1.1 EPBC Act significance assessment

Status

The Grey-headed Flying-fox is listed as Vulnerable under the EPBC Act and TSC Act.

Distribution

The Grey-headed Flying-fox is endemic to Australia and presently occurs along the east coast from Maryborough in Queensland to Melbourne, Victoria (Department of the Environment and Heritage 2003). This species is also occasionally found west of the Great Dividing Range to the western slopes of NSW and QLD. At any one time, the majority of animals only occupy a small proportion of this entire range (NSW National Parks and Wildlife Service 2001b).

Habitat

The Grey-headed Flying-fox utilises subtropical and temperate rainforests, tall sclerophyll forests, woodlands, heaths, swamps and mangroves, as well as urban gardens and fruit crops for foraging (Churchill 2008; NSW National Parks and Wildlife Service 2001b).

Ecology

This species is considered an important pollinator and seed disperser of native trees, as they forage on the nectar and pollen of eucalypts, angophoras, melaleucas and banksias, as well as fruit of rainforest trees and vines (NSW National Parks and Wildlife Service 2001b; Van Dyck & Strahan 2008). While the majority of foraging events occur within 20 km of their day roost, some individuals will disperse and commute up to 50 km (Van Dyck & Strahan 2008).

Grey-headed Flying-foxes are highly mobile and as the availability of native fruits, nectar and pollen varies over time and throughout their range, they respond to this by migrating between camps up and down the east coast, sometimes travelling hundreds of kilometres (NSW National Parks and Wildlife Service 2001b). When migration occurs they do not move as a colony, but as individuals or small groups resulting in the intermixing of sub-populations (Churchill 2008). The population concentrates in May and June in northern NSW and Queensland where animals exploit winter-flowering trees such as Swamp Mahogany, Forest Red Gum and Paperbark, dispersing south during the summer (Department of the Environment and Heritage 2003).

Grey-headed Flying-fox roost in large colonies of up to tens of thousands and may be shared with Little Red Flying-fox and Black Flying-fox(Churchill 2008). Camps are generally located in gullies with dense vegetation (such as mangrove, rainforest, Melaleuca and Casuarina), close to water and generally located within 20 km of a regular food source (NSW National Parks and Wildlife Service 2001b). Site fidelity to camps is high with some camps in NSW used for over a century (NSW National Parks and Wildlife Service 2001b).These bats usually return annually to particular camps for rearing young (NSW National Parks and Wildlife Service 2001b).

Threats

Threats to Grey-headed Flying-fox include:

- loss of foraging habitat
- disturbance of roosting sites
- unregulated shooting
- electrocution on powerlines.

Specific impacts

The subject site provides suitable foraging habitat for Grey-headed Flying-fox in the form of small fragmented patches of remnant native and urban exotic plantings including;

Removal of winter-foraging habitat including:

→ approximately 0.59 hectares of forest dominated by winter-flowering *Eucalyptus spp*.

→ isolated individual trees including; *Eucalyptus robusta, Corymbia citriodora*, *C. maculata*, and *E. sideroxylon*).

Removal of general habitat for foraging and roosting including:

→ approximately 0.62 ha of native vegetation communities

This area represents only a small component of locally occurring resources that are accessible to this species in the adjacent and wider locality.

The Grey-headed Flying-fox roost site known from Parramatta Park approximately <1km from the site is not impacted directly or considered likely to be indirectly impacted by the project.

In additional to habitat loss the proposed action may result in collision/electrocution of individuals on new overhead wiring. However the majority of the proposed alignment is restricted to existing rail and road corridors within a highly urbanised setting and where these hazards are already present.

Significance assessment

The Grey-headed Flying-fox is listed as Vulnerable under the EPBC Act. The following assessment has been undertaken following the Matters of National Environmental Significance, Significant Impact Guidelines 1.1 (Department of Environment 2013). Under the Act, important populations are:

- likely to be key source populations either for breeding or dispersal
- likely to be necessary for maintaining genetic diversity, and/or
- at or near the limit of the species range.

Grey-headed Flying-foxes occur across a range of wooded habitats where their favoured food, eucalypt blossom occurs. They set up roosting camps in association with blossom availability, which are usually situated in dense vegetation and associated with water. Grey-headed Flying-foxes can migrate up to 75 km north during the winter and during this time young flying-foxes establish camps.

Grey-headed Flying-foxes exist as a single population across the species' range and hence the concept of an important population is not meaningful for this species. Instead, impacts on the species have been assessed in terms of important habitat.

Due to the lack of known or likely breeding sites, the disturbed state of the vegetation present and the very small area of this habitat affected, the habitat of the study area is not considered to be important habitat.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will result in one or more of the following:

Lead to a long-term decrease in the size of an important population of a species (Lead to a long-term decrease in the size of an area of important habitat)

Not applicable. Grey-headed Flying-fox habitat in the study area is not important habitat.

Reduce the area of occupancy of an important population of the species (Reduce the area of important habitat)

Not applicable. Grey-headed Flying-fox habitat in the study area is not important habitat.

Fragment an existing important population into two or more populations (Fragment important habitat)

Not applicable. Grey-headed Flying-fox habitat in the study area is not important habitat.

Adversely affect habitat critical to the survival of a species

No critical habitat is listed for this species under the EPBC Act.

Habitat critical to the survival of a species may also include areas that are not listed on the Register of Critical Habitat if they are necessary:

- for activities such as foraging, breeding, roosting, or dispersal

- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)
- to maintain genetic diversity and long-term evolutionary development, or
- for the reintroduction of populations or recovery of the species or ecological community (Department of Environment 2013).

Due to the lack of known or likely breeding sites, the disturbed state of the vegetation present and the lack of important winter-flowering tree species, the habitat of the study area does not meet the above criteria.

Disrupt the breeding cycle of an important population (Affect breeding sites in important habitat)

Not applicable. Grey-headed Flying-fox habitat in the study area is not important habitat.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

Due to the highly urbanised setting, lack of known or likely breeding sites and the disturbed and fragmented state of the vegetation present, the habitat of the study area is considered to be in poor condition. Based on the small area (approximately 0.62 ha) of native vegetation and exotic plant foraging resources to be impacted, it is unlikely that the proposal would significantly affect the availability of quality habitat to the extent that species would decline.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species´ habitat

It is not likely that invasive species (such as introduced predators) that are harmful to the Grey-headed Flying-fox would become further established as a result of the proposal.

Introduce disease that may cause the species to decline

No. There are no known diseases that are likely to increase in the area as a result of the project.

Interfere with the recovery of the species

No recovery plan for the Grey-headed Flying-fox has currently been prepared under the EPBC Act. Given the degraded nature of the habitat affected and the abundance of canopy foraging opportunities that would remain in the locality it is unlikely that the proposal would interfere significantly with the recovery of the species.

Conclusion

Whilst the survey area provides potential marginal foraging resources for the Grey-headed Flying-fox, the habitat has previously been disturbed and consists of highly to moderately disturbed native and exotic vegetation which in some areas contains and entirely exotic groundcover. The proposed works will require the removal of a very small amount of native vegetation that is not considered to be important habitat. Importantly, the project will not directly impacts on known roost camps within the study area and an abundance of canopy foraging opportunities would remain in the locality. It is not likely that the proposal would cause a significant impact on the Grey-headed Flying-fox.

1. Swift Parrot (*Lathamus discolor*)

Status

The Swift Parrot is listed as Critically Endangered under the EPBC Act and Endangered under the TSC Act.

Distribution

The Swift Parrot breeds in Tasmania during spring and summer and migrates in autumn and winter to south-eastern Australia. On the mainland it occurs from Victoria and the eastern parts of South Australia, to south-east Qld. In NSW, Swift Parrot mostly occurs on the coast and south-western slopes (Department of Environment and Conservation 2006).

Habitat and ecology

Swift Parrots migrate to the Australian south-east mainland between March and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp infestations (Department of Environment and Conservation 2006). Favoured feed trees include winter flowering species such as *Eucalyptus robusta, Corymbia maculata, Corymbia gummifera, Eucalyptus sideroxylon, Eucalyptus albens* and *Eucalyptus tereticornis* (Higgins 1999). The parrots return to home foraging sites on a cyclic basis depending on food availability (Department of Environment and Conservation 2006). Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum *E. globulus* (Webster 1988).

Threats

On mainland Australia, the main threat affecting this species is the loss of habitat through clearing for agriculture and urban and industrial development. During the breeding season and winter migration, collisions with wire netting fences, windows and cars threaten this species, particularly where such obstacles are in close proximity to suitable habitat (Department of Environment and Conservation 2006).

Specific impacts

It is not known whether or not Swift Parrots utilise any of the vegetation in the subject site. The subject site does contain potential foraging habitat for this species in the form of isolated remnant trees and small patches of native forest containing suitable winter-flowering trees and tree species prone to lerp infestation. No bird surveys have been completed during the core period when Swift Parrots' arrive in their wintering grounds on mainland Australia.

The minimisation of potential impacts on native vegetation, especially potential habitat for the Swift parrot, has been considered during the design of the project and the construction planning process.

Approximately 0.59 ha of potential foraging habitat will be impacted by the proposed action including:

- → approximately 0.59 hectares of forest dominated by winter-flowering *Eucalyptus spp*.
- → isolated individual trees including; *Eucalyptus robusta*, *Corymbia citriodora*, *C. maculata* and *E. sideroxylon*).

Collision/electrocution of individuals on new overhead wiring. There is also a small risk of mortality due to collision of individuals with overhead wiring.

1.1 EPBC Act significance assessment

The Swift Parrot is listed as Endangered under the EPBC Act. The following assessment has been undertaken following the Matters of National Environmental Significance, Significant Impact Guidelines 1.1 (Department of the Environment Water Heritage and the Arts 2009). Under the EPBC Act, population of a species is defined as:

- a geographically distinct regional population, or collection of local populations; or
- a population, or collection of local populations, that occurs within a particular bioregion.

An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will result in one or more of the following:

Will the action lead to a long-term decrease in the size of a population of a species?

Approximately 0.59 ha of potential habitat for the Swift Parrot would be affected by the proposed action. While habitat in the subject site has potential to be used by this species, it is considered to be marginal due to the highly urbanised setting, its small patch size, fragmentation, weed invasion and location in a highly urbanised environment.

The small area of potential habitat affected only represents a small proportion of similar locally occurring resources that would be accessible to this species and any Swift Parrots in the area would not be restricted to habitat within the subject site.

New infrastructure associated with the proposed action (e.g. overhead wiring) may pose some collision risk for the species. However, given that the proposed action would also result in the removal of some existing collision hazards and that the design would include measures to reduce collision hazards, the proposed action's overall impact on collision hazard is likely to be, at worst, neutral.

Therefore, the proposal is not likely to result in a long-term decline in the size of a population.

Will the action reduce the area of occupancy of the species?

The non-breeding range of swift parrots includes much of the east coast of mainland Australia, primarily including forested areas of Victoria and eastern New South Wales but ranging up to south-east Queensland (EPBC listing). Given the temporally and spatially variable long-distance movements of swift parrots, and their specialised breeding and foraging requirements, calculating area of occupancy for the species is challenging. Each year swift parrots move long distances to occupy new locations in response to changing food availability at the landscape scale and hence undergo extreme fluctuations in the area used between years, with estimates at ranging from 18.5 km^2 to 355 km^2 between 2009 and 2014 (EPBC listing).

The small area of potential habitat affected (0.59 Ha) only represents a small proportion of the local area of habitat potentially occupied by the species. The effect of the proposed action on the overall area of occupancy of the Swift Parrot is therefore likely to be negligible.

Will the action fragment an existing population into two or more populations?

The majority of the subject site is located in cleared land, with only scattered remnant and planted indigenous trees and other non-indigenous vegetation. Impacts on areas of native vegetation communities are located in peripheral areas of vegetation patches. The proposed activity is thus unlikely to result in a substantial increase in the fragmentation or isolation of habitat for the species.

Due to the negligible potential impact of the proposed activity on habitat connectivity and the long-distance movements of Swift Parrots, the proposed activity would not fragment an existing population into two or more populations.

Will the action adversely affect habitat critical to the survival of a species?

No critical habitat is listed for this species under the EPBC Act or the TSC Act. Habitat critical to the survival of a species may also include areas that are not listed on the Register of Critical Habitat if they are necessary:

- for activities such as foraging, breeding, roosting, or dispersal
- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)
- to maintain genetic diversity and long-term evolutionary development, or
- for the reintroduction of populations or recovery of the species or ecological community (Department of the Environment Water Heritage and the Arts 2009).

The proposal would remove approximately 0.59 ha of potential foraging habitat. While this habitat has potential to be used by this species, it is considered to be marginal due to its small patch size, fragmentation, weed invasion and location in a highly urbanised environment. It is unlikely that this habitat would be critical to the survival of the Swift Parrot.

Will the action disrupt the breeding cycle of a population?

Swift Parrots breed in Tasmania during spring and summer, migrating to south-eastern Australia during autumn and winter (Department of Environment and Conservation 2006). Successful breeding of Swift Parrots is also likely to be dependent on flowering resources across a wide range of habitats (woodlands and forests) within their NSW wintering grounds, the most important of these would consist of large stands of native vegetation containing substantial populations of winter-flowering tree species. No such important foraging habitat exists in the subject site.

Due to the fact that the project would not affect breeding habitat or potentially important foraging habitat, it would not disrupt the breeding cycle of a population of the Swift Parrot.

Will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

The proposed action is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the Swift Parrot is likely to decline, for the following reasons stated in further detail in the preceding sections of this assessment:

- habitat in the subject site is considered to be marginal due to its small patch size, fragmentation, weed invasion and location in a highly urbanised environment
- the small area of potential habitat affected only represents a small proportion of similar locally occurring resources that would be accessible to this species.
- the proposed activity would have negligible on habitat connectivity and the long-distance movements of Swift Parrots
- the subject site lacks habitat likely to be critical to the survival of a species
- the proposed action is unlikely to affect breeding habitat or otherwise disrupt the breeding cycle the species.

Will the action result in invasive species that are harmful to an Endangered species becoming established in the Endangered species´ habitat?

It is not likely that invasive species (such as introduced predators or nectar competitors) that are harmful to the Swift Parrot would become further established as a result of the proposed action as it would not involve the movement of animals or the transport of materials likely to harbour invasive animal species. Industry standard weed management measures would be sufficient to ensure that the likelihood of the introduction of additional invasive weed species would be negligible.

Will the action introduce disease that may cause the species to decline?

The proposed action would not involve the movement of animals or materials likely to be infected with pathogens that would cause disease the Swift Parrot populations.

Measures would be in place to minimise the potential for the introduction of plant pathogens, which could affect the Swift Parrot's habitat, in materials used for the proposed action.

It is therefore unlikely that the proposed action would introduce disease that could cause the species to decline.

Will the action interfere with the recovery of the species?

The Action Plan for Australian Birds (Garnett & Crowley 2000) addresses the need for further ecological research on the species and the conservation and protection of roosting habitat and identification of specific breeding requirements.

Specific objectives of the Swift Parrot Recovery Plan (Swift Parrot Recovery Team 2001) include:

- identify priority habitats and sites across the range of the Swift Parrot
- implement management strategies to protect and improve priority habitats and sites resulting in a sustained improvement in carrying capacity
- reduce the incidence of collisions with man-made structures
- determine population trends within the breeding range
- quantify improvements in carrying capacity by monitoring changes in extent and quality of habitat
- increase public awareness about the recovery program and to involve the community in the recovery.

The study area is not considered to be a priority habitat for this species, however based on the potential ecological impacts of the proposal on this species, it is likely that the proposal would be in conflict with the objectives of this species recovery plan. The potential habitat contained within the study area is generally of low to moderate quality and an abundance of similar and likely higher quality habitat is located is the locality. The action is considered unlikely to result in interfering with the recovery of this species.

Conclusion

Although the Swift Parrot was not recorded in the study area during current surveys, the study area provides potential foraging resources in the form of winter flowering Eucalypt trees. The proposal would affect a relative small area of potential habitat (approximately 0.59 ha). The potential habitat contained within the study area is generally of low to moderate quality. Therefore it is unlikely that the proposal will have a significantly adverse effect on Swift Parrot viability in the long-term on a local or national scale.