I INTRODUCTION TO YORKRAKINE ROCK, EAST YORKRAKINE AND NORTH BUNGULLA NATURE RESERVES

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The biological survey of these reserves is part of a programme evaluating the relationships between vertebrate fauna and vegetation on reserves in the Western Australian wheatbelt. Studies published are listed in Dell (1979). In addition surveys of Marchagee Nature Reserve (Dell *et al.* 1979) and Buntine and Nugadong Nature Reserves (Kitchener *et al.* 1979) have now been published.

Description of Reserves

Yorkrakine Rock Nature Reserve (YRR) and East Yorkrakine Nature Reserve (YER) are in the Shire of Tammin while North Bungulla Nature Reserve (NBR) is in the Shire of Kellerberrin in the Western Australian wheatbelt. Tammin (31°39'S, 117°28'E), the nearest town, is *ca* 170 km east of Perth.

These reserves and the wheatbelt generally are situated on the granites and granitic gneisses of the Yilgarn Block of the Precambrian Shield. There is a slight increase in altitude for the general land surface from west to east over the area covered by these reserves, from 300 m at Yorkrakine Rock Nature Reserve to 330 m at North Bungulla. However the granite tor, Yorkrakine Hill, is the highest point at 341 m above mean sea level. In spite of their proximity to each other these reserves have quite different soil and vegetation.

YORKRAKINE ROCK NATURE RESERVE (No. 23586)

Yorkrakine Rock Nature Reserve (31°26'S, 117°31'E) is situated 20 km north of Tammin. It occupies Avon location 27483 and has an area of 158 ha. The reserve is dominated by Yorkrakine Hill, a granite tor which is a well known landmark in the Shire of Tammin. The reserve has previously come under the attention of biologists from the University of Western Australia, including Dr B.Y. Main working on trapdoor spiders *Anidiops villosus* and Drs D.H. Edward and R.E. Jones studying midges of the family Chironomidae. The natural history and environment of the reserve form much of the basis of Dr Main's book *Between Wodjil and Tor* (Main 1967).

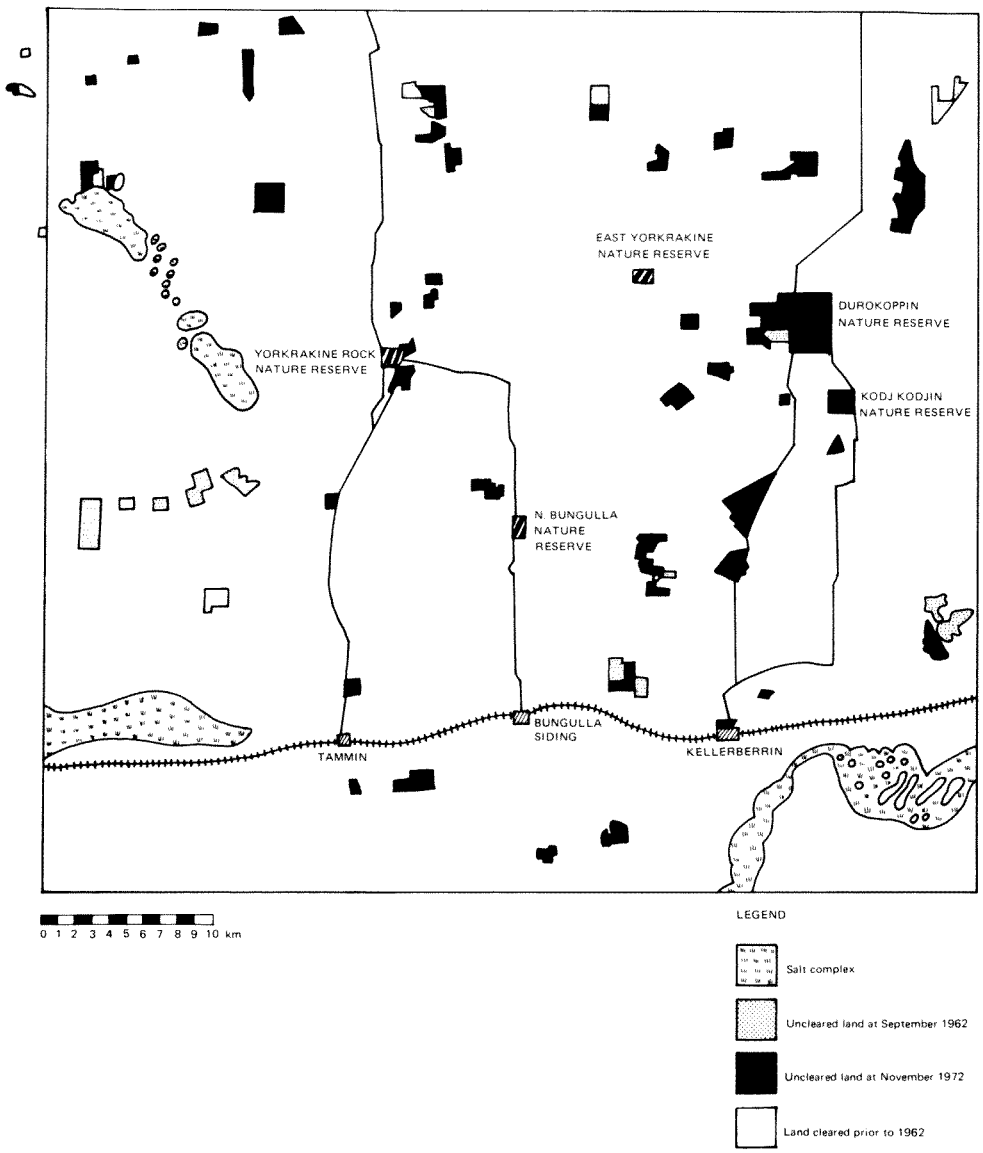

Fig. 1: Map showing amount of uncleared land in a 20 km radius of Yorkrakine Rock, East Yorkrakine and North Bungulla Nature Reserves. Map drawn from aerial photographs taken in September 1962 and November 1972.

The reserve has been inspected several times by members of the then Fauna Protection Advisory Committee. It was vested in the Western Australian Wildlife Authority in February 1957. On account of the popularity of the Rock as a local tourist and picnic venue there has been some conflict between the conservation and recreation functions of the reserve. A recreation plan for visitor usage was prepared by the Department of Fisheries and Wildlife in March 1974 and adopted in July 1975.

EAST YORKRAKINE NATURE RESERVE (No. 23085)

East Yorkrakine Nature Reserve (31°24'S, 117°39'E) has an area of 81 ha; it has no Avon location number but is situated 30 km north-east of Tammin. It was gazetted a reserve for Flora on 19 May 1950 at the initiative of the Shire of Kellerberrin. It is not vested.

NORTH BUNGULLA NATURE RESERVE (No. 17732)

North Bungulla Nature Reserve (31°32'S, 117°35'E) has an area of 104 ha and occupies Avon locations 20831, 22239 and 28436; it is situated 15 km north-east of Tammin. This reserve is the study site for Dr Main's continuing trapdoor spider study. It was gazetted for Conservation of Flora and Fauna in September 1971 and vested in the Western Australian Wildlife Authority on 21 September 1977.

Climate

At Yorkrakine the annual average rainfall is 322 mm (Anon. 1958). Most climatic data are for Kellerberrin *ca* 30 km east of Tammin and are extracted from Anon. (1975). The annual average and annual median rainfalls are 339 mm and 336 mm respectively. The rainfall is reliable and predominantly in winter. **Table 1** indicates the seasonal distribution of rainfall.

TABLE 1

Actual and effective rainfall (mm) for Kellerberrin

	J	F	M	A	M	J	J	A	S	O	N	D
Actual rainfall	11	13	23	22	44	59	55	42	27	19	11	13
Effective rainfall	76	74	67	47	35	26	23	28	37	50	64	78

There are thus 4 months in which actual rainfall exceeds effective rainfall.

Table 2 indicates that July/August are the coldest and January the hottest months.

TABLE 2

Temperature and humidity data for Kellerberrin

	J	F	M	A	M	J	J	A	S	O	N	D	Year
Mean daily max. temp. (°C)	33.9	33.1	30.0	24.9	20.8	17.3	16.1	17.2	20.1	24.8	28.9	32.1	24.9
Mean daily min. temp. (°C)	17.7	17.5	15.6	12.2	8.8	7.9	6.1	5.6	7.2	9.4	12.7	15.8	11.4
9 am mean humidity (%)	43	50	55	65	74	86	83	80	69	53	45	41	42
3 pm mean humidity (%)	23	26	31	38	46	60	58	52	43	30	24	21	38

Wind data are not recorded in the vicinity of these reserves.

For the years of the survey the rainfall for Kellerberrin was above average for 1974 (451 mm cf. 339 mm) and below average for 1975 (276 mm). For the period of the surveys, 11-16 May 1975 the weather was fine and warm to cool with average maximum and minimum recorded at Kellerberrin of 21.8°C and 5.6°C respectively. For the period 18-24 November 1974 these were 26.0° and 10.8°C respectively. No rain fell during either survey.

Fire History

There have not been any major, recent fires on these reserves. Muir (this publication) records very old fire patterns on location numbers 3.2 on YRR, 2.5 and 4.3 on YER and 4.7 on NBR. Generally the vegetation of these reserves is probably of the order of 25-30 years old, though in small local patches it is undoubtedly older.

Agricultural Development and Isolation

The Tammin district was first settled in 1888. Prior to this the only form of land use was seasonal sheep grazing by stock from the Avon Valley. In 1906-7 a group-settlement scheme commenced at Yorkrakine and clearing and cropping commenced shortly thereafter (Hocking, undated). Generally, the district including the Shires of Tammin and Kellerberrin was among the first parts of the wheatbelt to be cleared. This is on account of its proximity to Perth, its relatively high rainfall, good soils and road and rail accessibility. For these reasons the district is the most extensively cleared area of the wheatbelt; Gentilli (1961) records it as being 90% cleared.

Rates of alienation and clearing of adjoining natural vegetation are documented where possible because the fauna of a reserve, particularly avifauna

and other mobile species, e.g. kangaroos, possums and goannas, is dependent to a certain extent on the quantity and spatial arrangement of other uncleared land in its vicinity.

For the following analysis, which is based on 1 : 40,000 aerial photography taken in September 1962 and November 1972, the 3 reserves are considered at the centre of an area 53 x 53 km (**Fig. 1**) which is derived by drawing a square around a point situated centrally between the three reserves. Within this area, at September 1962 there were 9,007 ha of uncleared land or 3.3% of the total. By November 1972 this had been reduced to 7,307 ha or 2.6%. These uncleared lands exclude 7,433 ha of salt complex, most of which does not support bushland of the type considered in this report.

In 1974/75 there were *ca* 112 ha of uncleared farmland contiguous with YR. This included *Eucalyptus loxophleba* woodland adjacent to the south boundary and *Acacia acuminata* woodland adjacent to the north and east boundaries. The other reserves are completely surrounded by cleared farmland.

Biological Survey

These reserves were surveyed between 18-24 November 1974 by A. Chapman, J. Dell, D. Hembree, J. Henry and D.J. Kitchener, and between 11-16 May 1975 by A. Chapman, J. Dell, G. Harold, M. Jackson and K.D. Morris. B.G. Muir (with J. Dell) mapped the vegetation of these reserves between 30 August and 5 September 1977.