

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Glossary

Term	Definition	Reference
Blue space	"Outdoor environments—either natural or manmade—that prominently feature water and are accessible to humans either proximally (being in, on or near water) or distally/virtually (being able to see, hear or otherwise sense water)."	Grellier et al., 2017, p. 3
Green space	Outdoor environments dominated by vegetation, such as urban parks.	Adapted from Taylor et al., 2017
Mental Health	"A state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community."	WHO, 2014
Mental Wellbeing	"The psychological, cognitive and emotional quality of a person's life. This includes the thoughts and feelings that individuals have about the state of their life, and a person's experience of happiness."	Linton et al., 2016, p. 12
Urban	Relating to a city or town.	Oxford dictionary
Peri-urban	An area directly adjacent to a city or a town.	Oxford dictionary
Ecosystem services	Ecosystems are the planet's life supporting systems and include the need for food, water, clean air, shelter, and relative climate constancy. Other health benefits include those derived from having a full complement of species, intact watersheds, climate regulation, and genetic diversity.	MEA, 2005
Salutogenic effects	Health-promoting effects, as opposed to pathogenic or detrimental health effects.	

1. Report Summary

Urbanization is increasingly putting pressure on ecosystems and ecosystem services. Some evidence has shown that green and blue spaces can support the mental health of urban residents. Policy makers, city planners, other decision makers and land managers now face a major challenge to maintain and enhance natural areas and characteristics. Knowing which types and characteristics of green and blue space are beneficial for mental health is necessary to inform planning and management decisions.

EKLIPSE received a request from the Ministry in charge of the Environment of France (MTES) to review: "Which types of urban and peri-urban green and blue spaces, and which characteristics of such spaces, have a significant impact on human mental health and wellbeing?". A call for expertise was issued in March 2017. After a preliminary scoping, it was decided to perform two systematic reviews assessing the specific types and characteristics of blue space (review 1) and green space (review 2) on mental health and wellbeing. The systematic searches were supported and conducted by an experienced team of librarians, made possible by the financial support of the WHO. This report presents the systematic review for blue space (Review 1).

A number of previous (systematic) reviews have focused on the effects of the amount and availability of blue spaces on mental health and wellbeing (Britton, Kindermann, Domegan, & Carlin, 2018; Gascon et al., 2017; Völker & Kistemann, 2011). These reviews point at positive associations of blue space with mental health. The salutogenic effects of blue space have been proposed via three pathways (Gascon et al., 2017; Nutsford, Pearson, Kingham, & Reitsma, 2016; White, Alcock, Wheeler, & Depledge, 2013): 1) improved social interaction, 2) increased physical activity, and 3) stress-reduction. Despite positive associations found between blue space exposure and mental health, these reviews also claim a need for more research (Britton et al., 2018; Gascon et al., 2017; Völker & Kistemann, 2011). From a theoretical point of view, the need to know which features (or elements) of blue (and green) spaces are beneficial for mental health has also been expressed (e.g., Bratman et al., 2019). To our knowledge, none of the existing reviews have distinguished mental health benefits of specific types or characteristics of blue spaces.

This systematic review was performed according to the PRISMA guidelines (Moher, Liberati, Tetzlaff, Altman, & Group, 2010). In November 2018, a literature search was performed using Ovid MEDLINE, Web of Science, and Scopus, as well as through a focused investigation in the Journal of Landscape and Urban Planning, initially yielding 22.755 unique (i.e., deduplicated) papers.

Eligibility screening was performed employing the PICO (Population, Intervention, Comparison, and Outcome; Higgins & Green, 2011) / PECO (Population, Exposure, Comparison, and Outcome) approach (see section 2.1.2 for further explanations). No restrictions were made in terms of population. Eligible blue space interventions included those that changed the physical environment, either by targeting its characteristics or habitat type. Studies looking at dose effects of a specific characteristics or habitat type were also deemed eligible (e.g., cross-sectional studies looking at effects of amount of freshwater surrounding the residential area on mental health or wellbeing). Studies employing a compound measure of blue space (e.g., freshwater and coast taken together), performed indoors, or without a comparator (i.e., a control group, urban environments, green

environments, or other blue environments / characteristics) were excluded, as were studies looking only at therapeutic interventions (aimed at the individual rather than the physical environment). We did not exclude studies performed in rural areas as exposure to blue space in these environments may also inform about effects of these particular blue spaces in urban or peri-urban areas. A wide range of mental health and mental wellbeing outcomes were considered, ranging from momentary mood to suicide risk. Other health outcomes included life satisfaction, wellbeing, (recalled) restoration, problem behaviour, and mental health problems.

A total of twenty-four papers reporting twenty-six studies were included in the review after filtering against the inclusion/exclusion criteria (six experimental papers with eight studies, twelve cross-sectional, and six qualitative papers). The oldest paper was published in 2013. A critical appraisal was performed to assess the risk of bias, after which three further studies were excluded due to low quality (one for each category).

The narrative synthesis revealed that the majority of studies (18) looked at the salutogenic effects of the coast. In addition, most studies looked at a specific type, rather than characteristics, of blue space. Fourteen of the twenty-six studies were conducted in the United Kingdom. Participants numbers ranged from eleven to an entire population, and included the elderly, children, representative panel data, convenience samples, and people with mental distress. Most studies investigated the effects of blue space on affective outcomes, but wellbeing, life satisfaction, (recalled) restoration, general mental health problems, and problematic behaviour were also examined.

Benefits of the coast were found across all three study categories. Studies looking at direct effects of coastal exposure, as opposed to just coastal availability or proximity, showed more consistent positive results. Few studies investigated inland water exposure, looking at either a river, a canal, a wetland, or at the percentage of freshwater around the residence. It appeared that positive associations with mental health were less clear for inland waters than coastal blue space. Across blue space categories, the most pronounced effects were found for affect and affective disorders. Qualitative studies pointed towards unique and beneficial characteristics of blue spaces, including the visual openness of the space and fluidity of the water.

Too few studies in each category were present to allow for firm conclusion and recommendations. The outcomes of the systematic review signal the need to look beyond mere availability and proximity of blue spaces, to actual exposure and the experiences people have in blue space. Moreover, this review was aimed at urban and peri-urban exposure to blue space. The majority of studies reported effects of the coast and this type of blue space is geographically limited and will certainly not pertain to most urban and peri-urban areas. The main conclusion of the systematic review is that in this relatively young field of research more high quality research is necessary, including a focus on a wider range of blue space (particularly inland water) types, blue space characteristics, and geographical locations (especially beyond the United Kingdom). The outcomes do point at beneficial effects of blue space visits and visibility, at least for the coast. Qualitative studies have provided insights into the experiential characteristics of blue spaces, which would certainly

guide future research, such as the unique dynamic and fluid characteristic of water and the sense of visually open space.

2. Background

In an increasingly urbanizing world, pressures are growing on natural ecosystems. Furthermore, urbanization is associated with an increase of several mental disorders (Srivastava, 2009) .To reduce negative mental health effects in cities, functional and healthy ecosystems are a necessity (WHO, 2016). Policy makers, designers, planners and practitioners face the challenge of creating natural resources and preserving and conserving existing ones that are important for maintaining and optimizing human wellbeing. In an urban context, space is a scarce resource. Therefore, knowing which type of blue and green spaces, with which characteristics, are most beneficial for wellbeing is critical. It is exactly this question that lies at the core of the request put to EKLIPSE's experts.

2.1 Aims and objectives

In March 2017, EKLIPSE called for experts (call for experts No. 2/2017) to assess and share existing knowledge across disciplines, following up a request initially formulated by the Expert Working Group Biodiversity & Health, 3rd National Plan on Health and Environment (PNSE3) – Ministry in charge of the Environment (MTES), France. MTES aims to provide recommendations for the "conservation, creation, design and management of natural spaces that would benefit urban citizens, by maintaining or enhancing their mental health and wellbeing", as well as promoting systematic, interdisciplinary, and cross-cultural research.

The request

The request was as follows:

"Which types of urban and peri-urban green and blue spaces, and which characteristics of such spaces, have a significant impact on human mental health and wellbeing?"

The intention of the request is to provide guidelines and recommendations to policy makers, practitioners and researchers regarding the planning, design, construction, and management of green and blue spaces in urban or peri-urban areas to promote the mental health and wellbeing of urbanites.

After a preliminary scoping exercise, it was agreed with the requester to specifically focus on comparing different types of urban and peri-urban green and blue spaces and/or variations in green/blue space characteristics. It was decided to perform two systematic reviews, one for blue and one for green space. This report presents the outcomes for the blue space systematic review.

The expert working group

The expert working group was composed of 11 members from 7 countries. A range of disciplines and backgrounds were covered: urban ecology, biology, landscape architecture, medicine, psychology, and sociology. Communication was maintained across the team via email and virtual meetings, with a series of face-to-face meetings organised by EKLIPSE to facilitate key stages of the work. Experts worked intuitu personae, and on a voluntarily basis without receiving financial compensation. A post-

doc fellow joined the expert working group in April 2019 to help conduct the work, with the financial support of EKLIPSE. Librarians were employed as part of the expert working group, conducting the systematic literature searches and to assisting with the first stages of eligibility screening. This was made possible with the financial support of the WHO.

2.2 Theoretical framework: Blue space and mental health and wellbeing

"Most of the earth's surface is covered by water, and most of the human body is composed of water – two facts illustrating the critical linkages between water, health and ecosystems."

(WHO, 2017)

The above often-cited quote from the World Health Organization illustrates the importance of water, and thus blue space, for human existence and health. Recent research further stresses that blue space is not only linked with physiology and physical health, but that it also provides numerous opportunities for restoration, and serves to maintain and improve mental health (e.g., lower depression rates).

A number of reviews have already focused on the salutogenic effects of proximity to and availability of blue space on physical and mental health (Gascon et al., 2017; Volker & Kistemann, 2011), or the efficacy of therapeutic activities performed in blue space for mental health (Britton, et al., 2018). These reviews generally point to a beneficial relation between the amount of blue space and mental health and wellbeing. Such associations have, for instance, been found for self-reported mental health (Alcock et al., 2015) or physiological outcomes (e.g., heart rate, blood pressure; Hignett et al., 2018) following exposure to blue space.

Four pathways have been identified for the beneficial effects of nature (either green or blue) on health (Hartig, Mitchell, De Vries, & Frumkin, 2014): 1) stress reduction, 2) physical activity, 3) social cohesion, and 4) air quality. Three of these pathways (all but air quality) have been discussed within the blue space literature (Gascon et al., 2017; Lovell, Husk, Cooper, Stahl-Timmins, & Garside, 2015; Nutsford, et al., 2016; White, et al., 2013), see Figure 1.

The first pathway has traditionally received most empirical and theoretical attention. Restoration theories have proposed evolutionary-based positive affective responses to nature (Stress Reduction Theory; Ulrich et al., 1991), as well as cognitive recovery and resource replenishment after viewing natural settings (Attention Restoration Theory; Kaplan, 1995). These two theories mainly rely on aesthetic and visual qualities of the natural environments, and are related to presumed intrinsic characteristics of nature. Humans are proposed to have an intrinsic affection toward unthreatening nature, a term that has been labelled 'biophilia', as opposed to 'biophobia' relating to for instance innate fight or flight responses we have toward snakes and spiders (Kellert & Wilson, 1995; Ulrich, 1993). Stress-reduction may also come about through the absence of noise and crowding in more natural environments (Hartig et al., 2014). Indeed, research has indicated from a wide range of environmental types, people mostly preferred blue space for relaxing and recovering from daily stressors, more than for instance urban parks (White, Pahl, Ashbullby, Herbert, & Depledge, 2013).

The second pathway, physical activity is currently increasingly gaining attention. Blue spaces offer opportunities for many different forms of physical activity (e.g., swimming, sailing, walking). Physical activity, in turn, has been demonstrated to have beneficial effects on mental health (Bize, Johnson, & Plotnikoff, 2007). Furthermore, blue space often offers opportunities for leisure and recreation at

relatively low costs (Haeffner, Jackson-Smith, Buchert, Risley, & planning, 2017; White, Pahl, Wheeler, Fleming, & Depledge, 2016).

Improvements in social interactions (at the individual level) and social cohesion (at the neighbourhood level) is a third proposed pathway linking nature exposure with mental health. The link between social interaction and mental health has been firmly established (Holt-Lunstad, Smith, & Layton, 2010) and some studies have also pointed towards the beneficial effects of blue space on social interaction (De Bell, Graham, Jarvis, White, & Planning, 2017), although this has received less research attention.

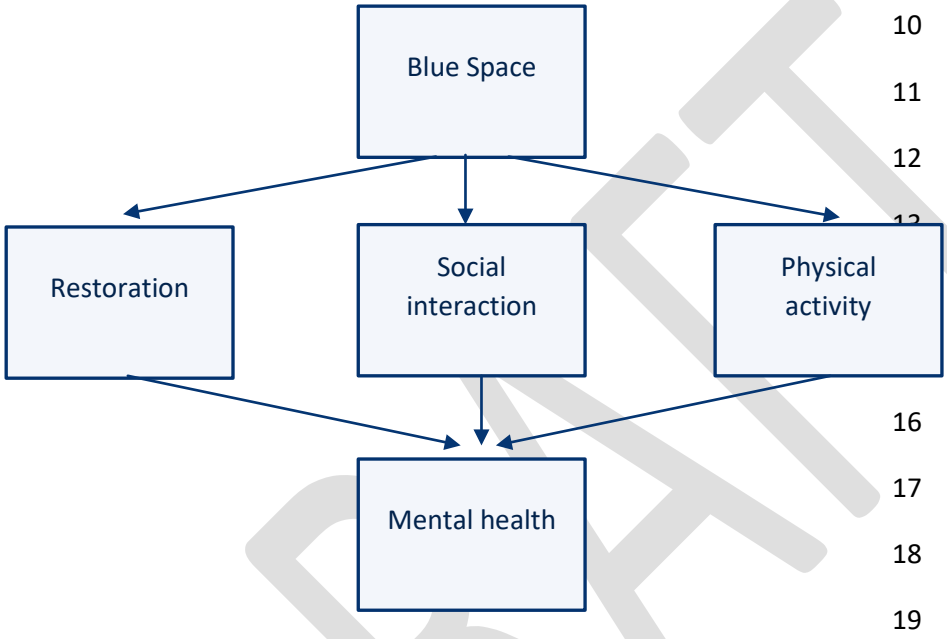

Figure 1. Proposed pathways for the mental health benefits of blue space

Even though the beneficial effects of blue space exposure have been observed, systematic reviews on the benefits of the amount of blue space exposure on health have all identified a need for more research on this relatively new topic (Britton et al., 2018; Gascon et al., 2017). In addition, the geographical diversity of urban settings and the heterogeneity of objectives, theoretical frameworks, and research methods in the reviewed studies made the comparison and establishment of robust results difficult (Britton et al., 2018; Frumkin et al., 2017; Gascon et al., 2017; Hartig et al., 2014).

In existing blue space research, similar to green space research, the focus is often on the amount or proximity of blue rather than the typology or specific qualities of blue environments. According to the international research agenda proposed by Frumkin and colleagues (2017) on the health-benefits of nature contact, the research outcomes have not progressed significantly. They conclude that "standard exposure measures are not grounded in the ecological elements most relevant to human health and wellbeing" (p. 6). For example, the quantity of nature is often measured using aerial photography or remote sensing techniques. Such data offer little information on the quality of the landscape view from the ground level, do account for how often residents interact with these natural environments, or focus on other attributes which may be important in terms of generating positive health outcomes. More knowledge on the importance of the type, characteristics of blue

space, may help to unlock its potential to contribute to human health (Frumkin et al., 2017; van den Bosch & Sang, 2017; Zürcher & Andreucci, 2017) and can thus inform planning and management decisions.

The framework by Frumkin and colleagues explicitly includes identifying a measurable element of nature and identifying a key characteristic of this natural element. Similarly, a recent conceptual model aimed at translating outcomes of research on the restorative effects of nature on mental health benefits and implementing nature as an ecosystem service (Bratman et al., 2019) also included natural features as a key component. Specifically, they refer to differences in biodiversity and differences in vegetation. Besides natural features, the model also points to the importance of exposure – operationalized as accessibility, proximity, and actual time spent in nature, which are all related to the design and composition of natural landscapes. The third component 'experience' adds to 'exposure' by looking at the (sensory) qualities of natural areas, the way people interact with it, and the dose (or the "absorbed internal dose"). In other words, a distinction is made between "objective" exposure and how much effect this exposure has by individual differences in, for instance, connectivity with nature or attention. The last component refers to the range of mental health effects that can be expected.

There is thus both a practical and theoretical need to gain a better understanding of which types and characteristics (or features or elements) of blue space matter most for urban residents in terms of mental health and wellbeing. The objective of the present systematic review was tackle this knowledge gap. This review aims to inform and provide recommendations to decision makers in several domains, such as health promotion, nature management, spatial policy, and urban planning and design.

3. Method

The systematic review adhered to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2010) and consisted of six consecutive steps; literature search, eligibility screening, meta-data extraction, critical appraisal, descriptive synthesis, and narrative synthesis. A protocol of the systematic review is available on the website of EKLIPSE (http://www.eklipse-mechanism.eu/health_activities).

3.1 Literature search

Search strategy

The search strategy to retrieve evidence for the impact of blue spaces on mental health conditions was developed in MEDLINE, and run in the databases MEDLINE, Web of Science, and Scopus. After completion of the MEDLINE and Web of Science searches, it became clear that some known relevant records were not being identified by the searches. The majority of these records were from the Journal of Landscape and Urban Planning. A focused search of this journal was therefore undertaken in Scopus.

The searches examined journal article subject headings, as well as the title, abstract and keywords. Search terms for blue spaces were combined with terms for mental health and wellbeing.

The search was multi-stranded and had two searches which were combined with the Boolean operator OR. The second strand was developed after the first search was tested against a set of reference papers (see appendix A) and was found to miss some known relevant studies. The search was constructed as follows:

1. Strand 1: blue spaces AND general or specific mental health issues (lines 1 to 60, see Appendix A)

2. Strand 2: blue space terms in title/abstract/author keywords AND psychological terms in the title only (lines 61 to 75)

3. Strand 1 OR strand 2 (line 76)

The searches were limited to English language only. In both MEDLINE and Web of Science, animal studies were removed using a standard algorithm. Publication types found via MEDLINE which were unlikely to yield relevant information, such as comment pieces, editorials, news, letters and case reports, were also excluded. In Web of Science, the following article categories were excluded as these were deemed unlikely to yield relevant information: geosciences, multidisciplinary, chemistry physical, geography physical, fisheries. The titles and abstracts of bibliographic records were downloaded and imported into the bibliographic management software EndNote, before all duplicate records were deleted.

Eligibility

The search was restricted to papers from peer-reviewed journals. Eligibility was defined based on the PICO/PECO approach; PICO stands for Population (or Patient or Problem), Intervention, Comparison, and Outcome, and defining the PICO terms is an integral part of a Cochrane Review (Higgins & Green, 2011). In PECO, the E stands for Exposure and allows for the inclusion of cross-sectional studies (without an intervention), which, even though they do not allow for causal inferences, can be highly informative in this field of research.

Population

No restrictions were made in terms of the population. However, single-case or single-case studies (n=1) were excluded.

Intervention

Eligible blue space interventions were those that manipulated or changed the exposure to blue space, either by targeting its characteristics or habitat type. The amenities and facilities present in a blue space were also of interest, as these may influence accessibility, affordances, and attractiveness, and, thereby, the exposure and type of contact. Studies investigating only the efficacy of therapeutic interventions in blue environments were excluded from the systematic review. This is because the intervention is focused on human beings, unless these studies also included an intervention on the physical environment, such as the design of a therapy garden incorporating blue space.

Exposure

Only studies investigating exposure to outdoor blue space were deemed eligible (e.g., studies investigating effects of an aquarium were excluded). Exposure to nature can be divided into indirect,

incidental, and intentional interactions with nature (Keniger, Gaston, Irvine, Fuller, & health, 2013). All types of exposure were included in the review, both intentional and incidental. For indirect interactions, viewing representations of nature, as well as viewing nature through a window were included. However, we distinguished between real and direct exposure to blue spaces. Studies looking at rural exposure to blue space were also included in the review, as they could still inform about mental health benefits of these types of blue space and characteristics.

Comparison

Only studies investigating exposure to outdoor blue space were deemed eligible (e.g., studies investigating effects of an aquarium were excluded). Exposure to nature can be divided into indirect, incidental, and intentional interactions with nature (Keniger, Gaston, Irvine, Fuller, & health, 2013). All types of exposure were included in the review, both intentional and incidental. For indirect interactions, viewing representations of nature, as well as viewing nature through a window were included. However, we distinguished between real and direct exposure to blue spaces. Studies looking at rural exposure to blue space were also included in the review, as they could still inform about mental health benefits of these types of blue space and characteristics.

Outcome

A wide range of mental health and wellbeing outcomes were included in the review, ranging from momentary mood to suicide rates. Included categories encompassed: general mental health (i.e., quality of life, satisfaction with life, subjective wellbeing); acute and direct effects on momentary mood, stress, and mental fatigue; retrospective reporting of momentary mood (i.e., recalled restoration); prevalence and severity of mental health problems; and specific correlates of mental health (e.g., loneliness, sleep, and pain). The World Health Organization ICD-10 mental health classification system (WHO, 1992) was adhered to: affective disorders, stress-related diseases; schizophrenia, psychosis, paranoia; personality disorders; disorders of psychological development; cognitive dysfunction; neurodegenerative disease; problem behaviour. Studies looking only at preference ratings, perceived restorativeness, expected restorative effects physical health correlates of mental health (such as physical activity without looking directly at mental health outcomes) were excluded. Studies looking at psychological states directly linked with mental health (such as loneliness) were included in the review.

Qualitative studies were searched for using the same inclusion and exclusion criteria. These studies were included to identify in-depth insights into people experiences of engaging with blue spaces and the meanings people ascribed to these experiences. .

Record selection

Obviously ineligible records in EndNote by a single reviewer, with a sub-set screened by a second reviewer to verify accuracy. Potentially eligible records were then loaded into a systematic review management system (Covidence), before the titles and abstracts were screened against the eligibility criteria. A conservative approach was taken, whereby any paper that was not obviously ineligible was retained. Subsequently, the expert working group screened the records at full text in Covidence. Each document was screened by two reviewers independently. Where there was disagreement, a third reviewer would look at the full text to resolve the conflict.

3.2 Meta-data extraction

An extensive compilation of descriptive data was extracted from each individual selected paper. Data were gathered across four different categories: general study information, methodology, blue space, and mental health (Table 1).

Table 1. Overview of the information extracted during the meta-data phase

General	Methodology	Blue space	Mental health
First author	Type of data (quantitative, qualitative)	Operational definition of blue spaces	Typology of outcome measure
Year of publication	Study design (cross-sectional, experimental, or qualitative)	Diversity of habitats (i.e., does the study look at one or multiple types of blue space)	Measurement instruments used *(not applicable for qualitative studies)*
Paper title	Data collection method (e.g., survey or interview)	Type of blue space exposure (indirect versus direct)	Results
Journal name	Participant recruitment process	Type of blue space	Covariates and confounding variables *(not applicable for qualitative studies)*
Country the study took place in	Population type	Description of the blue space characteristics	
Location the study took place in	Inclusion and exclusion criteria for participation	Blue space size (km^2)	
Season the study took place in	Sample size (number of participants)	Duration and frequency of visits	
	Sample age (mean and standard deviation)	Activities performed in the blue space	
	Sample age (range)	Type of environmental assessment (e.g., residential exposure, blue space visits)	
	Sample percentage female		
	Study duration		
	Rationale behind method *(qualitative studies only)*		

3.3 Critical Appraisal

During the critical appraisal phase, the risk of bias being incorporated into the study was assessed for each of the three types of study separately. The criteria were developed specifically for this systematic review, but based on existing critical appraisal tools, namely the Cochrane Collaboration Tool (Higgins & Green, 2011) and the Quality in Prognostic Studies tool (Hayden, van der Windt, Cartwright, Côté, & Bombardier, 2013). One custom item was added for the quantitative categories, assessing risk of bias of the blue space manipulation.

A three-level scoring ('high', 'moderate' and 'low' confidence of no bias) was used, with a fourth 'not applicable' category. For each scoring option, the criteria were defined at the onset of the critical appraisal process. Each paper was assessed independently by two or three members of the expert working group.

Experimental

Risk of bias in the experimental studies was assessed on the basis of seven different categories (Table 2): selection bias, performance bias, attrition bias, detection bias, manipulation, reporting bias, and covariates. These categories investigated potential bias during every stage of the study procedure, starting at the selection of the participants and how they related to the true population. Next, performance bias was targeted in the allocation of participants to experimental conditions and the blinding of participants for the manipulations. Attrition was included as dropouts during the experiment, which may cause bias in the outcomes. Detection bias investigated whether there was direct contact between the researcher and the participants. Unique to the type of studies assessed in this systematic review are the environmental manipulations related to the blue space type or characteristics. A separate category therefore assessed whether any potential bias could have been introduced to the studies by the choice and execution of blue space manipulations. Specifically, the duration and frequency of blue space exposure were taken as a measure of potential bias as longer and more frequent exposure may provide better or more consistent results. The two last categories tested for bias in the analysis phase of the study; specifically looking at whether authors reported all outcomes (including non-significant outcomes) and had identified and accounted for covariates in the analysis. See Table 2 for an overview of the items and the criteria.

Cross-sectional

Six categories (selection bias, attrition bias, detection bias, manipulation, reporting bias, covariates) were employed to assess the risk of bias for the cross-sectional studies (Table 3). These categories were very similar to those used for the experimental studies, except that no assessment was made of the performance bias as it is irrelevant for cross-sectional studies as there are no experimental manipulations.

Qualitative

The bias assessment of the qualitative studies differed from the two quantitative categories, due to the difference in study characteristics and objectives. Five items were considered in two categories (selection bias and qualitative methods) (Table 4). The assessment focused on clarity in the description of the sampling used and recruitment of participants. In addition, the qualitative method was assessed on whether independent raters were used in the analysis, whether stakeholders were involved during the analysis, and if triangulation of methods was implemented.

Table 2. Critical appraisal items for the experimental studies

Category		Criteria for confidence of no bias			
	Item	High	Moderate	Low	Not applicable
	Representative sampling	Random sampling is used (probability sampling); the sample is representative for the population under study	Purposive sampling is used; researchers have sampled individuals for a specific purpose, but non-probability sampling was used.	Convenience sampling is employed; sample is drawn for the part of the population that is close to hand, non-probability sampling	-
	Sample description in relation to population	The authors provide a description of both the true population and the sample	Authors describe the sample but provide no description of the true population	No description was provided	
	Baseline study characteristics	At baseline, the groups are similar on the value of the dependent variable, unless differences were included purposefully	At baseline, the groups are not similar on the value of the dependent variables unless differences are purposefully, but they are similar in composition in demographic variables	It is unknown whether the groups in different conditions are similar in terms of their score on demographic or independent variables	It is only one group (i.e., it is a within subjects design, not a between-subjects design)
Selection bias	Random allocation of participants to the experimental conditions	Participants were randomly assigned, allocation was based on chance.	Participants were only semi-randomly assigned, allocation was according some pre-set plan (e.g., a list on paper)	No description was provided or participants were not randomly assigned	It is only one group (i.e., it is a within subjects design, not a between-subjects design)
Performance bias	Order of conditions, interventions, or stimuli to participants	The order in which participants are exposed to a condition, intervention or stimuli is/are randomized	One or more orders is missing, or order is not fully randomized (e.g. 123, 321)	No description was provided; or order of conditions, interventions or stimuli to participant was not randomized	-

Cate-Gory		Confidence of no bias – criteria			
	Item	High	Moderate	Low	Not applicable
Performance bias (cont.)	Blinding of participants	Authors report their efforts for blinding the participants for the research purpose	Authors acknowledge that blinding was not done / not possible and recognize this may have influenced the outcomes	No description was provided	-
Attrition bias	Attrition	There is evidence of no attrition (note: attrition only applies to the period after the study has started), i.e., there are no drop-outs. OR: there is attrition but it is reported and the consequence on the outcomes are taken into account in the analyses.	drop-out rates are described (first and final sample size) but no analyses have been conducted into the consequence of attrition	no description of attrition (drop-outs) was provided	there is only one measurement, no attrition (drop-out) possible
Detection bias	Blinding of outcome assessment	There is no direct contact between the researcher and the participant, including questionnaires delivered remotely	-	There is direct contact between the researcher and the participants, including questionnaires delivered by hand	-
Manipulation	Is the manipulation clearly defined	Direct exposure is described in terms of duration and frequency	-	there is no description about the characteristics of the exposure, or only availability (indirect exposure) is assessed	-

1

Category		Confidence of no bias – criteria			
	Item	High	Moderate	Low	Not applicable
Manipulation (continued)	Treatment similarity	The treatments in both groups were exactly the same (except in blue space type or characteristics) in duration, timing, intensity of physical activity, location (both indoors or both outdoors) and these similarities are described	The treatment of each group was similar on some aspects, but differed on others (aspects as described in the 'high score' field)	No description was provided	Not applicable when there is only one group
Reporting bias	Selective reporting	authors report or mention non-significant results (e.g table of all results is reported in the paper; or statement that results were non-significant)	Authors do not mention or report non-significant results.	Non-significant results were not reported. evidence of partial reporting (some results are missing), and no explanation why	-
Covariates	Covariates	Covariate (s) are identified and taken into account in the analyses	Covariate(s) have been identified, but they are only being discussed (not included in the analyses)	Covariate(s) were not identified	Not applicable, for true experiments with good random allocation to conditions with no difference on baseline

Table 3. Critical appraisal items for the cross-sectional studies

Cate-gory		Confidence of no bias – criteria			
	Item	High	Moderate	Low	Not applicable
Selection bias	Random selection participants	Participants were selected based on a priori plan to ensure randomization	Participants were selected by chance, or participants were self-selected	No description was provided	a census was used (census means: every possible record was available to the researcher)
	Sample description in relation to population	The authors provide a description of both the true population and the sample, and there is evidence that the sample is representative (at the start in case there are multiple measurements)	The authors provide a description of both the true population and the sample, but there is evidence that the sample is not representative	No complete description was provided	a census was used (census means: every possible record was available to the researcher)
Attrition bias	Proportion of baseline sample available for analysis	There is evidence of no attrition (note: attrition starts only applies to the period after the study has started), i.e., there are no drop-outs. OR: there is attrition but it is reported and the consequence on the outcomes are taken into account in the analyses.	drop-out rates are described (first and final sample size) but no analyses have been conducted into the consequence of attrition	no description of attrition (drop-outs) was provided	there is only one measurement, no attrition (drop-out) possible
Detection bias	Blinding	There is no direct contact between the researcher and the participant, including questionnaires delivered remotely		There is direct contact between the researcher and the participants, including questionnaires delivered hand to hand	

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Cate-Gory		Confidence of no bias – criteria			
	Item	High	Moderate	Low	Not applicable
Manipulation	Is the manipulation clearly defined	Direct exposure is described in terms of duration and frequency	Direct exposure is described in terms of duration	There is no description about the characteristics of the exposure, or only availability (indirect exposure) is assessed	
Reporting bias	Selective reporting	Authors report or mention non-significant results (e.g table of all results is reported in the paper; or statement that results were nonsignificant)	Authors do not mention or report non-significant results.	Non-significant results were not reported. evidence of partial reporting (some results are missing), and no explanation why	
Covariates	Covariates	Covariate(s) are identified and taken into account in the analyses	Covariate(s) have been identified, but they are only being discussed (not included in the analyses)	Covariate(s) were not identified	

Table 4. Critical appraisal items for the qualitative studies

Cate-gory		Confidence of no bias – criteria		
	Item	High	Moderate	Low
Selection bias	Source of target population	-	There is a description of the sample	There is no description of the sample
	Recruitment description	Purposeful / systematic sampling; the authors of the papers have chosen the people who were sampled	Convenience sampling; The researchers have taken people as they volunteered and were available	There is no description of the sampling process
	Independent raters	There are two or more independent raters that code the data	There was only one person coding the data	No description was provided
Qualitative method	Stakeholder involvement	Stakeholders (non-academic) are involved in the entire research process (from the design of the method to the analysis of the outcomes)	Stakeholders (non-academic) are involved in only part of the research process (only design of method or only at the outcomes)	No stakeholders (non-academic) are involved or no description was given
	Triangulation	A mix in research methods or data sources were employed and the outcomes were used together in the analysis	A mix in research methods or data sources were employed, but they were not used together in the analysis	No mix in research methods, data sources, or researchers (backgrounds) was employed

3.4 Synthesis

After completion of the critical appraisal, a narrative synthesis was performed. Studies scoring low quality (i.e., a 'low' score in the critical appraisal) for more than half of the critical appraisal categories were excluded from the synthesis. Thus, studies with more than and more than six, four , or three 'low' scores in respectively the experimental, cross-sectional, and qualitative category. The narrative synthesis consisted of four consecutive steps: developing a theory of change, performing a preliminary synthesis, exploring relationships within and between studies, and assessing the robustness of the synthesis (Popay et al., 2006).

The theory of change, or the conceptual framework, summarized the expected underlying mechanisms of the benefits of blue space on mental health. Its purpose was to guide the selection of studies, the categorization of studies, as well as performing the synthesis. The theory of change has already been described in the theoretical background of this report (section 1.2).

During the preliminary synthesis, study outcomes were grouped and tabulated per study type (experimental, cross-sectional, qualitative) and blue space type, divided into two broad categories: sea/coast or inland waters. Groupings and tabulations were also made per outcome measure, divided into the categories: affective; wellbeing; restoration; mental health problems; life satisfaction and quality of life; and behavioural problems. Also, a distinction was made between studies with direct exposure versus those with indirect representations of blue space (e.g., videos and Virtual Reality).

After these overviews were created, results were further analysed by looking at differences in possible moderators, such as type of activity, the study design, the sample, and risk of bias (outcomes from the critical appraisal), to understand the observed heterogeneity in outcomes. Conceptual maps were created to reveal patterns in the outcomes and to further explain heterogeneity. Lastly, triangulation was also assessed, both in terms of methodology used and background of the researchers.

The fourth, and final, step in the synthesis was to investigate the strengths and weaknesses of the systematic review process and, subsequently, the robustness of the outcomes. This was done not only by critically reflecting upon the synthesis phase, but also by looking at the generalisability of the synthesis product to the general population. The outcomes of this assessment are reported in the Discussion.

4. Outcomes

4.1 Search outcomes

The searches of MEDLINE and Web of Science were undertaken on 29 November 2018, and identified 26,873 records (Table 5). Following deduplication, 22,707 records were assessed for relevance. The Scopus search was undertaken on 7 February 2019 and retrieved a further 47 records.

Table 5. Literature search results

Resource	Number of records identified
Web of Science (SCI-EXPANDED, SSCI, A&HCI)	20,099
MEDLINE	6,774
Scopus	47
Total number of records retrieved	26,920
Total number of records after deduplication	22,755

After deduplication, 22,201 records were rejected based on an assessment of the title and abstract. A total of 554 records were loaded into Covidence, with 145 then assessed at full text after title and abstract filtering. After assessment of the full texts, 24 papers were selected as eligible (Figure 2): 7 experimental papers (8 studies); 12 cross-sectional papers; and 6 qualitative papers. Table 6, 7, and 8 provide a summary of the included studies.

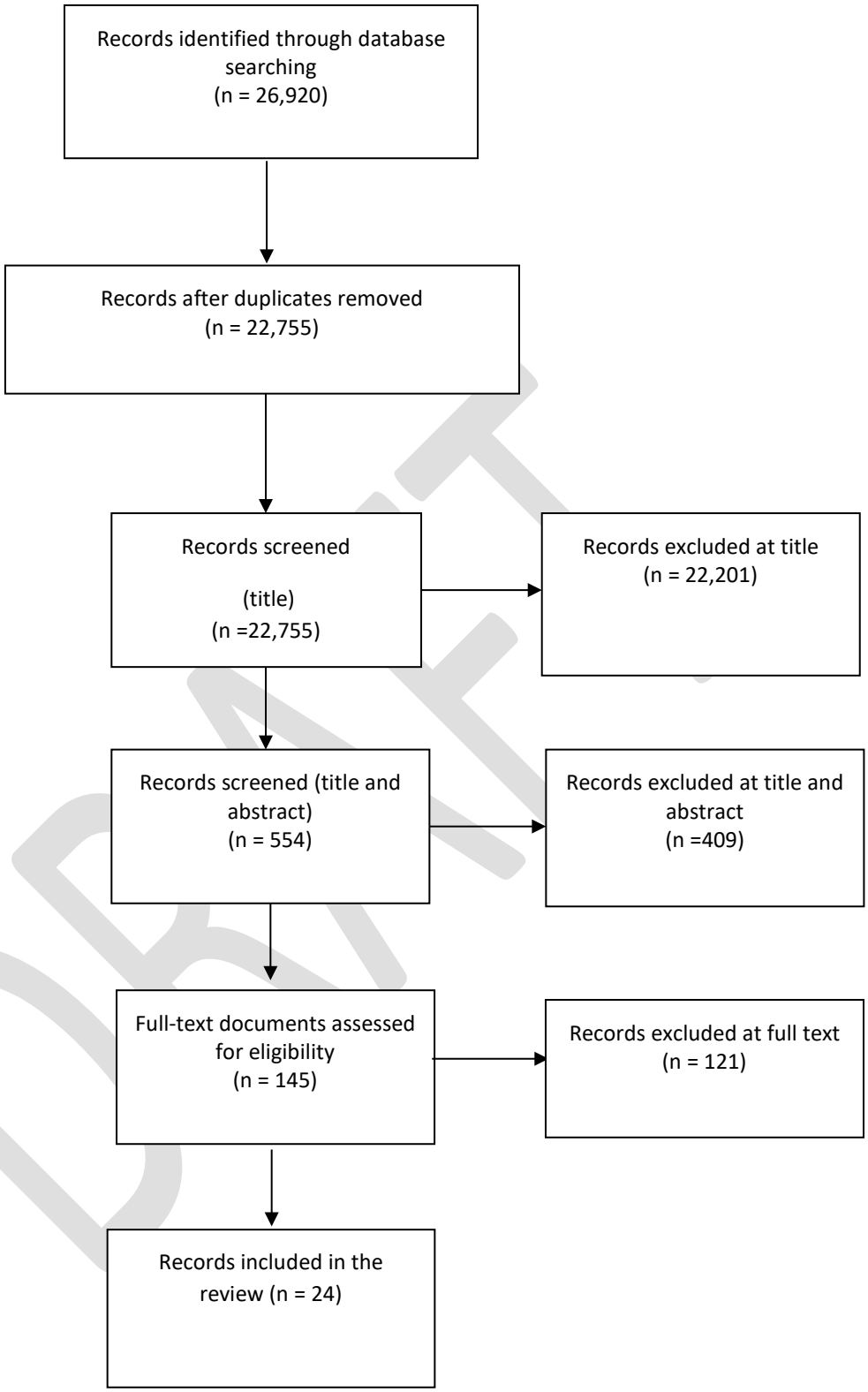

Figure 2. The PRISMA Flowchart for the study selection

1 **Table 6. Overview of the included studies; experimental**

Article	Blue space category	Blue space description	Participants	Indirect or direct	Type of outcome	Results
Triguero-Mas, et a;., 2017	Coast	River dominated delta beach	26 participants with indications of psychological distress	Direct	Mood, physiological stress, restorative outcomes	Better mood and HRV compared to urban environment
Tsutsumi, et al., 2017	Coast	Visuals and sounds of the sea	12 healthy men in their twenties	Indirect	Mood, physiological stress	Groups were divided based on preference for either a sea or a forest movie. For those who preferred the sea movie, mood improved after watching sea movie, parasympathetic nerve activity increased while watching the sea video and heart rate decreased. Similar effects were found for watching a forest movie (for those that preferred the forest movie).
Emfield & Neider, 2014	Coast	Images and sounds of natural beaches and the ocean	202 graduate students	Indirect	Mood, relaxation	No effect on mood, but participants reported finding the images (and sounds) more relaxing than the urban counterparts
Tanja-Dijkstra et al., 2018	Coast	Virtual reality coastal environment	85 students & 70 dental patients	Indirect	Experienced pain, vividness of memory	Less experienced pain, no effect on vividness of memory compared to no VR (Study 1) or an urban VR (Study 2).
White, et al., 2017b	Coast	Different types of beach images with three levels of biodiversity/videos of coastal wildlife differing in fascination level	1478 panel members	Indirect	Mood and recovery	Perceived biodiversity and fascination level was positively related with mood and recovery
Rogerson et al., 2016	Coast /inland	Beach route on and below the clifftops; riverside route within an urban park; heritage route overlooking river	331 participants from a convenience sample	Direct	Stress, mood	No difference between running environments, as self-esteem and mood improved and self-reported stress decreased along all routes.

Article	Blue space category	Blue space description	Participants	Indirect or direct	Type of outcome	Results
Gidlow et al., 2016	Inland	River promenade	38 locals	Direct	Mood, cortisol, experienced restoration	Mood and cortisol improved in all conditions (blue, urban, green), perceived exertion lower at the river promenade than during the two other conditions.

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1 **Table 7. Overview of the included studies; cross-sectional**

Article	Blue space category	Blue space description	Participants	Direct or Indirect	Type of outcome	Results
Qiang et al., 2019	Coast	Sea view	13 communities	Direct	Ratio of depressive disorder, ratio of mental bad days	No significant relation between ocean visibility and the mental health outcomes
Dempsey et al., 2018	Coast	Coastal proximity and sea view from home	8504 people aged over 50	Direct	Depression prevalence	Lower risk of depression when living closer to the sea, and when sea view increased. Sea view had a stronger association with depression levels than distance
Helbich et al., 2018	Coast	Coastal proximity	Almost entire Dutch population (382 municipalities)	Direct	Suicide rate	No relation between coastal proximity and suicide rate
Amoly, et al., 2014	Coast	Beach	2111 school children	Direct	Problematic behaviour: Strengths and Difficulties Questionnaire total scores and subscale (parents rated), ADHD symptom criteria (teacher rated)	Annual beach attendance was negatively related with several, but not all, SDQ outcomes. No association was found with the ADHD measures
White et al., 2013a	Coast	Coastal proximity	Panel data: 139632 for mental distress, 91765 for life satisfaction	Direct	Mental distress (GHQ), global life-satisfaction (single item)	Living closer to the coast was related (in the fully adjusted model) to mental health, but not to life satisfaction
White et al., 2017a	Coast	Coastal proximity	Panel data: 32482 urban peri-urban dwellers	Direct	Evaluative wellbeing, eudaimonic wellbeing, experiential wellbeing: happy – anxious	In fully adjusted model, no relation between coastal proximity and evaluative wellbeing, eudaimonic wellbeing, experiential happiness yesterday, and experiential anxiety yesterday
Mackerron & Mourato, 2013	Coast and inland	Coast & marine + wetlands, freshwater, flood plains	20000 app users	Direct	Momentary happiness	Marine and coastal margins are associated with higher momentary happiness than wetlands, freshwater and flood plains

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Article	Blue space category	Blue space description	Participants	Direct or indirect	Type of outcome	Results
White et al., 2013b	Coast and inland	Coast, beach, river/lake/canal	Panel members: 4255	Direct	Recalled restoration	No significant effect of river/lake/canal, a significant benefit for coast and beach compared to the open countryside
Alcock et al., 2015	Coast and inland	Saltwater, freshwater, coast	2020 rural residents	Direct	Mental health (general health questionnaire)	Significant positive relation between coastal proximity and mental health, no relation with freshwater, negative relation with salt water and mental health. Only for within variation --> people that moved. No effects were found for people that did not relocate
Pedersen et al., 2019	Inland	Three different Wetland areas	473 residents	Direct	Perceived Quality of Life, Perceived restorative Qualities, Affective responses	Helsingborg scored higher on several items of quality of life and on affect than the other two wetlands. Helsingborg is the only wetland integrated in the residential area.
Bryce, 2016	Other	Marine	1220 divers and anglers	Direct	Experienced wellbeing in three factors: engagement with nature, place identity, therapeutic value	Factor analysis revealed three outcome factors; engagement and interaction with nature; place identity; therapeutic value. No significant differential influence of the different marine characteristics on well-being scores were found.
Bitterman, 2017	Other	Water and fountain sounds	35	Indirect	Relaxing or annoyingness of sound	No difference between water sounds and fountain sounds. Better than wind chimes and crickets

1 **Table 8. Overview of the included studies; qualitative**

Article	Blue space category	Blue space description	Participants	Direct or indirect	Type of outcome	Results
Bell et al., 2015	Coast	Natural variety coastal path/trail beaches harbour	33 inhabitants of Cornwall	Direct	Perceived mental wellbeing therapeutic experiences	Eudaimonic wellbeing, renewal and restoration, restorative immersive experiences after visiting the sea
Willis, 2015	Coast	Coast/stormy sea	40 visitors and locals at Jurrasic Coast, United Kingdom	Direct	Feelings of rejuvenation, peace, relaxation, being uplifted emotionally	The landscape at each case study site appears to fascinate and captivate visitors and induces emotional responses to it. Responses to this environment included feelings of being energised and at the same time, relaxed, calm and peaceful.
Coleman et al., 2015	Coast	Sandy beaches with some large areas of native bush and hilly (and sky)	11 senior residents	Direct	Perceived therapeutic benefit - giving structure to everyday life, assist process of grieving aiding appreciation of life	Sea represents a symbolic connection with the past, a fluid context for wellbeing.
Ashbullby et al., 2013	Coast	Beach; Rock pool	15 families, 24 parents, 20 children	Direct	Psychological wellbeing (e.g. feelings of happiness, enjoyment, stress relief, sleep, social and family interaction - children and parents)	Main reported benefits were psychological (fun, stress relief, engagement with nature), and social interaction. Barriers for beach visit were also mentioned. Important role for parents in beach visits
Pitt, 2018	Inland	Canal/river: brown, grey, green water	84 locals	Direct	Mental health benefits - places to relax and de-stress, emotionally refreshed, peaceful	As urban waterways highlight, not all water is blue. This is significant because it is qualities associated with blueness (freshness, fluidity, luminescence, rippling) which seem particularly salutogenic. The research reiterates the need for a relational perspective on therapeutic blue spaces, recognising that wellbeing may or may not be enhanced depending on how person and place interact in particular

Article	Blue space category	Blue space description	Participants	Direct or indirect	Type of outcome	Results
Volker & Kistemann, 2015	Inland	River promenade	113 passers-by	Direct	Getting away from everyday stress e.g. atmosphere	More pronounced benefits expressed in blue space than in green space, in the four dimensions of therapeutic landscape: experienced, symbolic, social, and activity space

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4.2 Critical Appraisal

Experimental

Overall, the confidence of no bias of the experimental papers was poor (Figure 3; Table 9). Only two studies had a high score on half of the assessment criteria. A lack of blinding, both in terms of the outcome assessment and of the participants to the researchers, was especially problematic. Furthermore, none of the studies employed representative sampling or described the sample in relation to the population. However, the experimental papers did generally score well on defining the blue space manipulation in terms of duration and frequency, keeping the treatments similar in all other respects than the experimental factor under investigation, and in avoiding selective reporting.

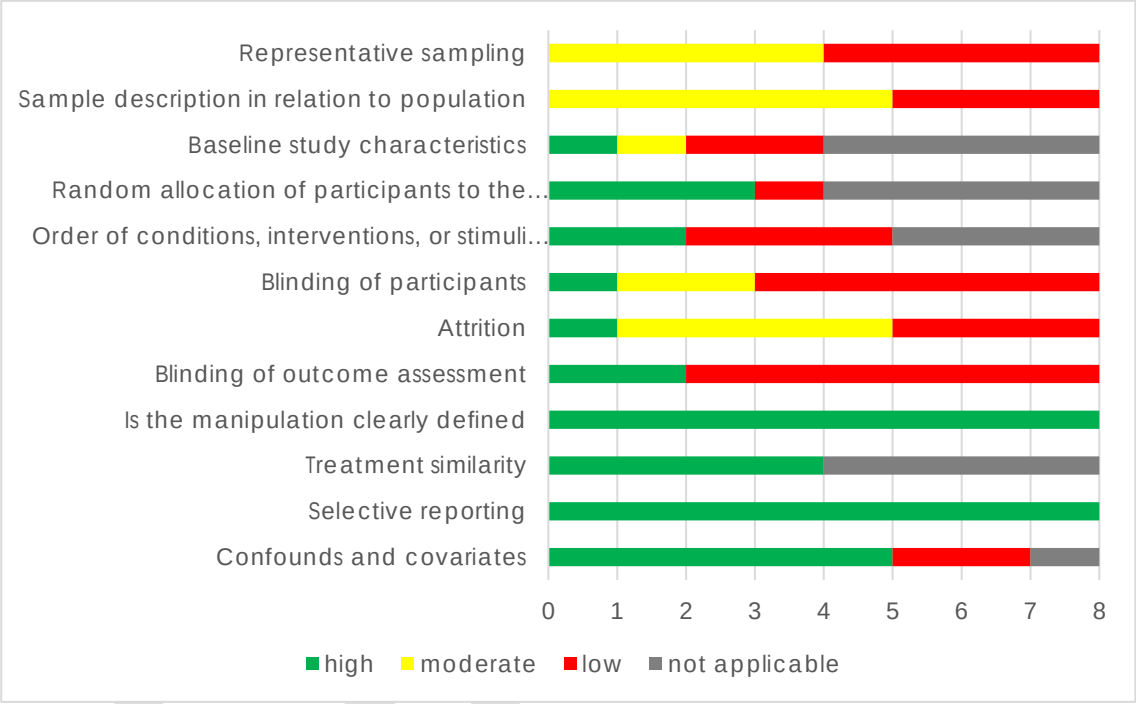

Figure 3. Overall score (confidence of no bias) per item on the critical appraisal for the experimental studies

Table 9. Confidence of no bias for the individual experimental studies

	Representative sampling	Sample description - population	Baseline study characteristics	Random allocation participants	Order of conditions	Blinding of participants	Attrition	Blinding of outcome assessment	Definition of manipulation	Treatment similarity	Selective reporting	Confounds and covariates
Trigure-Mas et al., 2017	□	□	n/a	n/a	+	□	-	-	+	n/a	+	+
Tsutsumi et al., 2017	□	□	n/a	n/a	-	-	-	-	+	n/a	+	-
Rogerson et al., 2016*	-	-	-	-	n/a	-	-	-	+	+	+	-
Emfield & Neider, 2014	-	-	+	+	-	-	□	+	+	+	+	n/a
Tanja-Dijkstra et al., 2018, Study 1	-	-	-	+	n/a	□	+	-	+	+	+	+
Tanja-Dijkstra et al., 2018, Study 2	□	□	□	+	n/a	-	□	-	+	+	+	+
White et al., 2017b	-	□	n/a	n/a	-	-	□	+	+	n/a	+	+
Gidlow et al., 2016	□	□	n/a	n/a	+	+	□	-	+	n/a	+	+

* *low quality: low scores on more than half of the items; not included in synthesis*

+ = high confidence of no bias, □ = moderate confidence of no bias, - = low confidence of no bias, n/a = not applicable

Cross-sectional

The confidence of no bias of cross-sectional studies appeared better than that of the experimental studies, although there is much room for improvement (Figure 4; Table 10). Four of the twelve studies scored relatively well, with 'high' ratings on more than four of the seven criteria. In contrast to the experimental studies, the cross-sectional studies generally scored well on the blinding of participants, but low on the description of the blue space manipulation. In line with the experimental studies, selective reporting did not occur often.

Table 10. Confidence of no bias for the individual cross-sectional studies

	Random selection participants	Sample description in relation to population	Proportion of baseline sample available for analysis	Is the manipulation clearly defined	Selective reporting	Confounds and covariates	Blinding of participants
Pedersen et al., 2019	□	-	n/a	-	+	-	+
Dempsey et al., 2018	+	+	n/a	-	+	+	+
Helbich et al., 2018	n/a	n/a	n/a	-	+	+	+
Amoly et al., 2014	□	□	n/a	□	+	+	+
White et al., 2013a	+	+	n/a	-	+	+	+
White et al., 2017a	+	+	n/a	-	+	+	+
Bitterman, 2017*	-	-	n/a	□	-	-	+
Bryce et al., 2016	□	-	n/a	-	+	-	+
Mackerron & Mourato 2013	□	□	□	-	+	+	+
White et al., 2013b	+	□	□	□	+	□	-
Qiang et al., 2019	n/a	n/a	n/a	-	+	-	+
Alcock et al., 2015	+	□	+	-	+	+	+

** low quality: low scores on more than half of the items; not included in synthesis*

+ = high confidence of no bias, □ = moderate confidence of no bias, - = low confidence of no bias, n/a = not applicable

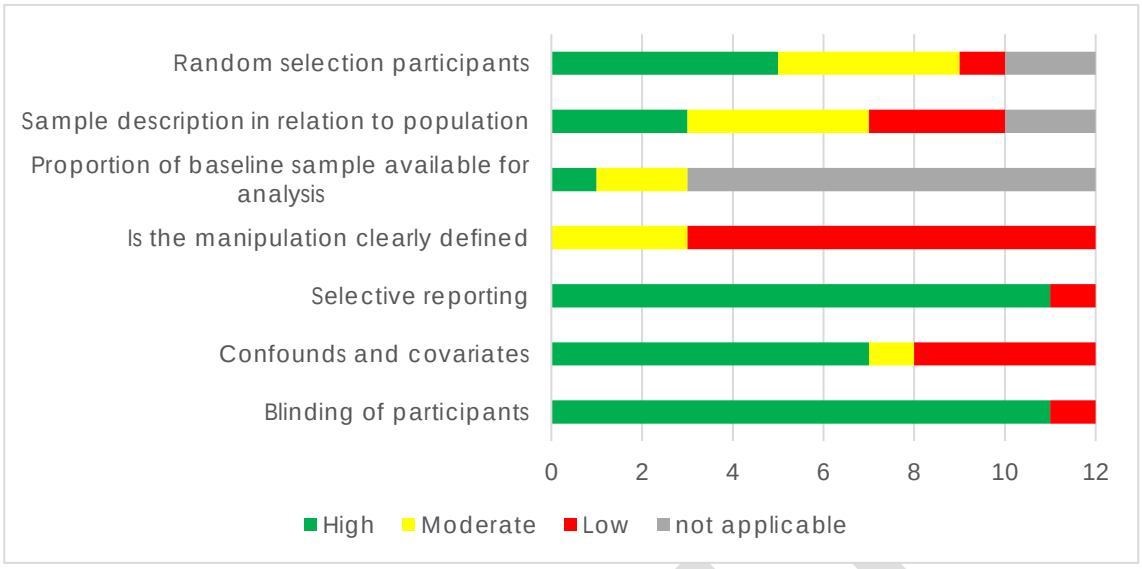

Figure 4. Overall score (confidence of no bias) per item on the critical appraisal for the cross-sectional studies

Qualitative

The confidence of no bias scores were generally low for the qualitative studies (Figure 5; Table 11). Only one article had a 'high' rating on three of the five criteria, and two studies only had one 'high' score. Qualitative studies scored low on stakeholder involvement and high on recruitment description. Very mixed results were found for triangulation and the employment of independent raters.

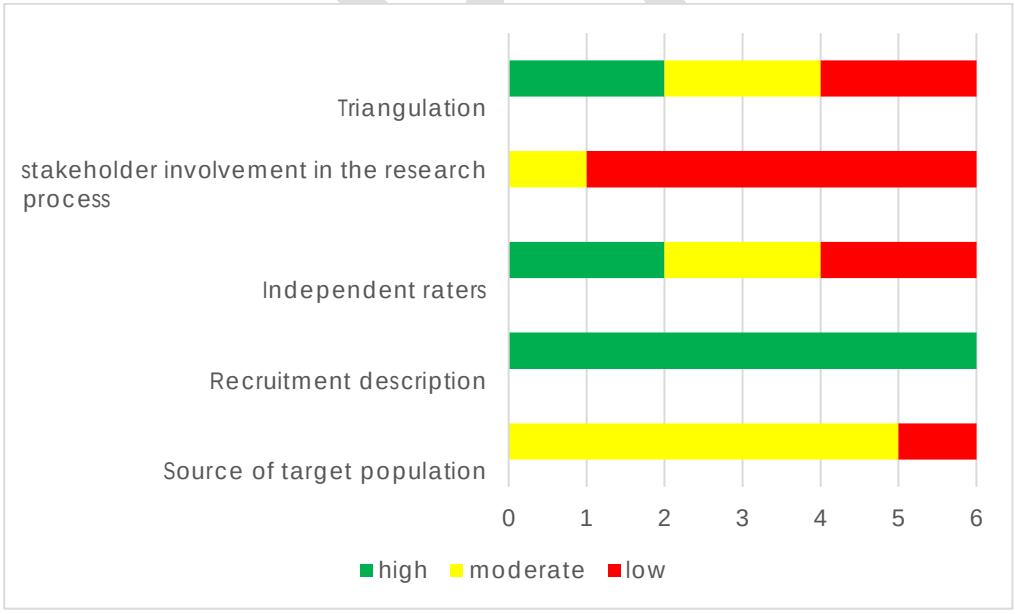

Figure 5. Overall score (confidence of no bias) per item on the critical appraisal for the qualitative studies

Table 11. Confidence of no bias for the individual qualitative studies

	Source of target population	Recruitment description	Independent raters	stakeholder involvement in the research process	Triangulation
Bell et al., 2015	□	+	□	□	+
Volker & Kistemann, 2015	□	+	□	-	-
Coleman et al., 2015	□	+	+	-	+
Ashbullby et al., 2015	□	+	+	-	-
Pitt, 2018	□	+	-	-	□
Willis, 2015*	-	+	-	-	□

* *low quality: low scores on more than half of the items; not included in synthesis*

+ = high confidence of no bias, □ = moderate confidence of no bias, - = low confidence of no bias, n/a = not applicable

4.3 Synthesis

Descriptive synthesis

Three studies were excluded from the synthesis due to low quality (one in each category). No mixed method studies were retrieved and included in the systematic review. The research area is relatively new, as illustrated by the fact that the "oldest" papers included in the review date from 2013. The majority of studies were from the United Kingdom (14/26), eight of which were from the same research group. Most studies looked only at one specific blue environment, with the majority (18) investigating benefits of the coast (Figure 6).

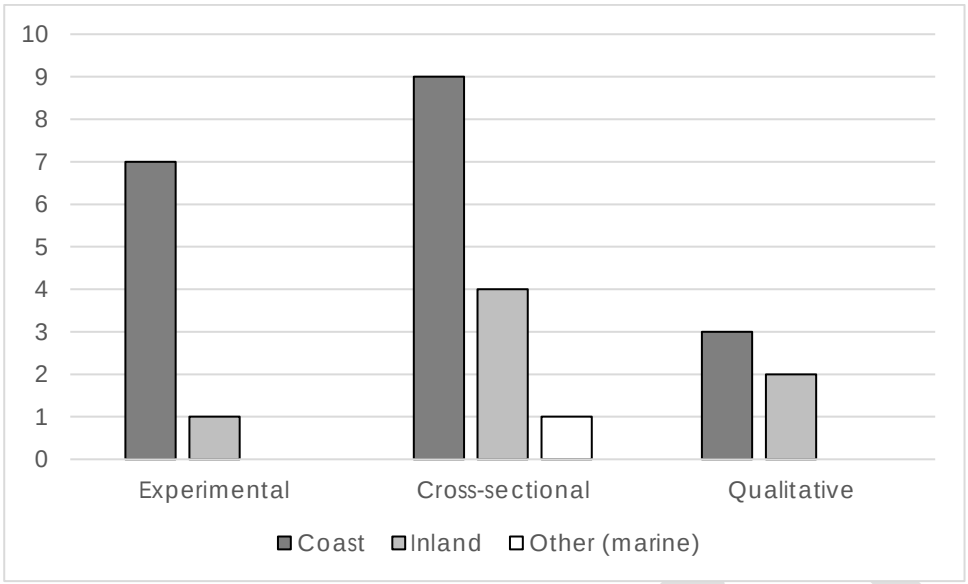

Figure 6. Distribution of studies over the blue space categories, per study type

Experimental

A total of six papers (eight studies) were included in the experimental category. One paper reported a randomized controlled trial (Tanja-Dijkstra et al., 2018). Five studies were conducted in the United Kingdom (Gidlow et al., 2016; Tanja-Dijkstra et al., 2018; White et al., 2017b), one in Spain (Triguero-Mas et al., 2017), one in Japan (Tsutsumi et al., 2017), and one in the United States of America (Emfield & Neider, 2014).

Seven of the eight studies focused on effects of the coast, with only Gidlow and colleagues (2016) investigating benefits of inland water on mental health. Five of the eight studies compared one specific type of blue space with green and/or urban environments (Emfield & Neider, 2014; Gidlow et al., 2016; Tanja-Dijkstra et al., 2018; Triguero-Mas et al., 2017; Tsutsumi et al., 2017). One study compared Virtual Reality exposure to the coast with no direct exposure at all (Tanja-Dijkstra et al., 2018), and two studies looked at characteristics of the coast using a movie or images (ranging in the level of biodiversity and fascination; White et al., 2017b).

Two studies implemented real exposure to nature (Gidlow et al., 2016; Triguero-Mas et al., 2017), and the other six studies used representations of nature in the form of videos (Tsutsumi et al., 2017; White et al., 2017b), images (Emfield & Neider, 2014, White et al., S1), and Virtual Reality (Tanja-Dijkstra et al., 2018).

Participant numbers ranged between 12 and 1478, and included students (Emfield & Neider, 2014; Tanja-Dijkstra et al., 2018), healthy men (Tsutsumi et al., 2017), subjects with signs of psychological distress (Tiguero-Mas et al., 2017), dental patients (Tanja-Dijkstra et al., 2018), panel members (White et al., 2017b), and locals (Gidlow et al., 2016).

All studies investigated momentary mental health outcomes, with two studies also looking at the vividness of memory one week after the experiment (Tanja-Dijkstra et al., 2018). Six studies looked at effects on mood (Gidlow et al., 2016; Emfield & Neider, 2014; Triguero-Mas et al., 2017; Tsutsumi et al., 2017; White

et al., 2017b). Three of these studies also included physiological measurements (cortisol levels: Gidlow et al., 2016; heart rate variability: Triguero-Mas et al., 2017; heart rate variability and heart rate: Tsutsumi et al., 2017). Two studies investigated effects on perceived pain (Tanja-Dijkstra et al., 2018), and two studies also investigated recovery (White et al., 2017b).

Cross-sectional

A total of eleven studies were included in the cross-sectional category synthesis. Again, a relatively large proportion (6) of the studies were conducted in the United Kingdom (Alcock et al., 2015; Bryce et al., 2016; MacKerron & Mourato, 2013; White et al., 2013a; White et al., 2013b; White et al., 2017a;), with the other studies conducted in the Netherlands (Helbich et al., 2018), Ireland (Dempsey et al., 2018), Sweden (Pedersen et al., 2019), Spain (Amoly et al., 2014), and Hawaii, USA (Qiang et al., 2019).

Four of the eleven studies looked at associations of the coast with mental health (Dempsey et al., 2018; Helbich et al., 2018; White et al., 2017a; Qiang et al., 2019). Four studies looked at both the coast and inland water (Alcock et al., 2015; MacKerron & Mourato, 2013; White et al., 2013a; White et al., 2013b) One study investigated associations between inland water and mental health alone (Pedersen et al., 2019), while another focused on marina areas (Bryce et al., 2016). All studies used direct exposure to blue space as manipulation.

Distance and visit frequency to blue space in the cross-sectional category was defined as a self-reported visits (visit frequency) in four studies (Amoly et al., 2014; Bryce et al., 2016; Pedersen et al., 2019; White et al., 2017a), one study investigated the Euclidian distance to the coast (Dempsey et al., 2018), two studies matched the residential postal code with a land-cover system (GIS) to assess land cover near the home address (Alcock et al., 2015; Helbich et al., 2018), two studies used the linear distance to the coast (White et al., 2013a; White et al., 2017a), two studies looked at the visibility of the sea (Dempsey et al., 2018; Qiang et al., 2019), and one study derived blue space visits from GPS locations of mobile phones (MacKerron & Mourato, 2013).

Participant numbers ranged from 473 to a census of the population of the Netherlands (millions of people). In six of the eleven studies, examined participants who were part of a (nationwide) database, or some subset of it (e.g., only people aged over 50, Dempsey et al., 2018; only rural residents, Alcock et al., 2015). In one study, residents of a specific residential area were recruited (Pedersen et al., 2019), another study targeted school children (Amoly et al., 2014), and one study was aimed at divers and anglers (Bryce et al., 2016).

One study investigated depression levels and prevalence (Dempsey et al., 2018), while another targeted suicide risk (Helbich et al., 2018). General mental health was measured in four studies (Alcock et al., 2015; White et al., 2013a; White et al., 2013b; Qiang et al., 2019). Two studies used happiness as health outcome (MacKerron & Mourato, 2013; White et al., 2017a), and one study focused on restoration outcomes (White, 2013b). General wellbeing was measured in two studies (Bryce et al., 2016; White et al., 2017a), whereas three looked at either life satisfaction (White 2013a; White 2013b) or quality of life (Pedersen et al., 2019). Problematic behaviour was targeted in one study (Amoly et al., 2014).

Qualitative

Five papers in total were included in the synthesis for the qualitative studies. Three of the five were conducted in the United Kingdom (Ashbullby et al., 2013; Bell et al., 2015; Pitt, 2018), one in New-Zealand (Coleman et al., 2015), and one in Germany (Volker & Kistemann, 2015).

Three studies focused on people's experiences of the coast (Ashbullby et al., 2013; Bell et al., 2015; Coleman et al., 2015). All of these talked about the seaside or coast. In other words, not just the blue sea but also adjacent land-based elements, with the beach mentioned by all three papers. These included mention of nature close to the sea (Bell et al., 2015; Coleman et al., 2015), a rockpool (Ashbullby et al., 2013), and a harbour (Bell et al., 2015). The sky was also referred to in Coleman and Kearns (2015). Two papers focused on inland water exposure (Pitt, 2018; Volker & Kistemann, 2015).

Mental wellbeing and social interaction were mentioned by Bell et al. (2015) and Ashbulby et al. (2013), therapeutic benefits surfaced in two papers (Bell et al., 2015; Coleman et al., 2015) with other mental wellbeing outcomes only appearing singly by individual papers including stress reduction, relaxation, improved sleep, happiness, peace, and place identity. All-but-one studies included local residents, with the Volker and Kistemann (2015) study being the only one addressing visitors of a specific area. Participant numbers ranged from 11 to 113, and targeted local residents (Bell et al., 2015; Pitt, 2018), senior residents (Coleman et al., 2015), visitors (Volker & Kistemann, 2015), and families (Ashbullby et al., 2013).

Narrative synthesis

The majority of papers investigated a specific type of blue space rather than highlighting different characteristics of those blue spaces. Therefore, the papers were grouped in two categories: inland blue space and coastal blue space.

Experimental

All seven experimental studies reported at least one positive short-term effect of exposure to blue space on mental health. Four studies also reported non-significant effects on other outcome variables (Emfield & Neider, 2014; Tanja-Dijkstra et al., 2018; Gidlow et al., 2016).

Exposure to the coast was often (4 studies; Emfield & Neider, 2014; Gidlow et al., 2016; Tanja-Dijkstra et al., 2018; Triguero-Mas et al., 2017) contrasted with urban environments and most studies used indirect representations of blue space. Only two investigated effects of direct exposure to blue space (Gidlow et al., 2016; Triguero-Mas et al., 2017) and, in both cases, the participants were walking in blue spaces (river promenade and along a river dominated delta beach). Beneficial effects of the coast were reported for both exposure types (direct exposure and indirect representations).

All experimental studies but two (Tanja-Dijkstra et al., 2018) focused on momentary mood. Three studies reported significant mood improvements (Triguero-Mas et al., 2017; Tsutsumi et al., 2017; White et al., 2017b), and two found no significant effects (Emfield er al., 2014; Gidlow et al., 2016). Mood improvements were reported after exposure to movies of the coast (Triguero-Mas et al., 2017; Tsutsumi et al., 2017) and were found to be correlated to both the biodiversity and fascination level of the beach (White et al., 2017b). No mood improvements were reported after viewing images of the coast (coupled with sounds of the sea; Emfield & Neider, 2014), or after a river promenade (Gidlow et al., 2016).

Measurements of mood improvement were supplemented with physiological measurements in three studies (Gidlow et al., 2016; Triguero-Mas, Gidlow, Martínez, et al., 2017; Tsutsumi et al., 2017). Two of the three studies reported beneficial effects of blue space exposure on physiology (Triguero-Mas et al., 2017; Tsutsumi et al., 2017). One of these, however, was a pilot study (Tsutsumi et al., 2017) with only 12 participants, so these outcomes should be treated with caution.

One paper explored the effects of exposure to the coast in Virtual Reality on experienced pain and vividness of thoughts one week after the painful experience (Tanja-Dijkstra et al., 2018). In two studies (of which one was the only randomized controlled trial) reported in the same paper (Tanja-Dijkstra et al., 2018), the authors found that exposure to a coast in Virtual Reality lowered pain experienced during a painful experience, but that it did not alter how participants reported their experience one week later.

Cross-sectional

Eight of the eleven cross-sectional studies reported at least one positive relationship between blue space exposure and mental health (Alcock et al., 2015; Amoly et al., 2014; Bryce et al., 2016; Dempsey et al., 2018; MacKerron et el., 2013; Pedersen et al., 2019; White et al., 2013a; White et al., 2013b), three studies reported no significant relationship (Helbich et al., 2018; White et al., 2017a; Qiang et al., 2019), and one study reported a negative relationship (Alcock et al., 2015). Two of the three studies that reported no effects of blue space also investigated the relationship between green space exposures on the outcome variable. One study investigating effects of nature on suicide rates (Helbich et al., 2018), reported a positive relation between green space and suicide rate, whereas the other study found very limited evidence for a relation between green space and wellbeing (White et al., 2017a).

Five studies looked at potential mental-health benefits of inland water (Alcock et al., 2015; MacKerron & Mourato, 2013; Pedersen et al., 2019; White et al., 2013a; White et al., 2013b), and showed very mixed results, with only weak evidence for positive relationships. The majority of studies in this category investigated the relationship between mental health and the amount of freshwater available in the proximity of the residence and mental health, and. None of them pointed towards beneficial effects (Alcock et al., 2015; White et al., 2013a; White et al., 2013b). One experience sampling study investigated the association between being in direct proximity of freshwater and momentary happiness (MacKerron & Mourato, 2013). This study yielded a positive relationship, albeit less pronounced than the beneficial association it found for the coast and happiness. Another cross-sectional study used a survey to investigate different responses to three wetland areas in Sweden (Pedersen et al., 2019). One of these areas, in Helsingborg, scored higher on some aspects of life satisfaction and affect. It should be noted that the Helsingborg area was integrated within a residential zone, unlike the other two wetland areas that were located far from it. This may have caused the better outcomes reported in the paper, as closer proximity could facilitate a higher contact frequency.

The benefits of the coast were investigated from three different perspectives: having a sea view, proximity to the coast, and beach attendance. Two studies looked at the effects of having a sea view (Dempsey et al., 2018; Qiang et al., 2019). One study reported that a better view of the sea was related to beneficial effects on the prevalence of depression for the elderly, and this effect was more pronounced than proximity to the coast (Dempsey et al., 2018). The other found no such relationship with the prevalence of a depressive disorder or the amount of poor mental health days (Qiang et al., 2019). The latter study, however, had a very low sample size. The authors report including only 13 samples.

Proximity to the coast and mental health outcomes were tested in four studies (Dempsey et al., 2018; Helbich et al., 2018; White et al., 2013a; White et al., 2017a), and one study investigated availability of coast in the environment (Alcock et al., 2015). These studies rendered mixed results. Three reported a positive relationship between coastal proximity and mental health; a lower prevalence of depression (Dempsey et al., 2018); less mental distress (White et al., 2013a); and a lower odds of mental health problems for people who had relocated to a location nearer to the coast (Alcock et al., 2015). This latter finding was based on data from only 46 individuals (412 observations), as only a few people in the database had relocated close to the coast within the study period. One of these three studies reported finding no relationship of coastal proximity on life satisfaction (White et al., 2013a). One study reported a negative relationship, -the only negative relationship found within the present systematic review, between mental health and relocation to nearer the coast (Alcock et al., 2015). Again, this outcome was based on relatively few participants (351 observations from 37 individuals).

Two studies did not find any relationship between coastal proximity and mental health. The first looked at suicide rate (Helbich et al., 2018). A national database was used in this study, but the analysis used municipalities as the unit of observation, whereas three other studies were conducted at the individual level. This study was also the only cross-sectional study that was not conducted within the United Kingdom. The second of these two studies examined wellbeing (White et al., 2017a). Three types of wellbeing were assessed: evaluative, eudaimonic (which closely resembles life satisfaction - 'How satisfied are you with your life nowadays'), and experiential. . Experiential wellbeing was measured by asking panel members how happy and anxious they felt the day before. Momentary mood did yield significant responses in the experimental studies. However, unlike these studies, mood was not directly linked with a visit to the coast in this study.

The studies that did investigate mental wellbeing related to visits to coastal areas yielded more consistent results. Beneficial effects of visits to the coast were reported on momentary happiness (MacKerron & Mourato, 2013), higher recalled restoration compared to the open countryside (White et al., 2013b). Annual beach attendance was found to be related with better outcomes on some aspects of problematic behaviour of school children. However, it was unrelated to ADHD symptoms (Amoly et al., 2014).

Qualitative

Studies including local residents often found they had an emotional attachment with blue spaces, both for people living near the coast and for those living near inland water. For instance, the Rhine running through the German cities of Düsseldorf and Cologne was seen as an essential part of daily life for this 23-year old resident of Cologne: "The River Rhine, the water, yes, so for me it is the river. A river in the city, that is what I always need, yes" (Volker & Kistemann, 2015, p. 202).

Being away from the coast made residents yearn to get back to it, but other participants also mentioned that going to the beach and being close to the coast was like an escape experience, allowing them to get away from daily hassles and struggles. As the quote from this male from the Southeast coast of England illustrates: "the beach isn't everything you have to attend to. It's all the busyness and the noise that isn't there, and the fact that it is what it is, and there's no advertising trying to sell you that." (Bell, 2015, p. 10). In a similar vein, respondents along the Rhine in Düsseldorf indicated that the river made them think of a holiday (Volker & Kistemann, 2015): "I think of holiday", "I appreciate the holiday flair", "I think of wind, water, vacation."

The coast provided a sense of space and scale that helped put things in perspective. Besides a sense of space, fluidity of the blue space was often referred to as being an important element in this experience of being away, and of clearing the head: “If I’m kind of upset about anything or if I just need to get away for a bit, I find that being by water and just staring at the waves crashing in kind of washes your emotions away… ” (Bell, 2015, p. 10).

The dynamics of water appeared very important in the aesthetic appreciation of blue space and the restorative effects of being close to the water. Fluidity was mentioned for both inland water and the coast. For instance, referring to the river Rhine a respondent mentioned: “simply by the wave motion […] you simply feel a piece of freedom.” (Volker & Kistemann, 2015, p. 200). Fluidity was also mentioned in relation to the dynamics of the sea, tidal movements and waves and the ability to clear the mind and de-stress: “It’s forever moving, it’s restless, it’s beautiful… [] It’s a bit like flame watching, it’s beautiful, there are things happening and it relaxes you and de-stresses you” (Bell et al., 2015, p.17). For some, just viewing the sea was already a calming experience, but others preferred stormy weather and waves while sailing or surfing. The daily fluctuations of the sea also provided a chance for contemplation. For instance, the tide and fluidity of the sea helped some elderly residents of Hawaii to feel at peace and come to terms with the final stages of life (Coleman et al., 2015).

The dynamics of the sea, and the potential dangers that it brings were embraced by some, but were also perceived as a barrier by others to go to the coast. Other barriers mentioned relate to cold weather, slipperiness of areas around canals, brown canal water being perceived as dirty, crowding of beaches, or a fear of children falling into water when footpaths were close to a canal. Thus, not all respondents were positive about blue space, as the quote of this teenager in reference to a canal illustrates: “boring, it’s just water” (Pitt et al., 2018, p. 167).

5. Discussion

The aim of this systematic review was to identify which types and characteristics of blue spaces in urban and peri-urban contexts are (especially) beneficial for mental health. Results from three different types of studies were examined: experimental, cross-sectional, and qualitative. The benefits of blue space is a new field of research, which was also reflected in the relatively small set of studies that were included in the review; twenty six studies with the 'oldest' paper dating from 2013.

5.1 Mental health benefits

Not all indicators of mental health were present in the systematic review. For instance, no studies addressed effects on neurodegenerative diseases or schizophrenia. For some health outcomes (e.g., ADHD, quality of life) there were only one or two studies. Most consistent beneficial associations of blue space across categories were found in studies targeting affect and affective disorders, which were the most common outcomes investigated by the studies in this review. Less consistent positive associations were found for general mental health and life satisfaction. Only one study reported a negative effect of blue space (salt water) on the mental health of people who had moved house and closer to the coast. However, these analyses were based on a very low number of observations.

5.2 Blue space typologies

The majority of the studies investigated benefits of the coast and/or sea, and only a few focused on inland water. Consequently, there was also only a small selection of potential inland water types represented in the dataset: wetlands, rivers and canals, or the percentage of freshwater. For example, there were no data for lakes, ponds, or streams. In addition, most studies investigated the effects of blue space types rather than examining the characteristics of the blue space. No comparisons, for instance, were made between wild or managed rivers, between sandy and rocky beaches, or between different colours of sand. There were not enough studies in all blue space categories, especially inland waters, to formulate robust recommendations.

5.3 Confidence of no bias for the included studies

For the experimental studies, blinding of participants and outcomes was especially weak, as was the lack of representative sampling. A lack of representativeness is problematic because it precludes generalisation of the outcomes to the population at large. Blinding participants to the environmental manipulation can present a challenge when investigating effects of environmental interventions on participants, but blinding of the outcome assessment and representative sampling are less problematic to realize and could (or even better should) be implemented to help overcome these limitations. Only one study included in the review adhered to the criteria for a randomized controlled trial. Cross-sectional studies generally scored better on these criteria. A relatively high number of studies in this category used national database information (e.g., panel or census data) combined with GIS or other land cover databases, which minimising bias associated with not blinding participants appropriately. On the other hand, these analyses were based on the proximity and/or availability of blue space and did not reveal any information concerning actual exposure in terms of frequency and/or duration. Relations were thus sought between availability or proximity of blue space as a proxy for exposure, rather than looking at actual exposure. Both experimental studies and cross-sectional studies had their shortcomings, but there was considerable overlap in their study outcomes. The qualitative studies generally scored low on the confidence of no bias, with especially stakeholder

involvement scoring low. This may not be surprising, as this is a relatively new approach to qualitative research. Triangulation in any shape or form (e.g., in research methods used or in the diversity of researchers involved) is another important improvement to gain a more reliable image on the experiential side of blue space benefits.

5.4 Differential effects coast versus inland waters

Based on the few studies included in the review, it seems that more pronounced and more consistent benefits occurred for coastal exposure than for inland waters. Four cross-sectional studies looked at both the coast and inland waters and all three studies yielded beneficial effects of the coast, whereas either no effect was found for inland waters or effects were less pronounced. Again, it must be emphasized that only a few studies investigated the benefits of inland water, and only a small proportion of potential inland water types were considered. Previous studies investigating scenic beauty though, have often found better scores for environments containing water features (Kaplan & Kaplan, 1989). In addition, from an evolutionary perspective, the presence of water is also assumed to be a positive element (Ulrich, 1983). Differences between these two categories may pertain to geographical and climatic diversity between the two blue spaces, further research is necessary in order to understand the role of these two.

Benefits of coastal exposure were reported in all three study categories: experimental, cross-sectional, and qualitative. Experimental and cross-sectional studies looking at direct exposure to the coast showed the most consistent beneficial pattern on wellbeing, especially for affective outcomes. These studies all investigated short-term effects during, or directly after, a visit. Cross-sectional studies taking availability as a proxy for exposure to the coast rendered more mixed and less consistent results. These results may signal a need for more studies looking at direct exposure rather than taking availability as a proxy. In fact, one study combined availability analyses with frequency analyses (White et al., 2017a). Participants were asked to report their mood in terms of happiness and anxiety for the day after a visit, and beneficial effects of visit frequency (taking green and blue spaces together) were reported whereas no association was found of coastal proximity (nor for amount of green) on experiential wellbeing (mood), carefully pointing at the importance of actual exposure rather than mere availability.

Only a few studies directly compared benefits of different characteristics of blue space. One study found that higher levels of biodiversity resulted in better mood while viewing a video of coastal scenery. Qualitative studies further shed light on the important characteristics of blue space, citing the fluidity and dynamics of the water. This was often mentioned as a means by which visitors clear their head, reduce stress, or contemplate daily problems or existential issues. The dynamics of water were mentioned for both coastal and inland blue space. Experimental studies reported a consistent beneficial effect of looking at videos of the sea or exposure to the coast via Virtual Reality (Triguero-Mas et al., 2017; Tsutsumi et al., 2017). Only one study did not find this positive effect on affect (Emfield & Neider, 2014). As this study used static images rather than videos, this result may add further weight to the benefits associated with the dynamics of water.

Two qualitative studies investigated barriers to visiting the coast (Ashbullby et al., 2013) and a river/canal (Pitt, 2018). Canals were sometimes perceived as dirty when they contained brown water, and people indicated a fear of slippery surfaces and falling into the water, where the water was directly adjacent to the footpath and indistinct visually. A teenager also commented that the water was just boring, providing nothing to do. For the coast, people mentioned that you needed a car to get there, that cold weather was

off putting and they were fearful of accidents due to the dangers of the sea. Conversely, stormy weather and crushing waves appeared to also attract people to the beach and even into the water.

Additionally, the qualitative studies indicated that inhabitants of coastal areas, as well as visitors, find the combination of sea and adjacent land (e.g. beaches, nature) beneficial in numerous ways, some of which are linked to mental wellbeing. Many locals felt an emotional attachment with the blue spaces and some also had strong associations of these spaces with holidays and recreation.

5.5 Pathways from blue space to mental health

Theoretically, the benefits of blue spaces are proposed to run through three different pathways: by enhancing social interactions, facilitating physical activities, and reducing stress (restorative effects). The majority of the experimental studies in this review used representations of nature and thereby focused mainly on the restorative effects of nature, rather than the other two pathways. Cross-sectional studies also did not include measures on social interaction or physical activity. Hence, the studies included in this review shed little light on the pathways underpinning the beneficial effects of blue space on mental health. In the qualitative studies, all three pathways were mentioned by participants in relation to the coast and rivers and canals. These results should also be explored quantitatively.

Bratman and colleagues (2019) commented that in many empirical studies the 'experience' step is not considered, which also appeared to have happened in the quantitative studies included in this review. For example, they provided little insight in the specific sensory qualities of blue spaces. One experimental study found benefits of blue space images, with and without sounds, on relaxation (Emfield & Neider, 2014). The qualitative studies, again, provided insights in the experiential part of blue space exposure, referring to the smell of water, the wind in your hair, waves crashing against your body, and the dynamics of tidal movements and waves, reporting them as positive and often exhilarating experiences.

5.6 Limitations

The systematic review showed that there is a lack of high-quality papers on the topic of the request. Whereas the experimental studies often lacked blinding and representativeness, the cross-sectional papers often failed to measure direct exposure. In 2007, Velarde, Fry, and Tveit noted that in most experimental studies on green space, only a crude distinction was made between natural and urban landscapes. In a similar vein, in this systematic review we could also only make a crude distinction between coast and inland waters. Research on inland water was limited to wetlands, freshwater, rivers and canals, and was not representative of the wide range of inland blue spaces that are accessible to people. Furthermore, only a few studies investigated the characteristics of blue space. Finally, a relatively large proportion of studies were undertaken in one country, the United Kingdom, presenting a large geographical bias.

The aim of this systematic review was to provide information about blue spaces in urban and peri-urban environments. Not all of the included studies were executed in these types of environments. In fact, most studies related to the benefits of the coast. These outcomes are informative for urban and peri-urban environments along the coastline, but do not directly translate to inland urban and peri-urban areas. This, once again, stresses the importance of more research into potential inland water benefits for mental health and wellbeing.

6. Concluding remarks

In this systematic review, we set out to identify which types and characteristics of blue space in urban and peri-urban areas are (especially) beneficial for mental wellbeing. Few high- quality papers were available, and with little systematic variation in the type of blue space exposure studies investigated. Inland waters were underrepresented, as were studies looking into the characteristics of blue spaces. This prevented us from formulating firm conclusions and recommendations, other than future research is warranted. Few benefits of rivers or canals could be identified, but coastal visits were consistently related to better affective outcomes. The qualitative studies included in the systematic review provided insights into the experiential characteristics of blue spaces which could guide future research, such as the unique dynamic and fluid characteristic of water and the sense of visually open space.

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Appendix A – Full search strategies

Database: Ovid MEDLINE ALL <1946 to November 28, 2018>

Interface / URL: OvidSP

Database coverage dates: 1946 to November 28, 2018

Search date: 29 November 2018

Retrieved records: 6774

Search strategy:

1 lakes/ or ponds/ or rivers/ (29562)

2 Wetlands/ (6364)

3 exp "oceans and seas"/ (32218)

4 (blue adj5 (space$ or area$1 or zone$1 or corridor$ or connector$ or landscap$ or environment$1 or architecture$ or infrastructure$ or design$)).ti,ab,kf. (1838)

5 bluespace$.ti,ab,kf. (5)

6 (blue adj5 (urban$ or neighbourhood$ or neighborhood$ or community or communities or city or cities or town or towns or suburb$ or semiurban or periurban or semisuburban or residential or municipal or metropolitan or metropolis$)).ti,ab,kf. (159)

7 ((sustainable adj3 drain$) or water-sensitive urban design$).ti,ab,kf. (122)

8 (water feature$ or water mirror$ or (water$ adj3 sound$) or water surface$ or (water$ adj3 (body or bodies)) or water fall$ or waterfall$ or falling water$ or flowing water$ or water park$ or waterpark$ or water way$ or waterway$ or waterscape$ or water-scape$ or waterside$ or water-side$ or water front$ or waterfront$ or water course$ or watercourse$ or watershed$ or water shed$).ti,ab,kf. (28153)

9 (water$ adj5 (urban$ or neighbourhood$ or neighborhood$ or community or communities or city or cities or town or towns or suburb$ or semiurban or periurban or semisuburban or residential or municipal or metropolitan or metropolis$)).ti,ab,kf. (10808)

10 (water$ adj3 (expose$ or exposure$ or interact$ or proximity or vicinity or vicinities or distance$ or location$1)).ti,ab,kf. (16701)

11 (aquatic or subaquatic or beach or beaches or bog or bogs or brook or brooks or canal or canals or coast or coasts or coastal or creek$1 or dock or docks or estuary or estuaries or fjord$ or flood plain$ or floodplain$ or fountain$).ti. (57830)

12 ((aquatic or subaquatic or beach or beaches or bog or bogs or brook or brooks or canal or canals or coast or coasts or coastal or creek$1 or dock or docks or estuary or estuaries or fjord$ or flood plain$ or floodplain$ or fountain$) adj5 (urban$ or neighbourhood$ or neighborhood$ or community or communities or city or cities or town or towns or suburb$ or semiurban or periurban or semisuburban or residential or municipal or metropolitan or metropolis$)).ab,kf. (4981)

13 ((aquatic or subaquatic or beach or beaches or bog or bogs or canal or canals or coast or coasts or coastal or creek$1 or dock or docks or estuary or estuaries or fjord$ or flood plain$ or floodplain$ or fountain$) adj3 (expose$ or exposure$ or interact$ or proximity or vicinity or vicinities or distance$ or location$1)).ab,kf. (2954)

14 (harbor or harbors or harbour or harbours or hydrographic or island$1 or lagoon$1 or lake or lakes or marina or marinas or marsh or marshes or marshland$).ti. (44446)

15 ((harbor or harbors or harbour or harbours or hydrographic or island$ or lagoon$1 or lake or lakes or marina or marinas or marsh or marshes or marshland$) adj5 (urban$ or neighbourhood$ or neighborhood$ or community or communities or city or cities or town or towns or suburb$ or semiurban or periurban or semisuburban or residential or municipal or metropolitan or metropolis$)).ab,kf. (5330)

16 ((harbor or harbors or harbour or harbours or hrographic or island$1 or lagoon$1 or lake or lakes or marina or marinas or marsh or marshes or marshland$) adj3 (expose$ or exposure$ or interact$ or proximity or vicinity or vicinities or distance$ or location$1)).ab,kf. (1608)

17 (ocean$1 or pond$1 or pool or pools or port or ports or riparian or river or rivers or riverside or riverbank$ or riverfront$ or rockpool$ or rock pool$ or sea or seas or seashore$ or stream or streams or wetland$ or wet land$).ti. (93123)

18 ((ocean$1 or pond$1 or pool or pools or port or ports or riparian or river or rivers or riverside or riverbank$ or riverfront$ or rockpool$ or rock pool$ or sea or seas or seashore$ or stream or streams or wetland$ or wet land$) adj5 (urban$ or neighbourhood$ or neighborhood$ or community or communities or city or cities or town or towns or suburb$ or semiurban or periurban or semisuburban or residential or municipal or metropolitan or metropolis$)).ab,kf. (6873)

19 ((ocean$1 or pond$1 or pool or pools or port or ports or riparian or river or rivers or riverside or riverbank$ or riverfront$ or rockpool$ or rock pool$ or sea or seas or seashore$ or stream or streams or wetland$ or wet land$) adj3 (expose$ or exposure$ or interact$ or proximity or vicinity or vicinities or distance$ or location$1)).ab,kf. (3936)

20 or/1-19 (271190)

21 Mental Health/ (32271)

22 exp mental disorders/ or mentally ill persons/ (1146247)

23 quality-adjusted life years/ or "quality of life"/ or "value of life"/ (181911)

24 aggression/ or delusions/ or depersonalization/ or depression/ or exp stress, psychological/ or mental fatigue/ or problem behavior/ or exp self-injurious behavior/ or anxiety/ (349331)

25 ((mental$ or psychological$ or psychiatric) adj3 (fatigue$ or disease$ or disorder$ or illness$ or diagnos$ or wellbeing or well-being or hygiene or satisf$ or stress$ or wellness$ or resilien$)).ti,ab,kf. (173905)

26 ((mental or psychological or psychiatric) adj health).ti,ab,kf. (132084)

27 (wellbeing or well-being).ti. (13203)

28 (mentally ill or mentally unwell).ti,ab,kf. (7538)

29 ((psychological$ or psychiatric or psychotherapeutic) adj3 (impact$ or outcome$1 or effect$1 or benefit$ or value$)).ti,ab,kf. (22160)

30 (behavio?r$ adj (disorder$1 or illness$1 or disease$1)).ti,ab,kf. (10499)

31 (quality of life or quality adjusted life or QOL or QALY or QALYs or HRQOL).ti,ab,kf. (243814)

32 (disability adjusted life or DALY or DALYS).ti,ab,kf. (3197)

33 (utility adj3 (score$1 or valu$ or health$ or cost$ or measur$ or disease$ or mean or gain or gains or index$)).ti,ab,kf. (13077)

34 (health state utilit$ or utilities or HSUV$1).ti,ab,kf. (6479)

35 addiction.ti,ab,kf. (41362)

36 (adhd or attention deficit or hyperactiv$).ti,ab,kf. (59256)

37 (aggression or aggressive$ or aggressivity).ti,ab,kf. (186450)

38 (dement$ or amentia$ or senile or senility or presenile or presenility or alzheimer$).ti,ab,kf. (204321)

39 ((cognitiv$ or cognition or neurocognit$ or mental) adj3 (declin$ or dysfunction$ or impair$ or disorder$ or deteriorat$ or function)).ti,ab,kf. (174524)

40 (neurodegenerative adj (illness$ or disorder$ or disease$)).ti,ab,kf. (60439)

41 ((affective or body dysmorphic or cyclothymic or deficit or depersonalization or depersonalisation or depressive or developmental or dissociative or dysthymic or emotional or factitious or mood or obsessive-compulsive or panic or sleep$) adj disorder$1).ti,ab,kf. (104134)

42 (depression or depressive illness$ or anxiety or anxieties or anxious$ or agoraphobi$ or phobia$ or phobic).ti,ab,kf. (412258)

43 (amnesia or autism or autistic or bipolar or bi-polar or manic depressive or mania).ti,ab,kf. (115088)

44 (bore$ out or boreout$ or brown$ out or brownout$ or burn$ out or burnout$).ti,ab,kf. (9982)

45 (emotional adj3 (wellbeing or well-being or regulat$)).ti,ab,kf. (7916)

46 (happiness or peace of mind or serenity or relaxing or relaxation).ti,ab,kf. (124226)

47 (attention restoration or restorative or restorativeness).ti,ab,kf. (19971)

48 (insomnia or insomniac$ or sleep quality or somatisation or somatization or somatoform).ti,ab,kf. (34964)

49 mental aging.ti,ab,kf. (33)

50 ((belonging$ or coherence) adj3 sense).ti,ab,kf. (2743)

51 (subjective wellbeing or subjective well-being or vitality).ti,ab,kf. (13719)

52 (paranoia or psychosis or psychotic or schizophreni$ or suicide$ or suicidal).ti,ab,kf. (217351)

53 (stress adj3 (disorder$1 or illness$ or trauma$ or posttrauma$ or acute or chronic$ or episod$ or emotional or occupational or psychologic$ or recover$ or reduc$)).ti,ab,kf. (99481)

54 salutogenetic$.ti,ab,kf. (70)

55 or/21-54 (2493722)

56 20 and 55 (7788)

57 exp animals/ not humans/ (4519948)

58 (news or comment or editorial or letter or case reports).pt. or case report.ti. (3615358)

59 56 not (57 or 58) (5754)

60 remove duplicates from 59 (5749)

61 (blue adj5 (space$ or area$1 or zone$1 or corridor$ or connector$ or landscap$ or environment$1 or architecture$ or infrastructure$ or design$)).ti,ab,kf. (1838)

62 bluespace$.ti,ab,kf. (5)

63 (blue adj5 (urban$ or neighbourhood$ or neighborhood$ or community or communities or city or cities or town or towns or suburb$ or semiurban or periurban or semisuburban or residential or municipal or metropolitan or metropolis$)).ti,ab,kf. (159)

64 ((sustainable adj3 drain$) or water-sensitive urban design$).ti,ab,kf. (122)

65 (water feature$ or water mirror$ or (water$ adj3 sound$) or water surface$ or (water$ adj3 (body or bodies)) or water fall$ or waterfall$ or falling water$ or flowing water$ or water park$ or waterpark$ or water way$ or waterway$ or waterscape$ or water-scape$ or waterside$ or water-side$ or water front$ or waterfront$ or water course$ or watercourse$ or watershed$ or water shed$).ti,ab,kf. (28153)

66 (water$ adj5 (urban$ or neighbourhood$ or neighborhood$ or community or communities or city or cities or town or towns or suburb$ or semiurban or periurban or semisuburban or residential or municipal or metropolitan or metropolis$)).ti,ab,kf. (10808)

67 (water$ adj3 (expose$ or exposure$ or interact$ or proximity or vicinity or vicinities or distance$ or location$1)).ti,ab,kf. (16701)

68 (aquatic or subaquatic or beach or beaches or bog or bogs or brook or brooks or canal or canals or coast or coasts or coastal or creek$1 or dock or docks or estuary or estuaries or fjord$ or flood plain$ or floodplain$ or fountain$ or freshwater or saltwater).ti,ab,kf. (210867)

69 (harbor or harbors or harbour or harbours or hydrographic or island$1 or lagoon$1 or lake or lakes or marina or marinas or marsh or marshes or marshland$).ti,ab,kf. (159214)

70 (ocean$1 or pond$1 or pool or pools or port or ports or riparian or river or rivers or riverside or riverbank$ or riverfront$ or rockpool$ or rock pool$ or sea or seas or seashore$ or stream or streams or wetland$ or wet land$).ti,ab,kf. (338507)

71 (mental or psychological or wellbeing or well being or restoration).ti. (170457)

72 or/61-70 (672118)

73 71 and 72 (2293)

74 73 not (57 or 58) (1929)

75 remove duplicates from 74 (1928)

76 60 or 75 (7309)

77 limit 76 to english language (6774)

1 Database: Web of Science – citation indexes only

2 Interface / URL: http://apps.webofknowledge.com.

3 Database coverage dates: Timespan=1900-2018

4 Search date: 29 November 2018

5 Retrieved records: 20099

6 Search strategy:

# 40	20,099	(#38) *AND* LANGUAGE: (English) *AND* DOCUMENT TYPES: (Article) Refined by: [excluding] WEB OF SCIENCE CATEGORIES: (GEOSCIENCES MULTIDISCIPLINARY OR CHEMISTRY PHYSICAL OR GEOGRAPHY PHYSICAL OR FISHERIES) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 39	24,160	(#38) *AND* LANGUAGE: (English) *AND* DOCUMENT TYPES: (Article) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 38	27,133	#37 OR #32 *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 37	7,037	#36 AND #35 *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 36	2,041,520	#34 OR #33 *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 35	257,476	TI=(“mental” OR “psychological” OR “wellbeing” OR “well being” OR “restoration”) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 34	1,941,585	TS=(“aquatic” OR “subaquatic” OR “beach” OR “beaches” OR “bog” OR “bogs” OR “canal” OR “canals” OR “coast” OR “coasts” OR “coastal” OR “creek$” OR “dock” OR “docks” OR “estuary” OR “estuaries” OR “fjord$” OR “flood plain$” OR “floodplain$” OR “fountain$” OR “harbOR “OR “harbors” OR “harbour” OR “harbours” OR “hydrographic” OR “island$” OR “lagoon$” OR “lake” OR “lakes” OR “marina” OR “marinas” OR “marsh” OR “marshes” OR “marshland$” OR “ocean$” OR “pond$” OR “pool” OR “pools” OR “port” OR “ports” OR “riparian” OR “river” OR “rivers” OR “riverside” OR “riverbank$” OR “riverfront$” OR “rockpool$” OR “rock pool$” OR “sea” OR “seas” OR “seashore$” OR “stream” OR “streams” OR “wetland$” OR “wet land$”) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 33	179,710	#7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1 *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 32	20,618	#31 AND #17 *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 31	2,690,825	#30 OR #29 OR #28 OR #27 OR #26 OR #25 OR #24 OR #23 OR #22 OR #21 OR #20 OR #19 OR #18 *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*

# 30	150,789	TS=("stress" NEAR/3 ("disorder$" OR "illness$" OR "trauma*" OR "posttrauma*" OR "acute" OR "chronic$" OR "episode$" OR "emotional" OR "occupational" OR "psychologic*" OR "recover*" OR "reduc*")) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 29	309,086	TS=("subjective wellbeing" OR "subjective well-being" OR "vitality" OR "paranoia" OR "psychosis" OR "psychotic" OR "schizophreni$" OR "suicide$" OR "suicidal" OR salutogenetic$) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 28	4,489	TS=(("belonging$" OR "coherence") NEAR/3 "sense") *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 27	440,111	TS=("happiness" OR ("peace" NEAR/3 "mind") OR "serenity" OR "relaxing" OR "relaxation" OR "attention restoration" OR "restorative" OR "restorativeness" OR "insomnia" OR "insomniac$" OR "sleep quality" OR "somatisation" OR "somatization" OR "somatoform" OR "mental aging") *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 26	9,724	TS=("emotional" NEAR/3 ("wellbeing" OR "well-being" OR "regulat*")) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 25	951,655	TS=(affective DISORDER$ OR body dysmorphic DISORDER$ OR cyclothymic DISORDER$ OR deficit DISORDER$ OR depersonalization DISORDER$ OR depersonalisation DISORDER$ OR depressive DISORDER$ OR developmental DISORDER$ OR dissociative DISORDER$ OR dysthymic DISORDER$ OR emotional DISORDER$ OR factitious DISORDER$ OR mood DISORDER$ OR obsessive-compulsive DISORDER$ OR panic DISORDER$ OR sleep DISORDER$ OR depression OR depressive illness$ OR anxiety OR anxieties OR anxious* OR agoraphobi$ OR phobia$ OR phobic OR amnesia OR autism OR autistic OR bipolar OR bi-polar OR manic depressive OR mania OR bore$ out OR boreout$ OR brown$ out OR brownout$ OR burn* out OR burnout$) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 24	67,260	TS=("neurodegenerative" NEAR/1 ("illness$" OR "disorder$" OR "disease$")) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 23	207,634	TS=(("cognitive*" OR "cognition" OR "neurocognit*" OR "mental") NEAR/3 ("declin*" OR "dysfunction*" OR "impair*" OR "disorder*" OR "deteriorate*" OR "function")) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 22	602,085	TS=("health state utilit$" OR "utilities" OR "HSUV$" OR "addiction" OR "adhd" OR "attention deficit" OR "hyperactive" OR "aggression" OR "aggressive$" OR "aggressivity" OR "dement*" OR "amentia$" OR "senile" OR "senility" OR "presenile" OR "presenility" OR "alzheimer$") *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 21	21,063	TS=("utility" NEAR/3 ("score$" OR "valu*" OR "health$" OR "cost$" OR "measure*" OR "disease$" OR "mean" OR "gain" OR "gains" OR "index*")) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 20	325,859	TS=(("quality" NEAR/2 "life") OR "quality adjusted Life" OR "QOL" OR "QALY" OR "QALYs" OR "HRQOL" OR "disability adjusted life" OR "DALY" OR "DALYS") *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*

# 19	31,153	TS=(((“psychological$” OR “psychiatric” OR “psychotherapeutic”) NEAR/3 (“impact$” OR “outcome$” OR “effect$” OR “benefit$” OR “value$”)) OR (“behavio?r$” NEAR/1 (“disorder$” OR “illness$” OR “disease$”))) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 18	396,383	TS=((mental$ OR psychological$ OR psychiatric) NEAR/3 (fatigue$ OR disease$ OR disorder$ OR illness$ OR diagnos* OR wellbeing OR well-being OR hygiene OR satisfy* OR stress* OR wellness$ OR resilien$) OR ((mental OR psychological OR psychiatric) NEAR/1 health) OR(wellbeing OR well-being OR mentally ill OR mentally unwell)) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 17	984,435	#16 OR #15 OR #14 OR #13 OR #12 OR #11 OR #10 OR #9 OR #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1 *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 16	22,883	AB=((“ocean$” OR “pond$” OR “pool” OR “pools” OR “port” OR “ports” OR “riparian” OR “river” OR “rivers” OR “riverside” OR “riverbank$” OR “riverfront$” OR “rockpool$” OR “rock pool$” OR “sea” OR “seas” OR “seashore$” OR “stream” OR “streams” OR “wetland$” OR “wet land$”) NEAR/3 (“expose$” OR “exposure$” OR “interact*” OR “proximity” OR “vicinity” OR “vicinities” OR “distance$” OR “location$”)) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 15	23,637	AB=((“ocean$” OR “pond$” OR “pool” OR “pools” OR “port” OR “ports” OR “riparian” OR “river” OR “rivers” OR “riverside” OR “riverbank$” OR “riverfront$” OR “rockpool$” OR “rock pool$” OR “sea” OR “seas” OR “seashore$” OR “stream” OR “streams” OR “wetland$” OR “wet land$”) NEAR/5 (“urban*” OR “neighbourhood$” OR “neighborhood$” OR “community” OR “communities” OR “city” OR “cities” OR “town” OR “towns” OR “suburb*” OR “semiurban” OR “periurban” OR “semisuburban” OR “residential” OR “municipal” OR “metropolitan” OR “metropolis$”)) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 14	461,135	TI=(“ocean$” OR “pond$” OR “pool” OR “pools” OR “port” OR “ports” OR “riparian” OR “river” OR “rivers” OR “riverside” OR “riverbank$” OR “riverfront$” OR “rockpool$” OR “rock pool$” OR “sea” OR “seas” OR “seashore$” OR “stream” OR “streams” OR “wetland$” OR “wet land$”) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 13	8,349	AB=((“harbOR“ OR “harbors” OR “harbour” OR “harbours” OR “hYDrographic” OR “island$” OR “lagoon$” OR “lake” OR “lakes” OR “marina” OR “marinas” OR “marsh” OR “marshes” OR “marshland$”) NEAR/3 (“expose$” OR “exposure$” OR “interact*” OR “proximity” OR “vicinity” OR “vicinities” OR “distance$” OR “location$”)) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 12	15,300	AB=((“harbOR“ OR “harbors” OR “harbour” OR “harbours” OR “hydrographic” OR “island$” OR “lagoon$” OR “lake” OR “lakes” OR “marina” OR “marinas” OR “marsh” OR “marshes” OR “marshland$”) NEAR/5 (“urban*” OR “neighbourhood$” OR “neighborhood$” OR “community” OR “communities” OR “city” OR “cities” OR “town” OR “towns” OR “suburb*” OR “semiurban” OR “periurban” OR “semisuburban” OR “residential” OR “municipal” OR “metropolitan” OR “metropolis$”)) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*

# 11	202,543	TI=(“harbOR“ OR “harbors” OR “harbour” OR “harbours” OR “hydrographic” OR “island$” OR “lagoon$” OR “lake” OR “lakes” OR “marina” OR “marinas” OR “marsh” OR “marshes” OR “marshland$”) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 10	11,259	AB=((“aquatic” OR “subaquatic” OR “beach” OR “beaches” OR “bog” OR “bogs” OR “canal” OR “canals” OR “coast” OR “coasts” OR “coastal” OR “creek$” OR “dock” OR “docks” OR “estuary” OR “estuaries” OR “fjord$” OR “flood plain$” OR “floodplain$” OR “fountain$”) NEAR/3 (“expose$” OR “exposure$” OR “interact*” OR “proximity” OR “vicinity” OR “vicinities” OR “distance$” OR “location$”)) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 9	17,112	AB=((“aquatic” OR “subaquatic” OR “beach” OR “beaches” OR “bog” OR “bogs” OR “brook” OR “brooks” OR “canal” OR “canals” OR “coast” OR “coasts” OR “coastal” OR “creek$” OR “dock” OR “docks” OR “estuary” OR “estuaries” OR “fjord$” OR “flood plain$” OR “floodplain$” OR “fountain$”) NEAR/5 (“urban*” OR “neighbourhood$” OR “neighborhood$” OR “community” OR “communities” OR “city” OR “cities” OR “town” OR “towns” OR “suburb*” OR “semiurban” OR “periurban” OR “semisuburban” OR “residential” OR “municipal” OR “metropolitan” OR “metropolis$”)) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 8	187,926	TI=(“aquatic” OR “subaquatic” OR “beach” OR “beaches” OR “bog” OR “bogs” OR “brook” OR “brooks” OR “canal” OR “canals” OR “coast” OR “coasts” OR “coastal” OR “creek$” OR “dock” OR “docks” OR “estuary” OR “estuaries” OR “fjord$” OR “flood plain$” OR “floodplain$” OR “fountain$”) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 7	50,773	TS=(“water$” NEAR/3(“expose$” OR “exposure$” OR “interact*” OR “proximity” OR “vicinity” OR “vicinities” OR “distance$” OR “location$”)) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 6	32,104	TS=(“water$” NEAR/5 (“urban*” OR “neighbourhood$” OR “neighborhood$” OR “community” OR “communities” OR “city” OR “cities” OR “town” OR “towns” OR “suburb*” OR “semiurban” OR “periurban” OR “semisuburban” OR “residential” OR “municipal” OR “metropolitan” OR “metropolis$”)) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 5	98,687	TS=(“water feature$” OR “water mirror$” OR (“water$” NEAR/3 “sound$”) OR “water surface$” OR (“water$” NEAR/3 (“body” OR “bodies”)) OR “water fall$” OR “waterfall$” OR “falling water$” OR “flowing water$” OR “water park$” OR “waterpark$” OR “water way$” OR “waterway$” OR “waterscape$” OR “water-scape$” OR “waterside$” OR “water side$” OR “water front$” OR “waterfront$” OR “water course$” OR “watercourse$” OR “watershed$” OR “water shed$”) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 4	480	TS=((“sustainable” NEAR/3 “drain*”) OR “water-sensitive urban design$”) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 3	558	TS=(“blue” NEAR/5 (“urban*” OR “neighbourhood$” OR “neighborhood$” OR “community” OR “communities” OR “city” OR “cities” OR “town” OR “towns” OR “suburb*” OR “semiurban” OR “periurban” OR “semisuburban” OR “residential” OR “municipal” OR “metropolitan” OR “metropolis$”)) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*

# 2	10	TS=("bluespace$") *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*
# 1	4,579	TS=(blue NEAR/5 (space$ OR area$ OR zone$ OR corridor$ OR connector$ OR landscap* OR environment* OR architecture$ OR infrastructure$ OR design$)) *Indexes=SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2018*

1

2

Database: Scopus
Interface / URL: www.scopus.com
Database coverage dates:
Search date: 7 February 2019
Retrieved records: 47
Search strategy

1 2	((((ABS (("ocean*" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports " OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "ri verfront*" OR "rockpool*" OR "rock pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR " wetland*" OR "wet land*") W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR " vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (ABS (("ocean* " OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "riverfront*" OR "rockp ool*" OR "rock pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR " wetland*" OR "wet land*") W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "com munity" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residentia l" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE ("ocean *" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "riverfront*" OR "rock pool*" OR "rock pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR " wetland*" OR "wet land*")) OR (ABS (("harbOR" OR "harbors" OR "harbour" OR "harbours" OR "hYDrographic" OR "island*" OR "lagoon*" OR "lake" OR "lakes" OR "marina " OR "marinas" OR "marsh" OR "marshes" OR "marshland*") W/3 ("expose* " OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (ABS (("harbor" OR "harbors" OR "har bour" OR "harbours" OR "hydrographic" OR "island*" OR "lagoon*" OR "lake " OR "lakes" OR "marina" OR "marinas" OR "marsh" OR "marshes" OR "mars hland*") W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "co mmunity" OR "communities" OR "city" OR "cities" OR "town" OR "towns" O R "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residen tial" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE ("har bor" OR "harbors" OR "harbour" OR "harbours" OR "hydrographic" OR "islan d*" OR "lagoon*" OR "lake" OR "lakes" OR "marina" OR "marinas" OR "mars h" OR "marshes" OR "marshland*")) OR (ABS (("aquatic" OR "subaquatic" OR "beach" OR "beaches" OR "bog" OR "bogs" OR "canal" OR "canals" OR " coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "est uary" OR "estuaries" OR "fjord*" OR "flood plain*" OR "floodplain*" OR "fountain*") W/3 ("expose*" OR "exposure*" O R "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (ABS (("aquatic" OR "subaquatic" OR "beach" OR "beache s" OR "bog" OR "bogs" OR "brook" OR "brooks" OR "canal" OR "canals" OR	47 document results

	"coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "est uary" OR "estuaries" OR "fjord*" OR "flood plain*" OR "floodplain*" OR "fountain*") W/5 ("urban*" OR "neighbourhood *" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cit ies" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" O R "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "m etropolis*"))) OR (TITLE ("aquatic" OR "subaquatic" OR "beach" OR "beache s" OR "bog" OR "bogs" OR "brook" OR "brooks" OR "canal" OR "canals" OR "coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "est uary" OR "estuaries" OR "fjord*" OR "flood plain*" OR "floodplain*" OR "fountain*")) OR (TITLE-ABS-KEY ("water*" W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity " OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (TITLE-ABS-KEY ("water*" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "resid ential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("water feature*" OR "water mirror*" OR ("water*" W/3 "sound*") OR "water surface*" OR ("water*" W/3 ("body" OR "bodies")) OR "water fall*" OR "waterfall*" OR "falling water*" OR "flowing water*" OR "water park*" OR "waterpark*" OR "water way*" OR "waterway*" OR "waterscape*" OR "water-scape*" OR "waterside*" OR "water side*" OR "water front*" OR "waterfront*" OR "water course*" OR "watercourse*" OR "watershed*" OR "water shed*")) OR (TITLE-ABS-KEY (("sustainable" W/3 "drain*") OR "water-sensitive urban design*")) OR (TITLE-ABS-KEY ("blue" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "c ommunity" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "reside ntial" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("bluespace*")) OR (TITLE-ABS-KEY (blue W/5 (space* OR area* OR zone* OR corridor* OR connector* OR landscap* OR environment* OR architecture* OR infrastructure* OR design*)))) AND ((TITLE-ABS-KEY ("stress" W/3 ("disorder*" OR "illness*" OR "trauma*" OR "posttrauma* " OR "acute" OR "chronic*" OR "episode*" OR "emotional" OR "occupational " OR "psychologic*" OR "recover*" OR "reduc*"))) OR (TITLE-ABS-KEY ("subjective wellbeing" OR "subjective well-being" OR "vitality" OR "paranoia" OR "psychosis" OR "psychotic" OR "schizo phreni*" OR "suicide*" OR "suicidal" OR salutogenetic*)) OR (TITLE-ABS-KEY (("belonging*" OR "coherence") W/3 "sense")) OR (TITLE-ABS-KEY ("happiness" OR ("peace" W/3 "mind") OR "serenity" OR "relaxing" OR "relaxation" OR "attention restoration" OR "restorative" OR "restorativeness" OR "insomnia" OR "insomn iac*" OR "sleep quality" OR "somatisation" OR "somatization" OR "somatoform" OR "mental aging")) OR (TITLE-ABS-KEY ("emotional" W/3 ("wellbeing" OR "well-	

	being" OR "regulat*"))) OR (TITLE-ABS-KEY ("affective DISORDER*" OR "body dysmorphic DISORDER*" OR "cyclothymic DISORDER*" OR "deficit DISORDER*" OR "depersonalization DISORDER*" OR "depersonalisation DISORDER*" OR "depressive DISORDER*" OR "developmental DISORDER*" OR "dissociative DISORDER*" OR "dysthymic DISORDER*" OR "emotional DISORDER*" OR "factitious DISORDER*" OR "mood DISORDER*" OR "obsessive-compulsive DISORDER*" OR "panic DISORDER*" OR "sleep DISORDER*" OR "depression" OR "depressive illness*" OR "anxiety" OR "anxieties" OR "anxious*" OR "agoraphobi*" OR "phobia*" OR "phobic" OR "amnesia" OR "autism" OR "autistic" OR "bipolar" OR "bi-polar" OR "manic depressive" OR "mania" OR "bore* out" OR "boreout*" OR "brown* out" OR "brownout*" OR "burn* out" OR "burnout*")) OR (TITLE-ABS-KEY ("neurodegenerative" W/1 ("illness*" OR "disorder*" OR "disease*"))) OR (TITLE-ABS-KEY (("cognitive*" OR "cognition" OR "neurocognit*" OR "mental") W/3 ("declin*" OR "dysfunction*" OR "impair*" OR "disorder*" OR "deteriorate*" OR "function"))) OR (TITLE-ABS-KEY ("health state utilit*" OR "utilities" OR "HSUV*" OR "addiction" OR "adhd" OR "attention deficit" OR "hyperactive" OR "aggression" OR "aggressive*" OR "aggressivity" OR "dement*" OR "amentia*" OR "senile" OR "senility" OR "presenile" OR "presenility" OR "alzheimer*")) OR (TITLE-ABS-KEY ("utility" W/3 ("score*" OR "valu*" OR "health*" OR "cost*" OR "measure*" OR "disease*" OR "mean" OR "gain" OR "gains" OR "index*"))) OR (TITLE-ABS-KEY (("quality" W/2 "life") OR "quality adjusted Life" OR "QOL" OR "QALY" OR "QALYs" OR "HRQOL" OR "disability adjusted life" OR "DALY" OR "DALYS")) OR (TITLE-ABS-KEY ((("psychological*" OR "psychiatric" OR "psychotherapeutic") W/3 ("impact*" OR "outcome*" OR "effect*" OR "benefit*" OR "value*")) OR ("behavio?r*" W/1 ("disorder*" OR "illness*" OR "disease*")))) OR (TITLE-ABS-KEY ((mental* OR psychological* OR psychiatric) W/3 (fatigue* OR disease* OR disorder* OR illness* OR diagnos* OR wellbeing OR well-being OR hygiene OR satisfy* OR stress* OR wellness* OR resilien*) OR ((mental OR psychological OR psychiatric) W/1 health) OR (wellbeing OR well-being OR mentally AND ill OR mentally AND unwell))))) OR ((((TITLE-ABS-KEY ("water*" W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (TITLE-ABS-KEY ("water*" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("water feature*" OR "water mirror*" OR ("water*" W/3 "sound*") OR "water surface*" OR ("water*" W/3 ("body" OR "bodies")) OR "water fall*" OR "waterfall*" OR "falling water*" OR "flowing water*" OR "water park*" OR "waterpark*" OR "water way*" OR "waterway*" OR "waterscape*" OR "water-scape*" OR "waterside*" OR "water side*" OR "water	

	front*" OR "waterfront*" OR "water course*" OR "watercourse*" OR "watershed*" OR "water shed*")) OR (TITLE-ABS-KEY (("sustainable" W/3 "drain*") OR "water-sensitive urban design*")) OR (TITLE-ABS-KEY ("blue" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("bluespace*")) OR (TITLE-ABS-KEY (blue W/5 (space* OR area* OR zone* OR corridor* OR connector* OR landscap* OR environment* OR architecture* OR infrastructure* OR design*)))) OR (TITLE-ABS-KEY ("aquatic" OR "subaquatic" OR "beach" OR "beaches" OR "bog" OR "bogs" OR "canal" OR "canals" OR "coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "estuary" OR "estuaries" OR "fjord*" OR "flood plain*" OR "floodplain*" OR "fountain*" OR "harbor" OR "harbors" OR "harbour" OR "harbours" OR "hydrographic" OR "island*" OR "lagoon*" OR "lake" OR "lakes" OR "marina" OR "marinas" OR "marsh" OR "marshes" OR "marshland*" OR "ocean*" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "riverfront*" OR "rockpool*" OR "rock pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR "wetland*" OR "wet land*"))) AND (TITLE ("mental" OR "psychological" OR "wellbeing" OR "well being" OR "restoration")))) AND (SRCTITLE ("Landscape and Urban Planning")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English")) View Less	
11	SRCTITLE ("Landscape and Urban Planning")	3,655 document results
10	(((ABS (("ocean*" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "riverfront*" OR "rockpool*" OR "rock pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR "wetland*" OR "wet land*") W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (ABS (("ocean*" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "riverfront*" OR "rockpool*" OR "rock pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR "wetland*" OR "wet land*") W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE ("ocean*" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "riverfront*" OR "rock	35,700 document results

	pool*" OR "rock pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR " wetland*" OR "wet land*")) OR (ABS (("harbOR" OR "harbors" OR "harbour" OR "harbours" OR "hYDrographic" OR "island*" OR "lagoon*" OR "lake" OR "lakes" OR "marina " OR "marinas" OR "marsh" OR "marshes" OR "marshland*") W/3 ("expose* " OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (ABS (("harbor" OR "harbors" OR "har bour" OR "harbours" OR "hydrographic" OR "island*" OR "lagoon*" OR "lake " OR "lakes" OR "marina" OR "marinas" OR "marsh" OR "marshes" OR "mars hland*") W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "co mmunity" OR "communities" OR "city" OR "cities" OR "town" OR "towns" O R "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residen tial" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE ("har bor" OR "harbors" OR "harbour" OR "harbours" OR "hydrographic" OR "islan d*" OR "lagoon*" OR "lake" OR "lakes" OR "marina" OR "marinas" OR "mars h" OR "marshes" OR "marshland*")) OR (ABS (("aquatic" OR "subaquatic" OR "beach" OR "beaches" OR "bog" OR "bogs" OR "canal" OR "canals" OR " coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "est uary" OR "estuaries" OR "fjord*" OR "flood plain*" OR "floodplain*" OR "fountain*") W/3 ("expose*" OR "exposure*" O R "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (ABS (("aquatic" OR "subaquatic" OR "beach" OR "beache s" OR "bog" OR "bogs" OR "brook" OR "brooks" OR "canal" OR "canals" OR "coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "est uary" OR "estuaries" OR "fjord*" OR "flood plain*" OR "floodplain*" OR "fountain*") W/5 ("urban*" OR "neighbourhood *" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cit ies" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" O R "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "m etropolis*"))) OR (TITLE ("aquatic" OR "subaquatic" OR "beach" OR "beache s" OR "bog" OR "bogs" OR "brook" OR "brooks" OR "canal" OR "canals" OR "coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "est uary" OR "estuaries" OR "fjord*" OR "flood plain*" OR "floodplain*" OR "fountain*")) OR (TITLE-ABS- KEY ("water*" W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity " OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (TITLE- ABS- KEY ("water*" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "resid ential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE- ABS-KEY ("water feature*" OR "water mirror*" OR ("water*" W/3 "sound*") OR "water surface*" OR ("water*" W/3 ("body" OR "bodies")) OR "water fall*" OR "waterfall*" OR "falling water*" OR "flowing water*" OR "water park*" OR "waterpark*" OR "water way*" OR "waterway*" OR "waterscape*" OR "water- scape*" OR "waterside*" OR "water side*" OR "water front*" OR "waterfront*" OR "water	

	course*" OR "watercourse*" OR "watershed*" OR "water shed*")) OR (TITLE-ABS-KEY (("sustainable" W/3 "drain*") OR "water-sensitive urban design*")) OR (TITLE-ABS-KEY ("blue" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("bluespace*")) OR (TITLE-ABS-KEY (blue W/5 (space* OR area* OR zone* OR corridor* OR connector* OR landscap* OR environment* OR architecture* OR infrastructure* OR design*)))) AND ((TITLE-ABS-KEY ("stress" W/3 ("disorder*" OR "illness*" OR "trauma*" OR "posttrauma*" OR "acute" OR "chronic*" OR "episode*" OR "emotional" OR "occupational" OR "psychologic*" OR "recover*" OR "reduc*"))) OR (TITLE-ABS-KEY ("subjective wellbeing" OR "subjective well-being" OR "vitality" OR "paranoia" OR "psychosis" OR "psychotic" OR "schizophreni*" OR "suicide*" OR "suicidal" OR salutogenetic*)) OR (TITLE-ABS-KEY (("belonging*" OR "coherence") W/3 "sense")) OR (TITLE-ABS-KEY ("happiness" OR ("peace" W/3 "mind") OR "serenity" OR "relaxing" OR "relaxation" OR "attention restoration" OR "restorative" OR "restorativeness" OR "insomnia" OR "insomniac*" OR "sleep quality" OR "somatisation" OR "somatization" OR "somatoform" OR "mental aging")) OR (TITLE-ABS-KEY ("emotional" W/3 ("wellbeing" OR "well-being" OR "regulat*"))) OR (TITLE-ABS-KEY ("affective DISORDER*" OR "body dysmorphic DISORDER*" OR "cyclothymic DISORDER*" OR "deficit DISORDER*" OR "depersonalization DISORDER*" OR "depersonalisation DISORDER*" OR "depressive DISORDER*" OR "developmental DISORDER*" OR "dissociative DISORDER*" OR "dysthymic DISORDER*" OR "emotional DISORDER*" OR "factitious DISORDER*" OR "mood DISORDER*" OR "obsessive-compulsive DISORDER*" OR "panic DISORDER*" OR "sleep DISORDER*" OR "depression" OR "depressive illness*" OR "anxiety" OR "anxieties" OR "anxious*" OR "agoraphobi*" OR "phobia*" OR "phobic" OR "amnesia" OR "autism" OR "autistic" OR "bipolar" OR "bi-polar" OR "manic depressive" OR "mania" OR "bore* out" OR "boreout*" OR "brown* out" OR "brownout*" OR "burn* out" OR "burnout*")) OR (TITLE-ABS-KEY ("neurodegenerative" W/1 ("illness*" OR "disorder*" OR "disease*"))) OR (TITLE-ABS-KEY (("cognitive*" OR "cognition" OR "neurocognit*" OR "mental") W/3 ("declin*" OR "dysfunction*" OR "impair*" OR "disorder*" OR "deteriorate*" OR "function"))) OR (TITLE-ABS-KEY ("health state utilit*" OR "utilities" OR "HSUV*" OR "addiction" OR "adhd" OR "attention deficit" OR "hyperactive" OR "aggression" OR "aggressive*" OR "aggressivity" OR "dement*" OR "amentia*" OR "senile" OR "senility" OR "presenile" OR "presenility" OR "alzheimer*")) OR (TITLE-ABS-KEY ("utility" W/3 ("score*" OR "valu*" OR "health*" OR "cost*" OR "measure*" OR "disease*" OR "mean" OR "gain" OR "gains" OR "index*"))) OR (TITLE-ABS-KEY (("quality" W/2 "life") OR "quality adjusted Life" OR "QOL" OR "QALY" OR "QALYs" OR "HRQOL" OR "disability adjusted	

	life" OR "DALY" OR "DALYS")) OR (TITLE-ABS-KEY ((("psychological*" OR "psychiatric" OR "psychotherapeutic") W/3 ("impact*" OR "outcome*" OR "effect*" OR "benefit*" OR "value*")) OR ("behavio?r*" W/1 ("disorder*" OR "illness*" OR "disease*")))) OR (TITLE-ABS-KEY ((mental* OR psychological* OR psychiatric) W/3 (fatigue* OR disease* OR disorder* OR illness* OR diagnos* OR wellbeing OR well-being OR hygiene OR satisfy* OR stress* OR wellness* OR resilien*) OR ((mental OR psychological OR psychiatric) W/1 health) OR (wellbeing OR well-being OR mentally AND ill OR mentally AND unwell))))) OR ((((TITLE-ABS-KEY ("water*" W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (TITLE-ABS-KEY ("water*" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("water feature*" OR "water mirror*" OR ("water*" W/3 "sound*") OR "water surface*" OR ("water*" W/3 ("body" OR "bodies")) OR "water fall*" OR "waterfall*" OR "falling water*" OR "flowing water*" OR "water park*" OR "waterpark*" OR "water way*" OR "waterway*" OR "waterscape*" OR "water-scape*" OR "waterside*" OR "water side*" OR "water front*" OR "waterfront*" OR "water course*" OR "watercourse*" OR "watershed*" OR "water shed*")) OR (TITLE-ABS-KEY (("sustainable" W/3 "drain*") OR "water-sensitive urban design*")) OR (TITLE-ABS-KEY ("blue" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("bluespace*")) OR (TITLE-ABS-KEY (blue W/5 (space* OR area* OR zone* OR corridor* OR connector* OR landscap* OR environment* OR architecture* OR infrastructure* OR design*)))) OR (TITLE-ABS-KEY ("aquatic" OR "subaquatic" OR "beach" OR "beaches" OR "bog" OR "bogs" OR "canal" OR "canals" OR "coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "estuary" OR "estuaries" OR "fjord*" OR "floodplain*" OR "floodplain*" OR "fountain*" OR "harbor" OR "harbors" OR "harbour" OR "harbours" OR "hydrographic" OR "island*" OR "lagoon*" OR "lake" OR "lakes" OR "marina" OR "marinas" OR "marsh" OR "marshes" OR "marshland*" OR "ocean*" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "riverfront*" OR "rockpool*" OR "rock pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR "wetland*" OR "wetland*"))) AND (TITLE ("mental" OR "psychological" OR "wellbeing" OR "well being" OR "restoration"))) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English")) View Less	

9	(((ABS (("ocean*" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "riverfront*" OR "rockpool*" OR "rock pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR "wetland*" OR "wetland*") W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (ABS (("ocean*" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "riverfront*" OR "rockpool*" OR "rock pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR "wetland*" OR "wetland*") W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE ("ocean*" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "riverfront*" OR "rockpool*" OR "rock pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR "wetland*" OR "wetland*")) OR (ABS (("harbOR" OR "harbors" OR "harbour" OR "harbours" OR "hYDrographic" OR "island*" OR "lagoon*" OR "lake" OR "lakes" OR "marina" OR "marinas" OR "marsh" OR "marshes" OR "marshland*") W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (ABS (("harbor" OR "harbors" OR "harbour" OR "harbours" OR "hydrographic" OR "island*" OR "lagoon*" OR "lake" OR "lakes" OR "marina" OR "marinas" OR "marsh" OR "marshes" OR "marshland*") W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE ("harbor" OR "harbors" OR "harbour" OR "harbours" OR "hydrographic" OR "island*" OR "lagoon*" OR "lake" OR "lakes" OR "marina" OR "marinas" OR "marsh" OR "marshes" OR "marshland*")) OR (ABS (("aquatic" OR "subaquatic" OR "beach" OR "beaches" OR "bog" OR "bogs" OR "canal" OR "canals" OR "coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "estuary" OR "estuaries" OR "fjord*" OR "floodplain*" OR "floodplain*" OR "fountain*") W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (ABS (("aquatic" OR "subaquatic" OR "beach" OR "beaches" OR "bog" OR "bogs" OR "brook" OR "brooks" OR "canal" OR "canals" OR "coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "estuary" OR "estuaries" OR "fjord*" OR "floodplain*" OR "floodplain*" OR "fountain*") W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE ("aquatic" OR "subaquatic" OR "beach" OR "beaches" OR "bog" OR "bogs" OR "brook" OR "brooks" OR "canal" OR "canals" OR	51,746 document results

	"coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "estuary" OR "estuaries" OR "fjord*" OR "flood plain*" OR "floodplain*" OR "fountain*")) OR (TITLE-ABS-KEY ("water*" W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (TITLE-ABS-KEY ("water*" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("water feature*" OR "water mirror*" OR ("water*" W/3 "sound*") OR "water surface*" OR ("water*" W/3 ("body" OR "bodies")) OR "water fall*" OR "waterfall*" OR "falling water*" OR "flowing water*" OR "water park*" OR "waterpark*" OR "water way*" OR "waterway*" OR "waterscape*" OR "water-scape*" OR "waterside*" OR "water side*" OR "water front*" OR "waterfront*" OR "water course*" OR "watercourse*" OR "watershed*" OR "water shed*")) OR (TITLE-ABS-KEY (("sustainable" W/3 "drain*") OR "water-sensitive urban design*")) OR (TITLE-ABS-KEY ("blue" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("bluespace*")) OR (TITLE-ABS-KEY (blue W/5 (space* OR area* OR zone* OR corridor* OR connector* OR landscap* OR environment* OR architecture* OR infrastructure* OR design*)))) AND ((TITLE-ABS-KEY ("stress" W/3 ("disorder*" OR "illness*" OR "trauma*" OR "posttrauma*" OR "acute" OR "chronic*" OR "episode*" OR "emotional" OR "occupational" OR "psychologic*" OR "recover*" OR "reduc*")) OR (TITLE-ABS-KEY ("subjective wellbeing" OR "subjective well-being" OR "vitality" OR "paranoia" OR "psychosis" OR "psychotic" OR "schizophreni*" OR "suicide*" OR "suicidal" OR salutogenetic*)) OR (TITLE-ABS-KEY (("belonging*" OR "coherence") W/3 "sense")) OR (TITLE-ABS-KEY ("happiness" OR ("peace" W/3 "mind") OR "serenity" OR "relaxing" OR "relaxation" OR "attention restoration" OR "restorative" OR "restorativeness" OR "insomnia" OR "insomniac*" OR "sleep quality" OR "somatisation" OR "somatization" OR "somatoform" OR "mental aging")) OR (TITLE-ABS-KEY ("emotional" W/3 ("wellbeing" OR "well-being" OR "regulat*"))) OR (TITLE-ABS-KEY ("affective DISORDER*" OR "body dysmorphic DISORDER*" OR "cyclothymic DISORDER*" OR "deficit DISORDER*" OR "depersonalization DISORDER*" OR "depersonalisation DISORDER*" OR "depressive DISORDER*" OR "developmental DISORDER*" OR "dissociative DISORDER*" OR "dysthymic DISORDER*" OR "emotional DISORDER*" OR "factitious DISORDER*" OR "mood DISORDER*" OR "obsessive-compulsive DISORDER*" OR "panic DISORDER*" OR "sleep DISORDER*" OR "depression" OR "depressive	

	illness*" OR "anxiety" OR "anxieties" OR "anxious*" OR "agoraphobi*" OR "phobia*" OR "phobic" OR "amnesia" OR "autism" OR "autistic" OR "bipolar" OR "bi-polar" OR "manic depressive" OR "mania" OR "bore* out" OR "boreout*" OR "brown* out" OR "brownout*" OR "burn* out" OR "burnout*")) OR (TITLE-ABS-KEY ("neurodegenerative" W/1 ("illness*" OR "disorder*" OR "disease*"))) OR (TITLE-ABS-KEY (("cognitive*" OR "cognition" OR "neurocognit*" OR "mental") W/3 ("declin*" OR "dysfunction*" OR "impair*" OR "disorder*" OR "deteriorate*" OR "function"))) OR (TITLE-ABS-KEY ("health state utilit*" OR "utilities" OR "HSUV*" OR "addiction" OR "adhd" OR "attention deficit" OR "hyperactive" OR "aggression" OR "aggressive*" OR "aggressivity" OR "dement*" OR "amentia*" OR "senile" OR "senility" OR "presenile" OR "presenility" OR "alzheimer*")) OR (TITLE-ABS-KEY ("utility" W/3 ("score*" OR "valu*" OR "health*" OR "cost*" OR "measure*" OR "disease*" OR "mean" OR "gain" OR "gains" OR "index*"))) OR (TITLE-ABS-KEY (("quality" W/2 "life") OR "quality adjusted Life" OR "QOL" OR "QALY" OR "QALYs" OR "HRQOL" OR "disability adjusted life" OR "DALY" OR "DALYS")) OR (TITLE-ABS-KEY ((("psychological*" OR "psychiatric" OR "psychotherapeutic") W/3 ("impact*" OR "outcome*" OR "effect*" OR "benefit*" OR "value*")) OR ("behavio?r*" W/1 ("disorder*" OR "illness*" OR "disease*")))) OR (TITLE-ABS-KEY ((mental* OR psychological* OR psychiatric) W/3 (fatigue* OR disease* OR disorder* OR illness* OR diagnos* OR wellbeing OR well-being OR hygiene OR satisfy* OR stress* OR wellness* OR resilien*) OR ((mental OR psychological OR psychiatric) W/1 health) OR (wellbeing OR well-being OR mentally AND ill OR mentally AND unwell))))) OR ((((TITLE-ABS-KEY ("water*" W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (TITLE-ABS-KEY ("water*" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("water feature*" OR "water mirror*" OR ("water*" W/3 "sound*") OR "water surface*" OR ("water*" W/3 ("body" OR "bodies")) OR "water fall*" OR "waterfall*" OR "falling water*" OR "flowing water*" OR "water park*" OR "waterpark*" OR "water way*" OR "waterway*" OR "waterscape*" OR "water-scape*" OR "waterside*" OR "water side*" OR "water front*" OR "waterfront*" OR "water course*" OR "watercourse*" OR "watershed*" OR "water shed*")) OR (TITLE-ABS-KEY (("sustainable" W/3 "drain*") OR "water-sensitive urban design*")) OR (TITLE-ABS-KEY ("blue" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-	

	ABS-KEY ("bluespace*")) OR (TITLE-ABS- KEY (blue W/5 (space* OR area* OR zone* OR corridor* OR connector* OR landscap* OR environment* OR architecture* OR infrastructure* OR design*)))) OR (TITLE-ABS- KEY ("aquatic" OR "subaquatic" OR "beach" OR "beaches" OR "bog" OR "bogs" OR "canal" OR "canals" OR "coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "estuary" OR "estuaries" OR "fjord*" OR "flood plain*" OR "floodplain*" OR "fountain*" OR "harbor " OR "harbors" OR "harbour" OR "harbours" OR "hydrographic" OR "island*" OR "lagoon*" OR "lake" OR "lakes" OR "marina" OR "marinas" OR "marsh" OR "marshes" OR "marshland*" OR "ocean*" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "riverfront*" OR "rockpool*" OR "rock pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR "wetland*" OR "wet land*"))) AND (TITLE ("mental" OR "psychological" OR "wellbeing" OR "well being" OR "restoration"))) View Less	
8	(((TITLE-ABS- KEY ("water*" W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (TITLE-ABS- KEY ("water*" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("water feature*" OR "water mirror*" OR ("water*" W/3 "sound*") OR "water surface*" OR ("water*" W/3 ("body" OR "bodies")) OR "water fall*" OR "waterfall*" OR "falling water*" OR "flowing water*" OR "water park*" OR "waterpark*" OR "water way*" OR "waterway*" OR "waterscape*" OR "water- scape*" OR "waterside*" OR "water side*" OR "water front*" OR "waterfront*" OR "water course*" OR "watercourse*" OR "watershed*" OR "water shed*")) OR (TITLE-ABS-KEY (("sustainable" W/3 "drain*") OR "water-sensitive urban design*")) OR (TITLE-ABS- KEY ("blue" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("bluespace*")) OR (TITLE-ABS- KEY (blue W/5 (space* OR area* OR zone* OR corridor* OR connector* OR landscap* OR environment* OR architecture* OR infrastructure* OR design*)))) OR (TITLE-ABS- KEY ("aquatic" OR "subaquatic" OR "beach" OR "beaches" OR "bog" OR "bogs" OR "canal" OR "canals" OR "coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "estuary" OR "estuaries" OR "fjord*" OR "flood plain*" OR "floodplain*" OR "fountain*" OR "harbor " OR "harbors" OR "harbour" OR "harbours" OR "hydrographic" OR "island*"	12,838 document results

	OR "lagoon*" OR "lake" OR "lakes" OR "marina" OR "marinas" OR "marsh" OR "marshes" OR "marshland*" OR "ocean*" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "riverfront*" OR "rockpool*" OR "rock pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR "wetland*" OR "wet land*"))) AND (TITLE ("mental" OR "psychological" OR "wellbeing" OR "well being" OR "restoration")) View Less	
7	TITLE ("mental" OR "psychological" OR "wellbeing" OR "well being" OR "restoration")	308,614 document results
6	((TITLE-ABS-KEY ("water*" W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (TITLE-ABS-KEY ("water*" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("water feature*" OR "water mirror*" OR ("water*" W/3 "sound*") OR "water surface*" OR ("water*" W/3 ("body" OR "bodies")) OR "water fall*" OR "waterfall*" OR "falling water*" OR "flowing water*" OR "water park*" OR "waterpark*" OR "water way*" OR "waterway*" OR "waterscape*" OR "water-scape*" OR "waterside*" OR "water side*" OR "water front*" OR "waterfront*" OR "water course*" OR "watercourse*" OR "watershed*" OR "water shed*")) OR (TITLE-ABS-KEY (("sustainable" W/3 "drain*") OR "water-sensitive urban design*")) OR (TITLE-ABS-KEY ("blue" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("bluespace*")) OR (TITLE-ABS-KEY (blue W/5 (space* OR area* OR zone* OR corridor* OR connector* OR landscap* OR environment* OR architecture* OR infrastructure* OR design*)))) OR (TITLE-ABS-KEY ("aquatic" OR "subaquatic" OR "beach" OR "beaches" OR "bog" OR "bogs" OR "canal" OR "canals" OR "coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "estuary" OR "estuaries" OR "fjord*" OR "flood plain*" OR "floodplain*" OR "fountain*" OR "harbor" OR "harbors" OR "harbour" OR "harbours" OR "hydrographic" OR "island*" OR "lagoon*" OR "lake" OR "lakes" OR "marina" OR "marinas" OR "marsh" OR "marshes" OR "marshland*" OR "ocean*" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "riverfront*" OR "rockpool*" OR "rock	3,324,631 document results

	pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR " wetland*" OR "wet land*"))	
4	(TITLE-ABS-KEY ("water*" W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity " OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (TITLE-ABS-KEY ("water*" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("water feature*" OR "water mirror*" OR ("water*" W/3 "sound*") OR "water surface*" OR ("water*" W/3 ("body" OR "bodies")) OR "water fall*" OR "waterfall*" OR "falling water*" OR "flowing water*" OR "water park*" OR "waterpark*" OR "water way*" OR "waterway*" OR "waterscape*" OR "water-scape*" OR "waterside*" OR "water side*" OR "water front*" OR "waterfront*" OR "water course*" OR "watercourse*" OR "watershed*" OR "water shed*")) OR (TITLE-ABS-KEY (("sustainable" W/3 "drain*") OR "water-sensitive urban design*")) OR (TITLE-ABS-KEY ("blue" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("bluespace*")) OR (TITLE-ABS-KEY (blue W/5 (space* OR area* OR zone* OR corridor* OR connector* OR landscap* OR environment* OR architecture* OR infrastructure* OR design*)))	342,160 document results
3	((ABS (("ocean*" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "river front*" OR "rockpool*" OR "rock pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR " wetland*" OR "wet land*") W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR " vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (ABS (("ocean*" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "riverfront*" OR "rockpool*" OR "rock pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR " wetland*" OR "wet land*") W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE ("ocean*" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "riverfront*" OR "rockpool*" OR "rock	39,761 document results

	pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR "wetland*" OR "wet land*")) OR (ABS (("harbOR" OR "harbors" OR "harbour" OR "harbours" OR "hYDrographic" OR "island*" OR "lagoon*" OR "lake" OR "lakes" OR "marina" OR "marinas" OR "marsh" OR "marshes" OR "marshland*") W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (ABS (("harbor" OR "harbors" OR "harbour" OR "harbours" OR "hydrographic" OR "island*" OR "lagoon*" OR "lake" OR "lakes" OR "marina" OR "marinas" OR "marsh" OR "marshes" OR "marshland*") W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE ("harbor" OR "harbors" OR "harbour" OR "harbours" OR "hydrographic" OR "island*" OR "lagoon*" OR "lake" OR "lakes" OR "marina" OR "marinas" OR "marsh" OR "marshes" OR "marshland*")) OR (ABS (("aquatic" OR "subaquatic" OR "beach" OR "beaches" OR "bog" OR "bogs" OR "canal" OR "canals" OR "coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "estuary" OR "estuaries" OR "fjord*" OR "flood plain*" OR "floodplain*" OR "fountain*") W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (ABS (("aquatic" OR "subaquatic" OR "beach" OR "beaches" OR "bog" OR "bogs" OR "brook" OR "brooks" OR "canal" OR "canals" OR "coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "estuary" OR "estuaries" OR "fjord*" OR "flood plain*" OR "floodplain*" OR "fountain*") W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE ("aquatic" OR "subaquatic" OR "beach" OR "beaches" OR "bog" OR "bogs" OR "brook" OR "brooks" OR "canal" OR "canals" OR "coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "estuary" OR "estuaries" OR "fjord*" OR "flood plain*" OR "floodplain*" OR "fountain*")) OR (TITLE-ABS- KEY ("water*" W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (TITLE- ABS- KEY ("water*" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("water feature*" OR "water mirror*" OR ("water*" W/3 "sound*") OR "water surface*" OR ("water*" W/3 ("body" OR "bodies")) OR "water fall*" OR "waterfall*" OR "falling water*" OR "flowing water*" OR "water park*" OR "waterpark*" OR "water way*" OR "waterway*" OR "waterscape*" OR "water- scape*" OR "waterside*" OR "water side*" OR "water front*" OR "waterfront*" OR "water course*" OR "watercourse*" OR "watershed*" OR "water	

	shed*")) OR (TITLE-ABS-KEY (("sustainable" W/3 "drain*") OR "water-sensitive urban design*")) OR (TITLE-ABS-KEY ("blue" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("bluespace*")) OR (TITLE-ABS-KEY (blue W/5 (space* OR area* OR zone* OR corridor* OR connector* OR landscap* OR environment* OR architecture* OR infrastructure* OR design*)))) AND ((TITLE-ABS-KEY ("stress" W/3 ("disorder*" OR "illness*" OR "trauma*" OR "posttrauma*" OR "acute" OR "chronic*" OR "episode*" OR "emotional" OR "occupational" OR "psychologic*" OR "recover*" OR "reduc*"))) OR (TITLE-ABS-KEY ("subjective wellbeing" OR "subjective well-being" OR "vitality" OR "paranoia" OR "psychosis" OR "psychotic" OR "schizophreni*" OR "suicide*" OR "suicidal" OR salutogenetic*)) OR (TITLE-ABS-KEY (("belonging*" OR "coherence") W/3 "sense")) OR (TITLE-ABS-KEY ("happiness" OR ("peace" W/3 "mind") OR "serenity" OR "relaxing" OR "relaxation" OR "attention restoration" OR "restorative" OR "restorativeness" OR "insomnia" OR "insomniac*" OR "sleep quality" OR "somatisation" OR "somatization" OR "somatoform" OR "mental aging")) OR (TITLE-ABS-KEY ("emotional" W/3 ("wellbeing" OR "well-being" OR "regulat*"))) OR (TITLE-ABS-KEY ("affective DISORDER*" OR "body dysmorphic DISORDER*" OR "cyclothymic DISORDER*" OR "deficit DISORDER*" OR "depersonalization DISORDER*" OR "depersonalisation DISORDER*" OR "depressive DISORDER*" OR "developmental DISORDER*" OR "dissociative DISORDER*" OR "dysthymic DISORDER*" OR "emotional DISORDER*" OR "factitious DISORDER*" OR "mood DISORDER*" OR "obsessive-compulsive DISORDER*" OR "panic DISORDER*" OR "sleep DISORDER*" OR "depression" OR "depressive illness*" OR "anxiety" OR "anxieties" OR "anxious*" OR "agoraphobi*" OR "phobia*" OR "phobic" OR "amnesia" OR "autism" OR "autistic" OR "bipolar" OR "bi-polar" OR "manic depressive" OR "mania" OR "bore* out" OR "boreout*" OR "brown* out" OR "brownout*" OR "burn* out" OR "burnout*")) OR (TITLE-ABS-KEY ("neurodegenerative" W/1 ("illness*" OR "disorder*" OR "disease*"))) OR (TITLE-ABS-KEY (("cognitive*" OR "cognition" OR "neurocognit*" OR "mental") W/3 ("declin*" OR "dysfunction*" OR "impair*" OR "disorder*" OR "deteriorate*" OR "function"))) OR (TITLE-ABS-KEY ("health state utilit*" OR "utilities" OR "HSUV*" OR "addiction" OR "adhd" OR "attention deficit" OR "hyperactive" OR "aggression" OR "aggressive*" OR "aggressivity" OR "dement*" OR "amentia*" OR "senile" OR "senility" OR "presenile" OR "presenility" OR "alzheimer*")) OR (TITLE-ABS-KEY ("utility" W/3 ("score*" OR "valu*" OR "health*" OR "cost*" OR "measure*" OR "disease*" OR "mean" OR "gain" OR "gains" OR "index*"))) OR (TITLE-ABS-KEY (("quality" W/2 "life") OR "quality adjusted Life" OR "QOL" OR "QALY" OR "QALYs" OR "HRQOL" OR "disability adjusted life" OR "DALY" OR "DALYS")) OR (TITLE-ABS-	

	KEY ((("psychological*" OR "psychiatric" OR "psychotherapeutic") W/3 ("impact*" OR "outcome*" OR "effect*" OR "benefit*" OR "value*")) OR ("behavio?r*" W/1 ("disorder*" OR "illness*" OR "disease*")))) OR (TITLE-ABS-KEY ((mental* OR psychological* OR psychiatric) W/3 (fatigue* OR disease* OR disorder* OR illness* OR diagnos* OR wellbeing OR well-being OR hygiene OR satisfy* OR stress* OR wellness* OR resilien*) OR ((mental OR psychological OR psychiatric) W/1 health) OR (wellbeing OR well-being OR mentally AND ill OR mentally AND unwell))))	
2	(TITLE-ABS-KEY ("stress" W/3 ("disorder*" OR "illness*" OR "trauma*" OR "posttrauma*" OR "acute" OR "chronic*" OR "episode*" OR "emotional" OR "occupational" OR "psychologic*" OR "recover*" OR "reduc*"))) OR (TITLE-ABS-KEY ("subjective wellbeing" OR "subjective well-being" OR "vitality" OR "paranoia" OR "psychosis" OR "psychotic" OR "schizophreni*" OR "suicide*" OR "suicidal" OR salutogenetic*)) OR (TITLE-ABS-KEY (("belonging*" OR "coherence") W/3 "sense")) OR (TITLE-ABS-KEY ("happiness" OR ("peace" W/3 "mind") OR "serenity" OR "relaxing" OR "relaxation" OR "attention restoration" OR "restorative" OR "restorativeness" OR "insomnia" OR "insomniac*" OR "sleep quality" OR "somatisation" OR "somatization" OR "somatoform" OR "mental aging")) OR (TITLE-ABS-KEY ("emotional" W/3 ("wellbeing" OR "well-being" OR "regulat*"))) OR (TITLE-ABS-KEY ("affective DISORDER*" OR "body dysmorphic DISORDER*" OR "cyclothymic DISORDER*" OR "deficit DISORDER*" OR "depersonalization DISORDER*" OR "depersonalisation DISORDER*" OR "depressive DISORDER*" OR "developmental DISORDER*" OR "dissociative DISORDER*" OR "dysthymic DISORDER*" OR "emotional DISORDER*" OR "factitious DISORDER*" OR "mood DISORDER*" OR "obsessive-compulsive DISORDER*" OR "panic DISORDER*" OR "sleep DISORDER*" OR "depression" OR "depressive illness*" OR "anxiety" OR "anxieties" OR "anxious*" OR "agoraphobi*" OR "phobia*" OR "phobic" OR "amnesia" OR "autism" OR "autistic" OR "bipolar" OR "bi-polar" OR "manic depressive" OR "mania" OR "bore* out" OR "boreout*" OR "brown* out" OR "brownout*" OR "burn* out" OR "burnout*")) OR (TITLE-ABS-KEY ("neurodegenerative" W/1 ("illness*" OR "disorder*" OR "disease*"))) OR (TITLE-ABS-KEY (("cognitive*" OR "cognition" OR "neurocognit*" OR "mental") W/3 ("declin*" OR "dysfunction*" OR "impair*" OR "disorder*" OR "deteriorate*" OR "function"))) OR (TITLE-ABS-KEY ("health state utilit*" OR "utilities" OR "HSUV*" OR "addiction" OR "adhd" OR "attention deficit" OR "hyperactive" OR "aggression" OR "aggressive*" OR "aggressivity" OR "dement*" OR "amentia*" OR "senile" OR "senility" OR "presenile" OR "presenility" OR "alzheimer*")) OR (TITLE-ABS-KEY ("utility" W/3 ("score*" OR "valu*" OR "health*" OR "cost*" OR "measure*" OR "disease*" OR "mean" OR "gain" OR "gains" OR "index*"))) OR (TITLE-ABS-KEY (("quality" W/2 "life") OR "quality adjusted Life" OR "QOL" OR "QALY" OR "QALYs" OR "HRQOL" OR "disability adjusted life" OR "DALY" OR "DALYS")) OR (TITLE-ABS-	4,226,965 document results

	KEY ((("psychological*" OR "psychiatric" OR "psychotherapeutic") W/3 ("impact*" OR "outcome*" OR "effect*" OR "benefit*" OR "value*")) OR ("behavio?r*" W/1 ("disorder*" OR "illness*" OR "disease*")))) OR (TITLE-ABS-KEY ((mental* OR psychological* OR psychiatric) W/3 (fatigue* OR disease* OR disorder* OR illness* OR diagnos* OR wellbeing OR well-being OR hygiene OR satisfy* OR stress* OR wellness* OR resilien*) OR ((mental OR psychological OR psychiatric) W/1 health) OR (wellbeing OR well-being OR mentally AND ill OR mentally AND unwell)))	
1	(ABS (("ocean*" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "riverfront*" OR "rockpool*" OR "rock pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR "wetland*" OR "wet land*") W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (ABS (("ocean*" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "riverfront*" OR "rockpool*" OR "rock pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR "wetland*" OR "wet land*") W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE ("ocean*" OR "pond*" OR "pool" OR "pools" OR "port" OR "ports" OR "riparian" OR "river" OR "rivers" OR "riverside" OR "riverbank*" OR "riverfront*" OR "rockpool*" OR "rock pool*" OR "sea" OR "seas" OR "seashore*" OR "stream" OR "streams" OR "wetland*" OR "wet land*")) OR (ABS (("harbOR" OR "harbors" OR "harbour" OR "harbours" OR "hYDrographic" OR "island*" OR "lagoon*" OR "lake" OR "lakes" OR "marina" OR "marinas" OR "marsh" OR "marshes" OR "marshland*") W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (ABS (("harbor" OR "harbors" OR "harbour" OR "harbours" OR "hydrographic" OR "island*" OR "lagoon*" OR "lake" OR "lakes" OR "marina" OR "marinas" OR "marsh" OR "marshes" OR "marshland*") W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE ("harbor" OR "harbors" OR "harbour" OR "harbours" OR "hydrographic" OR "island*" OR "lagoon*" OR "lake" OR "lakes" OR "marina" OR "marinas" OR "marsh" OR "marshes" OR "marshland*")) OR (ABS (("aquatic" OR "subaquatic" OR "beach" OR "beaches" OR "bog" OR "bogs" OR "canal" OR "canals" OR "coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "estuary" OR "estuaries" OR "fjord*" OR "floodplain*" OR "fountain*") W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (ABS (("aquatic" OR "subaquatic" OR "beach" OR "beache	1,387,219 document results

	s" OR "bog" OR "bogs" OR "brook" OR "brooks" OR "canal" OR "canals" OR "coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "estuary" OR "estuaries" OR "fjord*" OR "flood plain*" OR "floodplain*" OR "fountain*") W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE ("aquatic" OR "subaquatic" OR "beach" OR "beaches" OR "bog" OR "bogs" OR "brook" OR "brooks" OR "canal" OR "canals" OR "coast" OR "coasts" OR "coastal" OR "creek*" OR "dock" OR "docks" OR "estuary" OR "estuaries" OR "fjord*" OR "flood plain*" OR "floodplain*" OR "fountain*")) OR (TITLE-ABS-KEY ("water*" W/3 ("expose*" OR "exposure*" OR "interact*" OR "proximity" OR "vicinity" OR "vicinities" OR "distance*" OR "location*"))) OR (TITLE-ABS-KEY ("water*" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("water feature*" OR "water mirror*" OR ("water*" W/3 "sound*") OR "water surface*" OR ("water*" W/3 ("body" OR "bodies")) OR "water fall*" OR "waterfall*" OR "falling water*" OR "flowing water*" OR "water park*" OR "waterpark*" OR "water way*" OR "waterway*" OR "waterscape*" OR "water-scape*" OR "waterside*" OR "water side*" OR "water front*" OR "waterfront*" OR "water course*" OR "watercourse*" OR "watershed*" OR "water shed*")) OR (TITLE-ABS-KEY (("sustainable" W/3 "drain*") OR "water-sensitive urban design*")) OR (TITLE-ABS-KEY ("blue" W/5 ("urban*" OR "neighbourhood*" OR "neighborhood*" OR "community" OR "communities" OR "city" OR "cities" OR "town" OR "towns" OR "suburb*" OR "semiurban" OR "periurban" OR "semisuburban" OR "residential" OR "municipal" OR "metropolitan" OR "metropolis*"))) OR (TITLE-ABS-KEY ("bluespace*")) OR (TITLE-ABS-KEY (blue W/5 (space* OR area* OR zone* OR corridor* OR connector* OR landscap* OR environment* OR architecture* OR infrastructure* OR design*)))	

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