

Universal Design Implementation in Natural Conservation Park for Accesible Nature-Based Tourism (NBT)

Case Study of Puncak Becici

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ABSTRACT: *Natural conservation parks besides use to preserve the ecology in their utilization can be managed into nature-based tourism with relatively minimum disturbance of the natural existing. Puncak Becici as Pines Conservation Park has typical morphology of elevated contour with breathtaking panoramic views. In their function to bring visitor experience towards nature, Puncak Becici must be able to accommodate good accessibility and equal service for all. This research is conducted for evaluating the implementation of accessible design in Puncak Becici as Nature-Based Tourism (NBT). The method of the study using descriptive analysis by adaptation of seven principles of Universal Design in the park as an evaluation parameter. The research found that there are three classified elements in Puncak Becici as natural conservation park such as circulation and access; outdoor recreation or picnic features; and park services. The result indicates that Puncak Becici's provision for accessible circulation and access has not fully implement universal design principles and accessible natural park standards.*

Keywords: Universal Design, Accessibility, Natural Conservation Park, Puncak Becici.

INTRODUCTION

Nature-based tourism defined as tourism that consists of trips to relatively minimal physical disturbance and pollution of natural areas with the specific purpose of studying, admiring, and enjoying the scenery and habitats in it, as well as the manifestations of the culture in its area (Luzar et al. 1995)

The attraction in nature-based tourism, besides following the factor within the natural areas itself, is also formed by the existence of supportive factors of tourism in the natural areas (Metin, 2019). According to Marzuki et al. 2011, attractive factors of nature based-tourism can be categorized in some indicators, such as physical features, infrastructures, and accessibility. Natural Conservation Park that regarded as an urban park, should be able to fulfill the needs of the various groups of community and accessible for all. Accessibility of the park is the indicator of attractive factors in Nature Based-Tourism (NBT). To accommodate the equal use for all groups, the strategy is by taking consideration of Universal Design principles.

Puncak Becici (PB) as a pine forest conservation with a total area of 4,4 ha, since 2015 managed to become a natural tourist attraction by local involvement. Located 30 kilometers from the City of Yogyakarta, PB have typical morphology of a contoured level and a good panoramic view that able to bring the various experiences of visitors in exploring the ecology and natural environment.

The question of the research divide into two sections:

1. How is the adaptation of universal design principles towards the natural park in creating accessible nature-based tourism?
2. How is the implementation of Puncak Becici as a natural conservation park in ensuring accessibility and equal services for all groups?

The study firstly defining natural park elements and an overview of universal design in general. Then the transformed principles of UD related natural conservation park design will be the guidance in evaluating the implementation of accessible design in Puncak Becici. The present information and condition of Puncak Becici will be provided. The outcome of the evaluation can be used to enhance Puncak Becici and other Nature Based-Tourism (NBT) attraction as well.

LITERATURE REVIEW

Defining Element in Natural Conservation Park as Nature-Based Tourism

Forest protected area that managed become natural conservation park, in their usage expected to maximize the utilization of forest itself. As mentioned in article 23 paragraph (1) b UU No. 6 the Year 2007 about Forest Administration and Formulation of Forest Management and Forest Utilization Plans, the land can be used for natural tourism with the terms and conditions not destruct the environment sustainability.

According to (Marzuki, 2011) there are three categorizations of indicators that support the attractiveness of Nature Based-Tourism. Those three categorizations are,

1. Physical features: physical condition, topography, plant quality, water quality, etc.
2. Service and Infrastructure: accommodation, food provision, information, restroom area, camping area, electricity, and other services provision.
3. Accessibility: pedestrian and vehicle materiality type and design of access.

Physical Features and Spatial Structure of Natural Park

Different from most landscape architecture, which designs an entire space, in outdoor recreation design we tend to take a landscape that has many existing qualities to preserve and insert as minimum amount facilities necessary for less environment degradation (Bell, 2018).

Natural park, as well as natural heritage, has two forms: the tangible, which consist of geological forms such as cliffs, stones, flora, fauna, ecological processes, and the intangible which is serviceability and infrastructure (Davidson on Livina, 2011).

Conservation parks that are managed into Nature-Based Tourism (NBT) should have a lot of consideration during the design phase, especially on processing the physical features. As its name, a natural park should have a relatively minimum disturbance. Whereas, managing Natural Conservation Park into Public Park, means that Park should provide the widest range for all users and consider all possible obstacles by design consideration.

Universal Design Principles

In visiting recreational areas, some factors may prevent people from enjoying themselves such as feel uneasy and feel threatened in some way because of place belonging, the safety thinking, and appropriation level of ability (Bell, 2018). Each human is unique in age, size, abilities, talents, and preferences (Story, et al. 1997).

Universal design is a guideline to create a product or environment that accommodates users, abilities, age, people who are sick or injured, and people who are uncomfortable due to the wider circumstances (Story, et al. 1997). Based on the Center of Universal Design at North Carolina State University, the universal design has seven principles with the following criteria.

Table 1. Universal Design Guideline from NCSU (Source: Story et al., 1997)

Principles	Description	Criteria
Equitable use	Useful and marketable to people with diverse abilities.	Same and equivalent service to all users. Design able to attract all users.
Flexibility in use	Accommodates a wide range of individual preferences and abilities.	Adaptable design for the user and provide an option in method-use
Simple and intuitive	Easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.	Avoiding complexity design and designed based on basic user abilities and intuition.
Perceptible information	Communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.	Provide information by different types (picture, verbal/sound, tactile).
Tolerance for error	Minimizes hazards and the adverse consequences of accidental or unintended actions.	Arrangement of elements to minimize dangers and mistakes starting from the elements the most frequently used, the most easily accessible, isolated, or protected.
Low physical effort	Can be used efficiently and comfortably and with minimum fatigue.	Use by normal force and once action without repetition.
Size and space for approach and use	Appropriate size and space is provided for approach, reach, manipulation, and use regardless of the user's body size, posture, or mobility.	Clear form and boundaries in every design and considering the needs of space by the minimum standard

(Source: Story et al., 1997)

Designing Accessible Natural Park based on UD Consideration

People with disabilities have the same motivation as other visitors in visiting a natural park-like experiencing nature, enrich well-being, learn about nature and cultural history, even participating in events and activities in the natural areas (CRDA, 2003). The lack of provisions of accessibility of facilities and service may cut off the same experience in contact with the natural park as other visitors and group members (CRDA, 2003).

Rodman (2010) observing that outdoor space has some common aspect that needs to be considered and can be divided into three main categories such as circulation area (pedestrian and vehicular); recreation features/facilities; and park service.

Natural conservation park as Environmental Park as well are designed to preserve the ecological system in a specific area (Keci, 2016). Features that supposed to be included in the environmental park are:

- a. Accessible trails;
- b. Boardwalks by adopting the native landscaping for shade;
- c. Accessible seating includes benches to encourage the groups gathering and engagement;
- d. Appropriate materials-used that relevant to the surrounding condition (resist and durable materiality);
- e. Clear provision of information;
- f. Safe design parking.

METHODS

The research study takes place in Puncak Becici, Dlingo, Bantul, Yogyakarta. The research aims to study the implementation of universal design in nature-based tourism especially natural conservation parks. The stages in doing the research are by:

1. Literature Study

The literature study is used to define the elements in nature-based tourism, especially natural parks, in the application of Universal Design. Besides, the literature study aims to obtain basic criteria before being used to observe Puncak Becici in the implementation of accessible nature-based tourism.

2. Secondary Data

Secondary data help to provide some information such as biophysical condition and geological data of Puncak Becici from journal and other relevant sources. The provided data used to planning the criteria of accessible and equal service in natural park based on the needs and relevant treats.

3. Field Observation

Field observation conducted to observe how people for some groups are served when walking surrounding Puncak Becici and to match the data obtained with real implementation. The measurement was also taken for quantitative data such as the size and approach of pedestrian circulation, service features such as landscape furniture anthropometric; safety element standard and access distance from one place to another. Schematic plan, section, and axonometric drawing are used in visualize the observed data. After finish collecting the data, the data will be analyzed by descriptive analysis method. The evaluation in Puncak Beici is using the criteria of UD that have been formed and arranged based on the value of natural park elements. The goals of the research expected to

give a positive impact by design suggestions for better accessibility and equal service for all group in Puncak Becici as nature-based tourism.

Table 2. Natural Park Design Guideline adapted from Universal Design Principles

Element	Criteria	Guideline
Circulation and Access	Walkways and Wayfinding	<ul style="list-style-type: none"> - The layout of the frontline entrance to the main park from a highway should combine an attractive landscape with the safe movement of vehicles and clear signage. - Walkways and sidewalks should be a minimum of 1500 mm [4' 11"] wide. - Providing edge along the pathway by contrasting material to a width 350 mm as boundaries - Avoid straight, boring trail layouts to differentiate between roadway and path walk. - Stairs minimum wide 1500mm must provide two-way traffics and use anti-slip material on all nosings. - Ramp requirement wide 920mm-1200mm for normal use and wheelchairs
Outdoor Recreation/Picnic Features	Viewing spot/platform, amphitheater	<ul style="list-style-type: none"> - Viewing platform designed jutting out from the solid ground and located in a shaded area without minimum obstruction in the front. - Outdoor amphitheatres accommodate 2 designated seating spaces for minimum capacities for 100 persons - Speaker and sound system for assistive listening to hearing impairments.
Park Serviceability	Public water, lighting, trash, seating area, safety guard, public restroom	<ul style="list-style-type: none"> - The sitting area on a stable surface with a height of 450-500mm - Providing trash receptacles along an accessible route and is the most common use place - Lighting source for park visibility along the pathways and pedestrian use - Restroom area (a public toilet, gazebo/rest area, or food corner) to picnic area connected with a walkway with approachability not further than 100m. - Accessible water taps and hand pumps by simple hand motion use - Guardrails minimal height 1.06m (42") and constructed with posts and rails.

Source: Adapted from Universal Design Guidelines for Outdoor Spaces: Plan and Design for Choice. Donna Rodman, 2009; Design for Outdoor Recreation. Simon Bell, 2018

RESULT AND DISCUSSION

Puncak Becici that located at Muntuk Village, Dlingo, Bantul has the typical morphology of elevated contour range from 25-100 masl (meter above sea level). Regarded as tropical forest, plant species that are found is Conifers/Gymnosperms. The type of soil mostly Latosol that comes from Breccia Rocks. The character of soil are acidic, has low to moderate organic matter content, has a red to yellow color, and has a loamy texture (clay).



Figure 1. Puncak Becici Site Maps

Source: Google Earth (accessed Desember 20, 2020)

Puncak Becici as a natural park accommodates an outdoor picnic that completed by platform to maintaining the view, amphitheater for art performance, food corner, public restroom, and health post. The natural landscape setting in Puncak Becici was completed with benches, public water, and adequate lighting sources.

a. Circulation and Access in Puncak Becici

1. Entrance Access

The entrance access differentiates by vehicular access and pedestrian access. For the pedestrian, it divides into 3 paths: enter, exit, and one conditional path. By entering on the right side and exit on the left side.



Figure 2. Entrance Access for Pedestrian

2. Parking Access

In Puncak Becici the parking system divides into 4-wheels and 2-wheels. The parking area itself is unpaved. There is no line for zoning and provides the ability to disable parking space. The vehicles intend to be not in the regular arrangement.



Figure 3. Parking Access for 2-wheels

3. Path walk and Materiality

The path walk is provided in three preferences materials which are paving block, stone path walk, and andesite paving-tiles. Stone used as primary material for pathwalk in Becici.



Figure 4.Material Preferences for Path Walk in Becici

4. Stairs and Steps

Stairs and steps in Puncak Becici are various. Commonly divided into natural stone steps and man-made tiles. The range of one-way access is up to 1.2 m. With the height of each step 10-15 cm.



Figure 5. Various type of stairs and steps in Puncak Becici

5. Ramps

The ramp is provided in Obama Peak. Circular ramp is made by andesite paving as an anti-slip surface with 10 degrees inclination. The wide of the ramp is enough to be accessed with a wheelchair user, but there is plant obstruction in the middle of the ramp that not cut-off.



Figure 6. Provision of ramp completed with railing guard in Puncak Becici

b. Outdoor Recreation/ Picnic Features

1. Viewing Spot/Viewing Platform

Almost all the edges of the hill in Puncak Becici are used as a place to maintaining the view that is completed with railing safety. Some others are vertical platform shape like a bird's nest with an opening. The vertical platform simply uses stairs to go up. This kind of platform is quite difficult to use by vulnerable groups.



Figure 7. Viewing Platform in Puncak Becici

The easiness level of viewing platform can be found in some part of Puncak Becici such as OBAMA Peak that is completed with ramp.

2. Amphitheatre Spot

Amphitheater designs were separated into two layouts with 2-way circulation in the middle. In the Puncak Becici amphitheater, adequate lighting source and sound system for assistive listening were provided. The access to the amphitheater provides 2-ways access with a guard rail in the middle. Because of the inclination steep, the stairs create resemble the ramp with a stone path walk. Nevertheless, it's still uneasy to be accessed by wheelchairs user.



Figure 8. Amphitheater seating layout and flexible stage as gathering point and viewing platform

When there is no event, the stage of the amphitheater can be used as a gathering place. The location of the stage in the edges of the peak was completed with railing safety

with a height of 1200 mm. The stage is a very suitable place for maintaining the wider view of the valleys and city below.

C. Puncak Becici Service and Infrastructure

1. Landscape Setting

In providing an experience for the visitor, the path separate to lead the visitor into some zone. The character of the path is continuous with various texture and materiality. In some paths put cross access that uses for a short path to another zone. It also can prevent congestion and provide alternatives, moreover if there are emergency conditions rescuer also can take short access.



Figure 9. The continuity of path walk giving easiness for mobility



Figure 10. The alternative path in between the primary path

Seating Area

The seating benches are accommodated along the pathway with a height standard of 35-40 cm. The benches are located in the side out path walk by unpaved surface. While the shaded seating such as gazebo is in less number. Only 1-3 in every zone.

2. Trash Receptacle

The trash receptacle easily can be found every 25-35 m interval. Some trash receptacles are tied in the trees, some others in the ground.

3. Public water

The washing area well-provided from the entrance until the picnic area. The visitor can found water taps easily every 30-50 m distance. The faucets are simply to use and complete with liquid soaps. The wastafel table is wheelchairs friendly with height between 76cm - 86 cm.

4. Lighting

As the open time until night, Puncak Becici provides many lighting to enhance the visibility of the place. Some are primary lighting and others are secondary as ambiance such as yellow light. The lighting has various luminance from 500-1800 lm. The arrangement of lighting put in the common use of place.



Figure 11. Lighting provision for clear sight and surveillance

5. Signage and Perceptible Information

Has a wide area of picnic zone, Becici provides large site maps in the entrance area. There is an administrator's office also to inquire about the information in the area of ticketing. Along the crossroad, we also can found the board signage for path guidance. Most of the information is readable. The information guideline uses the chocolate wood board with contrast white paint of font.



Figure 12. Site maps Becici



Figure 13. Wooden board signage

6. Public Service/Public Restroom

The visitor toilet can be found in the middle zone of Becici close to the Musholla. There is two-division of the toilet which are women and men. The toilet for the disabled is not yet provided in this area.

The second public service building is a health post in the entrance that is supported by PMI (Palang Merah Indonesia) organization. Health post are use to serve minor complaints from visitors regarding their health even cure the injury.

7. Guardrail Safety

Guardrail safety is placed in the edges of the peak, steep slope, and unsafe potency area. The safety guard using wooden posts. The range height of the guardrail start from 900 mm - 1200 mm.

Table 3. Universal Design Fulfillment in Puncak Becici

Category	Criteria	Element	UD Fulfillment			
			Very Good	Good	Average	Poor
Circulation and Access	Walkways and wayfinding	Entrance movement		V		
		Disable friendly walkways				V
		Materiality pattern and various	V			
		Ramp standard				V

		Stairs standard			V	
Outdoor recreation and features	Viewing spot/platform, amphitheater	Accessible viewing platform			V	
		Amphitheater seating standard and layout		V		
		Sound system for hearing impairments		V		
Park Serviceability	Public water, lighting, trash, seating area, public building service, and landscape setting	Benches layout		V		
		Public water mobile	V			
		Lighting landscape arrangement	V			
		Connection between facilities	V			
		Trash receptacle provision	V			
		Railing guard safety	V			

Source: Author's Analysis

CONCLUSION AND RECOMMENDATION

Puncak Becici as natural conservation park has the special activities of outdoor picnic, art performance, and maintaining the view. The access and circulation, outdoor recreation features, and park serviceability are considerations to reach accessible nature-based tourism.

Based on the universal design analysis, the result found that Puncak Becici has not yet fully implement the principles of accessible design especially for the accessibility. Based on the classification of function in Puncak Becici we can conclude that:

1. Puncak Becici has good preferences in material exploration to support visitor's walking experience. But at some areas the path quite uneasy to be accessed by vulnerable groups including wheelchairs user because of the uncomfortable surface and limited ramps accommodation.
2. Some outdoor recreation features such as a viewing platform are unsafe and uncomfortable enough because not yet completed with a guardrail. While the amphitheater in Puncak Becici already meets the requirement for the seating bench layout and size.
3. Park serviceability such as benches, trash receptacle, and public water mostly already fulfill the principles of equitable use and simple in use. While the signage and information in Puncak Becici already perceptible and understandable.

In managing natural parks as Nature-Based Tourism (NBT) we recommend to put consideration for the ease of accessibility by safe walking design, especially on steep level. Therefore, exploring the material that suits the physical condition may support the visitor's walking experience. The last, improving the serviceability of the park that considering the needs of vulnerable groups can be the attractive point of Nature-Based Tourism (NBT) also.

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