

# Evidence-based design strategies to produce health promoting landscapes

ANNA MARÍA PÁLSDÓTTIR<sup>A</sup>, JOHN, RAYNER<sup>B</sup>, ANNA LITSMARK<sup>A</sup>, LAURA ENGEL, ANDREA HALLDORSDDOTTIR, NURI RÖSEGG, HENNY SAHLIN, DIONA LOS, NINA TÖRN, YLVA HOLMGREN, JOHANNA BERGSTRÖM, JOHN SCOTT, ERIKA ANDERSSON, ELIN HÄRNQVIST, ANNA LAMING, LISA REDMO, AMANDA GABRIEL, FRIDA THURESSON, HENRIK JÖNSSON, MARIA LOSELL, OLIVIA RASMUSSEN AND ANN DOLLING<sup>C</sup>

<sup>A</sup>DEPT. OF WORK SCIENCE, BUSINESS ECONOMICS AND ENVIRONMENTAL PSYCHOLOGY, SLU, ALNARP, SWEDEN. <sup>B</sup>SCHOOL OF ECOSYSTEM AND FOREST SCIENCES (SEFS), FACULTY OF SCIENCE, UNIVERSITY OF MELBOURNE, AUSTRALIA. <sup>C</sup>DEPT. OF FOREST ECOLOGY AND MANAGEMENT, SLU, UMEÅ, SWEDEN

## Introduction

*Outdoor Environments for Health and Well-being* is an international master's program offered at the Swedish University of Agricultural Sciences (SLU) at Alnarp, leading to a Master of Science degree with a specialization in Environmental Psychology.

The course *Nature-Based Interventions LK0306* focuses on how different types of natural outdoor settings can be used for interventions as part of treatment, rehabilitation and programs for the prevention and promotion of healthy everyday habits in different user groups. This factsheet is the final product of the students' work within the course during the autumn term of 2019. This year, Associate Professor John Rayner, contributed to this factsheet with his thoughts on the findings from the different groups' work.

## Seasonal aspects for nature-based intervention designers: Recommendations for place affordances

By Laura Engel, Andrea Halldorsdottir, Nuri Rösegg & Henny Sahlin

In a case studies evaluation of nature-based interventions (NBI), a lack of outdoor activities in wintertime was discovered. Additionally, climate change has already begun to change the characteristics of the seasons, as the last two summers in particular have shown. It will most likely influence the seasons and their perception even more in the future. The impression of seasonal characteristics can create a supporting or hostile setting for users. We have therefore developed a recommendation for NBI designers in Middle and Northern Europe to approach a supporting outdoor environment that includes the different influences of the seasons. When planning for



**CONCLUSION**  
In a case studies' evaluation of nature based interventions (NBI) a lack of outdoor activities in wintertime was discovered. Additionally, climate change has already begun to change the characteristics of the seasons, as the last two summers especially have shown. It will most likely influence the seasons and their perception even more in the future. In the results we put together a list of recommendation.

Using the recommendation may help and encourage designers to offer multifunctional places that are suitable for as many seasons as possible.

VEGETATION	SOUND	SMELL	GROUND
shape	animals	animals	solid
colours	plants	plants	thickness
variation	soil	soil	depth of animals
length	wind		length

LIGHT	TEMPERATURE	WATER	WEATHER
length	grade	temperature	wind
colour	day/night variation	phase (liquid, ice)	rain
intensity	shade of sun/shadow		fog
sun angle			storm
shadow			thunderstorm

**RESULT**  
We developed a recommendation for NBI designers in Middle and Northern Europe. It consists of how a designer could approach a place during different seasons, which can create a supporting or hostile environment.

**Examples for different seasons:**

- Spring:** Windshelter in the sun, Early sprouting plants
- Summer:** Sunshelter plan variety in shape, Color flowering time
- Autumn:** Variety in shelter due to weather, Deciduous trees with changing colors
- Winter:** Windshelter in the sun, Plants with seeds for birds

NBI in different seasons, some aspects are suggested as an aid. There is a clear variation between the seasons concerning light, temperature, water, weather and vegetation change. Vegetation, ground, sound and smell are also aspects to have in mind while planning. Using the recommendation may help and encourage designers to offer multifunctional places that are suitable for as many seasons as possible. To better understand the implementation of these aspects, some examples are given on how to design and/or choose places for nature-based interventions. The examples are widely adaptable for both spaces and interventions or user groups. **Examples for vegetation change:** In the spring, you should plan for early sprouting plants, while in the summer you should plan for plant variety in

terms of shape, color and flowering time. In the autumn, incorporate deciduous trees with changing colors. In the winter, plan for plants with seeds to attract the birds and incorporate coniferous plants in order to have patches of green between patches of snow. **Examples for temperature and weather:** Plan for a sunny yet wind-protected site in the spring (like a dense, south-facing hedge) and a shady place in the summer (e.g. underneath trees with a wide canopy). In the autumn, the plan should have a variety of shelter to account for weather conditions (e.g. to protect against storms and rain), and in the winter plan for wind shelter in the sun for protection against the cold (like a greenhouse). **Examples for light and water:** Plan for spaces with shelter possibilities with adjustable light and

shadow options. This is especially important in winter, when there is a shorter amount of daylight. The plan should also incorporate water sites like a fountain or a pond. Several studies have shown that a combination of “green” and “blue” nature not only seems to be universally preferred, but can also provide more support for well-being and restoration. In conclusion, using the recommendations above might give designers more options to increase the support that outdoor environments provide to users of nature-based interventions.

### Find your strength in nature – Increasing basic knowledge of NBI among the general public

By Diona Los, Nina Törn, Ylva Holmgren, Johanna Bergström & John Scott

The concept of **Nature-Based Intervention** (NBI) is seeing increased use and

research. Despite this, the subject seems to be inaccessible and hard to understand for the general public. This affects the credibility of the subject. Learning about individual benefits and how outdoor qualities can contribute to healthier lives can serve as an easy-to-understand intervention to help people become empowered by nature. The aim of our study is to create basic understanding of NBI and the positive impact of nature through comprehensible language that is accessible to the general public. As a **method**, the authors first conducted a literature study where the essence of NBI was extracted. Several case studies were then created in different types of nature settings. From the case studies, key elements of NBI were identified, simplified and described in a language accessible to the general public. The extracted key elements were divided into three different aspects, i.e. the

benefits of nature, the individual’s needs, and beneficial qualities of the outdoor environment. **Results.** The first aspect is the fact that nature has positive effects on human health and well-being from both a salutogenic and a rehabilitation perspective. Being in nature can result in improved mood, relaxation, restored attention capacity, strengthened health and increased creativity, as well as serve as a source of inspiration, etc. Nature’s positive effect on human health has to be matched to the needs of the particular individual, which brings us to the second aspect. A person’s needs and preferences are different from one time to another depending on that person’s current state of being, scientifically known as scope of meaning/scope of action. The final important aspect is the qualities of the outdoor environments. Research has shown that the most preferred environmental qualities are open views (with views of water ranked high), place for shelter, and the presence of trees, bushes, wild nature and water. There is also a preference for coherence, with low complexity and high serenity. These preferences for nature have been translated into different theories, the most relevant being Kaplan’s Landscape Preference Matrix, Attention Restoration Theory (ART), Supportive Environmental Theory (SET) and Perceived Sensory Dimensions (PSD). A lot of research has been conducted in these theories. The challenge is to translate the knowledge into accessible information and actions people can take to strengthen their health. Outdoor environments with high qualities can be found in a number of different natural settings, like forests, beaches, meadows, parks, and gardens. To communicate the benefits of NBI to the general public, the authors suggest the use of the categories: the gift of nature, nature for you, options of nature and where to look for them.

To **conclude**, it is important to consider that the need for NBI can differ from individual to individual. NBIs are also very different, ranging from broad programs to a simple walking path. For researchers in NBI, it is important to communicate their findings to the public in a way that is easy to comprehend, with this poster and abstract providing an idea of how to start.

### Nature-based interventions in the winter season

By Erika Andersson, Elin Hårnqvist, Anna Laming & Lisa Redmo

One of the key elements of NBI is for it to be set in a supportive environment. According to Pálsdóttir (2014), the most important aspects of a supportive environment are refuge (a sanctuary, a secluded place), prospect (open space

There is an increased research on and use of the concept Nature Based Interventions (NBI) in the academic field. Despite this the results of scientific research on NBI seems to be inaccessible for the general public. This affects the trustworthiness and accessibility of the concept. This poster is a suggestion on how to communicate the basic elements of NBI to the general public.

**Find your strength in nature**

**Gifts of nature**  
Strengthen health  
Relaxation  
Clear mind  
Creativity  
Inspiration  
Better mood

**Nature for you**  
The kind you like  
The kind you need

The effects of nature depend on individual current state of being, preferences and compatibility.

**Options of nature**  
Forest  
Beach  
Sky  
Meadow  
Park  
Garden  
Hill

Research has shown that some environmental qualities are more positively influential on people's wellbeing.

Outdoor environments with high qualities can be found in several different natural settings.

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**Nature Based Interventions in the winter season**

Different seasons means changes in the outdoor environment, this means that NBIs have to be adapted, especially for the winter season. In Nordic countries winter can be a challenging time to perform NBIs and to be able to adapt the NBIs, the challenges have to be highlighted and taken into account.

In order to identify what challenges may be proposed in winter, the key aspects of a supportive environment (refuge, prospect and serene) are put in relation to the conditions of the nordic winter season. This is conducted with a group discussion.

Lack of light	Winter scenery	Weather conditions
<ul style="list-style-type: none"> <li>Hard to organise</li> <li>Small timeframe for daylight</li> <li>Poor visual sight and recognition</li> <li>Decreasing the feeling of safety</li> <li>Limited possible activities</li> </ul>	<ul style="list-style-type: none"> <li>Open and bare</li> <li>Less enclosed environment</li> <li>Increased prospect</li> <li>Can feel unsafe</li> <li>Less secluded</li> <li>Decrease of colors</li> </ul>	<ul style="list-style-type: none"> <li>Less peaceful</li> <li>Perceived as unsafe</li> <li>Need for shelter</li> <li>Insufficient sight</li> <li>Unreliable weather</li> </ul>

**Conclusion**  
To maintain a supportive environment the mentioned challenges have to be taken into account when planning and performing NBIs. These are to be used as a guide to highlight the importance of choosing the setting, sources of light, types of plants used and providing shelter. Further research is needed to develop solutions to the identified challenges when conducting NBIs in winter.

with vistas) and serene (peaceful, silent, safe, secure). Different seasons bring changes to the outdoor environment. This means that NBIs have to be adapted, especially for the winter season. In Nordic countries, winter can be a challenging time to perform NBIs. To be able to adapt the NBIs, the challenges must be highlighted and taken into account. **Approach:** In order to identify what challenges may be faced in winter, the key aspects of a supportive environment (refuge, prospect and serene) are looked at in relation to the conditions of the Nordic winter season. This is conducted with a group discussion. **Results:** The results are presented in three main challenges. **Lack of light:** Few hours of light during the day limits NBIs, making it hard to organize in practical terms; a small timeframe to conduct daylight interventions, poor visual sight and recognition, as well as the aspect of doing NBIs in the dark all decrease the feeling of safety and puts different demands on the organization to maintain the aspects serene and refuge. The lack of prospect due to darkness also limits the possible activities in NBI. **Winter scenery:** The fallen leaves and the lack of greenery causes the environment to be open and bare. This leads to a less enclosed environment and increases the prospect. Increased prospect due to less greenery could be perceived as unsafe and less secluded, thereby impacting the level of refuge and serene. The change of prospect during winter should therefore be considered. Another aspect is the decreased amount of color, which impacts our perception of the environment. The lack of color in winter puts higher demands on other aspects of the outdoor environment to be perceived as a supportive environment. **Weather conditions:** Stormy and cold weather conditions with hard wind, rain or snow makes the environment less peaceful and can be perceived as unsafe, and therefore less serene. The demand for a secure place, where participants can find refuge is higher. As with the lack of light, weather conditions can cause insufficient sight and become a safety issue. Unreliable weather conditions is an aspect that makes it hard to plan for NBI and could impact the motivation of the participants. **Conclusion:** The most important aspects for a supportive environment, i.e. refuge, prospect and serene, are impacted by seasonal changes during winter. To maintain a supportive environment, the challenges of lack of light, winter scenery and weather conditions have to be taken into account when planning and performing NBIs. The identified challenges should be used as a guide when planning NBIs in the winter season in Nordic countries, highlighting the importance of choosing the setting, sources of light, types

of plants used and providing shelter. Further research is needed to develop solutions to the identified challenges when conducting NBIs in the winter.

### The future challenge in urban planning Nature-based interventions promoting health and well-being in the urban environment.

By Amanda Gabriel, Frida Thuresson, Henrik Jönsson, Maria Losell & Olivia Rasmussen

Cities have positive benefits to society, but they are also related to some threats to human health. Urbanization is considered one of the most important challenges of the century. Environmental factors in urban living seem important to the relation of incidence of diseases in the somatic and neuropsychiatric spectrum, with the growing level of stress-related diseases and disorders such as anxiety and depression, as well as the growing number of individuals with obesity and a decline in physical activity. Today, mental illness represents one of the leading causes of disease burden in high-income countries, and depression the leading cause of disability worldwide. WHO has rated physical inactivity and stress as two of the major causes of death in the developed world, and consequently has made stress-related diseases and overweight priority health prevention areas. The decline of experiences of nature could be a direct contributor to health issues. Urban living is characterized by few restorative places where people can recover from stress. Despite the high urbanization, nature has become the holiest we have in Sweden and is the place where we search for peace and comfort in periods of serious life events.

The health benefits from contact with nature reported in studies are impressive as they embody a holistic perspective of human health that involves social, mental and physical benefits. The health benefits found by reviewing research of studies related to contact with nature are impressive as they embody a holistic perspective of human health that involves social, cultural, mental and physical benefits. Some of the benefits shown in research are reduced mortality from cardiovascular diseases, improved healing times from diseases, reduced respiratory illness and allergies, a reduced risk of poor mental health, and maintenance of cognitive ability. Research has also linked nature with benefits for social cohesion. Given this background, restorative natural places should be observed as great resources for the promotion of public health through stress prevention, promotion of physical activity and places for social cohesion. The possibility of having free contact to a well-planned and accessible environment with nature makes it possible for the population to perform self-care of their physical and physiological needs. How can green spaces promote these opportunities, working as supportive environments and used as a preventive resource?

Through group discussion and analysis of the course data and inspiration from the literature, we identified three factors that are important for the design of urban green spaces: **availability, quality and type.** **Availability** concerns mainly the proximity, size and availability of green areas. There are different **types** of urban green areas that may be used, e.g., parks, community gardens, urban forest, green corridors and green graveyards. **Quality** factors of



**THE CHALLENGE**

- Physical inactivity and stress are priority prevention areas as they are two of the major causes of death in the world (WHO)
- Nature environments could be used as a preventive resource as they offer a wide range of benefits for human health.

**WHY?**  
Promote health and well-being through:

- Stress prevention
- Social cohesion
- Physical activity

**WHEN?**

- In the beginning of the planning process
- Management practices

**HOW?**

- Availability
- Type
- Quality

importance are accessibility for all, perceived safety, good design and aesthetics, multi-functionality and multi-user focus, vegetation (rich in species), interesting and engaging affordances. Affordances identified as important for the use of urban green areas are *Serene, Space, Nature, Rich in Species, Refuge, Culture, Prospect, and Social*. To create attachment to the green area among locals, it is important to use a participatory design process when designing the area. These perceived dimensions can be used as guidelines for creating sub-areas. These factors can be used as a reference for the development of environments with natural elements that can promote health and well-being. Urban planners should include nature interventions in the beginning of planning processes and also during the management practices.

## Discussion

By John Rayner

Ensuring there is active participation in nature-based interventions (NBI) it is crucial to building greater public acceptance and support for these initiatives. The emphasis is on maintaining participation during unfavorable seasonal and climatic conditions. Winter conditions are hard to work with concerning NBI. However increasingly challenging conditions over summer; a feature that is likely to become more significant in the future because of climate change. The importance of landscape design and activity planning for NBI has to be considered to overcoming the barriers to participation. This include the role of design to ensure that outdoor environments provide for multifunctional outcomes and highlight seasonal elements and features. Some useful examples of how different features of seasonality and climate could be incorporated into both design solutions and NBI activities are presented. While clearly every site and project is different, examples such as these presented above are useful and provide some advice during design development.

Ways of increasing public awareness and understanding of nature-based interventions is important. While research and applications of NBI have increased significantly, there remain challenges in how the broader public engage with and interpret this information. This includes focusing on aspects of nature experience

that support human health and well-being and matching these to individuals and their needs. They link human preferences for natural elements to some of the key theories that underpin the analysis of 'restorative' environments, noting the difficulty in translating this information to making it more accessible. More examples of current messaging and communication for NBI need to be provided, particularly those that have shown to be more effective. In this way, the possible factors behind the lack of public engagement and understanding could be further explored. Some of the complex theories about human preferences for nature could similarly be translated to the features and settings of outdoor environments most connected to these preferences and best able to deliver these benefits. Above you find a list of simple messages as a way of communicating key aspects of NBI to make them readily interpreted and more meaningful to the public.

Planning and design in urban green space to provide human health and well-being outcomes is also elucidated. There is description of the significant role that these spaces can play in health prevention and some useful guidance on how to help deliver more nature-engaging and restorative spaces. The important factors and considerations needed to achieve these results; including the role of urban green space quality and accessibility, having a diversity of features and experiences, and affordances that promote nature engagement for a wide range of users is also discussed. It is also identified that the best results in planning and design are gained from a process that has active engagement with and participation from users. The ongoing management of these landscapes to ensure that design outcomes are sustained is important, but also providing a reference for wider health promotion in urban environments.

## Conclusion

While it is difficult to identify one single element that unifies all the examples, one issue that does link them together is the need for a high-quality and purposeful design process. It is well established that design is critical to delivering landscapes that support nature-based therapies, activities and treatments, with elements and features that facilitate nature engagement (Cooper Marcus and Sachs, 2013) and human restoration (Kaplan and Kaplan 1998).

These types of landscapes are under-pinned by evidence-based design strategies to produce physical environments and landscapes that promote more healing and provide better places for people to work (Ulrich et al, 2008). Careful consideration of the client and the setting should always form part of the design process in nature-based landscapes (Stigsdotter et al 2011), as should a rich and engaging participatory design process. Good examples of the latter are increasingly a feature of the literature, from 'healing gardens' (Winterbottom and Wagenfeld, 2015) through to children and school gardens (Tai et al, 2007).

Aside from creating more interesting and appealing outdoor environments, good design also builds public engagement and support; crucial to expansion of funding and the development of new opportunities for nature-based interventions in the future.

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