Harvey Basin Allocation Plan:

Western Ringtail Possum Survey

Prepared for

Water and Rivers Commission
Hyatt Centre
3 Plain Street
East Perth
Western Australia 6004

by

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October 1997

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Report on western ringtail possum survey within part of the inundation area of proposed Harvey Dam.

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October 1997

Summary

The consultancy brief was to determine whether the western ringtail possum, *Pseudocheirus occidentalis*, is present within the inundation area of the proposed Harvey Dam. Evidence of western ringtail possum presence was sought from survey of 4 selected areas where peppermint, *Agonis flexuosa,* was present and from historic records (published and unpublished), anecdotal accounts, previous *ad hoc* informal surveys and from discussions with current and former landholders and local residents.

Although within the former known distribution, there was no historic record of the western ringtail possum within the survey area. Anecdotal accounts indicated that the western ringtail possum may have been present as recently as 1982 in *Agonis flexuosa* vegetation to the north of the study. This area has since been cleared and is outside the area to be inundated by the proposed dam. The only other anecdotal evidence of presence of western ringtail possums in the survey area was ambiguous.

Survey involved diurnal searches for the presence of dreys (constructed nests) and nocturnal spotlighting. Diurnal searches revealed the presence of 3 potential dreys. Of these, only one was confidently identified as being constructed by a western ringtail possum. There was no evidence of recent use of this drey.

There were 4 nocturnal sightings of 2 western ringtail possums. All sightings were in the vicinity of recorded dreys/possible dreys.

The results clearly demonstrated the presence of the western ringtail possum within the survey area. The results further indicated that the population may be at a critically low density and may not be viable.

However, if the population is viable, it is of conservation significance as it represents the northern extent of the distribution of the western ringtail possum, exclusive of translocated populations.

Further survey is recommended. Priority for survey are the areas of contiguous *A. flexuosa* vegetation extending along the Harvey River towards Stirling Dam. Survey of non-*A. flexuosa* vegetated areas extending to the north and northeast of Harvey Weir may also be warranted.

Confirmation of additional sightings may warrant use of DNA techniques to complement density estimates derived from survey.

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1. The Consultancy Brief

The consultancy brief was to determine whether the western ringtail possum, *Pseudocheirus occidentalis*, is present in the inundation area of the proposed Harvey Dam east of Harvey, Western Australia. The brief specified survey of four areas within the inundation zone.

Figure 1 shows the location of the survey area. The specific areas of survey are shown in figures 1 and 2 and are as follows:

Area 1

The Harvey River from the Tucker property to the Harvey-Quindanning Road and north and west of the Harvey-Quindanning Road to Reserve 15515.

Area 2

Big Brook tributary of the Harvey River, for the sections if and where peppermint is dominant.

Area 3

The tributary east of Stansfield Road and extending, where peppermint is dominant, towards Falls Brook Nature Reserve.

Area 4

Reserve 15515 north and south of the Harvey River and west of Stansfield Road, for the sections where peppermint is dominant.

These areas are within the 90m inundation zone of the proposed dam and have riverine vegetation (peppermint, *Agonis flexuosa*) most likely to support the western ringtail possum, *Pseudocheirus occidentalis*.

Although not specified within the consultancy brief, the consultancy also attempted to validate the reliability of unconfirmed reports of western ringtail possums in the area.

The survey was undertaken in the period 22 September to 6 October 1997.

2. Conservation status and distribution of the western ringtail possum

The distribution of the western ringtail possum has contracted in recent times. In 1983 the western ringtail possum was listed as fauna that is 'likely to become extinct or is rare' pursuant to Section 14(2)(ba) of the Western Australian *Wildlife Conservation Act 1950*. The decline in the species' distribution has been attributed to habitat loss and/or habitat modification, predation by introduced predators and changing fire regimes (Burbidge and de Tores 1997).

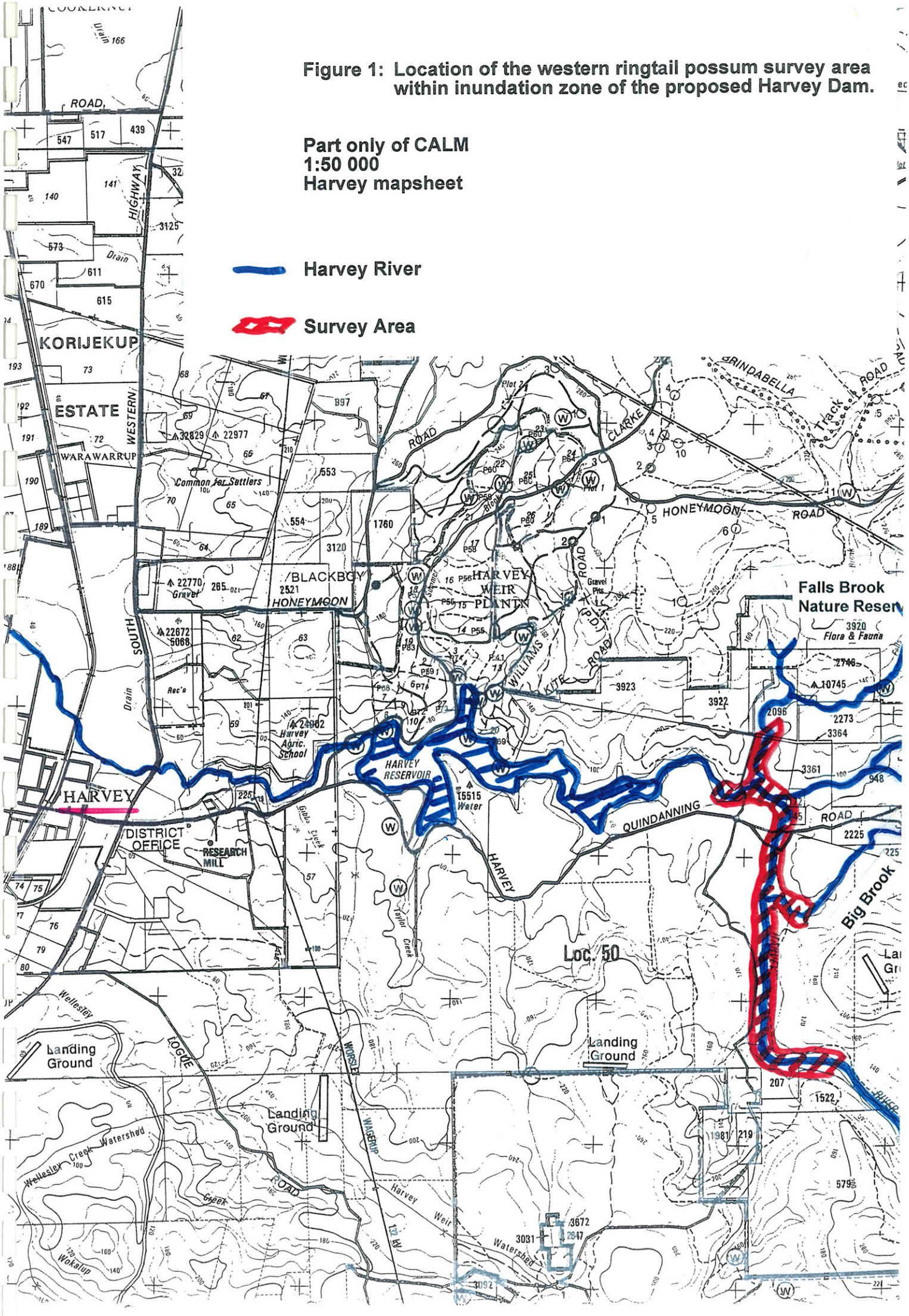
The former distribution encompassed a range of vegetation types. The current distribution is restricted to coastal and near coastal peppermint and peppermint/tuart (*Eucalyptus gomphocephala*) dominated habitat, with the only known inland populations from Perup proposed nature reserve and nearby state forest (Kingston and surrounding forest blocks). All other inland populations are thought to be locally extinct.

The Department of Conservation and Land Management (CALM) is responsible for management of the western ringtail possum and the species is currently managed in accordance with a (draft) Interim Recovery Plan (IRP) (Burbidge and de Tores 1997). In accordance with this IRP, populations have been translocated to Leschenault Peninsula Conservation Park, Yalgorup National Park, the northern jarrah forest southeast of Dwellingup and Karakamia Sanctuary, near Chidlow. To date, translocations have been deemed successful (i.e. have resulted in a self sustaining population) at Leschenault Peninsula Conservation Park only. Research is still underway to determine translocation success at all other sites.

Therefore, the site of the proposed Harvey Dam is within the former known distribution of the western ringtail possum. However, it is outside the species' current known distribution, exclusive of current translocation research sites.

Figure 1: Location of the western ringtail possum survey area within inundation zone of the proposed Harvey Dam.

Part only of CALM
1:50 000
Harvey mapsheet



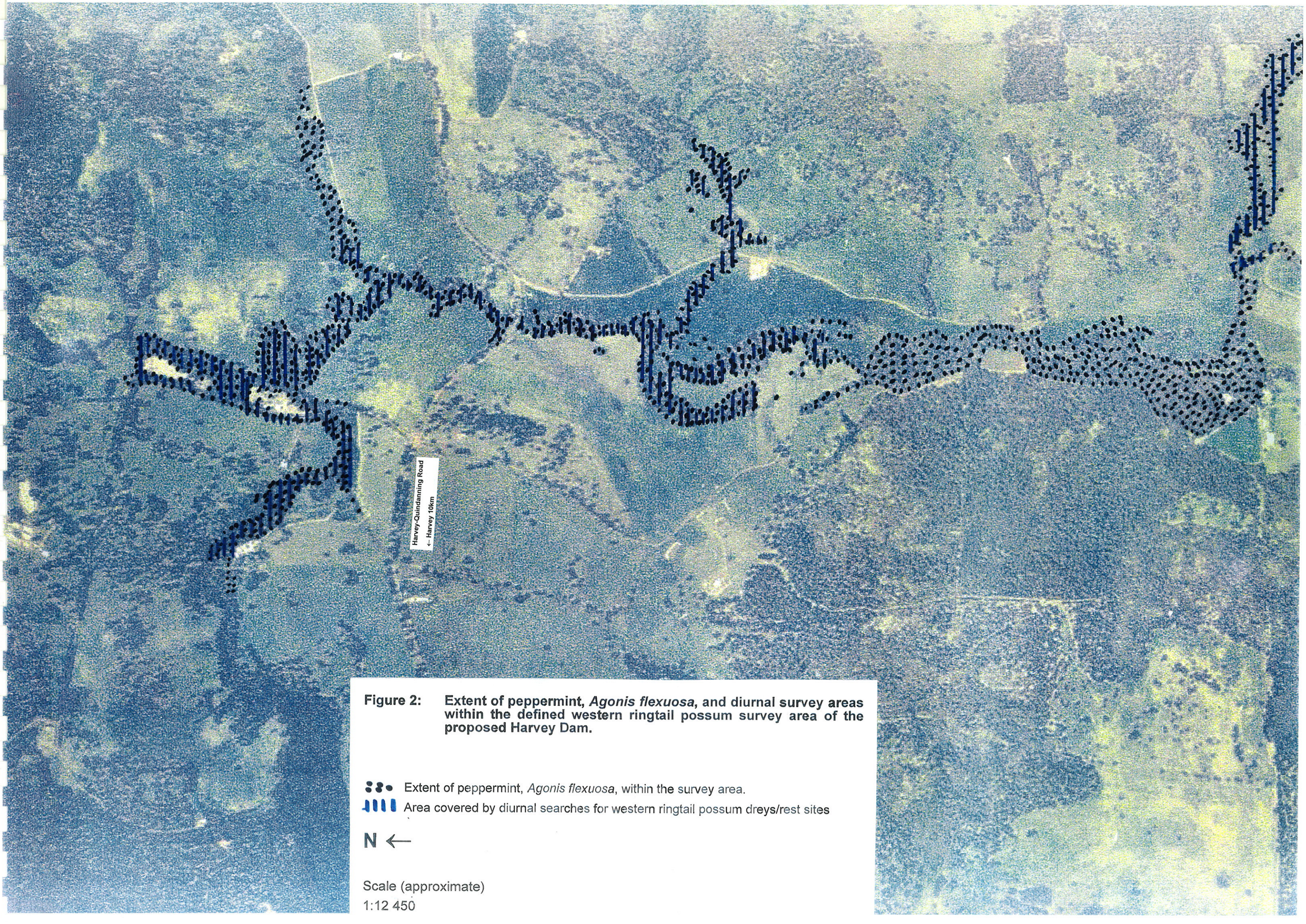


Figure 2: **Extent of peppermint, *Agonis flexuosa*, and diurnal survey areas within the defined western ringtail possum survey area of the proposed Harvey Dam.**

Extent of peppermint, *Agonis flexuosa*, within the survey area.

Area covered by diurnal searches for western ringtail possum dreys/rest sites

N ←

Scale (approximate)
1:12 450

3. Survey Techniques

3.1 Background to survey techniques

Although arboreal, the western ringtail possum is known to come to ground when foraging and has been recorded using rest sites on or near the ground. Diurnal refuges include rest sites with no protection or construction, rest sites in naturally occurring protected sites (e.g. in dense understorey or on the ground and under sedges and reeds), dreys (constructed nests) and tree hollows (de Tores *et al.* in prep).

The western ringtail possum is known to come to ground when the overstorey is discontinuous and to use rest sites at or near ground level. However, it is rarely caught in traps and conventional trapping techniques have been shown to be inappropriate for detection of presence (de Tores and Rosier, personal observations and unpublished data).

Dreys are constructed from fine to medium size material collected from overstorey and understorey vegetation. Dreys vary in the degree of construction and range from flimsy and platform like constructions providing minimal shelter, to elaborate constructions providing substantial protection (de Tores and Rosier, personal observations and unpublished data). Most dreys are constructed entirely or primarily of *Agonis flexuosa* when it is present. In the absence of *A. flexuosa*, the dominant overstorey and understorey species are used (Crow 1996; Millen 1997; de Tores and Rosier unpublished).

Therefore the presence of the western ringtail possum may be determined by detection of dreys in the canopy and understorey species. However, the absence of dreys does not equate with absence of the species.

Tree hollows are also used when available and the western ringtail possum has been recorded using hollows in peppermint (*A. flexuosa*), tuart (*Eucalyptus gomphocephala*), jarrah (*E. marginata*), marri (*E. calophylla*) and blackbutt (*E. patens*) (Inions *et al.* 1989; Jones *et al.* 1994; Crow 1996; Millen 1997; de Tores *et al.* in prep). At known western ringtail possum locations in the lower Collie River valley, dreys are rare and the use of tree hollows more common (de Tores and Rosier personal observations). At Perup proposed nature reserve, Jones *at al.* (1994) recorded the western ringtail possum in tree hollows only. Inions *et al.* (1989), also at Perup, claimed dreys were rarely recorded.

Confirmation of the presence of western ringtail possum at sites where tree hollows are commonly used relies on alternative techniques such as spotlighting and searches for the presence of faecal pellets. In both cases, detection of presence is enhanced with increased population density. At very low population density presence may not be detected.

Recent survey techniques using a combination of diurnal searches for dreys and other rest sites and nocturnal spotlighting have been shown to be successful in assessing western ringtail possum density at peppermint and non-peppermint dominated sites in the Busselton area (de Tores and Rosier, unpublished).

The current survey relied on diurnal detection of dreys or other signs of presence and nocturnal spotlight sightings. Where possibly, all current and former landholders within the survey area were contacted. Information was sought on western ringtail possum sightings.

3.2 Diurnal searches

Diurnal searches were carried out in the areas shown in figure 2. Each tree within the survey area was visually inspected for the presence of dreys. All accessible and visible tree hollows and forks were also examined for indicators of the presence of occupation, e.g. fresh nesting material, faecal pellets.

All potential dreys were thoroughly examined for occupancy. The material(s) used to construct the drey and the type of drey were recorded, e.g. from poorly constructed platforms to elaborate well constructed maternal dreys. Locations of all potential dreys were recorded and mapped. Locations were also recorded using a Magellan Global Positioning System (GPS).

Where necessary, potential dreys were removed and dismantled to assess whether they had been constructed by western ringtail possums.

3.3 Nocturnal spotlighting

Spotlighting was undertaken using two techniques:

- walked searches using head torches and hand held 50W spotlights; and
- driven transects using a 50W hand held spotlight.

Areas spotlit and are shown in figure 3.

The location of each spotlight sightings was mapped and recorded using a GPS.

3.4 Historic records and reports, contact with landholders and unconfirmed reports

Where possible, all landholders (current and former) with property within the survey area were contacted. Information was sought on recent and former sightings, roadkills and anecdotal accounts.

Clarification was sought for an unconfirmed roadkill reported from March 1997 and on reports of *ad-hoc* spotlighting and other surveys.

4. Results

4.1 Diurnal searches

Intensive searches (in excess of 56 hours) revealed the presence of only 3 possible dreys. None was occupied. Detail on description, type and location of dreys/potential dreys is given in appendix 1. Locations are also shown in figure 3.

Of the 3 dreys/potential dreys, only 1 (drey number 2) could be confirmed as constructed by a western ringtail possum. This drey was in a broken branch, had no fresh construction material and appeared to be disused.

There was no other evidence detected to indicate the presence of the western ringtail possum.

4.2 Nocturnal spotlighting

There was approximately 29 spotlighting hours (23hrs from walked searches, 6 hours from driven transects), with 4 confirmed sightings of 2 individual western ringtail possums. The details of each sighting, including location is given in appendix 2. Locations of sightings are also shown in figure 3.

The western ringtail possum from sighting number 1 and 2 (both sightings thought to be of the same animal) appeared to be an adult female, with distinct staining of the pouch area.

4.3 Historic records and reports, contact with landholders and unconfirmed reports

Western Australian Museum (WAM) records (Kitchener and Vicker 1981; WAM unpublished) and CALM database records (de Tores and Rosier unpublished) show no confirmed records of the western ringtail possum within the survey area. CALM database records showed an unconfirmed report of a roadkill. This record was traced to a reported roadkill recorded in March 1997. Photographs of the roadkill had been forwarded to CALM, Bunbury where it had been identified as a western ringtail possum. Photographs of the roadkill were available for inspection. The photographed carcass could not be unambiguously identified as a western ringtail possum.

Appendix 3 lists the landholders, former landholders and local residents contacted who commented on the presence/absence of western ringtail possums. Most were aware of the reported roadkill above, however there was uncertainty as to its identification.

Only one long term resident was able to confidently state that western ringtail possums were/had been present in the area. The area referred to was outside the area of inundation (see appendix 3).

CALM staff had previously conducted informal spotlight surveys in *A. flexuosa* vegetation of the Harvey River, east of Stirling Dam. The surveys were for approximately three hours in total, presumably over one night, and did not reveal the presence of western ringtail possums.

Similarly, results from *ad hoc* wire cage trapping conducted by local residents in conjunction with CALM did not reveal the presence of the western ringtail possum (D. Watts and W. Tucker pers. comm.).

Figure 3: **Areas covered by spotlight survey, locations of sightings and locations of dreys within the western ringtail possum survey area of the proposed Harvey Dam.**

Area covered by spotlight survey (walked searches using headtorches and hand held spotlights).

Area covered by spotlight survey (vehicle driven).

S1 Location of sighting and sighting number.

D1 Location of drey and drey number.

N ←

Scale (approximate)
1:12 450

5. Discussion

Previous surveys and anecdotal accounts

The lack of detection of the western ringtail possum from previous *ad hoc* trapping cannot be interpreted as lack of presence as the species is rarely trapped by conventional trapping techniques. Similarly, at low density, it is unlikely to be detected from a "one-off" spotlight session.

Anecdotal accounts varied. There were numerous references to a roadkill reported from the Harvey-Quindanning Road, east of the Harvey River. Some ambiguity as to its identification still exists. The photographs of the carcass showed it to be grossly compressed. Skull, teeth and pes features (diagnostic in a well preserved specimen) were not visible. Pelage was not typical of the commonly occurring form of the western ringtail possum, however the unusually long pelage was similar (in length only) to one aberrant specimen known from Busselton. The tail was not typical of a western ringtail possum. The photographic evidence alone is insufficient to conclude that the western ringtail possum is present in the survey area.

Anecdotal accounts of sightings were also inconclusive. Descriptions of reported sightings more often indicated the common brushtail possum, *Trichosurus vulpecula*, and/or the brush-tailed phascogale, *Phascogale tapoatafa*. Both species are often mistakenly reported as western ringtail possums. There was only one unambiguous recollection of western ringtail possums from the area, with the last sighting known from "15 to 20 years ago" (M. Ballingall pers. comm.). The area from which the report was made was formerly *A. flexuosa* woodland, to the north of, and outside the area to be inundated by the proposed Harvey Dam. The area is now largely cleared.

The current survey

The survey was restricted to 4 specified areas where *Agonis flexuosa* was present. The presence of *A. flexuosa* was influential in site selection as, when present, it is the preferred diet of the western ringtail possum (Jones *et al.* 1994). Records of nocturnal sightings of the western ringtail possum also indicate that *A. flexuosa* is the preferred diet. Radio-telemetry studies of nocturnal foraging showed 70-75% of sightings were in *A. flexuosa* at sites where it was dominant at Yalgorup National Park (Crow 1996; de Tores and Rosier unpublished).

A total of 3 dreys/potential dreys was identified in the current survey area. Of these, only one was able to be confirmed as a drey likely to have been constructed by a western ringtail possum. There were 4 confirmed spotlight sightings of 2 individual western ringtail possums (2 sightings of each animal). Each sighting was within the vicinity (within 50m) of a structure identified as a potential drey. Sighting number 1 was within 5m of the recorded location of the only confirmed drey, albeit disused.

Individual western ringtail possums have been recorded using 6-10 dreys or visible structures at sites where *A. flexuosa* is dominant (Leschenault Peninsula Conservation Park) (de Tores *et al.* in prep) and a minimum of 5 dreys or platforms (Locke Estate Nature Reserve) (Jones *et al.* 1994). If a viable population of the western ringtail possum were present in the Harvey River survey area, dreys would be expected.

However, the detection of very few dreys or other rest sites in the survey area alone does not indicate lack of a viable population. At jarrah/marri dominated sites, such as Perup proposed nature reserve, dreys are rarely recorded and the western ringtail possum is known to occur at high density (de Tores and Rosier, unpublished). At Abba River, near Busselton, tree hollows in tuart, *E. gomphocephala*, were the most frequently recorded diurnal rest sites (Jones *et al.* 1994). At the lower Collie River valley, where *A. flexuosa* is present, the western ringtail possum is rarely recorded in dreys and known to use tree hollows in blackbutt, *E. patens*. (de Tores and Rosier, unpublished). However, at other known western ringtail possum sites where *A. flexuosa* is present, even when tree hollows are regularly used, dreys are readily detected.

The implication is, that within the survey area, tree hollows are used in preference to constructed dreys. However, the detection of very few dreys, combined with detection of only 2 individual western ringtail possums from a relatively comprehensive survey of the limited area, indicates that the population may be at a critically low density.

The survey area is within the former known range of the western ringtail possum. However, the WAM published (Kitchener and Vicker 1981) and unpublished records show no record

of the occurrence of the western ringtail possum within the area. The closest known extant population is in the lower Collie River valley, 35km to the south. Although there have been recent translocations to Yalgorup National Park and the northern jarrah forest, southeast of Dwellingup, the occurrence of western ringtail possums in the Harvey River area is of conservation significance. If the population is viable, it represents the northern extent of the distribution of the western ringtail possum, exclusive of translocated populations.

Further survey of *A. flexuosa* areas within the area to be inundated may reveal the presence of a larger population.

Further survey is recommended for the areas of contiguous *A. flexuosa* along the Harvey River, extending towards the Stirling Dam from the property currently owned by Tucker (surveyed only by vehicle spotlighting in this study). Survey may also be warranted for non-*A. flexuosa* creekline vegetation extending northeast of Harvey Weir (towards Falls Brook Nature Reserve) and creeklines with isolated stands of *A. flexuosa* extending north of Harvey Weir.

If subsequent survey also indicate low density, use of DNA techniques currently being developed (P. Spencer pers. comm.) may be appropriate to complement the density estimates derived from survey.

References

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Appendices

Appendix 1: Structures identified as dreys or potential dreys within the western ringtail possum survey area of the proposed Harvey Dam.

Appendix 2: Western ringtail possum spotlight sightings from within the survey area of the proposed Harvey Dam.

Appendix 3: Record of reported sightings and anecdotal accounts of the western ringtail possums from landholders within the survey area of the proposed Harvey Dam.

Appendix 1: Structures identified as dreys or potential dreys within the western ringtail possum survey area of the proposed Harvey Dam.

Drey/ structure number	Description of location	AMG location reference (zone) easting northing	Description of drey/structure	Height of drey/rest site (m)	Veg height (m) and species	Occupied Yes/No
1	On property immediately northeast of the junction of Falls Brook and Harvey River.	(50) 406651 6339266	Compact cup/ball shaped tightly woven possible drey at 8.5m in 10m *Agonis flexuosa* overhanging river at junction of Falls Brook and Harvey River Constructed from *A. flexuosa*	8.5	10m *Agonis flexuosa*	No
2	On property formerly owned by D. Morris. Approx. 50m north of Harvey-Quindanning Road, west of the Harvey River.	(50) 404840 6338684	Disused drey in broken multi-stemmed fork. Oval maternal type drey of old *A. flexuosa* material densely compacted – drey removed to confirm identification – photographed.	8	8m *Agonis flexuosa*	No
3	On property formerly owned by B. Smedley. 3m north of Big Brook, 5m east of Peppermint Park road.	(50) 405108 6337898	Lightly constructed shallow cup-shaped drey. Constructed from *A. flexuosa*.	15	15m mature *Agonis flexuosa*	No

Appendix 2: Western ringtail possum spotlight sightings from within the survey area of the proposed Harvey Dam.

Sighting Number	Number of possums	Date	Time (24hr clock)	Description of location	AMG location reference (zone) easting northing
1	1	1/10/97	00:02	In vegetation fringing Harvey River, 60m from Harvey-Quindanning Road – at 7m in 8m *E. calophylla.*	(50) 404845 6338680
2	1	2/10/97	02:40	In roadside vegetation/fringing Harvey River, 5m from Harvey-Quindanning Road – on horizontal branch at 5.5m in 15m *A. flexuosa* with overstorey of *E. calophylla* to 20m	(50) 404842 6338656
3	1	3/10/97	01:00	In vegetation fringing Big Brook, 40m east of Peppermint Park property track, 4m north of creek. At 6m in 18m *E. calophylla,* sighted within intertwining regrowth *E. calophylla* and *A. flexuosa*. The *E. calophylla* was on outer edge of dense clump of *A. flexuosa* to 15m.	(50) 405108 6337898
4	1	4/10/97	00:05	In vegetation fringing Big Brook, 50m east of Peppermint Park property track, 4m north of Big Brook. At 10m in 12m *E. calophylla* in *A. flexuosa* grove. *A. flexuosa* to 15m with *E. calophylla* emergents to 20m.	(50) 405178 6337922

Appendix 3: Record of reported sightings and anecdotal accounts of the western ringtail possums from landholders within the survey area of the proposed Harvey Dam.

Name of landholder/former landholder/tenant	Description of property location or reason why contacted	Knowledge of sightings/occurrence of the western ringtail possum within the survey area
BALLINGALL, Maurice	Owner of property to north of Harvey Weir.	Confidently identified the presence of western ringtail possums approximately 15 to 20 years ago. Identified former *A. flexuosa* woodland in the area north of proposed dam inundation area. The *A. flexuosa* woodland has since been cleared/partially cleared.
BOYLE, Sandra and Chris	Property owners, Stansfield Road.	Aware of the reported western ringtail possum roadkill on Harvey-Quindanning Road, east of Harvey River. Unaware of any other reportings/sightings. No knowledge of presence of western ringtail possums.
BRODIE HALL, Jean and Sir Lawrence	Property owners, Stansfield Road.	Suspected presence of common brushtail possum only. No knowledge of presence of western ringtail possums.
CHIDLOW, John	Property owner	Believed western ringtail possums were present, however, descriptions matched common brushtail possum and brush-tailed phascogale.
GARDNER, Graham	Local resident, history of management of numerous properties in the area.	Believed western ringtail possums were present, however, relied on identification of eyeshine only from one animal.
JAMES, Susie and Ian	Property owners, Stansfield Road.	Aware of the reported western ringtail possum roadkill on Harvey-Quindanning Road, east of Harvey River. Unaware of any other reportings/sightings.
McDONNELL, Frank	Local resident, history of management of numerous properties in the area.	Commented on the conspicuous absence of western ringtail possums and common brushtail possums.
MORRIS, David and Janine	Most recent owners of "Jardup" (property and gallery), prior to sale to Water Corporation. Had owned the property since 1972.	Aware of the presence of brushtail possums only.
NEWBY, Ron	Long term resident of Harvey and builder of house on Prindiville property.	Aware of a possum roadkill on Harvey-Quindanning Road, west of the Harvey river. Different roadkill from the reported western ringtail possum roadkill east of the Harvey river. No knowledge of the presence of western ringtail possum in the survey area.
SMEDLEY, Barrie	Former property owner of "Peppermint Park" before sale to Water Corporation.	No knowledge of presence of western ringtail possums.
TUCKER, Michelle and Warren	Property owners, "Sunnyvale"	Aware of the reported western ringtail possum roadkill on Harvey-Quindanning Road, east of Harvey River. Unaware of any other reportings/sightings.
VALENTA, Narelle and Paul	Residents of property formerly owned by Morris family prior to sale to Water Corporation.	No knowledge of presence of western ringtail possums.
WATTS, Don	Local resident with long standing interest in fauna conservation issues. Associated with CALM in trapping and spotlighting in area.	Aware of the reported western ringtail possum roadkill on Harvey-Quindanning Road, east of Harvey River. Unaware of any other reportings/sightings.