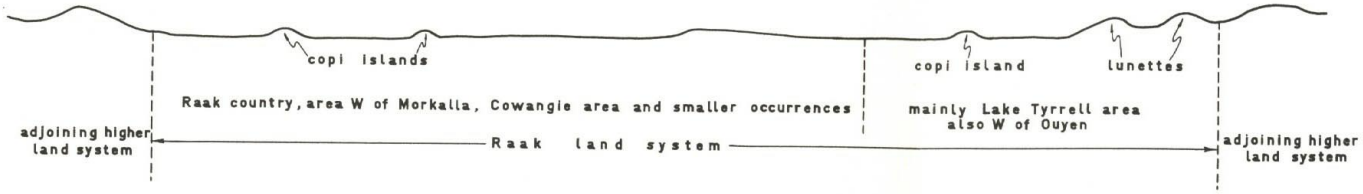
Raak Land System

Fig. 25 – Raak Land System

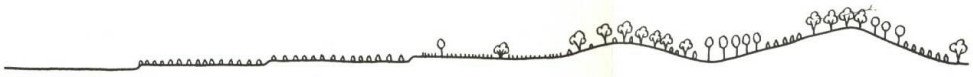
RAAK LAND SYSTEM

(a) Distribution of land forms



(b) Land system diagram

AVERAGE ANNUAL RAINFALL : 10"–13"
LAND USE: Mainly grazing of native vegetation



LAND FORM	Type	Plain				Copi Island	Lunette	
	Approx. percentage of land system	65				20	15	
	Approx. cross-section	50 yards–6 miles	¼–1 mile	¼–1 mile	¼–1 mile	50 yards–1 mile	50 yards–1 mile	
PARENT MATERIAL		..	Parna overlying salt and gypsum deposits	Coarse saltation material and parna overlying salt and gypsum deposits	Mainly coarse saltation material overlying copi, gypsum and salt	Saltation material, mainly of copi and sand	Parna (with saltation material at surface ?)	Parna
NATIVE VEGETATION		Nil	Shrub steppe of samphire	Shrub steppe of bladder saltbush	Grassland and savannah, containing pine, belar, buloke, mallees, rosewood, sandalwood	Big mallee and shrub steppe mallee containing bladder saltbush	Variable, includes pine, belar, mallees, bluebush	
SOIL	Textural group	..	Loams	Sandy loams	Sands	Sands	Sandy loams	Light clays
	Morphological group	Saltpan	Saline soils		Group D Reddish yellow	Shallow sands over copi	Group C	Light clays
	Proportion on land form	Subdominant	Dominant	Subdominant	Subdominant, confined to Raak country	Dominant	Codominant	
	Moisture characteristics	..	Poor	Moderate	Good for deep-rooted species	Good	Moderate	Poor
	Fertility reserves	..		Moderate	Low	Low	Moderate	High
LAND USE	Most suitable form	Salt harvesting	Gypsum harvesting	Light grazing of native vegetation		Light grazing of native vegetation	Cropping and grazing	
	Nutrients required in fertilizers	..	Fertilizers uneconomical			Fertilizers uneconomical	P	
	Recommended pastures	..	Native vegetation			Native vegetation	Barrel medic, Wimmera ryegrass	
	Land use class	6	6	5		5	2 (*b*)	
WIND EROSION HAZARD		Nil	Moderate	Moderate	Severe	Very severe on western face	Severe scalding followed by severe water erosion	Slight Moderate water erosion

Lakes Tyrrell and Timboram are internal drainage basins in which the soluble salts brought in by the Tyrrell and Lalbert Creeks are concentrated by evaporation. The main deposits are salt (sodium chloride) and gypsum (calcium sulphate). Similar internal drainage basins occur to the north of the Ouyen-Murrayville railway line between Danyo and Underbool, to the west of Nowingi (the "Raak Country") and to the west of Morkalla. These basins are no longer fed by creeks and the former creek courses cannot be, traced, having been covered by aeolian materials. There are also scattered, relatively small saline basins, for example those clustered around Ouyen, and it is possible that these have been formed by local rather than regional drainage.

The internal drainage basins have been mapped as the Raak land system and their aggregate area is approximately 630 square miles. The relief consists of low lying plains on which there are scattered copi islands,. whilst lunettes occur to the east of some plains (Fig. 25).

The plains were taken up for grazing long before agricultural settlement occurred on the surrounding land systems. Tyrrell Downs station to the east of Lake Tyrrell was established in the 1840's whilst in the same decade the Raak Country and the area to the west of Morkalla become grazing outposts from the runs with headquarters along the River Murray. Cow Plains station centred at Cowangie was set up in the 1860's. The average annual rainfall increases from 10½ inches to the west of Morkalla through 1½ inches in the Raak Country to 12½ inches at Lake Tyrrell, around Ouyen and to the north of the railway line between Danyo and Underbool.

Saltpans occupy the lowest sites on the plains and they occur most widely in the Lake Tyrrell district and also in the Raak country (Plate 29). They support no vegetation apart from lowly forms of plant life such as algae which may impart a pink hue to shallow waters which cover the pans intermittently. Salt is harvested from the pans at Lake Tyrrell and at the Pink Lakes to the north of Linga.

At slightly higher levels, or in the lowest sites where salt pans are absent, the salt and gypsum deposits are overlain by fine-textured, red soil which has originated as regional dust, or "parna". This soil is of variable depth ranging from one or two inches to at least 2 feet and it is sufficiently saline at the surface to exclude vegetation other than samphire. This is the most widespread type of plain within the land system. The fact that salt has not been removed from these soils under the virgin, ungrazed stands of samphire indicates that there is little possibility of desalinising the land for agricultural or pastoral use. Although the carrying capacity is low the land has been stocked. Grazing and trampling have caused degeneration of the samphire and this appears to have been accompanied by a rise in surface salinity with consequent further degeneration of the stands. A sample taken from a weak stand showed 4 per cent chloride at the surface which is well above the levels at which even the most salt-tolerant of species will grow. The weakening of growth is followed by windsheeting. Because of the low carrying capacity, there have been no investigations into the means of regenerating the samphire. The only economical method would probably be to discontinue grazing.

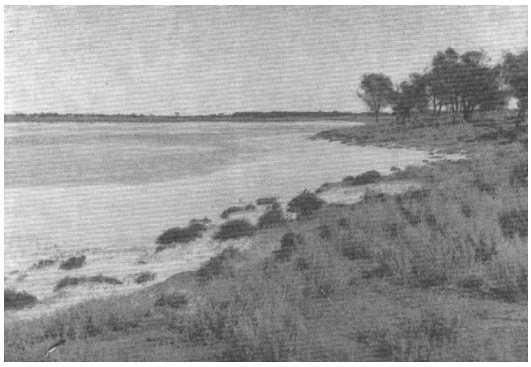


Plate 29 - Raak land systemto the west of Nowingi
Looking from a copi island with shrub steppe of bladder saltbush, across a band of samphire out to a saltpan. Belar trees to the right.

Degeneration of the samphire is most marked around the margins of basins which are bordered by steep, light-textured rises to adjacent land systems. In addition, salt is encroaching up the slopes. This indicates that seepage from the higher land has increased following the removal of the native mallee and pine-belar-buloke woodlands and its replacement by species with a lower moisture usage. Water tables have probably been formed or augmented around the margins of the basins with consequent increased evaporation, rising surface salinity, death of the samphire and encroachment of saline soils on to adjacent agricultural land. The first step in halting this encroachment and in regenerating the samphire is to establish lucerne on the rising ground to minimize seepage. The lower slopes could then be reclaimed with salt-tolerant species such as Wimmera ryegrass.

Plains carrying bladder saltbush frequently occur at hi her levels than the stands of samphire. They are most widespread in the areas to the north of the railway line between Danyo and Underbool. The soils are sands or sandy

loams which are non-saline at the surface and which appear to have been deposited by wind over the salt and gypsum layers. Salt has not risen to the surface beneath the saltbush, largely because, unlike the fine materials beneath the samphire, the soils are coarsely-textured. Any rise of salt following evaporation at the surface has been counteracted by downward leaching by rainfall.

The stands of bladder saltbush appear to provide good grazing and feed is available not only from the perennial shrubs but also from ephemeral grasses. In general the country has been well managed. However where, the saltbush has been eaten out severe wind erosion removes the sandy topsoils to variable depths. Where the saline subsoils are exposed they are colonised by samphire. The most economical method of reclamation is probably to exclude stock. The most stable form of land use is clearly light grazing in which the protective cover of saltbush is retained.

In the Raak country there is another type of plain which intermingles with the saltpans and the level areas supporting samphire and saltbush. On this type of plain the sand mantle over the copi is relatively deep, being rarely shallower than two feet and within this mantle reddish yellow sands of Group D have developed. The native vegetation is mainly grassland, with savannah containing pine, belar, buloke, sandalwood and mallees fringing the margins of the plains. The country is lightly grazed and although the abundance of grass provides good feed, water supply is a problem. Despite the severe erosion hazard, stability has generally been well maintained by retaining a good cover of grass. The erosion hazard is too severe for successful cropping and light grazing is the best form of land use.

The copi islands consist of low mounds scattered on the plains in all parts of the land system (see Geology and Physiography and also Plate 30). They are composed of layers of sand, copi (white, powdered gypsum), gypsum and occasionally of limestone. Before erosion takes place the uppermost layer is sand which is relatively shallow on the western faces (generally less than six inches deep) and deeper on the eastern faces. This is underlain by copi. The most common native vegetation is bladder saltbush, big mallee or a combination of the two (shrub-steppe mallee). Where the saltbush has been eaten out, erosion is severe, resulting in stripping of sand from the western faces to expose copi, and in the deposition of sand on the eastern slopes. Although erosion is widespread no attempts at reclamation have been observed. It is likely that the sand accumulations on the eastern slopes can readily be stabilized with cereal rye, barrel medic, Wimmera ryegrass and lucerne. However, experiments are needed to determine the most suitable species to establish on the exposed copi of the western aspects. The native halophytes may well be the most suitable. Reclamation is hindered by the fact that the copi islands occur within larger areas of plains which generally support samphire so that, before any attempt at establishing palatable species could be successful, the treated copi islands would need to be fenced to exclude stock and rabbits.

Lunettes flank the eastern margins of many basins, most commonly in the Lake Tyrrell and Ouyen districts. Although the native vegetation on the lunettes has been largely removed, remnants of pine-belar-buloke woodlands, mallee and big mallee indicate that the original communities were diverse and more akin to those on adjacent land systems rather than to the flora of the basins. The large lunette immediately to the east of Lake Tyrrell is an exception, because here bluebush appears to have been the original dominant species. The most common soils are sandy loams of Group C. Light clays have also been noted between Lakes Tyrrell and Timboram. In addition, there are occasional soils restricted to lunettes in this and the Tyrrell Creek land system, consisting of yellowish brown sandy loams sharply defined from yellow sandy clay loam or sandy clay subsoils.

The land use features of the lunettes are similar to those in the Tyrrell Creek land system where the same range of soils is found. Cultivation has been intense but wind and water erosion are frequently so severe that cropping is no longer possible. Reclamation measures are similar to those outlined in the section on the Tyrrell Creek land system.

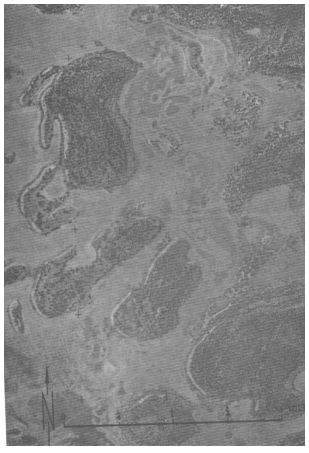


Plate 30 – Aerial photograph of part of the Raak land system in the Cowangie area.
The dark areas are copi islands clothed with big mallee. The intervening plains carry bladder saltbush or samphire, forming a complex pattern.