



Human and Nature: Identifying the Sustainability of Cultural Landscape from Marine and Aeolian Landforms in Southern Yogyakarta Special Province

Lidya Lestari Sitohang¹, Nurul Makhmudiyah¹, Putu Wirabumi¹, Nur Laili Rohmawati¹, Tarisa Wahyuni Putri Ridwan¹, Edho Bramatius Geofani¹, Chalisa Dwi Cahyana¹, Dewangga Anugrah Sasangka¹

¹ Universitas Negeri Surabaya, Indonesia
lidyasitohang@unesa.ac.id

Abstract. Marine landscapes are shaped by seawater, while aeolian landscapes are influenced by wind activity. Cultural landscapes, however, emerge from human activities, which often lead to sustainability challenges. This article examines the cultural landscape formation and its sustainability within the context of marine and aeolian land processes in the Parang Kusumo sand dunes. The study employs a qualitative descriptive method. The data collection process employed triangulation, comprising field observations, expert interviews, and literature reviews. Thematic analysis was employed in order to identify and interpret patterns within the qualitative data. This approach sheds light on the interplay between human activities and natural landscapes, with a particular attention to sustainability challenges encountered in marine and aeolian environments. The aim is to identify the cultural landscapes in marine and aeolian environments through a sustainability lens. The findings indicate that the unique marine and aeolian landforms significantly promote community activities that are economically beneficial. Nonetheless, human activities in the marine and aeolian areas of Yogyakarta are the primary factors contributing to the decline in ecosystem productivity of these landscapes.

Keywords: Cultural Landscape, Aeoline, Marine, Sustainability

1 Introduction

Indonesia has four sand dune points, including in Parangkusumo Yogyakarta, the Blue Lake Sand Dunes in Bintan, the Sumalu Sand Dunes in Toraja, and the Oetune Beach Desert in East Nusa Tenggara. However, only one sand dune is still active, namely sand dunes in the Yogyakarta area. This study aims to identify the sustainability of the cultural landscape in the sand dune landscape, it is important to be able to overcome the issue of sustainability in this landscape.

Landscapes have two aspects of study, namely natural landscapes with aspects of land form studies and cultural landscapes with aspects of studying human behavior towards their environment (anthropogenic). The shape of the land is part of the landscape that has different characters from one another. Land forms are classified into ten, including land forms from volcanic, structural, fluvial, marine, solutional, denudational, Eoline, Glacial, Organic, and land forms from anthropogenic processes[1], [2].

The stretch of sand dunes is part of the land form of the marine and aeolin process. The land form of origin of the marine process is a form of land that is influenced by marine activities, including beach ridges, bura (spit), tombolo, lagoons, and beach ridges. The land form from which the Eolin process originates is a large group of land form units that occur due to the wind process. Sand dunes actually have an important role in the provision of environmental services which include the protection of infrastructure and human life, in this case sand dunes are able to provide livelihoods for local residents, and sand dunes that develop well in coastal areas will be able to withstand typhoons and tsunami waves[3], [4]. In addition, sand dunes are also able to reduce the impact of sea level rise and seawater intrusion[4], [5]. Examples of these land form units include: barchan, parallel, parabolic, star, tongue, and transverse sand dunes. Of the two forms of land, the area in Yogyakarta with the form of marine land is Baron Beach; Parangtritis Beach; Depok Lagoon; and Parangkusumo Beach, while the area in Yogyakarta with the shape of Eoline land is the Parangkusumo Sand Dune

Cultural landscapes are human appearances or activities that are formed from the process of human adaptation to their environment [2],[4], [6].

2 Methods

The research was conducted at 5 points in the Special Region of Yogyakarta which have the form of marine and aeoline land. The five locations are Parang Kusumo Sand Dunes, Baron Beach, Parangkusumo Beach, Parangtritis Beach and Depok Beach. Baron is located in Ds. Kemadang, Gunungkidul Regency. Parangtritis Beach, Parangtritis Village, Bantul Regency. Parangkusumo Sand Dune, Parangtritis Village, Kretek District, Bantul Regency. The last is Depok Lagoon/Depok Beach, Parangtritis Village, Kapanewon Kretek, Bantul Regency.

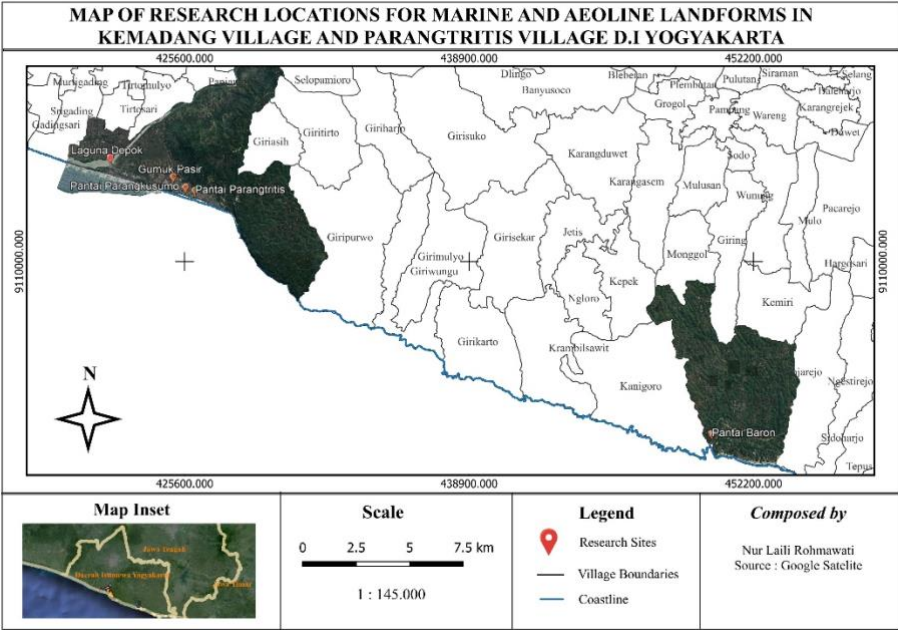


Fig. 1. Map of the Research Location

2.1 Rapid Appraisal Survey

The identification of the sustainability of the cultural diversity of the marine and aeolin land forms was carried out with the principle of rapid appraisal survey[7] This survey is applied using the principle of triangulation consisting of direct observation, interviewing and secondary data. The rapid survey integrated in this study was carried out in a integrated geography landscape fieldwork [14], [8] . Fieldwork is a learning method where students are invited to study geosphere phenomena directly in the field. This method is closely related to the learning approach outside the classroom (Outdoor Study) consisting of direct observation, interviews and secondary data [9].

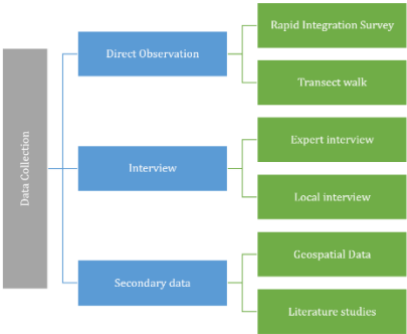


Fig. 2. Data Collection Techniques in Rapid Appraisal Survey

Observation represents a fundamental methodology for the collection of field data, enabling researchers to engage directly with and document their surrounding environment [10]. Similarly, interviews offer a means of gathering detailed information by posing a series of questions to sources, informants, and participants[10]. In this study, interviews were conducted with two local residents and three expert staff members, thereby ensuring a diverse range of insights. Furthermore, literature studies were conducted in order to address the research problems by means of a review of previously published writings and sources [11]. This comprehensive approach ensures a well-rounded understanding of the subject matter.

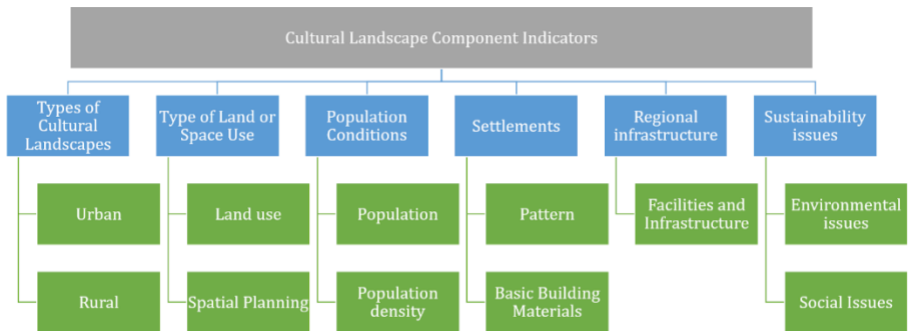


Fig. 3. Key identification of components of the cultural landscape

3 Result and Discussion

Based on the field observations, it was found that cultural landscapes are present at each site. Each site has a unique cultural landscape, but they also have some similarities. The following are some of the observations captured in photographs at each site

3.1 The cultural landscape of Pantai Parangtritis

The stretch of Parangtritis Beach is predominantly characterised by tourism-related activities. The observation of these activities revealed the presence of beach jeep rentals, umbrellas for the sale of goods or sunbathing, food and beverage vendors, and hot spring services, as illustrated in Fig. 4.

An interview with one key informant who is a vendor of fried food and *pecel* rice in the Parangtritis beach area, yielded insights into cultural activities and the accessibility of social facilities. It is noteworthy that the cultural traditions of *jaladri* and beach compound, which are held annually at Parangtritis Beach, continue to flourish. Furthermore, other customs that are still observed in the community include rituals for the seventh month of pregnancy, seventh-day post-death ceremonies, *tingkeban*, and more. Furthermore, the region surrounding Parangtritis Beach is the native habitat of the Jathilan artistic tradition.

While the tourism industry on Parangtritis Beach has a positive economic impact, it also has negative consequences. It was observed that there was an accumulation of

snack waste in the vicinity of the plants, which serves to illustrate the environmental damage that is caused by visitors who do not adhere to the established cleanliness protocols.



Fig. 4. (a) Jeep Destination, and Umbrella For Shelter. (b) Food Traders

3.2 The cultural landscape of Parangkusumo sand dune

The field observations revealed the presence of cultural landscapes at each location. While each site exhibited a distinctive cultural landscape, there were also notable similarities. The following section presents a summary of the observation results, captured in photographs at each location.



Fig. 5. (a) Bukit Pasir, dan Vegetasi, (b) Penyewaan Jeep

The community utilises the jeep rental service as a means of exploring the sand dunes, which contribute to the local economy (as illustrated in **Fig. 5**). Nevertheless, the practice of jeep rental has an adverse impact on the sustainability of the sand dunes, manifested in alterations to their physical configuration [12]. These changes are a consequence of the track path traversed by the jeep.

The vulnerability of sand dunes to human activity means that any such activity will result in a net loss of sand dunes [13]. Similarly, the current government, particularly

that representing the Parangtritis Geomaritime Science Park, is dedicated to restoring the original ecosystem of the sand dunes in the Parangtritis beach sand dune area. According to the Parangtritis Geomaritime Science Park staff, the majority of families residing in the vicinity of the sand dunes are engaged in jeep rental services as a means of generating income to meet their daily needs. Additionally, the issue of land ownership represents a significant challenge. It is incumbent upon the government to consider and provide solutions that will enable the community to remain productive without damaging the Gumuk Pasir ecosystem.

3.3 The Cultural Landscape of Baron Beach

Baron Beach, a notable tourist attraction situated in Kemadang Village, Kapanewon Tanjungsari, is located approximately 40 kilometres from the centre of Yogyakarta. The accessibility of Baron Beach is well developed, with the capacity to accommodate a variety of vehicles, including private automobiles, motorcycles, and buses. A distinctive feature of Baron Beach is the presence of an underground river with a fast flow, which empties into the ocean.

As a tourist destination, Baron Beach offers a variety of amenities, including fish auction facilities, children's play areas, motorised boats, souvenir shops, and food stalls. The local community enhances the visitor experience by providing free facilities, including mosques, and paid services such as bathrooms and boat rides to explore the broader beach area, which serves as a significant draw for tourists (as depicted in **Fig. 6**). These facilities play an important role in the local economy. Furthermore, Baron Beach is furnished with medical facilities, including health posts, which are equipped to provide emergency medical assistance to both the local population and visitors.

Baron Beach is one of the places to organize sea alms ceremonies for the local community [14]. The sea alms ceremony is held every Suro day in the Javanese calendar. The sea alms ceremony is carried out as an expression of gratitude of local residents for the abundance of fish catches at Baron Beach.



Fig. 6. (a) boat rentals and food stalls, (b) umbrella rentals.

Although Baron Beach is a tourist destination that is in demand, the cleanliness of Baron Beach has not been paid much attention. Based on observations, the author observed that there was a lot of garbage scattered from the place of sale to the beach.

3.4 The Cultural Landscape in Depok

Depok Beach is located in Parangtritis Village, Kretek District, Bantul Regency, Yogyakarta has a form of land from the marine process. Depok Beach has a wide stretch of sand and is blackish-brown, which is a common characteristic of beaches on the south coast. Depok Beach not only offers beautiful natural scenery, but also presents a rich culture that reflects the life of the people on the coast.



Fig. 7. (a) Kretek Bridge (b) Trading Place (c) Waste Condition on Depok Beach (d) Fishermen's Activities on Depok Beach

Depok Beach is famous for its fishermen activities with the majority of the people working as fishermen. Every day, local fishermen sail in their traditional boats to catch fish [15]. These boats called *Jukung* or *Payang Boats* line the coast, creating a distinctive scenery. On Depok Beach, culinary tourism is organized with a menu of seafood processed directly from the fresh fish market on the beach. The people of Depok Beach still hold fast to their traditions and customs. Some traditional ceremonies, such as sea alms or *larung sesaji*, are often held to respect the sea and ask for blessings and safety for fishermen. The culture of mutual cooperation is still strong

among coastal communities. It is evidenced by the community working together in various activities, ranging from cleaning the beach to improving public facilities. Regarding environmental issues, in the Depok lagoon there are many scattered foods waste, even garbage can also be found in the lagoon edge area, namely in Batu Batu.

3.5 The cultural landscape in Parangkusumo Beach

The result of Parangkusumo Beach is a form of land from the marine process, the location of this beach is right next to Parangtritis Beach. Unlike Parangtritis, Parangkusumo Beach is not used as a tourist attraction (as in the Fig. 7.), but in the location of Paragkusumo Beach, especially in the Parangkususmo Square complex, it is very famous for its sacred places or sacred places, namely Cepuri Parangkusumo and the footprints of the queen's mother [16], [17]. Through an interview with PGSP (Parangtritis Geomaritime Science Park) staff, it is known that another problem that is a factor in not making Parangkusumo Beach a tourist attraction is because the physical shape of the coast is short and not wide, so it is not possible to open a food store in the tourism sector

Based on the results of interviews conducted with key persons, namely Mr. Guntur Suradjin who is a resident around Parangkusumo Square. We got quite a lot of information from the resource persons related to the cultural landscape around Parangkusumo. The resource person said that the sacred place, namely *cepuri* or the queen's mother's nest, is a sacred location, but currently the sanctity of the place tends to decline because the place around the queen's nest area is used as a place for prostitution practice, the resource person also said that the practice of prostitution occurs as a result of tourism activities, these activities attract many immigrants from other areas, Even the resource person said that the population in the Parangkusumo area is dominated by immigrants. The resource person said that the development of the tourism sector is one of the driving factors for the practice of prostitution.



Fig. 8. Parangkusumo square complex area (a) Tire Site, (b) Cepuri Parangkusumo

3.6 Sustainability Concerns

A group discussion with the experts from the Parangtritis Geomaritime Science Park revealed several critical insights regarding the Parangtritis beach area, particularly the efforts to restore the original sand dune ecosystem in Bantul Regency. The productivity of this ecosystem has been observed to decline annually. The government acknowledged the degradation of the sand dunes, which play a vital role in preventing seawater intrusion and mitigating tsunami waves. In the 1970s, the sand dunes along Parangtritis beach reached elevations exceeding tens of metres. However, by 2009, the Ministry of Environment and Forestry had classified this area as a crisis landmass due to its severe aridity. Consequently, a reforestation initiative was launched, with the planting of shrubs with high water absorption capabilities, with the objective of rejuvenating the dunes. To evacuate the community from the coastal ecosystem of parangtritis and sand dunes, currently the government is still negotiating with the community and looking for solutions so that economic sustainability continues. Staff from Parangtritis Geomaritime Science Park said that there will be an assessment from UNESCO to get recognition as a world heritage, therefore there is a statement that in June 2024 tourism on Parangtritis Beach will be completely closed as an effort to restore the original ecosystem of the Sand Dunes on Parangtritis Beach.

It is crucial to acknowledge that natural sand dune ecosystems flourish in arid conditions, provided that there are no impediments that impede the deposition of sand particles [18]. The proliferation of shrubs and increased human activity, particularly tourism, have been identified as the primary drivers of the observed decline in sand dune productivity. This situation has also contributed to a notable decline in groundwater levels [19]. The government is confronted with considerable difficulties in reconciling the restoration of the sand dune ecosystem with the economic dependence of the local community on tourism.

The government is currently engaged in ongoing efforts to negotiate the relocation of the community from the coastal ecosystem of Parangtritis and its sand dunes [20]. This is being done with the objective of identifying sustainable economic alternatives for the residents. It has been indicated by personnel from the Parangtritis Geomaritime Science Park that the area is to be assessed by UNESCO for potential designation as a World Heritage Site. As part of this initiative, it has been announced that tourism on Parangtritis Beach will be entirely closed in June 2024, in order to facilitate the full restoration of the original sand dune ecosystem.

4 Conclusions

The cultural landscape shaped by marine and aeolian processes is marked by the prominent presence of tourism activities, as observed in the five destinations under study. In particular, Parangkusumo exemplifies a distinctive cultural landscape that is profoundly influenced by Javanese beliefs. This is evidenced by the sacred and spiritual site of Cepuri, which is held in high regard by both the local population and tourists. While the high level of tourism significantly benefits the local community by boosting income and livelihood, it simultaneously poses a threat to the sustainability of the sand

dunes' ecosystem. The influx of visitors has the potential to result in the degradation of these delicate landscapes. In order to ensure the preservation of the cultural and natural heritage of locations such as Parangtritis Beach, Baron Beach, Parangkusumo Beach, Depok Beach, and the Parangkusumo Sand Dunes, it is imperative that a collaborative effort is undertaken between the government, the local community, and relevant stakeholders. It is imperative that this collaboration is underpinned by a profound understanding of the environmental impact of human activities and a strong commitment to sustainability. It is only through such concerted efforts that the preservation of these valuable ecosystems and cultural landscapes for future generations can be ensured.

5 Acknowledgement

This article is the result of fieldwork conducted as part of the Geography Landscapes course. The findings of this study have been documented in the form of a video and poster, which can be accessed via the Cultural Landscape Video. The authors would like to express their gratitude to the Faculty of Social and Political Sciences, State University of Surabaya, for their invaluable support.

References

1. H. T. Verstappen, "Applied geomorphology,," *Elsevier Science Publishing Co*, New York, p. 437pp, 1983.
2. I. Hidayati, "Bentang Lahan Jawa Bagian Tengah," *Jurnal Geografi*, vol. XVIII, no. 2, pp. 145–146, Dec. 2020.
3. J. Gonsalves and P. Mohan, "Strengthening Resilience in Post-disaster Situations : Stories, Experience and Lessons from South Asia," New Delhi, 2011.
4. S. T. Putro and S. H. Prasetyowati, "Sedimentasi Di Gumuk Pasir Parangtritis Berdasarkan Tutupan Lahannya," *Geomedia Majalah Ilmiah dan Informasi Kegeografian*, vol. 18, no. 1, p. 2, May 2020.
5. U. Nehren *et al.*, "Ecosystem services of coastal dune systems for hazard mitigation: Case studies from Vietnam, Indonesia, and Chile," in *Advances in Natural and Technological Hazards Research*, vol. 42, Springer Netherlands, 2016, pp. 402–402. doi: 10.1007/978-3-319-43633-3_18.
6. F. Nuraini, Sunarto, and L. W. Santosa, "Pengaruh Vegetasi Terhadap Dinamika Perkembangan Gumuk Pasir Di Pesisir Parangkusumo," *Geomedia*, vol. 14, no. 2, pp. 2–3, Nov. 2016.
7. L. W. Santosa and L. Muta'ali, *Bentang Alam dan Bentang Budaya, Panduan Kuliah Kerja Lapangan Pengenalan Bentanglahan*. Yogyakarta: Badan Penderbit Fakultas Geografi (BPGF) UGM, 2014.
8. D. Norsandi, "Pengaruh Kuliah Kerja Lapangan (KKL) Terhadap Prestasi Belajar Mahasiswa Pendidikan Geografi Universitas PGRI Palangka Raya," *Jurnal Meretas*, vol. 5, no. 1, pp. 66–71, Jun. 2018.
9. N. Rochayati and A. Maetasari, "Pengaruh Kuliah Kerja Lapangan (KKL) III sebagai salah satu Model Pembelajaran Outdoor Study terhadap Peningkatan

- Motivasi Belajar Mahasiswa Semester VI Pada Program Studi Pendidikan Geografi Di FKIP Universitas Muhammadiyah Mataram Tahun 2013 1,” 2013.
10. A. Triyono, *Metode Penelitian Komunikasi Kualitatif*. Sleman: Bintang Pustaka Madani, 2021.
 11. H. Restu, M. I. Saputra, A. Triyono, and Suwaji, *Metode Penelitian*. Sleman: Deepublish, 2021.
 12. E. Damayanti, Ahmad, and S. Budhi, “Partisipasi Masyarakat Dalam Upaya Konservasi Dan Pengembangan Pariwisata Gumuk Pasir Di Desa Parangtritis Kecamatan Kretek Kabupaten Bantul Tahun 2020”.
 13. L. M. Putri and P. Wicaksono, “Mapping Of Land Use Changes In The Core Zone Of Parangtritis Sand Dunes Using OBIA Method 2015-2020,” *Jurnal Geografi*, vol. 13, no. 1, p. 2021, 2021, doi: 10.24114/jg.v%vi%i.21465.
 14. Admin, “Kenduri Sedekah Laut Pantai Baron,” <https://desakemadang.gunungkidulkab.go.id>. Accessed: Jul. 10, 2024. [Online]. Available: <https://desakemadang.gunungkidulkab.go.id/first/artikel/2113-Kenduri-Sedekah-Laut-Pantai-Baron>
 15. I. Chairunnisa, R. Rijanta, and M. Baiquni, “Pemahaman Budaya Maritim Masyarakat Pantai Depok Kabupaten Bantul,” *Media Komunikasi Geografi*, vol. 20, no. 2, p. 199, Dec. 2019, doi: 10.23887/mkg.v20i2.21216.
 16. S. M. Sabila and S. Putri, “Makna Komunikasi Ritual Sedekah Laut Di Pantai Parangkusumo Dalam Melestarikan Nilai-Nilai Budaya,” *KOMUNIKA*, vol. 4, no. 2, 2021, [Online]. Available: <http://ejournal.radenintan.ac.id/index.php/komunika>
 17. D. B. Yuwono, “Transformasi Spiritual Masyarakat Jawa Kontemporer,” *Panangkaran: Jurnal Penelitian Agama dan Masyarakat*, vol. 7, no. 1, pp. 31–57, Jun. 2023, doi: 10.14421/panangkaran.v7i1.3142.
 18. M. N. Malawani *et al.*, “Dynamics of the aeolian landform at the coastal geosite of Parangtritis sand dune area, Yogyakarta,” *Journal of Degraded and Mining Lands Management*, vol. 11, no. 3, pp. 5839–5847, Apr. 2024, doi: 10.15243/jdmlm.2024.113.5839.
 19. P. Setyono, “The Vulnerability Level of Groundwater Quality Degradation in The Ecosystem of Sand Dune Landscape on the Southern Coast of Central Java and the Yogyakarta Special Region, Indonesia,” *International Journal of Advances in Applied Sciences (IJAAS)*, vol. 3, no. 2, pp. 104–111, 2014, doi: <http://doi.org/10.11591/ijaas.v3.i2.pp104-111>.
 20. R. F. Putri, S. Wibirama, Sukamdi, and S. R. Giarsih, “Sand Dune Conservation Assessment In Coastal Area Using Alos Palsar DInSAR Technique,” *Journal of Urban and Environmental Engineering*, vol. 11, no. 1, pp. 9–29, 2017.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

