BlueHealth
Environmental Assessment Tool (BEAT)

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“blue spaces” – as an outdoor environment, 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)
Many tools are available that assess green space, built environment for health and planning and design (Mishra et al., 2020; Gidlow et al., 2012).

The pathways linking green space and health thought to be similar for blue spaces (White et al., 2020), but a unique instoration and restoration abilities associated with blue space setting have been recognised.

Research people recognise and value more to cultural ecosystem services more than other services (e.g. provisional services) of natural environment and more references are made intrinsic and sensorial aspect of the nature (Lyytimäki and Pitkänen, 2020).
Blue space attributes, health, and well-being benefits are **unique compared to green spaces**.

Coastal or inland waterbodies, are prime locations for leisure and tourism, homes or hotels with water views are significantly more expensive.

Person-Environment interaction model for blue space to understand the **blue space-health relationships**.

The role of blue space **affordances and affect** for health and well-being.

**Evidence: Concepts and approaches**
Type of tools reviewed

- The tool has been developed based on a systematic review using 39 existing place assessment tools;
Review of place assessment tools for health

- The theme which the tool functions (Country and year of publication)
- The type of place or space under assessment
- The scale of the place or space under assessment
- Aim of the assessment and assessment types
- Domains, factors, and criteria

- Contributing discipline and intended users
- Structure of the tool
- Complexity, length, number of question asked
- Data collection and assessment method
- Scoring methods
- Presentation and communication of the result
- Validity and reliability of the tool
BEAT has been developed as part of planning and design of blue spaces for pre and post intervention assessment using an evidence-based approach;

- Evaluates a place in a holistic way, through integrating a number of domains (such as the social, physical, aesthetical);
- Elements of tool are objective and measurable on-site, systematic, and can be administered by single person;
- BEAT is developed for experts, researchers, and local communities;
- BEAT enables comparable assessment of environmental aspects and attributes.
- The tool provides robust, objective measures of the environmental character of a blue space.

Development of BlueHealth Environmental Assessment Tool (BEAT)
The Person-Environment interaction model for Blue Space and health outcomes which forms the theoretical basis for the BEAT (Mishra et al., 2020).
Concepts and theoretical framework

Left: An interaction model for Blue Space use for physical activities and relaxation. (Mishra et al., 2020)

Right: Mapping across aspects extracted from the review to the BEAT aspects and their importance for their health antecedents. (Mishra et al., 2020)
Concepts and theoretical framework

BEAT domains and aspects derived from the review framework (Mishra et al., 2020).

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**BEAT domains and aspects derived from the review framework (Mishra et al., 2020).**

**Concepts and theoretical framework**
Health and Place
Testing the reliability and effectiveness of a new tool for assessing urban blue spaces
The BlueHealth Environmental Assessment Tool (BEAT)
--Manuscript Draft--

Location of sites assessed
(Mishra et al. N.D, accepted with revision)

Application and Validation of Environmental Assessment Tool (BEAT)
Each domain is subdivided into several factors or criteria, assessed separately.

A simple scoring system (1-5 to objectively assess the quality) and 0 for the attributes absent or not relevant in the context.

Tool has been divided into Four simple steps:

- **Step 1**: Preliminary Data about the site (macro-level assessment)
- **Step 2**: General Site Description (micro-level assessment)
- **Step 3**: On site Survey (terrestrial environment)
- **Step 4**: On site Survey (aquatic environment)
Basic Description of BlueHealth Environmental Assessment Tool (BEAT)- BEAT: Online Survey Tool- https://www.beat.bluehealth.tools/

BlueHealth Environmental Assessment Tool (BEAT)

In order to provide places where people can enjoy access to water and also obtain many of the health and well-being benefits associated with such blue spaces, it is important to be able to make effective links from a planning and design perspective. A tool for evaluating a place in a holistic way, through integrating a number of domains (such as the social, physical or ecological), and which enables the positive and negative aspects to be identified is needed.

The tool presented here provides a comprehensive method of assessing all relevant domains related to ‘blue spaces’ (any outdoor space that prominently features water, and which individuals may experience, whether by direct contact in, on or by the water, or by indirect means such as seeing it). The tool is designed primarily for identifying the extent to which a particular blue space provides opportunities for obtaining exposure to water but
BEAT: Online Survey Tool- Steps

**BEAT Step 1 and 2**

**BEAT Step 3**

**BEAT Step 4**
BEAT: Site Assessment and Analysis of Scores for the Terrestrial Environment

Chart illustrating the frequency of distribution of appropriated activities and health-dimensions of attributes for all blue spaces e.g. physical, pleasure
**BEAT: Site Assessment and Analysis of Scores**

Moderated rating scores for aspects and attributes of the physical domain

A before and after assessment of an blue space intervention
Descriptive statistics interpreting component health-dimensions extracted using Principal Component Analysis (PCA) that describe the underlying trait measured by blue space attributes.

Correspondence analysis can explore the association between place qualities and different health dimensions (i.e. affordance and affect).

**BEAT: Site Assessment and Analysis of Scores for the Terrestrial Environment**
BEAT: Site Assessment and Analysis of Scores for the Aquatic Environment

Methods to calculate aquatic ecosystem status

Table 1. The point system for the assessment tool

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Status</th>
<th>Score Points</th>
<th>Standing waters</th>
<th>Running waters</th>
<th>Marine Environments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substrate</td>
<td>Good</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Bad</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Human impact</td>
<td>Good</td>
<td>1</td>
<td>29–47</td>
<td>30–50</td>
<td>31–52</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>2</td>
<td>48–67</td>
<td>51–70</td>
<td>53–74</td>
</tr>
<tr>
<td></td>
<td>Bad</td>
<td>3</td>
<td>68–87</td>
<td>71–90</td>
<td>75–93</td>
</tr>
<tr>
<td>Ecosystem services</td>
<td>Good</td>
<td>1</td>
<td>16–26</td>
<td>16–26</td>
<td>21–35</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>2</td>
<td>27–37</td>
<td>27–37</td>
<td>36–50</td>
</tr>
<tr>
<td></td>
<td>Bad</td>
<td>3</td>
<td>38–48</td>
<td>38–48</td>
<td>51–63</td>
</tr>
<tr>
<td>Biological and Ecological</td>
<td>Good</td>
<td>1</td>
<td>19–31</td>
<td>10–16</td>
<td>12–19</td>
</tr>
<tr>
<td>aspects</td>
<td>Moderate</td>
<td>2</td>
<td>32–44</td>
<td>17–23</td>
<td>20–28</td>
</tr>
<tr>
<td></td>
<td>Bad</td>
<td>3</td>
<td>45–57</td>
<td>24–30</td>
<td>29–36</td>
</tr>
</tbody>
</table>

Table 2. Scale for assessing the Ecological status of waterbody

<table>
<thead>
<tr>
<th>Sum of Score points</th>
<th>Ecological Status of waterbody</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 – 5 points</td>
<td>Good status</td>
</tr>
<tr>
<td>6 – 9 points</td>
<td>Moderate status</td>
</tr>
<tr>
<td>10 – 12 points</td>
<td>Bad status</td>
</tr>
</tbody>
</table>

According to the example fillings of the tool, the status of a waterbody is:

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Status Score Points (SSP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substrate</td>
<td>2 (moderate)</td>
</tr>
<tr>
<td>Human impact</td>
<td>1 (good)</td>
</tr>
<tr>
<td>Ecosystem Services</td>
<td>1 (good)</td>
</tr>
<tr>
<td>Abiotic and Ecological</td>
<td>1 (good)</td>
</tr>
<tr>
<td>Sum of SSP (all four aspects)</td>
<td>5</td>
</tr>
<tr>
<td>Status of waterbody</td>
<td>GOOD</td>
</tr>
</tbody>
</table>

The total score will be the sum of score points of every aspect (Table 2).
References:


- BEAT website: [https://www.beat.bluehealth.tools/](https://www.beat.bluehealth.tools/)
Thank You!
for Your Attention

Any questions?