Epizootic disease associated with mammal declines in Western Australia: The historical record

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My involvement

- Serendipitous
- No hypothesis!
- Commenced 1999, leading to interest in early records of feral cats in Australia
- Predisposed (interested in historical ecology since 1973)
- Ecological interests; no expertise with pathology

Sources of information

- Oldtimers' recollections
- Archival records (newspapers, Govt files, letters)
- Historical documents (Hansard, Parliamentary reports)
- Local histories
- Scientific papers
- Collecting effort

PART 1: Disease up to 1925
Paper published

Abbott, I. 2006 Mammalian faunal collapse in Western Australia, 1875-1925: the hypothesised role of epizootic disease and a conceptual model of its origin, introduction, transmission, and spread. *Australian Zoologist* **33**: 530-561

1829-c.1900
SW WA mammal species:

- Many species abundant
- Some fearless: foraging around campsites, in houses & storerooms
- Some browsed crops & garden plants
- Some ate sown seed & grain
- Some defoliated fruit trees
- Some killed sheep, poultry

Museum collectors well rewarded

- 1839-43: Gilbert & Preiss (SW)
- 1860s: Masters
- 1870s: Webb
- 1890s: Dahl (Kimberley), Tunney (SW)

Sudden disappearance of species

- *many species of bush quadrupeds completely died out here [Minilya River] some years ago [1884]*

(Carter 1889)

- *in the early days…there were in the North-West a number of animals which have now disappeared [1880s]*

(Hicks 1901)

- *the extraordinary disappearance of the small marsupials in many parts of the State*

(Royal Commission 1901)

- *Their disappearance…first noticed about 1880, being most sudden and unaccountable*

  (Port Hedland, Carnarvon: Shortridge 1910)

- *a strange virus which attacked all small marsupials, killing many species right out…I think…in the 1880s or 1890s*

  (Balladonia: A Crocker)

- *All the 'possums, bandies, snakes, and goannas died [1888]. Every hollow log had its dead or dying inhabitant*

  (Konnongorring: CH Chitty)

- …*about 20 years ago opossums were Plentiful this District at which time [1893] some contagious Disease spread amongst them and they all died out*…

  [Meckering]

- [Possums] *died out about the same time [1890s] as the Aborigines had died of measles*

  [Gingin]

- *I used to find [1899] the oppossums during clearing opperations suffering undoubtedly from some disease. I have found them in hollow limbs, so weak and wasted as to be unable to climb up & I have found them asleep at the foot of trees too weak to climb up & I have found them dead both in hollows & on the ground*

  [Beverley district]

- *boodie went from being present in hundreds in 1903 [?in Williams district] to ‘practically extinct’ by 1918*

  (JA Greig 1918)

- *boodies and woylies ‘died out’ between 1912-13 at Lake Muir*

  (JT Tunney 1913)

Cause?

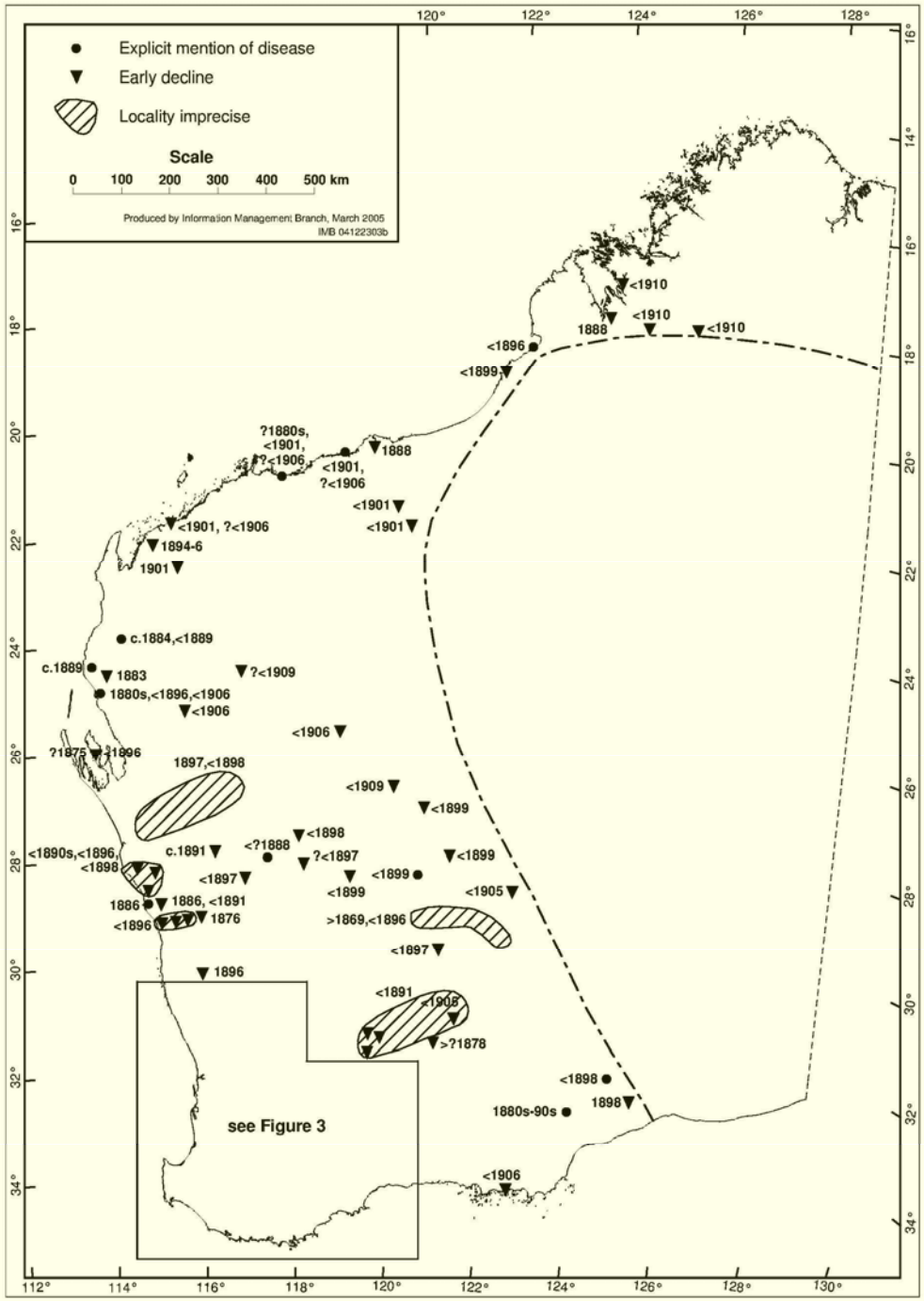
NOT

- clearing of vegetation for farms or towns
- hunting for food or for sport
- grazing by livestock
- logging of forests
- drought
- rabbits, foxes or cats

Cause?

Epizootic disease

- sudden
- many species affected
- large part of WA affected
- first noticed c. 1880
- dead and dying animals noted
- some affected species later increased
- later reports of possum skeletons in trees


Explicit mention of disease
Early decline
Locality imprecise
Scale
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Produced by Information Management Branch, March 2005
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see Figure 3
<1910
<1910
1888
<1910
<1896
<1899
?1880s,
<1901,
?<1906
1888
<1901,
?<1906
<1901
<1901
<1901, ?<1906
1894-6
1901
c.1884,<1889
c.1889
1883
?<1909
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?1875
?1896
1897,<1898
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<1898
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<1898
c.1891
<?1888
?<1897
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<1897
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<1905
1886
1886, <1891
1876
<1896
>1869,<1896
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1896
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>?1878
<1898
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1880s-90s
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112°
114°
116°
118°
120°
122°
124°
126°
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130°
16°
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22°
24°
26°
28°
30°
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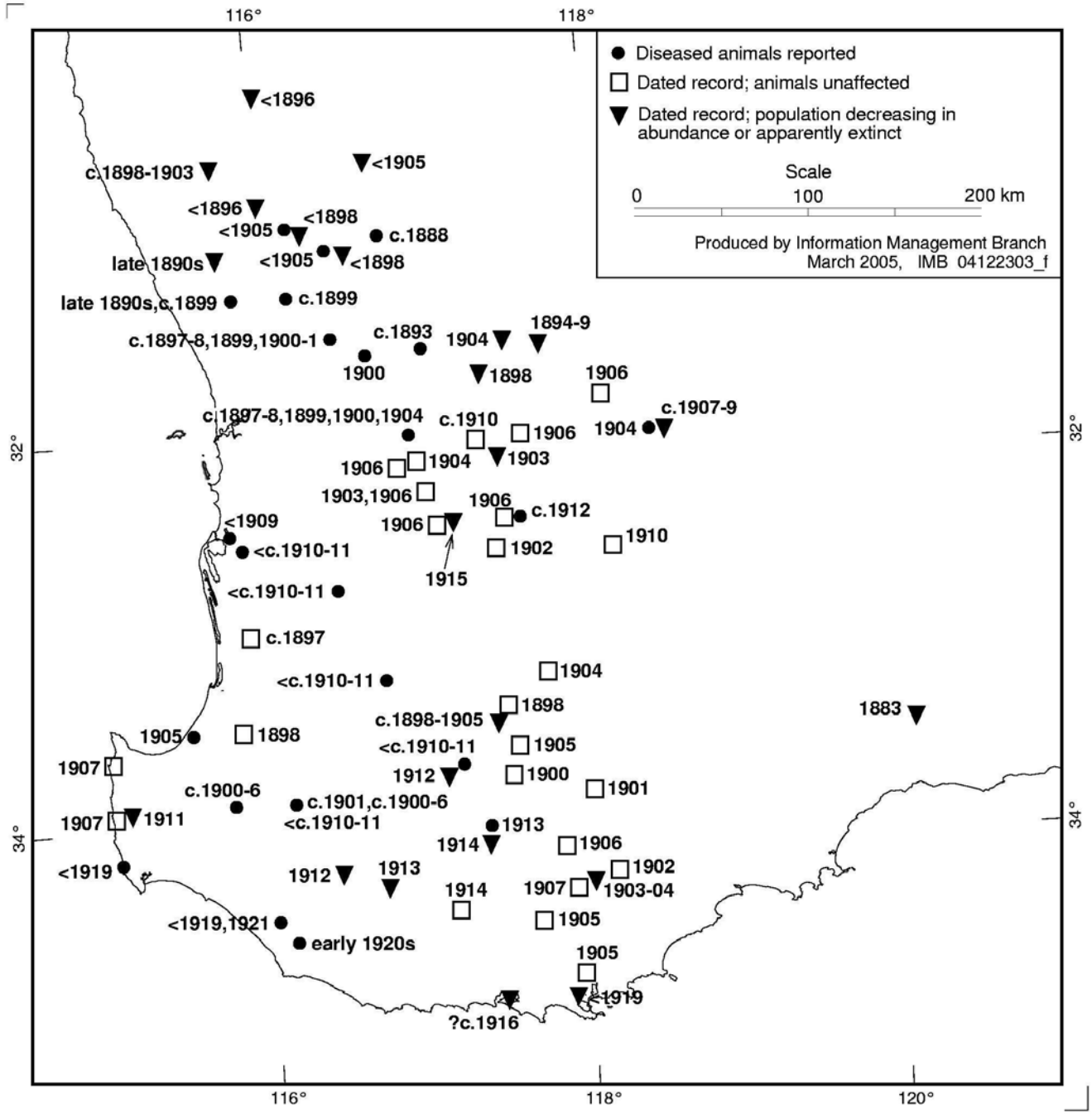
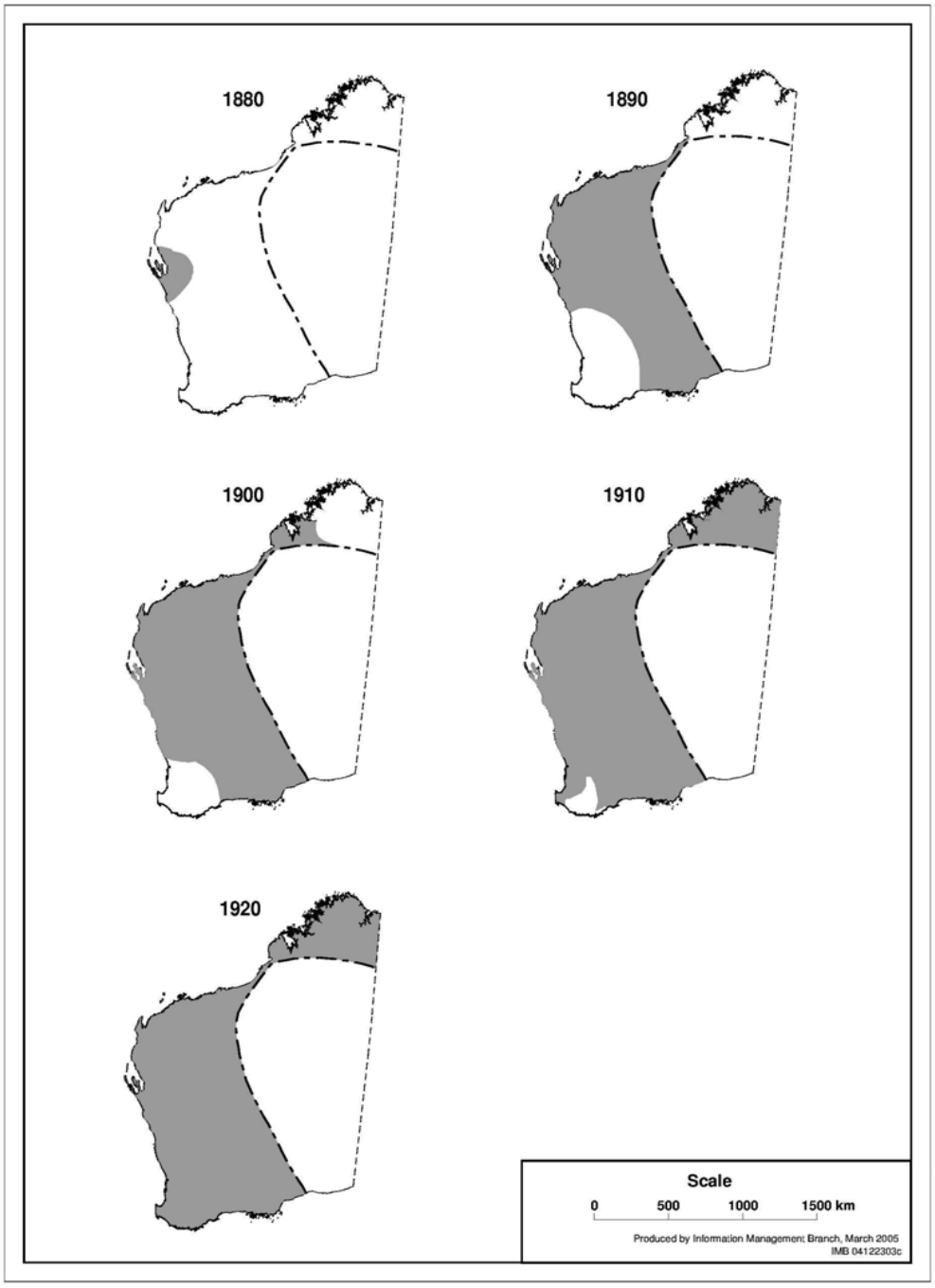

116°
118°
120°
32°
34°
Diseased animals reported
Dated record; animals unaffected
Dated record; population decreasing in abundance or apparently extinct
Scale
0
100
200 km
Produced by Information Management Branch
March 2005, IMB 04122303_f
<1896
<1905
c.1898-1903
<1896
<1898
<1905
c.1888
late 1890s
<1905
<1898
late 1890s,c.1899
c.1899
c.1897-8,1899,1900-1
c.1893
1904
1894-9
1900
1898
1906
c.1897-8,1899,1900,1904
c.1910
1906
1904
c.1907-9
1906
1904
1903
1903,1906
1906
c.1912
<1909
1906
1910
<c.1910-11
1902
1915
<c.1910-11
c.1897
1904
<c.1910-11
1898
c.1898-1905
1883
1905
1898
<c.1910-11
1905
1907
1912
1900
1901
c.1900-6
c.1901,c.1900-6
1907
1911
<c.1910-11
1913
1914
1906
1902
<1919
1912
1913
1914
1907
1903-04
<1919,1921
1905
early 1920s
1905
<1919
?c.1916

Deductions

- Origin: Shark Bay, c. 1875
- Rapid spread of the disease in 1880s
- Lower south-west affected last, 1910-20
- 33 spp may have been affected – major change in distribution & abundance


1880
1890
1900
1910
1920
Scale
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500
1000
1500 km
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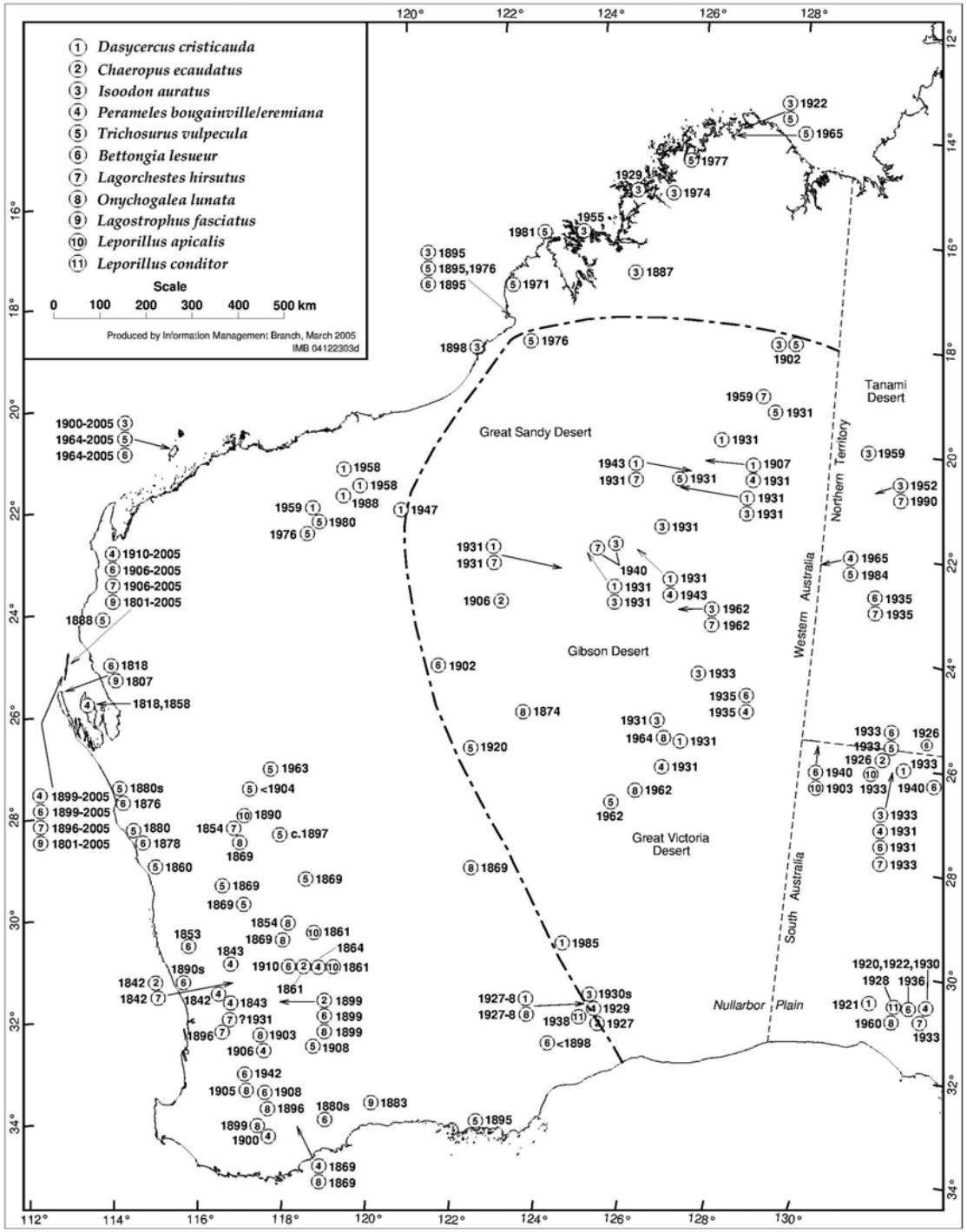
1 Dasycercus cristicauda
2 Chaeropus ecaudatus
3 Isoodon auratus
4 Perameles bougainville/eremiana
5 Trichosurus vulpecula
6 Bettongia lesueur
7 Lagorchestes hirsutus
8 Onychogalea lunata
9 Lagostrophus fasciatus
10 Leporillus apicalis
11 Leporillus conditor
Scale
0 100 200 300 400 500 km
Produced by Information Management Branch, March 2005
IMB 04122303d
Great Sandy Desert
Gibson Desert
Great Victoria Desert
Tanami Desert
Northern Territory
Western Australia
South Australia
Nullarbor Plain

Conjectured mechanism

- Source: SE Asia, ship rats via pearling fleets
- Spread: Cyclone-caused summer rain & local flooding
- Vector: Mosquito spp

Conclusions

- First wave of mammal declines in WA was caused by a disease
- A high impact, improbable event
- Role of less visible factors such as disease under-estimated in animal ecology
- Need to maintain vigilant quarantine
- Don’t presume that islands will confer long-term persistence
- Don’t presume that currently abundant species could survive an epizootic

Suggestions for future research

- Numerous early references to disease-induced declines in NSW, Vic, SA, Qld & Tas
- These declines appear independent of the disease in WA
- A comprehensive historical study needed
- Diseases antecedent to feline predation
- Can modern technology be used to identify the pathogens?

Rabbits and Tammas

To the Editor

Sir, I see by your paper that Inspector Craig reports that rabbits are dying off in great numbers in the northern portion of the State owing, he thinks, to scarcity of water. Well, **a similar fate overtook the indigenous animals in the back country in the past**. **In the early 'seventies' I assisted to cut a road from Esperance Bay to Fraser's Range** for the late Mr. A. Dempster, and **every thicket on the way was fairly alive with tammas, warrang, and other small animals**. On the range country the wild blacks used to construct yards to capture them. Their plan was to build a long triangular brush fence enclosing perhaps an acre of thicket, leaving a narrow gap at the apex of the triangle. While some acted as beaters, a couple of niggers armed with dowarks lay concealed near the gap, and waddied the little animals as they dashed through the opening. At the conclusion of the drive a great feast took place, as could be seen by the great heap of bones which remained close by. **Now the game taken in this and other ways by the blacks was an infinitesimal quantity of the whole, yet in a few years the animals had mysteriously and completely died out. Why?** The scarcity of water theory will not do, because there was less water on the runs before the occupation of the country by Dempster Bros., who sank tanks, constructed large dams, and opened up soaks. Feed was always abundant, yet the fact remains (which any of the Dempster family can verify) that **thickets which were teeming with animal life in 1875 were silent as the grave five or six years later, there being not even a track to be seen.** There is, of course, some rational explanation which perhaps some of your readers can furnish. But I feel sure the rabbits will die out very soon in the hinterland of the south-east coast (from Albany to Eucla), and I know that country well. It will be different though if they once get a footing in the rich lands of the wheat belt of this State. -– Yours, etc.,

CHARLES DIXON

Fremantle

PART 2: Disease after 1925

Abbott, I. *in press* Historical perspectives of the ecology of some conspicuous vertebrate species in south-west Western Australia. *Conservation Science Western Australia*

dalgyte

- Recovered by 1920s near Moora, Wickepin, and Brookton, before arrival of fox

- Extinct at Deeside early 1930s, caused by disease and not the fox

(Andrew Muir b 1917)

boodie

- Recovered in Wandering district by 1928, before arrival of fox
- Extinct at Deeside early 1930s, caused by disease and not the fox

(Andrew Muir b 1917)

woylie

- Disappeared from Brookton district c. 1910 but re-appeared in c. 1925, before arrival of fox
- Extinct at Deeside early 1930s, caused by disease and not the fox
- 1935-40 disease wave Pemberton district ‘similar to our 1912 experience in the wheatbelt’
- 1938-44 ‘catastrophic collapse’ in jarrah forest attributed to disease

tammar

- 1938-44 ‘catastrophic collapse’ in jarrah forest, lower Blackwood valley, attributed to disease

brush wallaby

- After 1918 ‘thousands’ died in Gingin district
- 1971 Large numbers dying, Unicup

quokka

- c. 1928 seemed to die out, Yallingup
- 1930-5 ‘orange spongey material on the belly’, Cowaramup
- 1931 moved in circles until they died, Middlesex
- 1933-7 sudden decline; died out, Yallingup
- 1934-6 many sick and dead animals (hair easily pulled out; pus present between inner & outer layers of skin and in nose), Yallingup
- mid-1930s puffed up eyes and ears; noses running, Peenebeelup

koomal

- early 1930s dying possums unable to climb trees, Shannon, Deeside, Pemberton
- 1934-7 sick and dead; hair easily pulled out; pus (only those living in sheds survived), Grasmere
- after 1935 no possum trees to be seen , Manjimup district
- 1938-44 ‘catastrophic collapse’; almost disappeared from jarrah & karri forests
- Late 1930s-early 1940s outbreak of cat flu affected possum numbers, Northcliffe
- Early 1940s sores on belly; eyes and nose running, Nannup
- 1964 apparently dying – refused to eat, Bridgetown

ngwayir

- Extinct at Deeside early 1930s, caused by disease and not the fox
- 1938-44 ‘catastrophic collapse’, ‘practically disappeared’ by c. 1945 from jarrah and karri forests