K’gari

2020 Conservation Outlook Assessment

SITE INFORMATION

Country: Australia
Inscribed in: 1992
Criteria: (vii) (viii) (ix)

Fraser Island lies just off the east coast of Australia. At 122 km long, it is the largest sand island in the world. Majestic remnants of tall rainforest growing on sand and half the world’s perched freshwater dune lakes are found inland from the beach. The combination of shifting sand-dunes, tropical rainforests and lakes makes it an exceptional site. © UNESCO

SUMMARY

2020 Conservation Outlook

Finalised on 02 Dec 2020

GOOD WITH SOME CONCERNS

Fraser Island (K’gari) has been viewed as a model in participatory conservation management between many different stakeholders and several excellent management plans for a variety of issues have been put in place. The state of the site's World Heritage values remains relatively good and significant human and financial resources are being directed to the management of the threats to these values. However, pressures from tourism and recreational use, as well as climate change, will require continued monitoring and increased management efforts to ensure preservation of the site's values in the long-term. The Fraser Island World Heritage site includes land and sea that is the traditional country of the Butchulla First Nations people. The Butchulla people have been recognised by the High Court of Australian as holding Native Title rights to K'gari (Fraser Island). The National Park tenure on Fraser Island is now officially known as K'gari, the traditional Butchulla name for the island. The Traditional Ecological Knowledge held by the Butchulla people incorporates knowledge of cultural heritage values, natural heritage values, and overall needs for the culturally appropriate management of K'gari. Incorporating Butchulla people's Traditional Ecological Knowledge into the management of the World Heritage site is critical to protect the island's natural and cultural values. The Queensland Department of Environment and Science is collaborating with the Butchulla people to ensure that management of the site incorporates Traditional Ecological Knowledge and practices.

FULL ASSESSMENT

Description of values

Values

World Heritage values

▶ **Largest sand island in the world with spectacular beaches, cliffs and blowouts** **Criterion:(vii)**

Fraser Island (K'gari) is the largest sand island in the world, containing a diverse range of features that are of exceptional natural beauty. The area has over 250 km of clear sandy beaches with long, uninterrupted sweeps of ocean beach, including more than 40 km of strikingly coloured sand cliffs as well as spectacular blowouts (World Heritage Committee, 2012).

▶ **Tall rainforest growing on high coastal sand dunes** **Criterion:(vii)**

The development of rainforest vegetation communities, with trees up to 50 metres tall on tall coastal dunes, is a phenomenon believed to be unique in the world (World Heritage Committee, 2012).

▶ **Largest unconfined aquifer and perched freshwater dune lakes** **Criterion:(vii)**

The world's largest unconfined aquifer on a sand island and half of the world's perched freshwater dune lakes occur on the island, producing a spectacular and varied landscape. K'gari also has a variety of freshwater dune lakes which are exceptional in terms of number, diversity and age. The dynamic interrelationship between the coastal dune sand mass, aquifer hydrology and the freshwater dune lakes provides a sequence of lake formation both spatially and temporally (World Heritage Committee, 2012).

▶ **Most complete age sequence of coastal dune systems** **Criterion:(viii)**

Immense sand dunes, which are part of the longest and most complete age sequence of coastal dune systems in the world and still evolving (World Heritage Committee, 2012).

▶ **Unique process of soil formation with deepest podzols in the world** **Criterion:(viii)**

Unique process of soil formation due to the successive overlaying of dune systems, meaning soil profiles range from rudimentary profiles less than 0.5 metres thick to giant forms more than 25 metres thick, deeper than any podzols anywhere else in the world (World Heritage Committee, 2012).

▶ **Unique flora and fauna demonstrating ongoing succession, speciation and radiation** **Criterion:(ix)**

Unique relict and disjunct populations of ancient angiosperm heathland and closed forest plant communities and associated vertebrate and invertebrate fauna with specialised adaptations to low fertility, fire, waterlogging and aridity, demonstrating ongoing speciation and radiation. The low shrubby heaths ('wallum') are of considerable evolutionary and ecological significance. The island has the only examples of sub-tropical patterned fens (along with those at Cooloola) known in the world. These fens support an unusual number of rare and threatened invertebrate and vertebrate species (World Heritage Committee, 2012). The area provides most of the world's known habitat for 'acid' frogs, threatened species which have adapted to the highly specialised acidic environment associated with wet heathlands and sedgelands in this siliceous sand environment. Vegetation associations and succession represented on Fraser Island display an unusual level of complexity, with major changes in floristic and structural composition occurring over very short distances. There is clear zonation and succession of plant communities according to salinity, water table, age and nutrient status of dune sands. The

chronosequence of podzol development has a direct influence on plant succession, with the older dune systems causing retrogressive succession (World Heritage Committee, 2012).

Other important biodiversity values

▶ **Dingoes**

Butchulla people and dingoes (wongari) have a long history of close cultural and spiritual association on Fraser Island (K'gari). As such, the Butchulla have cultural obligations to ensure their welfare. Dingo management on Fraser Island (K'gari) is a collaborative partnership between Queensland Parks and Wildlife Service and the Butchulla Aboriginal Corporation (IUCN Consultation, 2020a).
Although some degree of hybridisation between dingoes and domestic dogs is suspected to have historically occurred on the island (Clutton-Brock et al., 1994; Woodall et al., 1996; Behrendorff, 2016), K'gari represents an opportunity to maintain a self-sustaining population of wild genetically pure dingoes (UNESCO, 2001).

▶ **Marine biodiversity**

The World Heritage site extends seaward 500 m from the high-water mark. A substantial amount of internationally important marine biodiversity including resident and migratory shorebirds, waterfowl and seabirds, fish, crustaceans, oysters, sea turtles, sea snakes, dugongs, cetaceans and seagrass meadows occur within the property, which lies adjacent to the Great Sandy Marine Park and includes the Great Sandy Strait Ramsar site (State Party of Australia, 1991; State Party of Australia, 2003).

Assessment information

Threats

Current Threats

High Threat

Increased tourism is acting as a driver for a number of threats to the property, which include pollution, erosion and siltation, disturbance, and the introduction of invasive species. Management capacity is high, but significant negative effects on the site's values and integrity is probable unless management is increased. There is a need for up to date consistently collected data on the number of visitor arrivals on Fraser Island (K'gari) as this data is critical for effective decision-making and management outcomes.

▶ **Invasive Non-Native/ Alien Species**

High Threat

Inside site, scattered(5-15%)
Outside site

(Invasive species and pathogens)

Other invasive species names

Bitou bush (Chrysanthemoides monilifera); Easter cassia (Senna pendula); Singapore daisy (Sphagneticola trilobata); pandanus leafhopper (Jamella australiae); cane toad (Rhinella marina); myrtle rust (Uredo Rangelii)

Over 200 invasive species are present on FIWHA (DES, 2019). These include weeds such as bitou bush, Easter cassia, groundsel, invasive grass species, Abrus, Singapore daisy and asparagus fern; pests such as the Jamella pandanus leafhopper; feral animals including cane toads, cats, horses and coastal brown ants; and pathogens such as myrtle rust. Management is good and some species (like horses) have been almost totally removed. However, work on cane toads and ants has been less successful (IUCN Consultation, 2017). Myrtle rust, an exotic airborne pathogen, was first detected on K'gari in 2013 across a range of Myrtaceae species and based on the most recent monitoring in August 2020, has now become well established, impacting on vegetation regeneration following wildfire, particularly for Melaleuca quinquenervia (IUCN Consultation, 2020b). Research is underway to establish impact levels, at both a species and plant community level, to assist in the development of species conservation and management plans. The Queensland Department of Agriculture and Fisheries is working in collaboration with the Department of Environment and Science and the Butchulla Land and Sea Rangers to enhance biosecurity and awareness of Myrtle Rust on the island (IUCN Consultation, 2020a).

► Erosion and Siltation/ Deposition

High Threat

(Siltation)

Inside site, localised(<5%)

The large number of 4WD vehicles (inlcuding buses) used by tourists and residents and coastal urban development compact the soil and provoke erosion and siltation, filling pristine dune lakes with sediment (GHD, 2002). The impacts of recreational use and vehicular access have been under active management to ensure resource conservation (State Party of Australia, 2003).
Several road sections have been realigned and site access redesigned to minimise sedimentation issues (IUCN Consultation, 2017).
Sea level rise of approximately 100mm since the early 1900s may also affect erosion rates (CSIRO, undated) and recent global predictions of up to 1 m of sea-level change by 2100 would result in significant disruption of both coastal dunes and the key beach transportation network on the island.

► Logging, Harvesting & Controlling Trees

Very Low Threat

(Illegal firewood collection by tourists)

Inside site, localised(<5%)

Illegal firewood collection by tourists presented a problem. However, a range of park management tools have been employed and this practice has been largely eliminated (IUCN Consultation, 2020a).

► Fire & Fire Management

High Threat

(Fire hazards)

Inside site, widespread(15-50%)

Long-term traditional fire management practices maintained Fraser Island's (K'gari) floristic diversity and complexity. Historical European fire management (suppression) and development of a prevalent under-storey may have increased the risk of hot burns on the island. Cultural burning (cool, patchwork burns) provides an opportunity to reduce or prevent hot burns on the island under likely future climate change scenarios and such burns are likely to be important for maintaining biodiversity on Fraser Island (K'gari). In addition, the cultural burns will help reinforce Butchulla identity and cultural knowledge relating to Fraser Island (K'gari). Butchulla Land and Sea Rangers and scientists are working with Queensland Parks and Wildlife and Partnerships (QPWS&P) staff to develop fire management policies that take account of cultural burn requirements (IUCN Consultation, 2020a). Present data show modern fire regimes can alter vegetation community dynamics through changes in fire frequency and intensity (Stewart et al., 2020). The window of opportunity for cool burns may be reduced in future as a result of climate change. Changes in the plant communities may be driven by future climate change and accelerated by the increase in fires (Stewart and Moss, 2015). It is felt that modern regimes driven by climate change will result in a decrease in native biodiversity with a possible increase in pyrogenic invasive plant species (Stewart et al., 2017).

► Recreational Activities

High Threat

(Disturbance caused by tourists)

Inside site, scattered(5-15%)

The large numbers of 4WD vehicles driving along the beaches and beach camping disturb the littoral fauna, changes sand deposition and can disrupt the sense of wilderness, 'exceptional natural beauty' and 'uninterrupted sweeps of ocean beach' in some areas. Increased visitation also disturbs the native fauna and flora, especially by trampling vegetation around lakes. Work by Schlacher et al. (2008) has shown that macrobenthic invertebrate populations are reduced on off-road vehicle-impacted beaches and the death of such species can impact on sandy-beach food chains thus influencing the abundance of birds, crabs and fish that rely on them for food. A solution to what seems excessive 4WD traffic in the property needs to be put into place. Vehicle related impacts are concentrated around visitor sites and travel routes and are unlikely to be negatively altering on-going geomorphological processes at the landscape level (IUCN Consultation, 2017). The impact of beach camping and unrestricted camping in dunes without toilet facilities is potentially a threat with a preliminary study conducted in 2015 (Carter et al., 2015). The study suggested nutrient levels in the watertable were enriched in camping zones l signals in soil samples from the watertable interface. QPWS&P are actively managing visitors to reduce

the impacts of camping.

► Temperature extremes

High Threat

(Climate change)

Inside site, throughout(>50%)
Outside site

Climate change may contribute to increased frequency of high temperature fires and reduced rainfall across the island. This may impact key communities, notably rainforests. A number of species on Fraser Island (K'gari) are at the limit of their northern or southern distributions. Climate change, in particular changes in temperature, rainfall and seasonality, risk disrupting species distribution and abundance, and represent an increasing threat for these species. Climate change may already be responsible for sandblows (naturally devoid of vegetation) being colonized by encroaching vegetation. Sea level rise of approximately 100mm since the early 1900s may also affect erosion rates (CSIRO, undated). Climate change adaptation planning for Fraser Island (K'gari) is in progress (IUCN Consultation, 2020a).

► Water-borne & other effluent Pollution, Solid Waste

Low Threat

(Pollution caused by visitation and residents)

Inside site, scattered(5-15%)

Tourist numbers may have doubled since inscription in 1992; and tourism, along with climate change, is considered as a major driver for many of the current threats facing the World Heritage site today. Earlier water quality monitoring by University of Queensland and the Queensland Government of several lakes (ranging from low to high visitation) concluded that water quality was good and unchanged from monitoring conducted in 1988 (Arthington et al., 1989; Moss, 2009; DSITIA, 2012). However, at beach camping zones nutrient levels at the water table interface and beach flows show enrichment with faecal coliforms and faecal sterols resulting in negative environmental impacts of these zones (Carter et al., 2015). Regular and more frequent monitoring and research on water quality in the lakes is beneficial and has been incorporated into the draft QPWS&P Values Based Management thematic strategy (DES, 2019). Further, in November 2019, the Butchulla Land and Sea Rangers commenced a Water Quality Monitoring program. The Queensland Department of Environment and Science are working with Fraser Coast Regional Council to improve management of waste transfer stations and historical sites which may contain asbestos. Fraser Coast Regional Council recently developed the Fraser Coast Waste Strategy 2019-2029, with plans to upgrade transfer stations at Eurong, Happy Valley and Orchid Beach by 2024 (IUCN Consultation, 2020a).

Potential Threats

Very High Threat

Climate change projections indicate irreversible change of some of the physical properties of the site. Climate change has already been demonstrated as a threat to several of the values of the property, and will probably gain in importance in the future, with potential impacts on species composition, coastal processes, fire regimes and hydrological processes. The Queensland Department of Environment and Science is collaborating with the Australian Government and the Butchulla Aboriginal Corporation to progress climate adaptation planning.

► Invasive Non-Native/ Alien Species

High Threat

(Invasive species)

Inside site, extent of threat not known
Outside site

Increased visitation may increase the probability that other invasive species will be introduced (State Party of Australia, 2003). The Fraser Coast Regional Council (FCRC) recently released a Fraser Coast Biosecurity Plan (2019-2022). Biosecurity management initiatives are underway through a partnership between the Butchulla Aboriginal Corporation, the Queensland Department of Agriculture and Forestry

and the Queensland Department of Environment and Science. The biosecurity management initiatives are intended to reduce the likelihood of additional invasive species being introduced (IUCN Consultation, 2020a). A new project (August 2020), supported by the Australian Government through the University of Melbourne's Centre of Excellence for Biosecurity Risk Analysis and Chief Environmental Biosecurity Office, has commenced to develop tools and strategies to minimise the risks of new priority pests, weeds and pathogens (IUCN Consultation, 2020b).

▶ **Habitat Shifting/ Alteration, Droughts, Temperature extremes**

Very High Threat
Inside site, throughout(>50%)
Outside site

(Climate change)

Overall, climate change impacts including higher temperatures, rising sea levels, and more frequent and extreme weather events pose a very high potential threat to species composition, coastal processes, fire regimes and hydrological processes (Gontz et al., 2015; Wardell-Johnson et al., 2015). Increase in fire frequency, intensity and sequence is expected due to climate change drivers (Stewart and Moss, 2015). Fire regimes may also increase myrtle rust susceptibility. Myrtacea may be vulnerable when they sprout new growth after fire; Coutinhou (1998) notes that eucalyptus rust can be fatal when it infects coppice growth of highly
susceptible species. Predictions include increasing numbers of lower rainfall days/drought followed by heavy rainfall events which may further disrupt species distribution and abundance. Changing conditions will also increase biosecurity risk with the movement and prevalence of pest species including wind-borne myrtle rust and new weed species (IUCN Consultation, 2020b).

▶ **Unknown Threats**

Data Deficient
Inside site, throughout(>50%)

(Disease introduction, low genetic diversity and the prospect for population decline)

Current abundance estimates for the K'gari dingo population suggest that numbers lie between 73 (lower end of Conroy (2016b) range) and 257 (upper end of the range of Allen et al. (2015)) total individuals (see also Appleby and Jones, 2011), coupled with the geographic isolation the population is subject to, the population may be at risk of decline and possibly extinction at some point in the future. Conroy (2016a) reported relatively low genetic diversity, as to be expected for an island population, compared to mainland dingoes. High rates of human visitation and the possibility that domestic dogs (although domestic animals are prohibited on K'gari) continue to be brought by visitors to the island also raises the prospect of disease introduction. Thus, there are additional reasons for concern. Regular population monitoring, including abundance, survival and genetic studies, along with disease screening, are required to ensure population survivability.

Overall assessment of threats

High Threat

Increased visitation, biosecurity concerns and impacts of climate change are the major threats to the property. Increased tourism is acting as a driver for a number of other threats, which include pollution, erosion and siltation, disturbance, and the introduction of invasive species. Management capacity is high but significant negative effects on the site's values and integrity are probable unless management resources are increased. Climate change seems to be irreversibly changing some of the physical properties of the site and has already been demonstrated as a threat to several site values. These threats are likely to gain in importance in the future, with increases in risks such as localised species loss, sea level rise, loss of habitat (such as patterned fens), increased dune erosion, increased number of droughts and dramatic climate rainfall/storm events and wild fires and impacts to biosecurity.

Protection and management

Assessing Protection and Management

▶ **Mostly Effective**

The Queensland Parks and Wildlife Service & Partnerships (QPWS&P) is regarded as developing "best practice" for many aspects of protected areas management. However, there is no specific management plan for Fraser Island World Heritage site. It falls under the Great Sandy National Park Management Plan which covers the Great Sandy Region National Park, of which the Island is a section, along with adjacent marine areas and some lands outside the protected area. There is an urgent need for a specific World Heritage focussed plan that addresses Outstanding Universal Value (OUV) and is focussed solely on the World Heritage site. Fortunately, a strategic plan for the World Heritage site is currently in development in partnership with the Butchulla people through the Butchulla Aboriginal Corporation (BAC) and the Butchulla Native Title Aboriginal Corporation. Additional specific Island plans include Fraser Island Dingo Conservation and Risk Management Strategy and associated Implementation Plan (2013) and a Landscape Weed Management Plan (Harvey, 2011). In addition, climate adaptation planning (IUCN Consultation, 2020a), as well as Monitoring and Assessment Thematic Strategy and Cultural Heritage Thematic Strategy are underway (IUCN Consultation, 2020b).

▶ **Mostly Effective**

The latest state of conservation report (UNESCO, 2001) notes a general paucity of social science research addressing visitor and social impact management, adding that the greatest potential threats to site's values include recreational activities and a lack of knowledge about the ecological impacts of visitors.
Sinclair (2011) notes that the tourist management system needs to be improved to ensure conservation of the site's values. The new QPWS&P values-based planning framework is expected to evaluate management effectiveness on a regular basis (IUCN Consultation, 2017). The Queensland Department of Environment and Science is working on a new Strategic Plan for the World Heritage site; in addition, a new values-based Management Plan is in development for the K'gari (Fraser Island) section of the Great Sandy (IUCN Consultation, 2020b).

▶ **Highly Effective**

Existing boundaries are operationally sufficient (World Heritage Committee, 2012) however the Queensland Government is considering proposals to include significant additional areas of the Great Sandy Region in an expanded World Heritage site (subject to a consent framework to be developed with Indigenous Traditional Owners) (IUCN Consultation, 2017).

▶ **Mostly Effective**

Management of the World Heritage site is guided by the Great Sandy Region Management Plan 1994 (currently under revision). The revised management plan is being developed under a new values-based planning framework that includes a reporting mechanism for condition and trend of key values (IUCN Consultation, 2017). The Queensland Parks and Wildlife Service & Partnerships continues to work towards linking park key values and World Heritage values for the purposes of effective management, monitoring and reporting (IUCN Consultation, 2020a). The Butchulla Aboriginal Corporation RNTBC plans to develop a Healthy Country Plan for K'gari identifying their aspirations for the island and its management (IUCN Consultation, 2020b).

▶ **Highly Effective**

In 2014, the Federal Court of Australia made a consent determination recognizing the Butchulla people's native title rights in relation to Fraser Island (National Native Title Tribunal, 2014). The establishment of the Butchulla Aboriginal Corporation RNTBC (BAC) has provided the basis for co-stewardship arrangements to be established between Butchulla and Queensland Parks, Wildlife and Partnerships managers of the site. A second consent determination made December 2019 recognized the Butchulla people's native title rights in relation to the mainland, Great Sandy Strait and to high water on Fraser Island (National Native Title Tribunal, 2019). This has resulted in the formation of a second group, the

Butchulla Native Title Aboriginal Corporation RNTBC (BNTAC). An Administrative Working Group meets regularly to enable Parks Managers and the BAC to liaise for decision-making purposes. Negotiations are underway between the State Government and BAC in relation to strengthening and supporting co-stewardship arrangements into the future. The Queensland Department of Environment and Science support a Butchulla Land and Sea Ranger team that works alongside national parks managers. The management authority (the Department of Environment and Science including the Queensland Parks and Wildlife Service & Partnerships (QPWS&P) previously maintained two Fraser Island World Heritage Advisory Committees (a Scientific and a Community Advisory Committee) (World Heritage Committee, 2012). The committees included a broad representation of community viewpoints and scientific disciplines. Reinvigoration of the advisory committee structure is underway to ensure equal representation of the Butchulla people, scientific and community interests (IUCN Consultation, 2020a). The committees, supported by a secretariat through the Queensland Department of Environment and Science and funding from the Australian Government, will provide advice directly to both State and Federal ministers via a Communique which is published on the Department's website.

▶ **Highly Effective**

99% of the island is included in the Great Sandy National Park and protected under the Nature Conservation Act 1992 (Qld). The marine zone (500m) surrounding the island lies within the Great Sandy Marine Park and is subject to the Marine Parks Act 2004 (Qld). There is also specific legislation for World Heritage sites (Environment Protection and Biodiversity Conservation Act 1999 (Cth)). Legislation is rigorously enforced (World Heritage Committee, 2012). Other relevant legislation includes Recreation Areas Management Act 2006 (Qld); Planning Act 2016 (Qld); Environmental Protection Act 1994 (Qld); Fisheries Act 1994 (Qld); Aboriginal Cultural Heritage Act 2003 (Qld), Queensland Heritage Act 1992 and the Fraser Coast Regional Council Local Government Planning Scheme (IUCN Consultation, 2017). Whilst the majority of the Fraser Island World Heritage Area is within a protected area tenure, there are also around 500 private freehold properties. However, all development, regardless of land tenure, is subject to the Australian Government Environment Protection and Biodiversity Conservation Act 1999 as well as numerous State legislative controls, which are considered highly effective in maintaining World Heritage values.

▶ **Mostly Effective**

There is an active compliance program operating on the island with a priority focus on visitor behaviour (commercial tour operators and recreational visitors) and dingo management through the FIDCRMS Implementation Plan recently reviewed by the Chief Scientist (2019) (illegal feeding and deliberate interactions) (IUCN Consultation, 2020b).

▶ **Highly Effective**

There are no recent World Heritage Committee Decisions regarding this site.

▶ **Data Deficient**

The site is managed primarily under Queensland's Nature Conservation Act 1992. Sustainable uses of the Island and adjacent waters include commercial tourism and recreation, recreational and commercial fishing (Queensland Fisheries Act 1994), community lifestyles, natural resource management and cultural heritage protection.

▶ **Mostly Effective**

Organisational changes within the Queensland Government make direct comparisons of funding over time difficult.

The Queensland Department of Environment and Science provides funding for day to day management of the National Park. The Australian Government provides $145,000 annually to support the Advisory Committee structure and fund secretariat services. This funding has remained at the same level for the

last decade. The advisory committees have recommended a user pays (visitor levy) system to be implemented to fund protection of OUV and Traditional Owner needs on the island. The Queensland Government is currently considering this option (IUCN Consultation, 2020a).

▶ **Mostly Effective**

Staff capacity needs reassessment with increases in tourism and visitor numbers. The Queensland Parks and Wildlife Service & Partnerships (QPWS&P) staff have multiple training and development opportunities and continue to receive essential training in the use of firearms, fire and pest management, workplace health and safety, first aid, compliance and legislation (IUCN Consultation, 2017). Cultural heritage training is delivered to all QPWS&P staff who work on Fraser Island (K'gari) National Park by the Butchulla Aboriginal Corporation (IUCN Consultation, 2020a).

▶ **Mostly Effective**

Visitors are able to access information on Fraser Island through a variety of media: brochures, videos, maps, signage, websites and an app. However, due to different access points the distribution of educational and interpretation material is often limited and is dependent on the visitor and their recreational activities as to whether or not these materials are sourced or not. A more coherent approach to interpretation with a focus on the islands history, access and values is required (Wardell-Johnson et al, 2015).
The Queensland Parks and Wildlife Service & Partnerships (QPWS&P) are developing new interpretive materials which can be downloaded from the Queensland Department of Environment and Science's website – the 12-page 'Be dingo-safe' brochure being notable as well as the 'Be dingo-safe quick tips' sheets, which are available in multiple languages.
A K'gari (Fraser Island) app was developed by the University of the Sunshine Coast (USC) in partnership with the Butchulla Aboriginal Corporation (BAC) and launched in 2018. The app is a free guide for anyone planning a trip to the site and provides important information on what visitors need to know before they go to the island, including information on getting to the island and what to do when on the island.
Since 2018, the BAC has been working with QPWS&P and with project consultants, TCL Landscape Architecture, on the Central Station Master Plan. The plans to upgrade the Central Station precinct and interpretative displays will enable the project's partners to share Butchulla culture and lore with the over 400,000 visitors who travel to Fraser Island (K'gari) each year. This will greatly enhance the understanding of, engagement with, and access to the World Heritage-listed values of Fraser Island (K'gari). The project will also enable the Butchulla story and association with the World Heritage site to be delivered on Country.
There is a need for an increase in visitor briefings on dingo-safety with a focus on current risks and risk areas on-island (Archer-Lean et al., 2017).
The K'gari-Fraser Island World Heritage Discovery Centre is being developed in partnership with Kingfisher Bay Resort and USC with the support of the BAC (IUCN Consultation, 2020b).

▶ **Mostly Effective**

Visitor management covers: (i) pre-visit information; (ii) off-site orientation; (iii) on-site orientation; (iv) site interpretation; and (v) post-visit reinforcement (State Party of Australia, 2003).

▶ **Mostly Effective**

Key value health checks have recently been undertaken to support revision of the Management Plan (IUCN Consultation, 2017). The Monitoring and Assessment Thematic Strategy includes water monitoring recommendations and a collation of baseline data exists for any future monitoring to assess changes (IUCN Consultation, 2020b). A recent positive development is the Queensland Government funding of Butchulla Land and Sea Rangers, through the Queensland Indigenous Land and Sea Ranger Program. These rangers have started monitoring myrtle rust and water quality. The Butchulla Land and Sea Rangers' work will be invaluable in supporting improved monitoring regimes (IUCN Consultation, 2020a). Regular population monitoring, including abundance, survival and genetic studies, would also be

required the K'gari dingo population to ensure its survivability.

▶ **Mostly Effective**

Biennial Fraser Island Conferences were initiated by the community group, the Fraser Island Defenders Office (FIDO) in 2004, with the latest of these themed "Community, Culture and Collaboration" held in 2019. USC hosted a K'gari research symposium at the Fraser Coast campus in 2019 with the support of the BAC. The conferences enable networking of stakeholders and the dissemination of recent and relevant research.

The Fraser Island (K'gari) Research Archive is held by the University of the Sunshine Coast and brings together various collections of resources which contribute to research into Fraser Island (K'gari). The Archive is founded on a collection of material donated by John Sinclair AO, which underpinned his research in lobbying for environmental protection and World Heritage listing of the Island (https://libguides.usc.edu.au/fiacollection).

University of Queensland has long term flora and fauna monitoring projects. University of Southern Queensland are collaboratively facilitating research into dingo genetics. The QPOWS&P Monitoring and Assessment Strategy outlines previous research and identifies other research required for particular key values. QPWS&P Rangers are also using QPWS data in peer reviewed publications (IUCN Consultation, 2020b).

Overall assessment of protection and management

Mostly Effective

Protection and management is mostly effective. The Queensland Department of Environment and Science, Queensland Parks and Wildlife Service & Partnerships (QPWS&P) provides strategic oversight and undertakes day to day management activities through a collaborative arrangement with the Butchulla Aboriginal Land and Sea Ranger Program. However, high levels of visitation and pressures from recreational use and impacts related to climate change, sea level rise, biosecurity and surrounding land use activities will require enhanced and systematic monitoring and increased management focus on World Heritage values to ensure conservation of the site's values in the long-term. Climate adaptation planning is underway, supported by the Butchulla Aboriginal Corporation RNTBC (BAC), the Australian and Queensland governments.

▶ **Assessment of the effectiveness of protection and management in addressing threats outside the site**

Some Concern

Threats originating outside the site include climate change and a significant growth in population, an expansion of residential development and an increase in tourism and support industries in the Great Sandy Region. These issues are being addressed in management plans.

State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ **Largest sand island in the world with spectacular beaches, cliffs and blowouts**

Low Concern
Trend:Stable

The World Heritage site is still the largest sand island in the world and has spectacular beaches, cliffs and blowouts. Colonisation of sand blows is largely a natural process fundamental to on-going geological processes (IUCN Consultation, 2017). A possible threat in this area is the potential for accelerated coastal erosion on the east coast under rising sea-levels and disruption of dunes in the western part of the island as a result of increased intensity of fires. No obvious changes have occurred yet; however, ongoing monitoring is required (IUCN Consultation, 2020a).

▶ Tall rainforest growing on high coastal sand dunes

Low Concern
Trend:Stable

Tall rainforest on Fraser Island (K’gari) is a combination of rainforest and towering wet sclerophyll. Recent research has evaluated the long-term succession of wet-sclerophyll forest (Syncarpia hillii–Lophostemon confertus) within the FIWHA (Krishnan et al., 2019). The wet-sclerophyll species Syncarpia hillii is endemic to K'gari and the nearby Cooloola sandmass. Approximately 10,000 hectares remain with an 'of concern' biodiversity status (Queensland Government, 2019). Increased efforts to actively manage and conserve the wet-sclerophyll forest may be required to prevent a transition to rainforest (Krishnan et al., 2019). Conversely, intense wildfires burning into rainforest areas is a growing risk. Changes in fire regime under predicted climate change and recent observed fires (climate change and/or fire management related) indicates increase risk of dune destabilisation from this source, because of the destabilisation of vegetation after the fire(s). Similarly, hot burns breaking into rainforest areas may pose threats to the long-term viability of rainforest on Fraser Island (K’gari). Myrtle rust is established all over the island and has the potential to impact on Myrtaceae species. Myrtle rust is being monitored by the Queensland Government and the Butchulla Land and Sea Rangers. The rainforests of Fraser Island (K’gari) contain a wide range of plant foods and resources that were fundamental to traditional Butchulla residential occupation of the island (IUCN Consultation, 2020a).

▶ Largest unconfined aquifer and perched freshwater dune lakes

Low Concern
Trend:Stable

No current monitoring of aquifer water quality is taking place. Evidence from previous work suggests that the lakes are being well managed. Most impacts appear to be aesthetic and relate to localised erosion and infilling at key visitor access points (IUCN Consultation, 2017). Further research is required in respect to potential impacts of climate change and increased camping activity. Further research is also required to enhance understanding of the relationship between annual rainfall and groundwater table levels in the dune field (IUCN Consultation, 2020a).

▶ Most complete age sequence of coastal dune systems

Low Concern
Trend:Stable

All major changes in dunes are natural, with only minor changes due to localised erosion. The University of Queensland has recently undertaken as yet unpublished research that has demonstrated that the oldest sands on the island exceed 800,000 years. These sands occur in the lower parts of the cliffs on the eastern side of the island (and may also occur in cliffs on the western side). These sites are sensitive to coastal erosion, especially under rising sea-level scenarios. However, it is likely that other old sands would be exposed if coastal retreat occurred (IUCN Consultation, 2020a). Observations from east coast cliff sections and Ground Penetrating Radar (GPR) studies confirm the presence of the giant podzols. These buried soils are largely robust to changes at the surface but almost impossible to monitor.

▶ Unique process of soil formation with deepest podzols in the world

Low Concern
Trend:Stable

The underlying natural processes of soil formation are continuing at the World Heritage site scale (IUCN Consultation, 2017).

▶ Unique flora and fauna demonstrating ongoing succession, speciation and radiation

Low Concern
Trend:Stable

No reports of flora and fauna becoming increasingly threatened on the island, although given management issues, further monitoring of island populations is needed. Four species of "acid frogs" occur on the island: Cooloola tree frog Litoria cooloolensis, Freycinet's rocket frog L. freycineti, wallum sedgefrog L. oblongburensis and wallum froglet Crinia tinnula (Meyer et al., 2006). All evaluated as VU by IUCN apart from the Cooloola tree frog as EN (Hines et al., 2004a;b;c;d). Overall biosecurity is a major concern, particularly from myrtle rust. There is a need for baseline data to be compiled on main taxa and there are other threats such as Phytophera which could be devastating if established on the island. The major vegetation ecotones are largely stable; however, intense fires have affected Fraser Island (K'gari) over the last decade. These fires pose threats in two ways; fires are now penetrating areas of rainforest which anecdotally had previously been immune to fire and increased frequency of very intense fires on heathlands may disrupt the vegetation cover and reactivate the western dunes. Since inscription, a unique ecosystem for the sub-tropics has been recognised (patterned fens). These fens are largely confined to Fraser Island (K'gari) and the adjacent mainland (Cooloola) with the best examples at Moon Point on Fraser Island (K'gari). Private land holdings close to Moon Point and drainage associated with the road to Moon Point, partly to service these properties, pose threats to this ecosystem (IUCN Consultation, 2020a).

Summary of the Values

▶ **Assessment of the current state and trend of World Heritage values** — **Low Concern** — **Trend: Stable**

Since inscription in 1992 the state of World Heritage values remains relatively good and significant human and financial resources are being directed to the management of the threats to these values. Increased incorporation of cultural heritage values (not covered in this assessment) is being addressed in current planning and management.

▶ **Assessment of the current state and trend of other important biodiversity values** — **Low Concern** — **Trend: Stable**

This review cannot adequately assess the trend of the many biodiversity values on the island, but there have been no reports of a major decline in any of the flagship species.

Additional information

Benefits

Understanding Benefits

▶ The Island is the source of many jobs both directly and indirectly through associated industries (hence the conflict between tourism and nature conservation). In 2002 FIDO commissioned an independent study to assess the regional benefits of tourism. The study showed that the annual value of Fraser Island (K'gari) tourism to the Queensland economy was then estimated to be in the order of $277 million generating up to 2,880 jobs (Kleinhardt, 2002). However, there is a lack of up-to-date socio-economic data.

▶ **Outdoor recreation and tourism**

With its clean beaches and pristine lakes the island is an important source of recreation for visitors and the small community living on the island. The scenic benefits for tourism of giant dunes, towering rainforest and coloured cliffs is very high. Despite high visitation, there are still "wilderness" values on the island given lack of facilities, which in turn increases human pollution by hikers and swimmers seeking a "wilderness" experience (Hadwin and Arthington, 2003).

Factors negatively affecting provision of this benefit :

- Overexploitation Impact level - Moderate, Trend - Continuing

The intensity of use during peak visitation periods at key sites and travel routes may impact on the quality of the visitor experience. More data needed on visitor impacts and quality of visitor experience.

► **History and tradition,**
Sacred natural sites or landscapes

Fraser Island (K’gari) is of great cultural and spiritual significance and home to some 450-500 recorded Indigenous archaeological sites (DERM, 2012). The Butchulla people are the Indigenous Traditional Owners and have continuing connection to country. The 2014 and 2019 Native Title Determinations have major implications for involvement of Butchulla people. Negotiations are underway to formalise co-stewardship arrangements between the Queensland Government and the Butchulla Aboriginal Corporation in relation to ongoing management of the World Heritage area.

The whole island contains tangible (archaeological) evidence for the past occupation of Fraser Island (K’gari) by the ancestors of Butchulla Traditional Owners, including camping places (e.g. middens), stone quarries (e.g. headlands), burials (isolated graves and cemeteries), and ceremonial places (McNiven et al., 2002). Tangible evidence of long-term Butchulla use of, and association with, marine resources is amply demonstrated by hundreds of shell middens across K’gari, which contain shell and bones of fish, turtle, and dugong. There are many scarred trees and other physical remains of past human occupation. Patterned fens are particularly significant to Butchulla women.

Fraser Island (K’gari) is also a cultural landscape of both tangible and intangible heritage in the form of story places, resource areas, gendered places and other sites and locales of significance. All such places are of value to Butchulla people as an assertion of ongoing ancestral presence, traditional ownership, and identity. These places are protected under the Aboriginal Cultural Heritage Act 2003 [QLD].

Factors negatively affecting provision of this benefit :
- Overexploitation Impact level - Moderate, Trend - Continuing

The current patterns and levels of visitor use may conflict with Indigenous cultural values and aspirations for the future. A number of planning processes involving and led by the Butchulla Aboriginal Corporation are underway and will resolve potential conflicts with visitor management and conservation of cultural heritage values.

► **Access to drinking water**

With the largest aquifer on a sand island in the world and half of the world’s perched dune lakes, the site, even if the water is not used apart from local and tourist use, is an important reservoir of fresh water.

Factors negatively affecting provision of this benefit :
- Climate change Impact level - Moderate, Trend - Increasing

Climate change may impact on long-term hydrological processes operating at the World Heritage site scale.

Summary of benefits

Fraser Island (K'gari) provides major local and international benefits for nature conservation, tourism (with its scenery and wilderness values) and recreation. The island has the potential to be a living laboratory to increase scientific knowledge. It is also an important source of income, providing jobs and revenue to people living within and outside the World Heritage site though opportunities to enhance benefits for the Butchulla people require further focus. Its large aquifer and perched dune lakes provide an important fresh water reserve. Many aboriginal artefacts and sites occur on the island, and the Indigenous Traditional Owners are becoming increasingly involved in management of the World Heritage site. The 2014 and 2019 Native Title Determinations have major implications for involvement of Butchulla people in the management of the World Heritage site.

Projects

Compilation of active conservation projects

№	Organization	Brief description of Active Projects	Website
1	Fraser Island Natural Integrity Alliance	Acts as an umbrella organisation for government and non-government organisations to work collaboratively to protect and restore the natural integrity of Fraser Island. Projects have included: weed management, pest management – cane toad and Jamella (Pandanus leaf-hopper) workshops, restoration of the Eurong nursery, revegetation, education and awareness initiatives – website, signage and quarterly Newsletter.	https://finia.org.au/
2	Conservation Volunteers	Marine debris clean-up, flora and fauna monitoring and Dingo population research involving collection of biological specimens (working with DES), pest plant management.	www.conservationvolunteers.com.au/get-involved/holidays/fraser-island
3	Fraser Island Defenders Organisation	Eurong Bush Regeneration Project (removal of invasive species around inhabited areas) (and other projects, see website).	www.fido.org.au
4	Wildlife Preservation Society of Queensland	Biosecurity on Fraser Island, and other projects	http://www.wildlife.org.au/ http://www.wildlife.org.au/news/2010/biosecurity.html
5	Sandy Cape Lighthouse Volunteers	Pest management, care and maintenance of Sandy Cape precinct, Marine turtle conservation program (working with DES).	

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