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Natural and human induced factors enhance the vulnerability of ecosystems. These natural or human caused vulnerabilities are associated with the risks of particular ecosystems including the Avalon Sand Dunes and Cùc Phuong National Park. These two ecosystems are rich in biodiversity and therefore it is essential to introduce relevant strategies to reduce associated risk and promote their sustainability.

The Avalon Sand Dunes are situated between Whale Beach to the north, Bilgola Beach to the south, Pittwater to the West and the Pacific Ocean to the ~~west~~ East.

The sand dune ecosystems spans an area approximately 2.5 km^2 and is adjacent to Avalon Village. ~~The~~ The ecosystem is rich in ~~to~~ native fauna and flora ~~containing species of~~ however risks such as blow-outs, weather

and trampling are place the rich ecosystem at risk of destruction.

As the ecosystem is located on the beach, the sand dunes are immensely affected by wind and weather factors. Spring and summer are notorious for strong easterly winds which creates a constantly changing ecosystem. These winds can lead to blow-outs which causes significant quantities of sand to be shifted inland or to other areas of the ecosystem. New inland areas of the Sand dunes are unable to resist the high concentrations of sand in there soil profile causing the destruction of vegetation including native species such as the Silver Banksia, Casuarina Glauca and ~~the~~ Coastal Wattle. This can lead to a ripple effect throughout the entire ecosystem in which habitats and even microclimates are destroyed. Evident

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is the reduction of Silver Banksia's ~~size~~ in which native bird species including Butcher Birds and the Australian minor bird frequently use the nectar from the flowers. Such destruction ~~at~~ ~~blow~~ from blowouts and ~~the~~ prevailing winds can reduce ~~an~~ overall level of biodiversity in the ecosystems from this reduction in population and species.

Additionally, the prevailing ~~not~~ easterly winds in summer and westerly winds in winter enhance the aspects of erosion in the ecosystems. These winds undermine boardwalks ~~and~~ and rip out weak root systems such as Spinifex. As Spinifex aims to stabilise sand dunes its destruction enlarges the risk and susceptibility of another blow-out reoccurring. Thus, highlighting that naturally occurring factors heighten the risk placed on an ~~the~~ ecosystem.

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Furthermore, the impacts of humans on ecosystems often have detrimental effects. This is highlighted in the Avalon sand dunes in which activities including jogging, dune boarding and trampolining create a trampling effect on the ecosystem. Trampling is the main cause for the destruction of vegetation, killing low lying plants such as *Spinifex* and sea trees. Even previous circus activity disregarded the importance of the ecosystem evident in an article from *The Pittwater Life*, "if it wasn't for the Elephants of Ashton Circus, the Avalon Sand dunes would be double the size today". Trampling reduced biodiversity of the ecosystem by destroying the habitats of faunal species and emphasising the risk of blow-outs and erosion due to the destruction of the dune stabiliser *Spinifex*.

Additionally, the destruction of ~~Additional~~ vegetation is

explored on the stimulus booklet throughout Cù Phuong National Park. It expresses the destruction of more than 75% of the original forest cover in northern Vietnam in 1943. The destruction of this forest area has placed the ~~mountainous~~ mountainous and forested ecosystem at a major risk of depleting immense biodiversity levels.

~~Additionally~~ Furthermore, pollution are risk factors contributing to ~~both~~ the destruction of both Avalon Sand Dunes and Cù Phuong National Park. Waste pollution such as plastic bags are choking native species such as Hookaburr's and Kingfishers and reducing the levels of biodiversity in both ecosystems.

However, management strategies are in place in both ecosystems evident ~~through~~ to preserve and maintain the habitats. In the Avalon Sand-dunes the Pittwater Council

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has created a 'Dune Restoration Program' which has implemented strategies to reduce the risks associated with the ecosystem. Such initiatives include boardwalks and fencing to address both erosion and trampling and further a Pindone poisoning campaign to address the detrimental risks associated with rabbits. Evident in North Vietnam is the resettlement of villagers to preserve and sustain Cùc Phương National Park.

Therefore it is evident that there are many risk factors which can ~~at~~ destroy the ecosystem's of the Aralon Sand dunes and Cùc Phương National Park. Risk factors can be ~~at~~ human induced such as trampling and pollution or naturally occurring such as blow-outs or weather and thus, it is necessary to introduce efficient management strategies to preserve them.

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