

## CHAPTER 3

### THE ABORIGINAL GOULBURN VALLEY

#### 3.1 Introduction

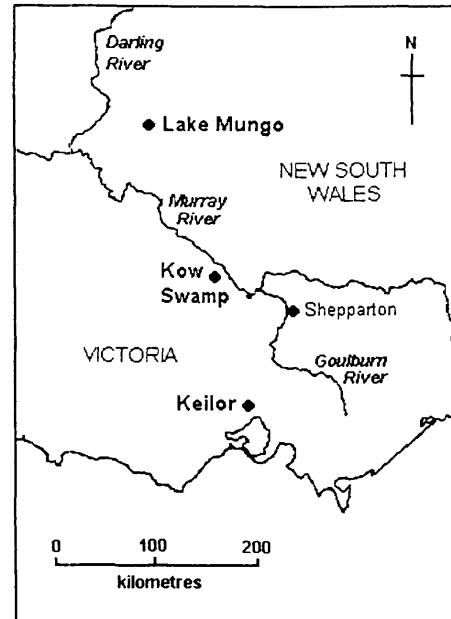
The first recorded human inhabitants of the Goulburn Valley were Aborigines. They were hunter-gatherers who directly exploited the natural resources of the region in an evidently sustainable fashion for at least 40,000 years. They did not merely live off the land in a 'state of nature,' however, as proclaimed by the colonising British (Shaw 1992), but actively managed the environment according to their needs and technology, with profound effects on the vegetation, fauna and soils. The effect of Aboriginal stewardship on the natural environment of the Goulburn Valley, and their perceptions of the land, are the subjects of this chapter. These are discussed in terms of how the land was used by the Aborigines, and how they structured their society in order to optimise their use of the region's resources. The success of their occupancy is explained systemically in terms of structural coupling processes arising from positive and negative feedback that enabled the Aborigines to maintain a 'dynamic equilibrium' with the regional environment.

#### 3.2 Aboriginal pre-history

Aboriginal people are believed to have occupied the Goulburn Valley from the earliest times of the Aboriginal occupation of Australia as a whole, based on archaeological evidence from Kow Swamp, 100 kilometres north-west of Shepparton, and from Lake Mungo, in western New South Wales (Figure 3.1)(Atkinson & Berriman 1983; Kohen 1995, p. 16). Kohen notes that there is abundant evidence of Aboriginal exploitation of aquatic resources at Lake Mungo dating back 35,000 to 40,000 years, and that this site is linked to Kow Swamp by the Murray-Darling river system without any interceding geographical barriers. Stone artefacts have also been found at Keilor, near Melbourne, 150 kilometres to the south, that appear to date back at least 36,000 years (Kohen 1995, p. 16). Little systematic archaeological research has been conducted in Goulburn Valley itself but sites indicative of Aboriginal occupancy abound throughout the region (Bird 1992), and it may be presumed that the resource-rich Goulburn Valley was inhabited by Aboriginal people for a similar period of time as the adjacent locations.

Considerable environmental change occurred throughout the Murray-Darling Basin during this period, including geomorphic changes and major climatic changes (see Chapter 2). How the Aborigines fared throughout this period of pre-history is a subject of academic speculation, and is largely beyond the scope of this thesis. As Bird (1992) notes, however, the Aborigines would doubtless have been affected by the alterations in their environment, and the environment in turn was affected by their occupancy, so that

**Figure 3.1: Aboriginal archaeological locations.**



various adaptations would have been required in response to changes in the distribution and availability of natural resources.

Of greater relevance is information pertaining to the Aboriginal inhabitants at the time of the European arrival, and of the Goulburn Valley environment itself at that time. This is of interest in the light of the subsequent history of the region, and provides a basis against which further environmental change can be assessed. The information available is fragmentary, however, as the Aborigines themselves left no written records, and traditional Aboriginal society declined while the existing landscape of the region changed rapidly following the arrival of the Europeans. Barwick (1984) adds that the observations recorded at the time were often amateurish and/or highly subjective in nature. Primary historical sources nevertheless include the writings of explorers, Protectorate officials (from 1839) and early European settlers, including the 'squatter' Edward Curr, who occupied several runs in the lower Goulburn Valley from 1841 to 1850 and published a memoir (Curr 1883) that is a widely cited, if somewhat flawed, source of information on the Aboriginal inhabitants of the region (Barwick 1984; Birdsell 1971).

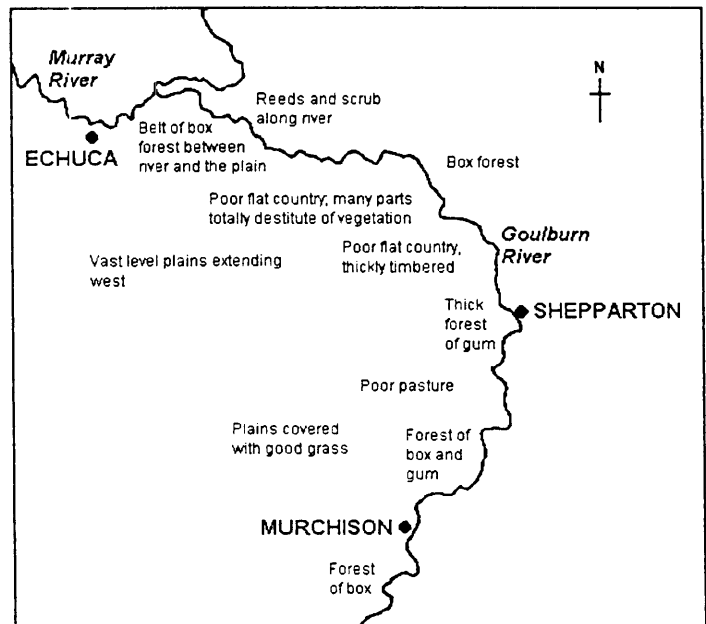
### **3.3 The Aboriginal environment**

The landscape inhabited by the Goulburn Valley Aborigines at the time of European arrival is generally described as savannah-like. The explorer Major Mitchell, who traversed the region in 1836, wrote of the plains east of the Goulburn River as level box-eucalyptus country, "open enough to afford a prospect of about a mile around us..." (Mitchell 1839, pp. 293-94). Pastoralists who followed in Mitchell's wake also described a savannah-like box-forest landscape with varying amounts of understorey vegetation from the south-east of the region to the western banks of the Goulburn as far north as the Murray River (Hawdon

1952; Walker 1965). Localised survey maps from the 1840s and overview maps of the Victorian pastoral industry and vegetation published after that time (see Figures 4.5 and 5.8, pages 65 and 95), suggest further that much of the Goulburn Valley was forested prior to European settlement, with the exception of some areas in the north-west of the region. Savannah woodlands are likely to have been predominant, but trees and scrub were generally denser along the river and to the east, while the country to the west opened out into grassy plains (Figure 3.2)(see also Presland 1977, p. 21). The trees themselves were generally identified by early observers as either box (*Eucalyptus hemiphloia* and *E. mellidora*) or gum (*E. camaldulensis*). Understorey species included kangaroo grass (*Themeda* spp.), a tall tussocky perennial, and the yam-daisy, or murnong (*Microseris scapigera*). This latter species was an Aboriginal food staple, which Edward Curr described as being present in such abundance on the plains west of the Goulburn that it was turned up "by the bushel" by the wheels of his dray (Curr 1886, vol. 1, p. 240).

Water was variously available throughout the region according to the season. The most consistent source was the Goulburn River itself, and the various Aboriginal clans that inhabited the region are known to have camped along its banks for at least part of each year<sup>1</sup> (Massola 1969, p. 134). Away from the river, the plains were traversed by small creeks and intermittent watercourses which provided seasonal supplies (e.g., Walker 1965). Permanent water could also be found in swamps such as Waranga and Reedy Lake, in "crab holes" (Curr 1883, p. 81), and in natural springs, including an important rock well at Whroo, in the south-west of the region (Massola 1969, p. 136).

**Figure 3.2: Surveyors' descriptions of vegetation along the Goulburn River, 1843-56 (from Lands Department survey maps, DNRE Collection).**



<sup>1</sup> Most archaeological traces of Aboriginal campsites have long since been obliterated, either by floods or farmers, but according to Massola (1969, p. 134) their locations are indicated by the names of some of the towns and stations along the river - for example, Mooroopna, Tallygaroopna, and Kotupna, and other place-names ending in an abbreviation of 'goopna', which refers to deep water holes in the river by which the natives camped.

Food resources appear to have been relatively, if seasonally, abundant in some parts of the Goulburn Valley. In part, this was because of the temperate climate, but also because of an unusual richness of resources conferred by the Goulburn River. Bircsell (1953) noted that the Murray-Darling river system overall provided a rather different set of ecological conditions from the rest of inland Australia. This was because the rivers were sourced primarily from outside the plains country, and thus contributed "unearned" surface water resources. The Murray-Darling system, including the Goulburn River, was accordingly superior in its food resources as the waters of the river directly contributed a number of important food fish, shell-fish and waterfowl, while indirectly the forested banks of the river increased the supply of birds and arboreal marsupials, and the rich bottom lands offered a greater abundance of food plants.

### **3.4 Aboriginal society in the Goulburn Valley**

According to the situational approach outlined in Chapter 1, the way in which the biophysical environment of the Goulburn Valley was perceived by the Aborigines can be deduced in a general way from their observed population characteristics, social behaviours, and forms of natural resource use.

#### **3.4.1 Population groups and social structure**

The exact size of the Aboriginal population that inhabited the Goulburn Valley prior to the European occupation of the region is unknown, although several rough estimates were made shortly after the arrival of the first European settlers. Dr W.H. Baylie, a physician who visited the newly established Aboriginal Protectorate at Murchison in 1841, estimated that at that time there were about a thousand Aborigines in the district centred on the Goulburn River and bounded by the Campaspe, Murray, Broken, Ovens and Plenty Rivers (Baylie 1843). The squatter Edward Curr contributes a similar figure for the Lower Goulburn of "not less than 1200 souls" (Curr 1883, p. 236).

As in other regions of the continent, the basic social unit in the Goulburn Valley appeared to be the 'clan' - a semi-autonomous group of 25 people or more in possession of a particular area of land. Clans were essentially large kinship groups, in which the women married into other clans, and were linked to larger tribal groups on the basis of a common language. Tribal territories were made up of clan territories, but the tribes were otherwise structurally amorphous. Across Australia, the populations of dialectical tribes varied from upwards of 200 people to 'supertribes,' or confederacies of clans who occupied favoured environments, including the riverine areas of Victoria, and comprised a thousand people or more (Birdsell 1971).

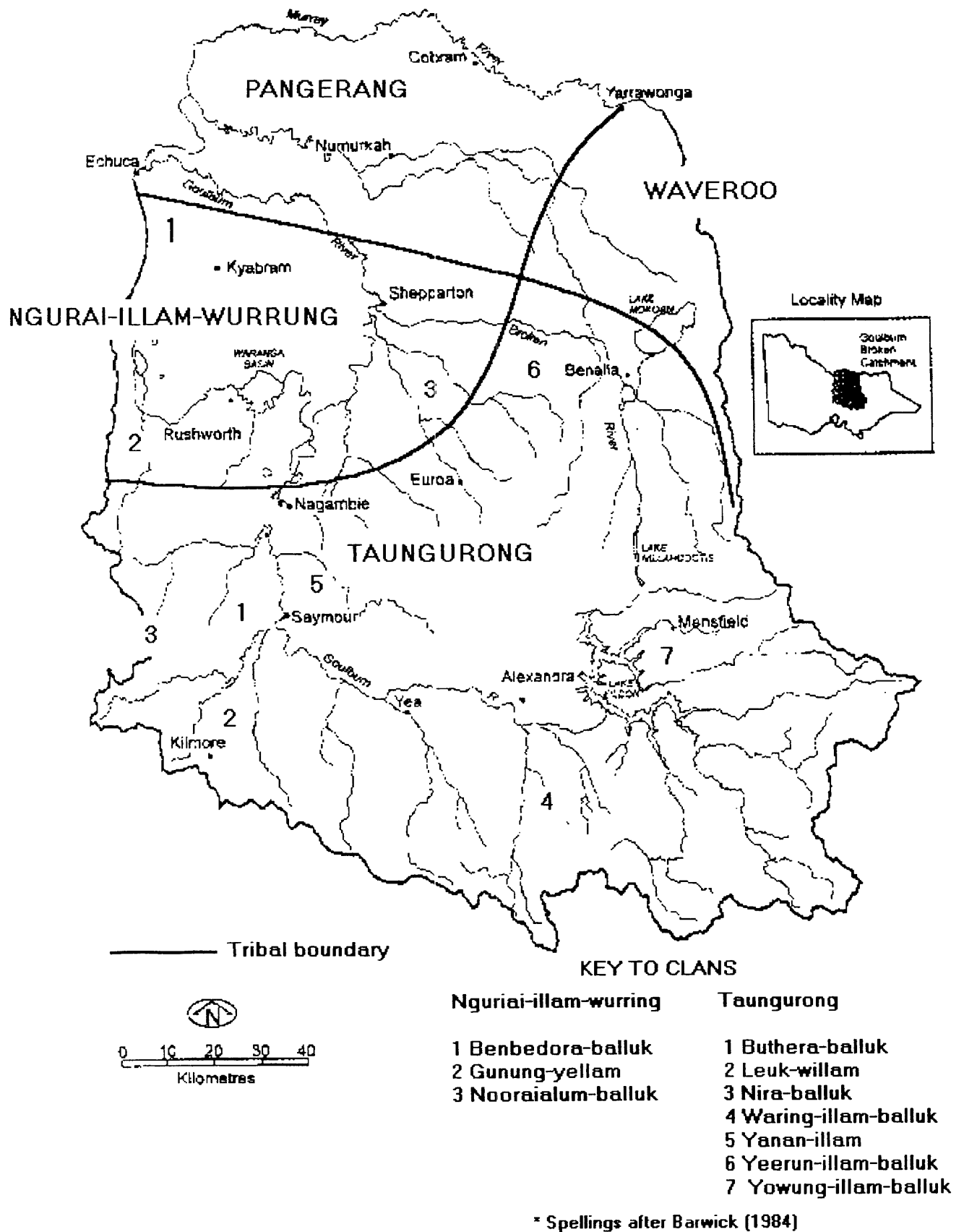
In the Goulburn Valley, historical sources from the 1840s refer to a 'Goulburn tribe', but it is generally agreed that several large, linguistically distinct tribes or clan-groups inhabited the overall Goulburn River catchment area. The 'Goulburn tribe' actually appears to have comprised two closely related tribes, the Ngurai-illam-wurrung of the lower Goulburn and Campaspe Rivers, and the Taungurong or Daung Wurrung, who occupied the upper reaches of the Goulburn, Broken, Coliban and Campaspe Rivers (Figure 3.3)(Barwick 1984; Bird 1992). A third, linguistically separate tribe, the Pangerang or Bangerang, occupied the country around the confluence of the Goulburn and Murray Rivers. Each of these tribes were subdivided into smaller local kinship groups or clans of 50 to 300 people each who spoke similar dialects and lay claim to particular territorial areas (Baylie 1843; Bird 1992; Birdsell 1971; Curr 1883, 1886; Tindale 1940). The Ngurai-illam-wurrung tribe appears to have comprised three clans, and the Taungurong nine (Barwick 1984; Bird 1992). Edward Curr thought there were also nine or ten Bangerang-speaking clans (Curr 1883, p. 301).

Birdsell (1953) estimated that overall population densities along the Goulburn River were considerably higher than in most other parts of Australia, and European observers indeed thought the indigenous inhabitants to be relatively numerous (Bland 1965; Bride 1969, p. 62; Hawdon 1952, p. 17; Presland 1977, p. 23, p. 32). The local clan groups also appear to have been relatively large, and they were more sedentary than Aboriginal populations elsewhere on the continent (Birdsell 1979; Webb 1984). On these bases it may be concluded that the relatively abundant food and water resources of the region were well recognised by the Aboriginal inhabitants.

It may also be surmised, however, that both water and food supplies in the Goulburn Valley were understood by the Aborigines to be both finite and highly variable, both from season to season, and from year to year. Studies of skeletal remains indicate that nutritional stress was a common occurrence in the region (Webb 1984), while behavioural evidence suggests that clan populations were maintained at functionally conservative levels because of expected food shortages. According to Edward Curr (1883, p. 260), the Lower Goulburn catchment could have supported "twice the number" of people he found in it, and to European observers the region may indeed have appeared underexploited. Anthropologists agree, however, that the size of hunter-gatherer populations is generally determined by the resources available at the worst of times - for example, during a prolonged drought (e.g. Birdsell 1971; Flannery 1994, p. 286; Jones 1971). Jones (1971) postulated accordingly that Aboriginal populations were probably maintained at an equilibrium somewhere below the maximum number of people the environment could support at any one time. This would have buffered them against fluctuations in the abundance of natural resources, but may also have meant that in favourable seasons not all food resources were utilised.

If population was the "basic parameter" of Aboriginal economies (Jones 1975, p. 22), population control was a necessary corollary. In the Goulburn Valley, various social and behavioural mechanisms operated to ensure that overall population numbers remained relatively constant, or at least at a level to match the

Figure 3.3: Aboriginal tribes and clans of the Goulburn-Broken catchment region (after Bird 1992).



availability of resources. Aboriginal men could take several wives, but they were often required to defer marriage (Baylie 1843; Birdsell 1971). Infanticide was apparently practised among the more nomadic groups, while elders of both sexes were generally obliged to fend for themselves and may even have been abandoned in seasons of scarcity (Bolton 1981, p. 6; Curr 1883, p. 263, p. 266). War was another curb on population growth (Blainey 1982, p. 108), and perhaps because of their relatively high population densities, the Goulburn Valley tribes were particularly warlike towards each other (Baylie 1843; Curr 1883; Massola 1958). These behaviours could all be viewed as adaptive mechanisms to prevent the over-utilisation of the available food resources.

### ***3.4.2 Territorialism and nomadic behaviour***

Territorialism functioned as another behavioural adaptation to the Goulburn Valley environment, in that it imposed restrictions on the access of certain population groups to the region's finite food resources (Hunn 1999). Birdsell (1971) recognised it as an example of adaptive 'spacing behaviour', manifested in land usage and reinforced by supernatural or spiritual attributes ascribed to various territories. Territories implied heritable rights to certain areas of land, together with the resources contained within them. They were defended accordingly to ensure the continuation of food supplies, and each group was aware of territorial boundaries. In the Goulburn Valley, the boundary between the Pangerang and Ngurai-illam territories apparently took the form of a 'no-man's land' or buffer zone of several kilometres width, in which both tribes hunted but neither dared to camp (Curr 1883, p. 232).

Different population groups nevertheless congregated on friendly terms in each other's territory in places and at times when food was locally abundant - for example, during the annual runs of fish in the rivers. In the Goulburn Valley, this prompted large gatherings at the area at the confluence of the Goulburn and Murray Rivers known as the Moira (Curr 1883, p. 166). Birdsell (1971) identified this as yet another form of adaptive behaviour, in that it resulted in the redistribution of surplus food resources and gave more flexibility to the spacing mechanisms that otherwise operated to prevent resource depletion. Sharing also helped to improve the efficiency of resource extraction, as ceremonies and other gatherings provided occasions for the exchange between groups of raw materials and hunting technologies (e.g., the Pangerang clans reportedly obtained flints and tomahawks from other tribes in exchange for reed spears)(Curr 1883, p. 273). The net result of these behaviours was that the carrying capacity of the land was increased, and the Aborigines were able to maintain higher population densities than would otherwise have been possible (Birdsell 1971).

Nomadic behaviour was a further adaptation to a biophysical environment in which natural resources were unevenly distributed in space and time. Across Australia, almost all Aboriginal populations employed what Hunn (1999) terms a 'mobile subsistence strategy' and roamed within (and occasionally beyond) their

respective territorial boundaries. The extent of the each group's nomadism was determined, however, by the relative, and seasonal, abundance of food and water in their local environments. In the Goulburn Valley, the various clans are presumed to have spent at least part of each year along the river (Lawrence 1971; Massola 1969, p. 134), with subsistence based at such times on the collection of aquatic foods. These were the particular mainstay of the Lower Goulburn clans, including the people of the Moira, for whom fish were so plentiful that Edward Curr "often wondered how that sage people managed to pass the time before [his] party came and taught them to smoke" (Curr 1883, p. 240). Curr added that the Moira clans led a relatively stationary life, seldom leaving the banks of the river or the swamps and reed-beds in its immediate vicinity.

Further upriver, the Aborigines rarely remained in any fixed spot for very long and their territories were somewhat larger (Curr 1886, vol. 3, p. 523). European observers thought their lifestyle to be "rude and undisciplined" (Baylie 1843), although in actuality they ranged over different ecosystems in order to exploit the different food resources available. Ecosystems from which food was obtained included the rivers, the red gum forests along the river edges wetlands (including swamps, billabongs, streams and anabranches), and savannah areas where the grassy plains were interspersed with patches of scrub. Food foraging was scheduled in accordance with seasons, with groups following an annually cyclic course (Atkinson & Berriman 1983). The warm months on the rivers were the most productive, while the colder months encouraged the clans to disperse into smaller family groups to forage in areas away from the main water bodies. Evidence for this may be seen in the relic ovens (now little more than mounds of ash and calcinated clay) and the remains of Aboriginal campsites, which are widespread throughout the Goulburn Valley (Barwick 1984; Bird 1992; Birdsell 1971; Massola 1969).

### **3.5 Aboriginal land use**

Aboriginal perceptions of the Goulburn Valley environment are indicated further by the nature of their direct interactions with the land and its resources, which also had implications for ecosystem stability both during and after their period of occupation.

#### **3.5.1 Fishing, hunting and gathering**

Birdsell (1971) observed of Aboriginal people in general that they subsisted on a broad-based diet comprised of all feasibly obtainable local food resources. In the Goulburn Valley, this depended largely on seasonal factors and where in the region a particular group was located.

Fish were the mainstay of the riverine clans, who would have eaten species including Murray cod, trout



cod, golden perch, silver perch, catfish, bony bream, and yabbies (fresh-water crayfish) (Land Conservation Council 1983, p. 113; Presland 1977, p. 10). Fish were also of great importance to the other groups in the region, as is evident from the use of technology such as primitive fish weirs (Atkinson & Berriman 1983), although the availability of fish upstream from the Murray confluence depended on the annual flooding of the river, when the swamps filled and the river flats became inundated. At such times, large groups of people lived by communally netting fish and crayfish, spearing fish, and spearing and trapping ducks and other waterfowl (Lawrence 1971; Presland 1977, p. 10). They also built simple weirs to trap fish as waters receded, and poisoned them in lagoons by throwing in large quantities of eucalypt boughs (Curr 1883, p. 241).

Fishing alone could not support large population concentrations even seasonally, however, and archaeological evidence (faunal remains) suggests that when the Aborigines camped by the rivers they also hunted land animals and brought them back to their shelters (Lawrence 1971). Game was of even greater importance for those groups who lived further upriver. Curr noted that the southern clans were "to a considerable extent an opossum-hunting people" (Curr 1883, p. 240), and were greatly dependent on this animal. Emu and kangaroo were also hunted, although more rarely (Curr 1883, p. 259). Other sources of dietary protein included "manna, eggs, kangaroo-rats, field-rats, birds of every sort, tadpoles, grubs, snakes, the larvae of ants, and one or two fruits of an inferior description" (Curr 1883, p. 259). Honey was also "ingeniously" found by Aborigines following bees (Walker 1965, p. 33).

Vegetables, which were plentiful throughout the region, were also of great dietary importance (Baylie 1843; Curr 1883, p. 259; ). The yam-daisy, or murnong (*Microseris scapigera*) was probably the staple food of the Lower Goulburn tribes. It was nutritious, sweet, and easily obtained and prepared, and was abundant in grassy and open areas across Victoria, including the Goulburn Valley (Curr 1886, vol. 1, p. 240; Gott 1983; Presland 1977, p. 18).

Besides murnong, orchids (of which at least 166 species were used by the Aborigines) and 'liliaceous' plants were the dryland species of greatest dietary significance (Gott 1982). In wetland areas, the most important food-plants to Victorian Aborigines were reeds or cumbungi (*Typha* spp.), rushes (*Scirpus* spp.), and water ribbons (*Triglochin procera* R.Br.) (Gott 1982, 1983). The rhizomes of all were a source of starch. Gott (1982) notes that the use of *Typha*, in particular, was extensively reported in southern Australia by early European observers. The Aborigines ate the rhizome, the spring shoots, and later the young flower stems which arose from the older shoots; they may also have eaten the copious pollen from the male flowers.

It may be concluded that the Goulburn Valley Aborigines left few natural food resources unexploited. This behaviour was characteristic of Aborigines in general (Birdsell 1953), and of hunter-gatherer peoples on other continents. The exploitation of numerous species of plants and animals tended to lessen pressures

on any single food resource, and also reduced vulnerability to drought and other climatic instabilities.

### **3.5.2 'Natural cultivation'**

Edward Curr thought it noteworthy that the Pangerang people, and in fact the whole Aboriginal population, "neither sowed nor reaped so they never abstained from eating the whole of any food they had got with a view to the wants of tomorrow" (Curr 1883, p. 262). The Aborigines, in other words, were not an agricultural people, at least in the European sense of the word, as they had no crops or farming methods that were recognisable to European observers.

This perceived 'failing' may be explained in part by the fact that the native Australia flora and fauna were largely unsuited to domestication (e.g., Diamond 1999). Although some cultivatable plants existed, including murnong and other root crops in the Goulburn Valley, the overall dietary needs of the Aborigines would not have been satisfied by the farming of these few species alone. Sources of protein would also have been required, but these were not available on a regular basis, other than to the few fish-eating clans who inhabited the Moira.

The generally poor fertility of the Australian soils has been postulated as a another factor precluding Aboriginal agricultural development, but the most inhibiting factor of all is likely to have been the variability and unpredictability of the climate (Diamond 1999, p. 309; Flannery 1994, p. 218; Kohen 1995). Driven by the two-to-eight year long ENSO cycle (see page 26), the hazards of irregular rainfall, long periods of drought and occasional flooding would have posed insurmountable difficulties for Aboriginal populations attempting to produce their own food, particularly since they could neither store nor transport surpluses to tide them over in lean years.

The absence of recognisable Aboriginal agriculture provided the basis for the European concept of Australia as *terra nullius* ('land of no-one'), and bestowed upon its colonists the moral authority to occupy the land and render it 'useful' (Shaw 1992). Whether the Aborigines were lacking in cultivation practices altogether, however, is a matter of definition. Ethnobotanist Beth Gott (1982) observes, for example, that when the regimes to which food-plants were subjected are examined, the distinction between 'gathering' and 'cultivating' seems less than sharp (Table 3.1). Jones (1975, p. 23) adds that the gathering of vegetable food affects "the gathered as well as the gatherer," and that plants or seeds are not merely dispersed by the process, but are deposited in specially favourable environments.

In the Goulburn Valley, the gathering by Aboriginal people of roots such as *Typha* and *Scirpus* would have thinned out the stands of these species, thus improving the growth of the remaining plants (Gott 1982). Pieces of rhizome capable of regeneration would have been carried away to other places,

facilitating the spread of these desirable species over wide areas. Clusters of tubers or bulbs, such as murnong and members of the Liliaceae, would also have been broken up and unwanted parts discarded into soil turned over with digging-sticks. For murnong, in particular, which clumps in a proliferation of rosettes if left undisturbed, digging would have promoted the growth and the spread of the plants in a manner similar to the horticultural practice of thinning tuberous perennials (Gott 1983). In addition, if the tops were thrown away into soil already loosened by digging, they would have regenerated during the winter. Digging for roots would also have aerated the soil, loosened it for seed germination and root penetration, and incorporated litter and ash into the soil, as well as facilitating plant propagation. In this way, the natural productivity of the region was enhanced by the Aborigines, and their repeated and purposeful manipulation of plants and soil could be considered accordingly to have been a form of 'natural cultivation' (Deur 1999; Gott 1982).

**Table 3.1: A comparison between agriculture and Aboriginal gathering.**

Agriculture	Aboriginal gathering
Preparation of soil, cultivating	Digging, loosening of soil, incorporation of litter
Fertilising	Burning at specific times => ash
Sowing and planting	Some tubers left or discarded, burning timed after seeds have formed
Spreading of cultivated plants	Tubers and seeds carried to camps, traded from tribe to tribe

Source: Gott and Conran (1991).

### **3.5.3 'Firestick farming'**

While Aboriginal 'cultivation' practices remain a subject for anthropological debate, there seems little argument that the Goulburn Valley environment was demonstrably 'managed' and food resources were enhanced by Aboriginal people through the active use of fire.

Edward Curr observed that the Aborigines in his locality were constantly setting fire to the grass and the trees, and the reports of other early Europeans include references to burnt tracts of country, suggesting that fires were a regular occurrence in the region (Bland 1965, p. 54; Presland 1977, p. 21, p. 32; Walker 1965, p. 28). Curr noted that some fires were accidental, but others were lit deliberately and systematically, almost as a form of tillage (Curr 1883, p. 188). Jones (1969) labelled this behaviour 'firestick farming,' noting that the Australian ethnographic record shows that bushfires were systematically and universally lit by Aborigines all over the continent for hunting purposes, to promote the regeneration of plant food for both animals and humans, for signalling, clearing ground, facilitating travel, killing vermin,

and also expanding human habitat by limiting the extent of the southern rainforest, which was otherwise largely unusable by Aborigines. This had been recognised by Major Mitchell, who observed that the extensive savannah woodlands of south-eastern Australia, through which his party was able to travel with "unwonted ease and facility," were not climax vegetation communities but the product of deliberately lit Aboriginal fires (Mitchell 1839, pp. 293-94, 1848, pp. 412-13).

In open woodlands, firestick farming helped to maintain a self-perpetuating cycle of low-intensity fires and create a habitat desirable for grazing marsupials. Nicholson (1981), for example, noted that when there is sufficient soil moisture after a fire, regrowth of vegetation occurs from propagules (epicormic buds, underground rootstocks or seeds) and becomes an attractive source of food for insects, birds and animals, which graze preferentially on the regrowth of freshly burnt areas in eucalyptus forests. Besides being a 'farming' tool, fire was also used by the Aborigines as a direct aid in hunting, by improving visibility in forest or tall grass, and causing fire-frightened animals to run into a prepared ambush or to come within spearing or clubbing distance. In the wake of the fire women and children also collected the smaller victims, whether insects, reptiles, birds or mammals. Aboriginal women also used fires to clear small areas of litter so that they could dig for food plants or insect larvae (Nicholson 1981).

Fire also promoted regeneration and growth of food plants by returning nutrients to the soil, removing shading litter, forming clear areas where seed could germinate, and maintaining the open structure of the vegetation necessary for plants such as murnong and bracken. Gott (1983) cites early records of fire being used in areas where murnong was abundant, noting that burning was generally practised in Victoria in the early autumn, when murnong and other tuberous food plants were still in summer dormancy. The tubers would be unharmed by fire and the plants could resprout without competition when the autumn rains came, the ash from the fires acting as a fertiliser. *Typha* was also burnt by the Aborigines. Curr (1883, p. 171) observed that the extensive reed beds of the Moira district were "patches and strips of different hues and growth, in accordance with their ages and the periods at which they had last been burnt."

There is some debate as to whether the Aborigines fully comprehended the "logical sequence" of destruction and growth initiated by their fires. Blainey (1982, p. 78) surmises, for example, that they may simply have been aware that regular burning was effective and lit fires accordingly. Gott and Conran (1991) suggest, however, that the Victorian Aborigines employed a certain expertise in their use of the fire-stick, since they were obviously aware that the lighting of fires in early autumn promoted the regrowth of food plants, and they also burned the land in small patches. This would have created a mosaic of vegetation in different stages of fire succession and prevented any fire from burning too far before running out of fuel. The frequency of firing presumably depended on the type of vegetation - grasslands or patches of *Typha* may have been burned yearly, the dry sclerophyll forest would have been burned less frequently, and tall forests, as in the mountainous upper Goulburn areas, were probably not burned at all.

### 3.6. Environmental impacts

From the time of their arrival in the Goulburn Valley, the Aborigines were responsible for major changes to the vegetation, fauna and soils. The existence of the savannah woodlands is a case in point, although it remains an enigma of paleobotany as to whether these environments were created or simply maintained by the Aborigines (Nicholson 1981).

Not all of the environmental changes wrought by the Aborigines were necessarily beneficial to the regional ecosystem. It has been hypothesised, for example, that the Aborigines changed the soil structure with their constant regime of fire, and that the regular loss of grasses and shrubs and protective covering of mulch as a result of frequent fires would have contributed to greater than natural runoff and erosion rates in dry sclerophyll forest country (Hughes & Sullivan 1986). Aboriginal fires would also have decreased the natural tree cover and reduced the genetic diversity of the forest (Barr & Cary 1992, p. 8). Kohen (1995, p. 94) speculates that salinity problems in the Murray-Darling Basin may have originated well before the arrival of Europeans, as an indirect consequence of Aboriginal fires and their effect on tree cover.

The Aborigines would also have had a profound effect on faunal populations. 'Fire-stick farming' and Aboriginal predation are thought to have contributed to the decline of megafauna including *Diprotodon* spp. and other giant marsupials known from the fossil record to have inhabited Australia during Pleistocene times (Calaby 1971; Flannery 1994; Kohen 1995). Kohen (1995, p. 93) cites evidence to suggest that kangaroo and wallaby populations were also reduced as Aboriginal populations increased during the climatically favorable Holocene period, such that the natives were forced to rely on other food resources. According to Kohen, this accounts for the expansion of co-operative fishing technologies such as fish traps and weirs during the last 1000 to 2000 years, and the development of more sophisticated hunting tools for smaller animals.

Between 3000 and 3500 years ago, Aboriginal people also introduced the dingo (*Canis familiaris*) into Australia, apparently from Timor and perhaps other parts of Indonesia (Kohen 1995, p. 86). An efficient and fast-breeding predator, this species is presumed to have driven the existing native carnivores, *Thylacinus* (thylacine) and *Sarcophilus* ('Tasmanian devil'), into extinction. Dingoes would have exploited the same game food as the Aborigines (i.e., kangaroos, wallabies, and smaller prey) and would have had a major impact on most faunal populations, for which the Aborigines may be held indirectly responsible, having imported the dingo into an otherwise closed ecosystem.

Bolton (1981, p. 8) thus rejects the myth of the 'noble savage' attuned to the needs and moods of the environment," and concludes instead that it is possible that the Aborigines left behind a damaged ecosystem. Against this it must be argued that Aboriginal society was evidently sustainable for several

tens of thousands of years, and was in no apparent danger of decline prior to the arrival of the Europeans. Barr and Cary (1992, p. 8) concur that, while not conservative, the Aboriginal practice of constant burning was indeed sustainable, in the sense that it enabled resource needs to be met without diminishing the prospects of future generations, and it helped create a new landscape which was capable of supporting more people. Otherwise, the nature and magnitude of Aboriginal culture generally enabled gross environmental damage and loss of resources to be avoided. Small, relatively stable communities lived in and with the natural environment, causing disturbances that were, in the main, both minor and repairable.

### **3.6.1 Post-Aboriginal environmental changes**

Aboriginal dependence on the land did not require large-scale interventionism or the wholesale extraction and export of resources that were characteristic of the European society which followed, and with a few exceptions (including constant inputs of solar energy) the ecosystem remained effectively closed until the arrival of the British. This made it possible for the Aborigines to achieve an equilibrium with their environment, based upon a relatively constant type and intensity of cultural interaction with landscape in which the Aborigines were not only adapted to the environment, but the environment, to some extent, was adapted to them (Jones 1975; Kirkpatrick 1994).

The end of this equilibrium can be seen in the Goulburn Valley from the environmental changes that ensued from the late 1830s with the incursions of European pastoralists into Aboriginal territories and the subsequent rapid decline of the indigenous populations. Regular burning of the landscape ceased from this time, and regional ecosystems were destabilised as a result. In some areas, vigorous woodland regrowth ensued. A surveyor, Clement Hodgkinson, who travelled in the region in 1856, reported that a dense underwood pervaded much of the box forest country on both the New South Wales and Victorian sides of the river. He added that such areas were rapidly deteriorating in terms of grazing capabilities, "owing to the great increase in scrub and underwood consequent upon the partial cessation of the bush fires which formerly checked their growth" (Hodgkinson 1856). An additional problem was that as scrub and forest litter built up in the absence of regular burning, the fires that eventually occurred were much hotter than previously, and capable of killing mature trees as well as animal inhabitants (Barr & Cary 1992, p. 76).

Certain faunal populations, notably those of prey species, increased as Aboriginal populations declined. It has been pointed out that koalas, for example, are rarely mentioned in the reports of the earliest Australian settlers, but by the mid-nineteenth century they were being reported frequently (Flannery 1994, p. 212). Parris (1948) writes that when his ancestor, William Day, came in 1856 to live on the Goulburn River at Noorilim, it was three years before he and his family saw a koala, and "of about twenty books published between Major Mitchell and 1856 by men travelling through the region," not one reports

sightings of koalas. After 1870, however, koalas appear to have been abundant, particularly in the red gum forests. Parris concluded that there were few koalas on the Goulburn when the white men arrived, because they were readily procurable in the red gum country and thus an "easy meal" for the Aborigines. Kohen (1995, p. 88) adds that koala populations are not self-regulating, and that the animals may outstrip their food resources if their numbers are not kept in check by hunting.

Possum numbers in the Goulburn Valley probably increased also as hunting pressure decreased. Curr (1883, p. 185) reported that possums became troublesome in gardens and cultivation paddocks in the decades following the decline of the Aborigines. Possum overpopulation was also thought to account for tree die-back in some areas of Victoria (e.g., MacPherson 1885)<sup>2</sup>, although this is more likely to have been associated with increased burdens of leaf-eating insects, the populations of which had previously been kept in check by regular burning (Cary & Barr 1992).

Kangaroo populations suffered from competition with sheep introduced by European settlers (Presland 1977, p. 18), but they also "increased enormously in many localities... after the Aborigines and the wild dog had been got rid of" (Curr 1883, p. 184). Goulburn Valley newspapers reported kangaroo plagues in the 1880s (Bossence 1979, p. 52), although Calaby (1971) points out that vegetation changes and the addition of watering points for stock would have been significant factors benefiting kangaroos besides the cessation of Aboriginal predation.

### **3.7 Discussion: a 'dynamic equilibrium'**

In the context of this thesis, Aboriginal society in the Goulburn Valley can be said to have comprised an open system in which natural resources were obtained by Aboriginal people from the biophysical environment for the essential purpose of group survival. Individual interactions with the land occurred within a hierarchical social framework of family groups, clans and tribes, with the structural links between these components manifested in linguistic and territorial relationships. The system functioned for a period of at least 40,000 years, during which time substantial changes occurred in the regional environment as a result of both Aboriginal activities and other external (e.g., climatic) events.

Of primary interest in this chapter is how the Aboriginal system maintained itself for such a long period. The answer appears to lie in the various observed forms of Aboriginal social behaviour and resource use, since these may be considered systemic adaptations to the external or operating conditions of the system, and are thus indicative of the degree to which the true biophysical characteristics of the Goulburn Valley

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<sup>2</sup> As MacPherson (1885, p. 93) explained it, "the tooth of the blackfellow operated on the opossum, and the tooth of the opossum operated on the leaves of the eucalypt. The former of these two factors is now struck out of account, and that leaves much larger scope for the operation of the second factor..."

environment were perceived by its Aboriginal inhabitants.

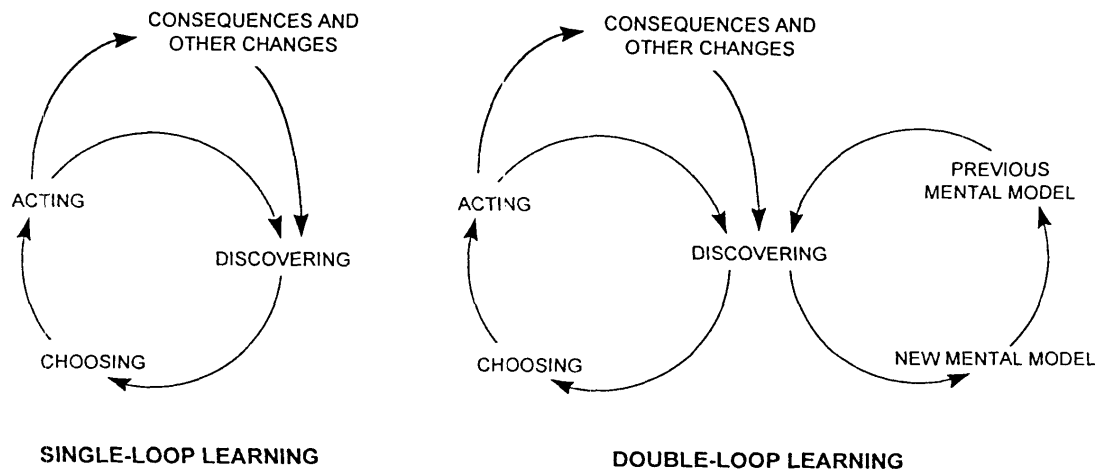
As reported by early European arrivals, the Aborigines of the region exhibited relatively high population densities, cultural mechanisms for the regulation of population size and spacing, broad-spectrum hunting and foraging practices, incipient forms of cultivation, and the use of fire as an environmental management technique. It is presumed accordingly that the region was understood by the natives to be richly endowed in terms of both food and water resources compared to other parts of Australia, but that these resources were nevertheless finite and subject to large fluctuations in supply, both between seasons and from one year to the next, because of the erratic climate. It seems likely that for the same reason the Aborigines did not develop systems of agriculture, but recognised that supplies of certain foods - grazing animals and possibly vegetables - could be enhanced to some degree through environmental manipulation, in particular the strategic use of fire.

This understanding is unlikely to have been profoundly 'scientific' or factual in the modern sense, but it was supported by belief systems which provided an intimate, and often highly personal, link between the people and the land. Rapoport (cited by Lopez 1986, pp. 265-66) suggests, for example, that the Aborigines inhabited both a mythic environment and a real environment, with the two overlapping at certain visible points in the landscape where "unobservable realities" found expression in "observable phenomena". Derived from stories that evolved from the local landscape, Aboriginal mythology provided an explanation of the natural world, and the place of Aboriginal people in it. Each individual, each family group and clan, and each part of territory was totemistically identified with a natural object or species, which the Aborigines treated with great respect in the belief that their totems would respect them in return and thus guarantee a measure of stability in the world. This spiritualism was an integral component of the Aboriginal perception of the environment, as landscape features and animals were invested with meanings beyond their physical form. These did not distort the 'true' (biophysical) nature of the environment, however, but served to reinforce it, providing both assurances and sanctions for particular actions that had implications for group survival (Christie 1979, p. 22; Kirkpatrick 1994, p. 34).

As Norgaard (1984) observes, information with considerable survival value tends to become incorporated into a culture (often in unconscious or non-deliberate ways) if it promotes the adaptive fit of that culture, and in the Goulburn Valley the natural environment was evidently perceived in such a way that the Aboriginal system was able to maintain itself over thousands of years. Undoubtedly this was achieved through an evolutionary process of adaptive learning and structural adjustment that occurred as a result of "a multiplicity of changing transactions of give and take" between the people and the environment over a long period of time (Powell 1989, p. 24). In systems terms, this can be equated to the process of structural coupling (see page 11), with the primary underlying mechanisms alternating between what Parker & Stacey (1995, p. 16) term 'single-' and 'double-loop' learning. As depicted in Figure 3.4, control of the system according to this model lies primarily with a balancing (negative feedback) loop, but changes in



**Figure 3.4: Single- and double-loop learning (after Parker & Stacey 1995).**



As Parker and Stacey (1995, pp. 15-16) explain, single-loop learning is a negative feedback process associated with stabilising or goal-seeking behaviour. What is discovered about the operating environment, and the way in which decisions are made, are governed by a shared mental model or paradigm. As actors learn about the consequences of their behaviour, they adjust their behaviour in the light of that learning. Meanwhile, the frame of reference within which their learning takes place remains unquestioned. However, if operating conditions change and uncertainty arises, the existing paradigm may no longer be appropriate – in which case double-loop learning is required in order that the shared mental model may be questioned and changed. Double-loop learning is thus a positive (or destabilising) feedback process that attends to the differences between the expectations associated with the old mental model and what is actually happening, allowing for a new mental model to be created as a result.

behaviour can result from positive feedback processes if changes are perceived in the environment in which the system operates.

In Aboriginal society, 'single-loop' feedback processes would have predominated over system functioning for much of the time because of the finite nature of the food resources within any one region. It may be imagined that a group who reared extra children following a run of bountiful seasons, or remained too long in one place, would have eventually been unable to feed all of the group members when climatic conditions were less favourable. They would also have found their mobility restricted by having more children than they could carry. Group survival would have been at risk unless certain behaviours were adopted to offset the consequences of the previous actions - infanticide, wider spacing of future pregnancies, abandonment of the aged or infirm, warfare, or the resumption of a more nomadic lifestyle.

Jones (1971) discussed the possibility that Aboriginal population sizes fluctuated widely about some mean in this fashion, increasing rapidly in good years but undergoing drastic reductions in drought years when population exceeded food supply. He thought it more likely, however, that tribal populations were maintained for long periods of time at an equilibrium level, which, as discussed earlier, would be somewhat below the maximum number of people the environment could generally support, so that populations could be buffered against fluctuations in the abundance of natural resources. After an initial

trial-and-error period, involving both positive and negative feedback, the size of Aboriginal populations would eventually have been maintained at equilibrium by negative feedback processes.

This process may also summarise Aboriginal experiences with fire, as they learned the benefits in terms of habitat management of setting small fires often, rather than large fires infrequently. Nicholson (1981) surmised that the skilful burning practices of the Aborigines must have evolved from "centuries of experience." Tindale (1940, p. 149) provides other examples of trial-and-error processes culminating in the development of consistent, stabilising patterns of behaviour:

If [the Aboriginal] camps too near water, game will be disturbed, and there will be no firewood, for this will have been already used by his ancestors; if he remains too far away there will be transport difficulties. He must observe a nice balance between these factors, bearing in mind also the importance of visibility in ensuring safety from enemies, and the inability of his only burden bearers, his wives, to travel more than three to five miles away from camp, gather root foods and return in the day.

Parker and Stacey (1995, p. 17) point out that in systems controlled by negative feedback there are identifiable conditions or parameter values which promote stability (in the Aboriginal system, these would have included lower limits for genetic viability, and upper limits to the size of nomadic kinship groups before group mobility is impaired), and that the system is attracted to a stable equilibrium point from which it will move only if there is an external 'shock' (e.g., major climatic changes; natural disasters; the arrival of the Europeans). Brookfield (1969) suggested similarly that if the real environment remains unchanged, and no change occurs in the means or technology for resource extraction, and if population numbers remain relatively constant, a human-environment system could in time achieve a steady state or develop the characteristics of a closed system, as the perceptions of the environment and its resources cease to undergo further modification.

Brookfield (1969) imagined that such situations were probably "widely obtained" during Paleolithic times, and they may also have occurred until comparatively recently in remote areas such as the New Guinea Highlands, where extreme geographical isolation prevented the introduction of new information or technology for perhaps centuries at a time. It seems possible that stable, steady-state systems may also have been characteristic of the Australian Aborigines for long periods, as they were physically isolated from the rest of the world, and also developed relatively little new technology of their own, presumably because systems dominated by negative feedback achieve stability and efficiency through repetition and tend not to be particularly creative in the absence of external changes (Parker & Stacey 1995, p. 17).

The Aborigines accordingly demonstrated little evidence of creativity or progressiveness, at least by European standards. In the broadest sense, there was little cultural differentiation between Aboriginal tribes living in different environments across Australia. According to Lawrence (1971, p. 256), "all economies remained at a hunting and gathering level, and their structure remained broadly the same.

There was little evidence of craft specialisation and with minor variations the division of labor based on sex was universal". Without such specialisation, Aboriginal societies and their technology remained at what Birdsell (1953, p. 171) described as an "essentially paleolithic level of economy".

The Aborigines were not opposed to change if it was of benefit to them, however. Blainey (1982, p. 119) writes that they appear to have been "sympathetic:" to such useful technological innovations which could be accommodated within their traditional way of living. The explorers Hume and Hovell thus observed Aborigines using an iron tomahawk to extract grubs from a tree (Bland 1965, p. 60), and the overlander John Hepburn noted there were small fragments of bottle glass at an Aboriginal encampment on the Goulburn River in 1836 (Bride 1969, p. 62). Blainey (1982, p. 119) notes generally that the Aborigines made ready use of metals and small containers in tool manufacture and food gathering when such items became available after European contact.

Some technological advances were also made by the Aborigines themselves at times, thereby enabling the continued importation of 'negentropy' necessary for system maintenance (see page X). Kohen (1995, p. 68) cites evidence of new tool types and stone-working appearing in the archaeological record beginning about 4000 years ago. The spearthrower is believed to have come into use at about this time, and in the last millennium bone began to replace stone points on multi-pronged fishing spears. The Aborigines would also have responded in various behavioural ways to changes in food resources which came about (at least initially) as unintended consequences of their own activities. Blainey (1982, p. 120) suggests that food plants, such as murnong, may have been spread inadvertently by Aborigines carrying seed and roots in their dilly bags, thereby increasing food availability in some places and perhaps creating an awareness of the possibilities of 'natural cultivation,' as discussed previously in this chapter. The presumed decline of kangaroo and wallaby populations as a consequence of Aboriginal over-hunting would have resulted in increased hunting pressures on smaller marsupials such as koalas and possums, encouraging the development of specialised hunting tools, and also of communal hunting and fishing techniques (Kohen 1995, p. 77, p. 93). Fires lit by Aborigines also helped to increase the food supply by creating favourable habitats for game animals of all sizes, so that regular burning was adopted, apparently in Holocene times (Kohen 1995, p. 79) as an environmental management technique.

The Aborigines are thus unlikely to have ever reached a perfectly (theoretically) stable equilibrium in their relationship with the environment, and certainly they would not have done so over the long term, for the reason that the environment did not remain static during their period of occupancy. As discussed previously, major climatic changes occurred throughout the Murray-Darling Basin within the last 40,000 years, and it was not until about 5000 years ago that the relatively mild Holocene period ensued, and the vegetation and fauna of pre-European settlement became established. According to Kohen (1995, p. 26, p. 79), the Aborigines responded to the favourable conditions at this time by increasing their populations substantially and expand their spatial distribution into previously marginal areas. They also modified their

technology (hunting tools, the use of fire) to make greater use of food resources including kangaroos, wallabies, possums, as well as food plants and fish. Animal populations and habitat conditions would have been affected in return, clearly suggesting that "a dynamic relationship" existed between the Aborigines, their technology, and the flora and fauna (Kohen 1995, p. ix).

Jones (1975) adds that no more environmental variation would have occurred throughout the overall period of Aboriginal occupancy than is encompassed by modern day Australia. Aboriginal systems were obviously flexible enough to accommodate this variety at the time of European settlement, hence Jones argues that no *a priori* reason exists to assume that Aboriginal people would not have been able to adapt to changes of the same order of magnitude affecting any particular region over the last 40,000 years.

It may be concluded accordingly that double-loop learning played a small but important role in the development of Aboriginal culture, and conferred a certain degree of flexibility in the continual process of adaptation to environmental change. It also seems likely, however, that for long periods, during which major environmental changes (as distinct from ENSO-induced climatic cycles) were imperceptible, Aboriginal interactions with the environment were dominated by negative feedback processes, which maintained the system in a conservative, relatively stable equilibrium state. Such a model accounts for the impressive sustainability of Aboriginal society, and also for inability of the Aborigines to adapt with the necessary rapidity to the biggest and most sudden environmental 'shock' of their 40,000-year existence - the arrival of the Europeans.

### **3.8 The decline of the Aborigines**

Edward Curr observed that during his decade of residence among one of the Pangerang clans in the 1840s "a large and steady decrease took place in their numbers, so that at the end of the ten years I doubt whether as many as 80 of the original 200 were left" (Curr 1883, p. 235). By the time Curr came to write his memoirs, thirty-five years later, "scarce one was left" (Curr 1883, p. 179).

Barwick (1971) notes that all historical sources agree that there was an extraordinary decline in the Victorian Aboriginal population during the 1840s and 1850s as a consequence of European settlement. Of an original population estimated at perhaps 15,000, fewer than 2,000 Aborigines remained by 1863. Of these, 182 were Goulburn Valley fullbloods. The most obvious cause of this excessive mortality was the introduction of alien diseases to which the Aborigines had no resistance, including influenza, measles, tuberculosis and venereal diseases (Barwick 1971, 1984). Increased inter-tribal warfare, violent encounters with settlers and punitive police expeditions, and intemperance and listlessness associated with what Curr (1883, p. 253) termed "detrribalisation" were also significant, as was basic starvation (Barwick 1984).

A certain moral responsibility was felt by some colonists towards the Aborigines, and also by the colonial administrators who were all too aware that the new land was not, after all, *terra nullius* (Christie 1979; Presland 1977, p. 30; Shaw 1992). Various underfunded mission stations and government-sponsored Aboriginal reserves of small acreages were established at various times around Victoria in an attempt to alleviate the situation. These included a Protectorate in the Goulburn Valley in the 1840s, consisting of approximately 250 hectares of country near Murchison. Trees were grubbed, crops were grown (cereals, potatoes and vegetables) and average daily attendance by the natives in 1843 was 78. This number declined to about 50 in 1844 and decreased further thereafter until the Protectorate was closed at the end of the decade (Barwick 1971; Bird 1992; Massola 1958). Some Goulburn Valley Aborigines were relocated at their request in 1859 to a reserve at Acheron, in the upper Goulburn catchment area, but were moved again, less willingly, four years later to a reserve at Corranderrk, near Healesville, another 50 kilometres to the south (Bird 1992). Subsequent government policies forbade marriages between fullbloods and half-castes, who were legally 'white' (Barwick 1971), so that by 1874 all that remained of the pre-European Goulburn Valley tribes were five men, three women, one boy and a girl. Some mixed-blood descendents survived and a small Aboriginal community resides within the present-day Goulburn Valley at Rumbalara, near Mooroopna, but the last surviving fullblood from the region was buried by the end of the nineteenth century (Massola 1958).

Barwick (1971) blamed diseases and bad government policy decisions for the ultimate demise of the Victorian Aborigines. Jones (1971) offers an evolutionary, anthropological view of the stronger Europeans eliminating the weaker natives. Kohen (1995, p. 84) provides a ecological explanation, arguing that with the available resources of the land being fully utilised by the Aborigines, the incoming European population could only survive by over-exploiting the ecosystem at the expense of the Aboriginal component.

The systemic viewpoint suggests that the arrival of the Europeans amounted to an external shock which was too sudden, and of too great a magnitude, for the finely balanced Aboriginal system to adjust to it. The introduction of alien diseases to closed communities was ecologically disruptive in itself, but the intricately evolved relationships of the Aborigines with the environment, and with each other, were also destroyed as the white men and their stock intervened and (as discussed in the next chapter) rapidly changed the ecology of the landscape. The parameters of the existing system were stretched beyond all tolerances, and the Aborigines lacked both the numerical and technological strength and the cultural flexibility to fit into a new system in which Europeans and their sheep were the dominant components. After 40,000 years, the tribes - and their landscape - thus disappeared from the Goulburn Valley, and their present-day legacy amounts to little more than scarred trees, relict oven mounds, and an assortment of place names that have no meaning to most of the region's current residents.

## CHAPTER 4

### THE SQUATTING PERIOD (1838-1870s)

#### 4.1 Introduction

The long occupation of the Goulburn Valley by Aboriginal people came to a rapid end with the arrival of the first European settlers. These were pastoralists or 'squatters'<sup>1</sup>, who came in the wake of the explorers Hume and Hovell and Major Mitchell, and grazed sheep and cattle in the region from the late 1830s. They occupied the land in large tracts, initially under temporary licence from the Crown and, later, under more tenured arrangements, and they dominated much of Victoria for three decades.

The squatting period is characterised by conflicting official and popular perceptions of environmental conditions in Australia. Policy decisions pertaining to colonial settlement and land use were made in London until the 1850s, and were based on an unreasonably optimistic view of the agricultural capabilities of the continent. Settlers who attempted to make a living from the land perceived it differently, and saw greater potential in pastoral activities. In the Goulburn Valley, the arrival of the squatters and their stock marked the beginning of a significant environmental transformation, as the closed ecosystem of the Aborigines was opened to introduced species, and as the region became a source of extractable resources. The environmental changes that occurred during this period of settlement were limited to a considerable degree, however, by the erroneous perceptions of the policy makers, as strict regulatory constraints were imposed on the squatters' activities in order to preserve the land for agricultural uses. The eventual decline of the squatting system is discussed in terms of cultural and political sources of systemic instability.

#### 4.2 Environmental perceptions and settlement activities

##### 4.2.1 Official perceptions of colonial Australia

In the 1830s, the control of lands in Australia was still retained in Britain. The Colonial Government in Sydney was allowed to intervene in small matters, but all decisions pertaining to lands were subject to approval by the Department of the Colonies in London, where it was firmly assumed that agricultural settlement was the most desirable and appropriate form of colonial development (Billis & Kenyon 1930, p. 4; Burroughs 1967, p. 102).

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<sup>1</sup> 'Squatter was a term applied by Government officials to a stockholder who grazed sheep and cattle on Crown land. It also came to mean a settler who, after searching for pasture land suitable for a run, stopped or 'squatted' there with his stock (Billis & Kenyon 1930, p. 20).

This assumption, which provided the basis for land use legislation in the Colony of what was then greater New South Wales, was based in part on practical reasons. Agriculture was the form of rural development with which Englishmen were most familiar. Unemployment, poverty and social unrest in England were high in the wake of the Industrial Revolution and it was thought that emigrant labourers could be employed in the colony as farm workers (Burroughs 1967, p. 102; Dingle 1984, p. 58). There were also important moral considerations. Pastoralism was traditionally considered to be unskilled and uncivilised, little more than "spontaneous growth of herbage on untilled land" (Donald 1965, p. 187). Agriculture, on the other hand, was

the first effort of the rational mind, in order to provide for our physical wants; it is the first germ of civilization, and the basis of every other art... It necessarily forms the foundation of all national prosperity... It affords the most healthful exercise both for mind and body, conduces to temperate and virtuous habits, and is found by experience to form the character of the mass in its best mould. It not only furnishes the best moral soil in which the seeds of knowledge can be sown, but forms the only foundation of national independence (*Port Phillip Magazine* 1843, p. 98).

The dispersion of settlement was viewed, in addition, as an 'evil', whereas 'civilising' effects were to be obtained from confining settlement within pre-determined geographical limits (Powell 1976, p. 27). Such thinking was behind the influential 'systematic' colonisation theories of E.G. Wakefield, who argued in 1829 that Australia had too much land, which offered no incentive for land improvement. Stable, prosperous farming communities could only be developed if land were purchased at a sufficiently high price by men of capital, who could then provide work for some of England's unemployed, who could in turn work towards purchasing their own farms (e.g., Barr & Cary 1992 p. 119; Dingle 1984 p. 59). For these reasons, from 1829, land occupation in the colony was legally restricted to nineteen established counties around Sydney, with the cost of land being a uniform £1 per acre (e.g., Heathcote 1965, p. 36). By such means it was hoped that the nostalgically-remembered, virtuous and hard-working peasant-based society of pre-industrial Britain could be recreated in Australia (Goodman 1988).

The suitability of south-eastern Australia for settlement of this kind appears to have been taken for granted by the Colonial Office. Powell (1976, p. 26) observes that land policy decisions made 27,000 kilometres away were bound to reflect a general ignorance of the environment, while observations of the land that could have been useful were prejudiced by European expectations, and by problems of semantics, which led to unfounded extrapolations (Heathcote 1965, p. 16, 1972). Australian ecosystems were commonly described by early visitors in the same terms as European ones, and were assumed accordingly to be capable of the same productivity and the same responses to European systems of agriculture (Flannery 1994, p. 347). Forest density was equated with soil productivity (Chauncy 1855, p. 91; Conacher & Conacher 1995, p. 112), and the savannah woodlands, including those near the Goulburn River, were likened to rural English parklands (Howitt 1972, pp. 76-77; Walker 1965, p. 34). Beyond these pre-conceptions was an unfounded bureaucratic optimism in the Australian climate that had been engendered by spurious eighteenth century theories linking climate with latitude: the 'best' climates

were supposedly those between the thirtieth and the thirty-sixth parallels (Heathcote 1972; Perry 1966). Such thinking persisted - in England, if not elsewhere - until the early nineteenth century, and even as late as 1831, after more than fifty years of settlement, officials at the Colonial Office in London still had "unreserved confidence in the agricultural potentialities of New South Wales" (Burroughs 1967, p. 102).

#### **4.2.2 Perceptions of settlers**

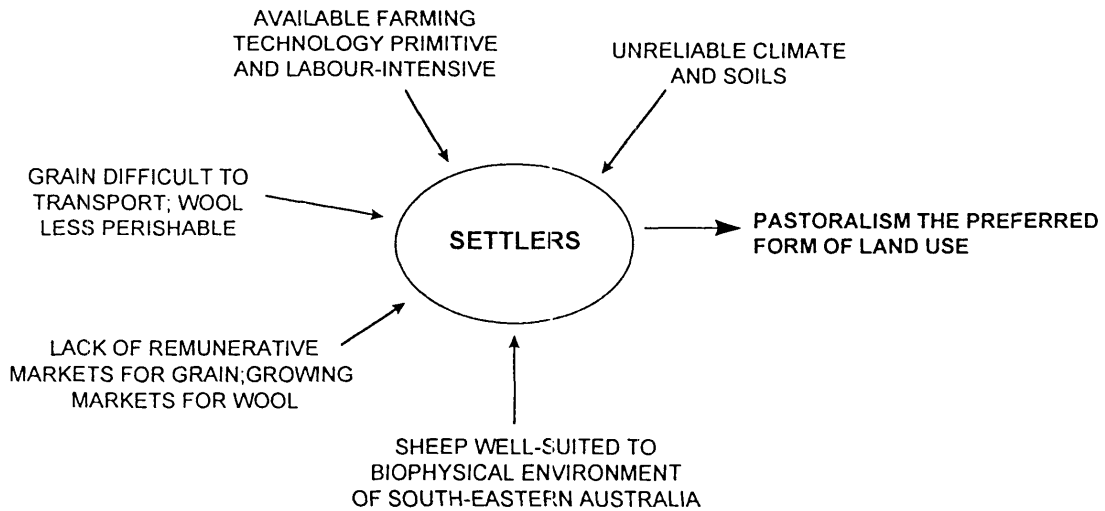
The perceptions of the settlers were somewhat different. Those who actually tried to farm in the colony had quickly recognised that the Australian climate was highly irregular, droughts were a frequent occurrence, and except along the rivers, which were prone to flooding, the soils were exceedingly poor for agriculture (Burroughs 1967, p. 104; Perry 1966). The available summer-growing English wheat varieties were unsuited to the Mediterranean climate, and there were, in addition, economic hindrances to cropping. Production costs in the colony were high because of the necessity for clearing and cultivating land (for which only primitive technology was available), transport of grain was difficult and expensive, and colonial farmers lacked an adequate and remunerative market for their crops. England was too far away for exported Australian grain to be competitive, and British farmers were in any case protected by the Corn Laws. Colonial wheat growers were thus confined to the domestic market, where demand was inelastic and prices were highly variable (Burroughs 1967, pp. 104-105).

Wool growing, on the other hand, was admirably suited to Australia, as John Macarthur had recognised as early as the 1790s (e.g., Davidson 1976). There was a ready and expanding market for fine wool in England and Europe; it was a commodity which could be carted by bullock wagon and shipped more easily and cheaply than heavier and more perishable grain; land, particularly the savannah grasslands of the interior, could be grazed in its natural state without the need for clearing; mild winters obviated the need for stock shelters; and, apart from shepherding, wool growing was an industry which required little labour (e.g., Burroughs 1967; Davidson 1976; Powell 1989).

The conclusion of the settlers, on the basis of direct experience, was thus that grazing was more profitable and less hazardous than agriculture (Figure 4.1) (Burroughs 1967, p. 110). From the 1820s, in defiance of both the land laws and high land prices, pastoralists began to move outside the "limits of location" (i.e., the nineteen counties) into unexplored areas in the interior of New South Wales where they could 'squat' with their stock for free on almost unlimited areas of grazing land. By the middle of the 1830s they had progressed as far south as the Murray River (Billis & Kenyon 1930, p. 61), and the colonial Governor, Sir Richard Bourke, wrote to London that in the light of the colony's "peculiarities", the fact of dispersion might have to be accepted (cited by Heathcote 1965, p. 36). Bourke's successor, Sir George Gipps, also protested the imposition of Wakefieldian settlement ideas upon Australia, arguing in 1840 that environmental conditions were not the same as in other colonies and that land policies should not be



**Figure 4.1: Situational interpretation of settlers regarding land use in New South Wales, 1830s.**



applied indiscriminately without recognition of local differences. Gipps perceived the inland plains not as agricultural country, but as pastoral land, and the squatters as pioneer settlers (cited by Dunsdorfs 1956, p. 56; also Heathcote 1965, p. 36).

#### **4.2.3 Official re-appraisals**

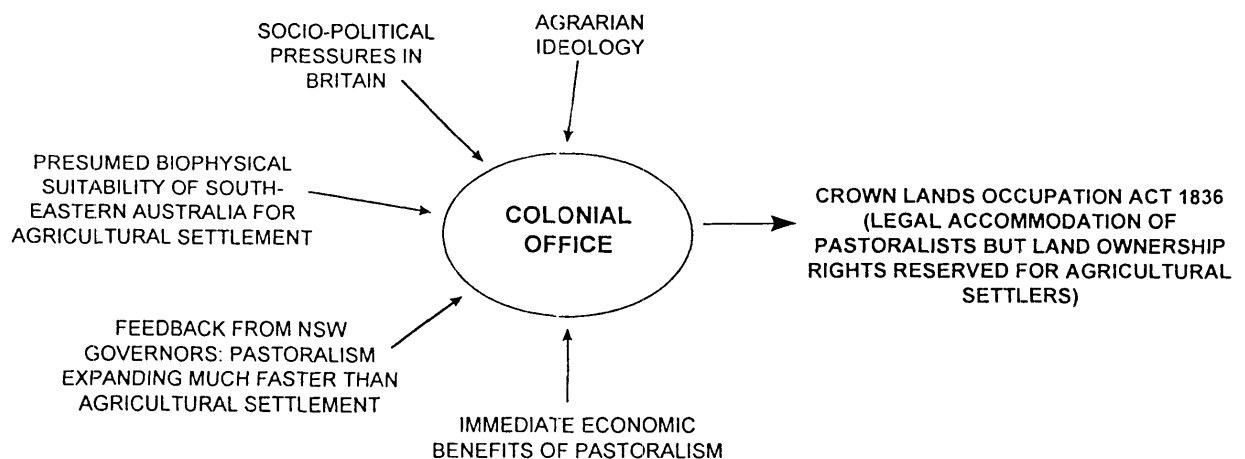
Burroughs (1967, p. 102) remarks that the officials in the Colonial Office were obviously aware of the rapid growth of pastoralism, but from London they did not view the wool industry as a reasonable basis for economic or social development. Governor Bourke's initial proposal in 1835 that the whole of the Port Phillip District (i.e., lands south of the Murray River) should be officially opened for settlement, and land sold to defray the administrative costs, was thus rejected, as the notion persisted in London that "sheep would gradually be forced to retreat before the plough" (Burroughs 1967, p. 119).

The Colonial Office was nevertheless entitled to review its decisions in the light of additional developments, and the Port Phillip District was declared open to settlement the following year (1836). According to Burroughs (1967, p. 165), this action was necessitated by the "irregular proceedings of [John] Batman and hordes of adventurers" who had begun bringing sheep across from Tasmania. Continuing feedback was also provided by Governor Bourke, who thought it "far better that a government with insufficient authority to prevent occupation should extend its administrative responsibilities, and thus 'turn to the best advantage a state of things which it cannot wholly interdict'" (cited by Burroughs 1967, p. 165).

The opening up of the Port Phillip District was probably the first real acknowledgement in London of the

inexorable expansion of the pastoral industry in Australia<sup>2</sup> (Burroughs 1967, p. 167). The next action taken by the Colonial Office was to legitimise but simultaneously restrain the activities of the pastoralists with the passing of the Crown Lands Occupation Act 1836. This Act allowed that lands beyond the limits of location could be depastured under annual licence for a fee of £10 per year, but no security of tenure was offered and the squatters were cautioned against making any improvements to their runs (Billis & Kenyon 1930, p. 5). As Burroughs (1967, p. 119) explains, "the interests of future generations of colonists, and of future cultivators in particular, had to be protected by a stern refusal to concede undue rights to pastoralists grazing their flocks on lands that might one day be required by thousands of small farmers" (Figure 4.2).

**Figure 4.2: Situational interpretation of Colonial administrators regarding land use in New South Wales, 1830s.**



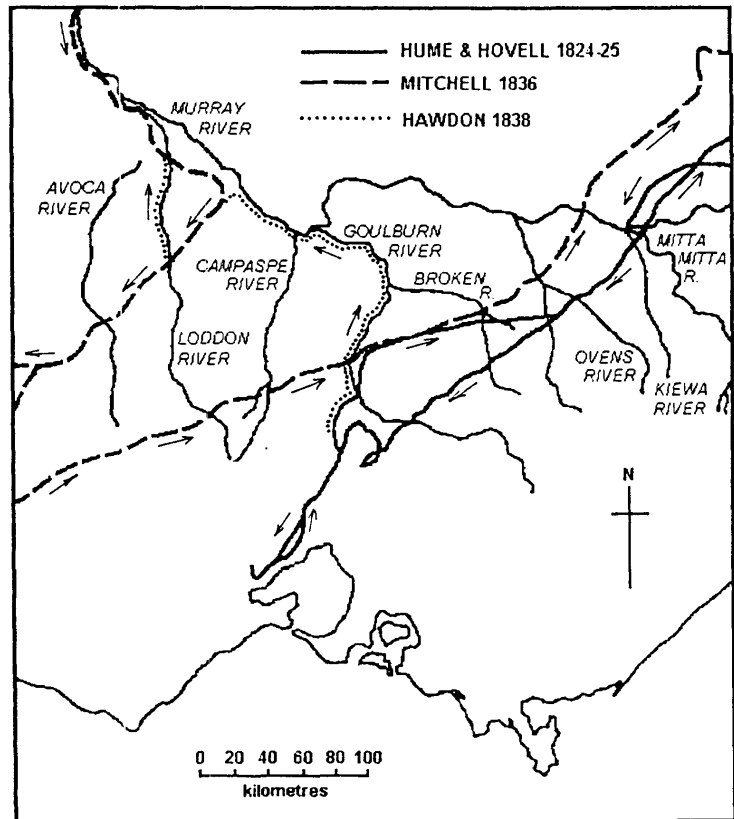
#### 4.2.4 Early perceptions of the Goulburn Valley

The spread of the squatters into the Port Phillip District was encouraged in the meantime by the reports of the explorer, Major Thomas Mitchell, who had traversed central Victoria in 1836 and published a euphoric account of the fine pastures of the Western District (Mitchell 1839). Mitchell passed to the south of the Goulburn Valley (crossing the river near what is now Mitchellstown) on his return to Sydney, and his route was adopted by many of the 'overlanders' who subsequently proceeded to drive stock south into the Port Phillip District (Figure 4.3). Mitchell's spring-time impressions of the Goulburn River and the open box-eucalyptus forest country to the east were highly favourable: he described the land as "grassy and good" and the Goulburn itself as "a fine river" (Mitchell 1839, pp. 291-94). Similar sentiments had been expressed by the explorers Hume and Hovell, who had first seen the region twelve years earlier, in 1824, and named the river after the then-Colonial Secretary, Major Frederick Goulburn<sup>3</sup>. Hume and Hovell

<sup>2</sup> Roberts (1964, p. 163) thought it "not a little ironical" that when the District's first land sales were held in 1837, in Melbourne, it already had permanent settlements and 100,000 sheep.

<sup>3</sup> Upon returning to Sydney, Hume and Hovell were advised that a river elsewhere in New South Wales

**Figure 4.3: Early exploration routes through north-central Victoria (after Powell & Duncan 1982).**



concluded of the plains to the east that "a finer country for sheep cannot exist" (Bland 1965, p. 56). Their impressions had gone largely unheeded, however, as their journals were not published until seven years after their expedition, and the places they described were a long way from established settlement in the 1820s and thus of little economic interest. The lands of the Port Phillip District, in other words, had yet to become a 'resource'.

The first of the overlanders who saw the Goulburn Valley were less enamoured of the region, presumably because they saw it in drier seasons. Joseph Hawdon, who led the first overlanding party from Sydney to Melbourne in the summer of 1836-37 and subsequently pioneered a stock route into South Australia, crossed the Goulburn River several times in the vicinity of Mitchell's crossing place (Figure 4.3). He noted in his journal of January 1838 that the surrounding country was comprised of box tree forest and, although pretty, was hilly and barren, and the land was poor. His route along the west bank of the Goulburn to the Murray with cattle was a seven day journey through grassless box forest country which he thought unprepossessing (Hawdon 1952, pp. 14-16).

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had already been assigned the name 'Goulburn', so the southern stream was re-named the 'Hovell'. As Bossence (1965, p. 8) eloquently explains, however, "somehow the original name stuck". Major Mitchell (1839, p. 29) commented that the river was "unfortunate in obtaining a variety of names", and that his preference was for the Aboriginal name, 'Bayunga'. Curr (1883, p. 303) adds that the various 'Goulburn' tribes each had names for their own stretch of river, including 'Kaiela' (Pangerang) and 'Waring' (Ngurai-illam-wurrung).

Another early overlander, Thomas Walker, noted the hydrological limitations of the region. As his party proceeded west from Violet Town, Walker wrote of level, open and thinly grassed box-forest country, and a succession of dry creeks. "We crossed several small creeks or watercourses, which were full of running water when Major Mitchell passed them, but which, excepting one, and that one within three miles of the river, were now quite dry, not a drop of water in the holes even." He added that "the quality of soil, herbage and timber varies of course in this distance, and some parts are bad whilst none can be called very good (Walker 1965, p. 27). His overall conclusion on traversing the plains towards the Goulburn River was that it was "a curious country - it can never be densely peopled, or stocked, and if it were, what would become of the inhabitants and their stock in dry seasons..." (Walker 1965, p. 28).

The whole of the country on the north side of Mitchell's Track was in fact dismissed as a "desert" by most of the early overlanders (Brodrigg 1978, p. 18; Presland 1977, pp. 21-22), and the Goulburn River was merely an obstacle to be crossed on the route to the Western District.

#### **4.2.5 Re-appraisal and settlement**

Perceptions of the Goulburn Valley changed again as a growing scarcity of grazing land brought about its re-appraisal. Overlanding into the Port Phillip district had been spurred on by the publication of Mitchell's report of his expedition, as well as a lengthening drought in New South Wales, and an economic boom fuelled by a combination of English capital and heady speculation (Powell 1974; Roberts 1964, p. 153). By the middle of 1838, over 140,000 sheep and 5,000 head of cattle had passed along Mitchell's Track on their way to the Western District, and as stock traffic continued to increase it was inevitable that for some would-be squatters the dry but relatively open, unoccupied<sup>4</sup> country in the north of the Port Phillip District was worthy of closer inspection (Billis & Kenyon 1930, p. 61). Edward Curr observed that much of the land to the immediate west of the Goulburn River had "the inestimable advantage of being ready for immediate use without the outlay of a sixpence" (Curr 1883, p. 180), and it proved to be a suitable environment for merino sheep. These were physiologically economical in their use of water and would regularly travel three miles or more from water to graze, and could go even further when pastures were sparse (e.g., Moule 1962).

The first squatters in the Goulburn Valley instinctively chose the greenest country. They also sought water frontage for their homesteads, although as they soon discovered, this left them susceptible to floods (Curr 1883, p. 217; Powell 1968b; Roberts 1964, p. 282). A regular supply of water was essential, nevertheless, and was the basis for Edward Curr's decision to establish his homestead near the Goulburn River at 'Tongala', rather than on the lush plains to the west at 'Colbinabbin', where the grass was much superior

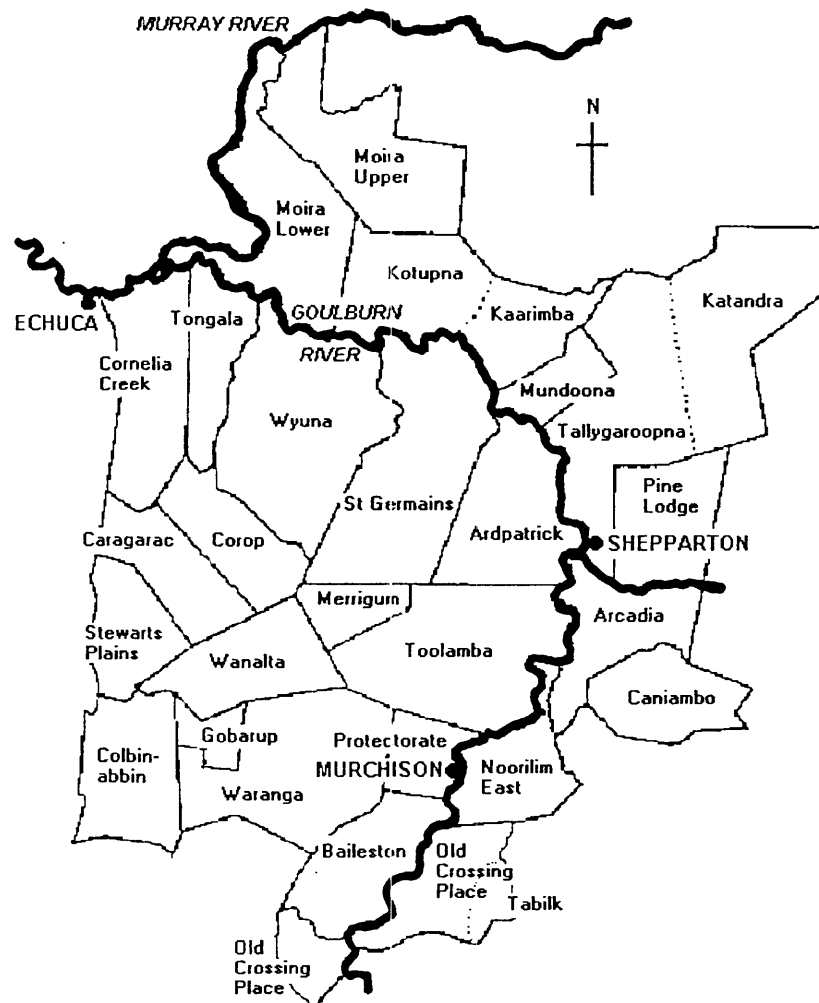
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<sup>4</sup> other than by Aborigines

but permanent water was in short supply (Curr 1883, p. 81). Further upriver, the squatter Edward Khull sited his 'Tallygaroopna' homestead by a highly prized freshwater spring, though it was surrounded by dense scrubland in which sheep management was all but impossible (James 1938, p. 15).

Land in the general region was taken up, in any case, from 1838 along the creeks upriver from what is now Seymour and grazing runs spread northwards along the Goulburn River over the next couple of years. Land immediately below Seymour was taken up from the beginning of 1839, as was 'Arcadia' run, near the junction of the Broken River and Seven Creeks with the Goulburn (Bride 1969, pp. 213-17). Other large runs in the open forest and scrub lands downriver from Mitchellstown were licensed between 1839 and 1841, including 'Noorilim' (18,500 hectares), 'Toolamba' (36,500 hectares) and 'Ardpatrick' (31,000 hectares) (Figure 4.4; Table 4.1) (Billis & Kenyon 1974; McLennan 1936, p. 11; Morvell 1983, p. 129). Runs also spread along the east-west axis of the Major's Line, though patchily at first as swamps and highlands were avoided (Powell 1974).

**Figure 4.4: Goulburn Valley squatting runs, 1848 (after Spreadborough & Anderson 1983).**



**Table 4.1: Goulburn Valley squatting runs, 1848<sup>\*</sup>**

Run	Year taken up	Approx. area (ha)	Est. carrying capacity		Hectares per sheep (approx.)**
			Sheep	Cattle	
Arcadia	1839	32,370	6,000	-	5.4
Ardpatrick	1841	30,450	4,000	-	7.6
Bailleston	1842	17,800	-	1,000	1.8
Caniambo	1843	15,380	4,000	100	3.1
Caragarac	1843	13,730	7,000	-	2.0
Colbinabbin	1844	15,800	6,000	-	2.6
Cornelia Creek	1844	27,480	6,000	-	4.6
Corop	1843	5,700	2,000	-	2.9
Gobarup	1847	7,770	4,000	-	2.0
Kotupna	1843	47,700	10,000	1,600	1.8
Moira	1842	25,900	13,000	-	2.0
Molka	1846	12,140	6,000	-	2.0
Mundoona	1846 <sup>1</sup>	4,850	-	600	0.8
Noorilim	1840	17,940	8,000	-	2.2
Old Crossing Place	1840	40,870	12,000	400	2.6
St Germain's	1844	31,100	4,000	-	7.8
Stewart's Plains	1844	11,800	4,000	-	3.0
Tallygaroopna & Katandra <sup>2</sup>	1841	64,750	10,000	-	6.5
Tongala	1841	11,400	3,000	-	3.8
Toolamba	1845	35,530	6,000	-	5.9
Wanalta	1840	25,010	6,000	-	4.2
Waranga	1840	21,000	6,000	-	3.5
Wyuna	1842	41,280	12,000	-	3.4

Source: Billis and Kenyon (1974).

\* Runs applied for under Orders-in-Council, 1848-49.

\*\*Cattle equated to 10 sheep

<sup>1</sup> Originally part of Tallygaroopna

<sup>2</sup> Subdivided in 1848 into two runs (Tallygaroopna and Katandra)

Police outposts were established in the meantime at both Violet Town and Mitchellstown to encourage settlement in the aftermath of violent clashes between squatters and Aborigines (e.g., Chambers 1985, pp. 2-3). Any claims the Aborigines might have had to the land were casually dismissed. The squatters employed them as guides in their search for runs, but the prevailing view was that the country was too fine to be wasted on "a few miserable savages" (Presland 1977, p.4, p. 23), and having paid a few pounds for a squatting licence, the squatters believed that this gave them a legal right to evict Aboriginal people from their runs, if not exterminate them altogether (Presland 1977, p. 7).

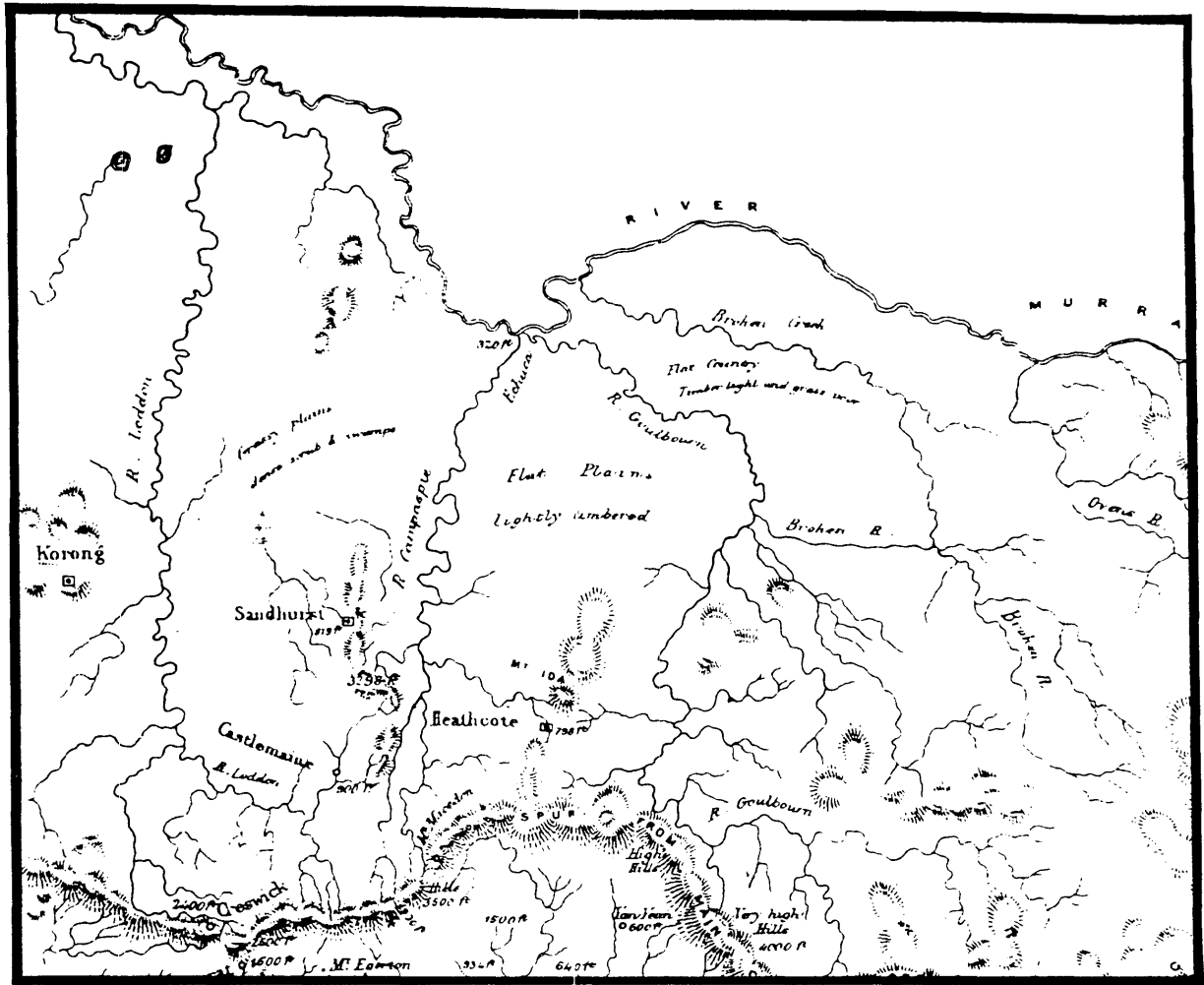
Few of the original squatters in the Goulburn Valley endured more than the first couple of years. Some seem to have been defeated by the land itself. 'Tallygaroopna' run on the eastern side of the Goulburn was abandoned after two years, it being a "vast scrub, heavily timbered and impossible to penetrate" (James 1938, p. 12). Others squatters succumbed to financial depression in 1841-43, to drought in the mid-1840s, or to sheep catarrh epidemics that wiped out entire flocks in the late 1840s. A number of Goulburn Valley runs changed hands as a result, but the industry remained generally viable and the new occupants were joined by a second wave of squatters who fitted into corners between pioneer runs or resumed abandoned runs (Chambers 1985, p. 71). By the end of the 1840s most of the drier plains country and the rugged wet mountain areas to the south and east were taken up also, although generally as additions to existing runs (Chambers 1985, p. 71; Land Conservation Council 1983, p. 32; Powell 1974).

The "desert" of the previous decade thus came to be fully occupied by squatters and their stock, and was depicted somewhat favourably in an 1847 map of the Victorian grazing industry (Figure 4.5). This was compiled by the surveyor Thomas Ham from all the maps and survey information available at the time, and perhaps reflects the grudging bureaucratic acceptance (if not actual approval) of the pastoral industry at that time.

#### **4.2.6 The promise of tenure**

The squatters gained a further measure of legitimacy at this time, in the form of a promise from the Colonial Office of greater security of tenure. This came after several changes in licence fee structures and other land occupancy regulations instituted by the New South Wales Government failed to provide the squatters with any additional claim to the land, and in some instances actually weakened their hold on it (Billis & Kenyon 1930, pp. 6-7). The squatters by that time felt they had earned certain rights to their runs (Bride 1969, p. 222; Forth 1985), and they appealed to London for greater security of tenure. Though still unwilling to concede the pastoralists too much (literal) ground, the Colonial Office was sympathetic, largely because many squatters had powerful family connections in Britain, and considerable sums of money had been invested by British merchants in banks and land settlement companies (Martin 1955.).

Figure 4.5: Detail from Ham's map of Australia Felix (Ham 1847).



The result was the 1847 Orders-in-Council, which included the provision that in the Unsettled Districts of Port Phillip - including the Goulburn Valley - pastoralists who had been in occupation for twelve months or more could be granted 14-year leases to their runs. Lessees were also promised rights to purchase land, in the form of surveyed lots of 65 hectares (160 acres) or more (Billis & Kenyon 1930, p. 9).

This was seen as a victory by the squatters, as the Colonial Office had apparently conceded to them the right of pre-emption of the land. There was accordingly a rush of lease applications from 1847 onwards, and as land was systematically assessed for carrying capacity as the basis for assigning rents, the first comprehensive survey of the grazing industry was effectively carried out at this time<sup>5</sup> (Powell 1970a, p. 27, 1989, p. 42).

<sup>5</sup> The acreages and stocking rates of Goulburn Valley runs shown in Table 4.1 are derived from squatters' claims of 1847. Chambers (1985, p. 84) notes that the information is not entirely reliable as many squatters appear to have underestimated the size of their runs, but it nevertheless provides a reasonable indication of the extent and carrying capacity of pastoral operations at the time.



In practice, the 14-year leases under the provisions of the 1847 Orders-in-Council never came to be issued, however, and the pastoral licensing system, with licences subject to annual renewal, was merely continued as before. The officially-stated reason was that the state of survey work in the colony prevented more definite leases being introduced (Billis & Kenyon 1930, p. 12), but in actuality the new Government of the fledgling Colony of Victoria (constituted upon the Separation of the Port Phillip District from New South Wales in 1851) was afraid that agricultural development would be indefinitely hindered by long pastoral leases and pre-emptive rights to Crown Land (Martin 1955, p. 6; Powell 1970a, p. 27). In 1854, it was finally ruled that the lease provisions of the Orders-in-Council were no longer applicable, owing to the changes in social and political circumstances brought about the gold rushes (Forth 1985).

#### **4.3 Land use in the squatting period**

How the squatters perceived the overall environment in which they operated can be surmised to some extent from how they managed it. Without security of tenure, and hence an incentive to modify their environment, they established their runs with minimal expenditure of either capital or effort. The savannah woodlands of the Goulburn Valley were grazed without clearing and fences were limited to homestead areas, the homesteads themselves being little more than crude bark huts (e.g., Curr 1883, p. 49). Many stations carried both sheep and cattle, although cattle were generally confined to foothill areas while sheep predominated in the drier country of the riverine plain (Billis & Kenyon 1974; Chambers 1985, p. 82; Land Conservation Council 1983, p. 32). Sheep were tended by shepherds and yarded at night within moveable hurdles, while cattle were managed by mounted stockmen (Chambers 1985, p. 91; Martindale 1958, p. 10). Stocking rates tended to reflect the natural resources of each locality, and local rainfall in particular (Powell 1989, p. 42). In the Goulburn Valley, the runs with the lowest carrying capacities tended to be those on the dry plains to the north of the region, while carrying capacities in the foothill districts to the south (e.g., Mitchellstown and Avenel) were somewhat higher, and those upriver from Seymour were higher still. Carrying capacities were also influenced by such factors as the amount of scrub and forest vegetation present (James 1938, p. 11), the availability of water for stock, and presumably by soil factors and terrain also.

Overall stocking rates in the region were of the order of one sheep per two to eight hectares (Table 4.1). This was low in comparison to the Western District, and also to the present-day carrying capacities of improved Goulburn Valley pastures. Wool production was low also, around one kilogram per sheep per year, and quality was often a problem (McLennan 1936, p. 17; Ross 1882). Since there were few native legumes originally present (Moore 1959, 1970b), this may reflect the nutritional quality of the early pastures, or the fact that there was little opportunity for the squatters to practise selective breeding. It is also a likely indication of overstocking. Edward Curr (1883, p. 185) wrote of the pastures in his district being "scourged" by constant overstocking, and that "according to the notions of those times... people

entertained somewhat princely ideas on the subject of feed for their flocks" (Curr 1883, p. 161). Donald (1965) suggests that the early stocking rates were based, ignorantly, on the total quantity of forage present rather than on annual growth of the grass. There was also the temptation for squatters to let their flocks and herds increase after a few good seasons to the maximum carrying capacities of their holdings (Hamilton 1892), especially since the natural increase in stock numbers was their chief source of profit (Burroughs 1967, p. 110). The English observer William Howitt thought accordingly that the country between the Goulburn and Broken Rivers was not stocked "one tenth part in proportion to its capabilities" when he passed through in the fine season of 1853 (Howitt 1972, p. 279).

Water was a critical resource in the region and its supply posed a problem for many squatters, particularly once it was realised that the smaller streams were not necessarily permanent (Roberts 1964, p. 282). Evelyn Pitfield Sturt, the first Commissioner in the broad Murray District (which included the Goulburn Valley), reported that water supplies for runs in northern Victoria were obtained by "sinking waterholes and throwing dams across the slight falls or declinations of the plain, which, though barely visible, yet here and there in wet seasons [became] runs of water" (Bride 1969, pp. 365-66). Water conservation technology was limited to the 'muckbilly', a low four-wheeled dredge, which was used to scrape and shape both natural and artificial depressions (Powell 1989, p. 44).

Problems arose for all squatters in drought years, since it was not possible for them to conserve and store fodder, and water supplies were ever more precarious. According to Commissioner Sturt, in dry seasons the squatters frequently had to "move on with their flocks towards some of the rivers for their absolute salvation, and, driven to become interlopers and marauders on others' runs, their existence [was] far from enviable..." (Bride 1969, p. 366). Life was evidently even less enjoyable for the sheep: "The starving animals devour every vestige of green herbage, pull the roots out of the ground and eat them, and even lick the seeds off the surface" (Hamilton 1892, p. 209). The ecological impacts of this were profound, as the native pastures rarely recovered from such treatment.

For nearly all squatters the major means of developing a sufficient income base to survive a drought was to acquire as much land as possible. Edward Curr and his family thus laid claim to several runs in the Goulburn Valley, including 'Tongala', 'Caragarac', 'Colbinabbin', and 'Moirá' (Curr 1883; Morvell 1983, p. 19)(see Figure 4.4), and their flocks led a somewhat migratory existence according to seasonal conditions. In winter they were grazed on the plains at 'Caragarac' and 'Colbinabbin', but when the water supplies dried up - usually around September - they were moved to the runs at 'Tongala' and the 'Moirá', adjoining the Goulburn River (Curr 1883, p. 354).

Another management strategy, which emulated that of the Aborigines, was the burning of dry pastures in autumn, "it being well known that the feed which springs up after a fire is particularly wholesome and fattening" (Curr 1883, p. 355). This was easily conducted in the absence of fences, but it also tended to

lull the squatters into a false sense of optimism, as the lush growth after burning in good seasons encouraged them to overstock (Barr & Cary 1992, p. 13).

Overall, stock management in the early years of squatting corresponds to the modern concept of 'rangelands pastoralism' as practised in the drier inland regions of Australia. As described by Barr and Cary (1992, pp. 98-100), this is characterised by low stocking rates (often as low as one sheep to ten hectares of land), low levels of inputs, the use of natural pastures, no fodder conservation, and limited intentional modification of the land. Few opportunities existed for the squatters to improve land productivity, other than indirectly through better stock control and water facilities.

The implications of this are that, as in modern rangelands pastoralism, overstocking was prevalent despite low stocking rates, recurrent droughts constrained run operations, and the squatters lacked the capacity (which comes with development) to repair physical damage to the pasture environment. It may be presumed that the early squatters possessed few pasture management skills in any case, and since they did not own the land their concerns lay primarily with the condition of their stock (Barr & Cary 1992, p. 101; Ross 1882).

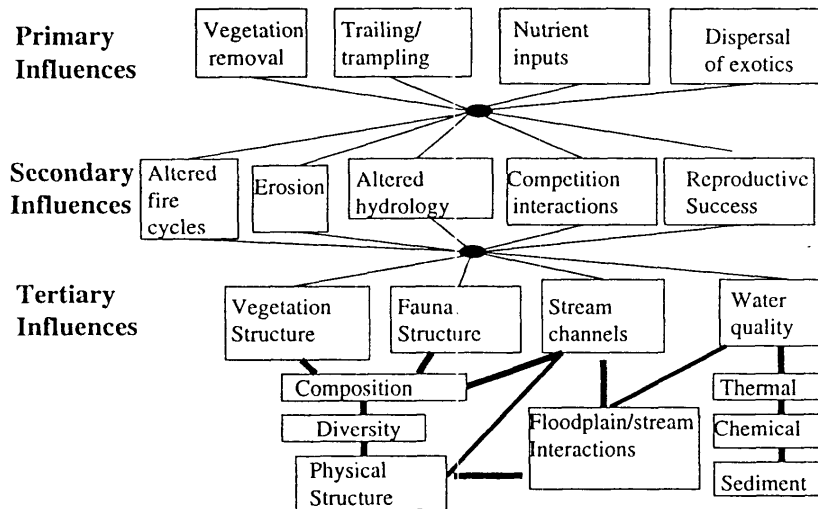
#### **4.4 Environmental impacts**

Edward Curr (1883, p. 187) observed that the introduction of domestic livestock - sheep, cattle and horses - was a major cause of environmental disturbance in Australia, and grazing may indeed be a pervasive form of land use, causing widespread and dramatic impacts in natural ecosystems (Figure 4.6). This occurred to some degree in the Goulburn Valley, as the stock arrived en masse in the early years of the squatting era, to the obvious detriment of the native herbaceous communities and soils. Other environmental impacts associated with the pastoral occupation of the region tended to be limited, however, in part because of the squatters' lack of technology (e.g., felling trees and the construction of post-and-rail fences were laborious tasks and avoided where possible), but also because of the precariousness of their tenure during most of the first decade. Powell (1976, p. 28) suggests that this must have been a great deterrent to anything but "a small amount of experimentation in techniques of clearing, draining, fencing, cultivation and water supply", and changes in the overall appearance of the landscape would not have been particularly marked during this period (Davidson 1976, p. 66).

##### **4.4.1 Effects on vegetation**

In 1841, five years after the opening up of the Port Phillip District to settlement, there were over a million sheep in the new colony, and by 1848 this number had increased five-fold (Billis & Kenyon 1974, p. 67;

**Figure 4.6: Hierarchical model of the influence of livestock grazing on ecosystems (Dwire *et al.* 1999).**



Primary influences are direct impacts; secondary influences are ecosystem responses to direct impacts; tertiary influences are the long term cumulative impacts that can ultimately occur (Dwire *et al.* 1999).

Victorian Year Book 1973). In the Goulburn Valley alone, there were at least 140,000 sheep by 1848, as well as several thousand cattle (Table 4.1). The native vegetation and soils were thus subjected, with sudden intensity, to the impact of millions of cloven hooves and the selective feeding habits of domesticated animals. The effects of this invasion on the herbaceous communities of the region (as well as on Aboriginal populations) were both profound and irreversible.

The original grasslands of the Goulburn Valley were of two types: temperate shortgrass communities, dominated by *Danthonia* spp. (wallaby grasses) and *Stipa* spp. (spear grasses), on the treeless plains closer to the Murray, and temperate tallgrass communities of *Themeda triandra* (formerly *T. australis*, known commonly as kangaroo grass<sup>6</sup>) and *Poa caespitosa* in the grey box woodlands further upriver in the mid-Valley (Moore 1970a). All of these species were present throughout the region, although the proportions of each differed in different localities according to soil type (Moore 1970b). *Themeda*, a tall, tussocky summer-growing perennial, in particular grew over extensive areas on red brown earth soils (Moore 1959), often in almost pure stands, and it features in early descriptions of the region. Lands Commissioner Evelyn Pitfield Sturt recalled that long kangaroo grass "waved to the very flaps of the saddle" (Bride 1969, p. 364), while Curr described it growing at Colbinabbin, in association with wire grass (*Aristida* spp.) and murnong, in the early days of his occupancy (Curr 1883, p. 81, p. 185). The Chief Aboriginal Protector, G.A. Robinson, also described it as being "very abundant all over the country" on the plains west of the Goulburn River in 1840 (Presland 1977, p. 22).

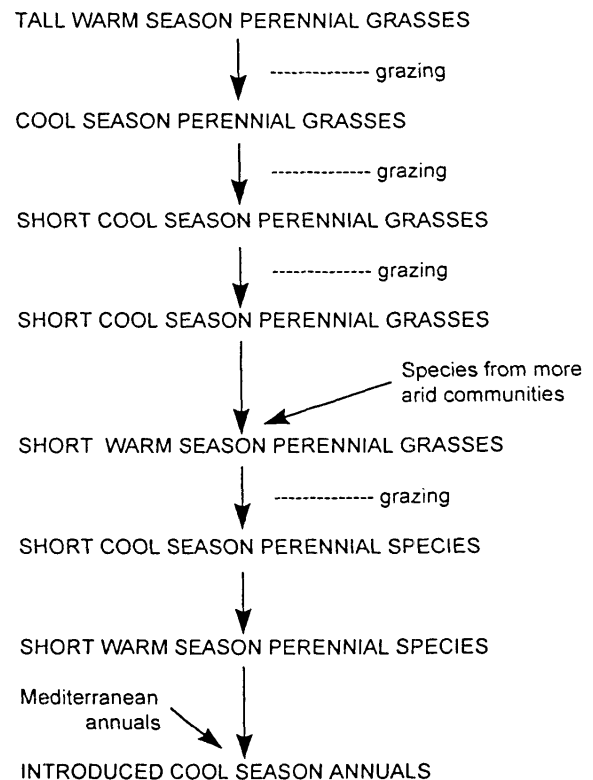
<sup>6</sup> *Themeda* is also referred to in some early writings as (yellow) oat grass.

*Themeda* and associated native grasses and herbs are presumed to have been in a stable equilibrium within the regional ecosystem before the arrival of the squatters, and were obviously adapted to both the Aboriginal fire regimes and the relatively light nibbling of soft-pawed marsupials (Barr & Cary 1992, p. 13; Moore 1959). The local ecosystem was quickly upset, however, with the arrival of the squatters and the intense, sedentary grazing of hard-hoofed stock, which compacted the soil and preferentially ate out the most succulent species. Sheep, in particular, are selective grazers and prefer the tips of green leaves, which they search out from the base of tussocks when the pasture appears to be dry (Moule 1962). Defoliation of *Themeda* in this way during its growth period reduces its root growth, thus compromising its summer survival ability (Moore 1970a). The reduction in density and basal area of the *Themeda* tussocks raises the level of mineral nitrogen in the soil and increases the amount of bare ground, encouraging the intrusion of winter-growing perennials (Moore 1962). The species is also affected by trampling: damaged stems are unable to set seed, while soil compaction around the tussocks due to repeated hoof pressure restricts root growth and reduces water infiltration (Willatt & Pullar 1983).

The introduction of sheep to the summer-growing *Themeda*-dominated grasslands thus caused the disappearance of the tussocks. The disclimax communities that succeeded them were initially dominated by short, coarse, cool-season native perennial grasses, *Danthonia* spp. (wallaby grasses) and *Stipa falcata* (spear grass) (Moore 1959, 1962, 1970a, 1970b), while native perennial herbs were also present in greater abundance than previously (Moore 1959, 1962). For the squatters this was actually beneficial, as *Themeda* in winter was dry and low in both protein and digestible carbohydrates, while the cool-season *Danthonia-Stipa* communities provided a higher level of nutrition for most of the year (Moore 1970b). The cool-season species also withstood grazing better than *Themeda* and were relatively stable under light stocking (Moore 1962).

With sustained heavy grazing, however, the native cool-season perennials were weakened too, and were eventually displaced by introduced annual species (Figure 4.7)(Moore 1962). These were primarily of Mediterranean origin (also from those parts of South Africa and South America with 'Mediterranean' climates), and their seeds arrived in Australia by various accidental means, including ship ballast, packaging, mattresses, and in crop seed and fodder. They were efficiently distributed across the country by sheep, and their growth was encouraged by the associated disturbances to the soils and native grasslands (Barr & Cary 1992, p. 22; Moore 1959). On the northern plains, early grass introductions included *Hordeum leporinum* (barley grass), *Vulpia bromoides* (silver grass) and *Bromus* spp. (Moore 1959). Introduced annual herbaceous species included hare's foot trefoil (*Trifolium arvense*), cluster clover (*T. glomeratum*), flatweed (*Hypochaeris radicata*) and burr medic (*Medicago polymorpha*). Howitt (1972, p. 282) noted in 1853 that "trefoil" appeared to be universal across the plains between the Goulburn and Broken Rivers, and grew in particularly extensive patches with rank nitrophilous weeds in sheep camps.

**Figure 4.7: Progressive changes in temperate woodland herbaceous communities as a result of grazing by sheep and cattle (after Moore 1962).**



Some settlers thought the introduced species were an improvement (Dingle 1984, p. 37). The growth of the grasses was more sward-like and luxuriant and they made the plains look more like an English meadow. Nutritionally, however, they were inferior to the native pastures. Curr (1883, p. 186) observed that there might have been more grass in the later years of his tenure, but its quality had been decidedly lowered. Many of the introduced species, including barley grass and burr medic, were also sharp-seeded or produced burrs which were damaging to wool, although Moore (1959) counters that the medics provided more protein than the native species, with the burrs also providing feed during dry periods.

Other plant species besides the native grasses were affected by grazing. Gott (1982) notes that the preferred sheep grazing areas were also the areas of greatest abundance of murnong, and Curr (1886, p. 240) wrote of sheep not only grazing the leaves of this plant (which was sufficient to destroy it), but also nosing up the tubers, such that within a year they began to get scarce. Mitchell (1839, p. 272) observed that cattle were also fond of murnong leaves and this species was apparently eaten out of the Mitchellstown vicinity by overlanding stock as early as 1839 (Dredge 1839, cited by Gott 1983; Presland 1977, p. 18).

Other species were virtually eradicated from the northern plains by overstocking, including the bushy and salsolaceous vegetation common to the west (Curr 1883, p. 185). Sheep ate saltbush (*Atriplex* spp.) bare to the stump, and the squatters were "unable or unwilling to spare the country for regeneration" (Bolton 1981, p. 85). 'Pigs-face' (*Disphyma clavellatum*) was also originally abundant in the more western areas

when Edward Curr first rode across them, but by the time he came to write his memoirs the plant was "nearly, if not quite, extinct" (Curr 1883, p. 423).

#### **4.4.2 Effects on the soil**

Aside from the gradual changes in his pastures, Edward Curr noted the effects of his sheep on the soil: "By the trampling of stock the ground has been hardened and drainage increased; the beds of creeks, rivers and lagoons by the same means have also been rendered more impervious to soakage, and their banks a little less precipitous" (Curr 1883, p. 187). He thought this beneficial, since his watercourses filled more readily than previously, and retained water for longer. Dixon (1892, p. 202) observed more critically that "for miles back from the river frontages, and in the neighbourhood of wells and dams, an unproductive surface, trodden down until almost impervious, now extends".

Such changes would have come about because repeated trampling by hard-hoofed stock reduces soil surfaces to powder, which then hardens into an impenetrable crust after rain. Most Goulburn Valley soils would have been particularly vulnerable to this form of physical degradation as they naturally tend to become hard-setting after repeated disturbance, due to naturally weak soil aggregation and further deterioration resulting from the destruction of soil organic matter (Skene & Poutsma 1962). Trampling by stock also causes compaction below the soil surface (Willatt & Pullar 1983), reducing soil moisture storage capacity and generally favouring the growth of shallow-rooted species over the deeper-rooted native perennials (Moore & Biddiscombe 1964). Root and shoot production also generally decrease as soil is compacted, so that overall pasture productivity is reduced.

Trampling would also have contributed to soil erosion, particularly around watercourses and in other areas of heavy stock traffic, due to the increased runoff and lack of vegetative protection against the erosive effects of raindrops. Conacher and Conacher (1995, p. 102) add that valuable topsoil would also have been lost from the region through wind erosion, as suggested by the dust raised when mobs of sheep move across dry paddocks.

Soil nutrients would have been lost as a matter of course through their export from the region in the form of wool, and soil fertility would have declined as overstocking continued, regular pasture burning ceased, and no manure was added other than that contributed by the stock themselves (Dixon 1892; Hamilton 1892; Ross 1882). In the Goulburn Valley, it was observed accordingly that after a boundary fence between 'Toolamba' and 'Ardpatrick' runs was burnt, the ashes from the fire acted as a fertiliser and the site of the fence through the paddocks was easily discernible for some years afterwards by the stronger growth of grass (Morvell 1983, p. 20).

#### 4.5 Squatting in the 1850s and 1860s

Few fortunes were made in the dry country of the Goulburn Valley (Forster 1964, p. 37), but pastoralism was perceived to be a viable use of land. This was particularly so in the 1850s, as the discovery of gold brought a new prosperity to Victoria, and squatters shared in the wealth through their provision of mutton and beef for the diggings (including those on the fringes of the Goulburn Valley at Whroo and Rushworth). The squatters thus continued to lobby for leasehold tenure, and for opportunities to purchase land and undertake improvements.

By this time the new Colonial Government was in place in Victoria, and in 1855 it assumed responsibility from London for the administrative control of its territories (Billis & Kenyon 1930). Land use policy remained essentially unchanged, however, since, for reasons that are discussed in the following chapter, the new Government shared the determination of the Colonial Office that the squatters should eventually cede their land to agricultural settlers.

The squatters were a strong presence in the State legislature, nevertheless (Forth 1985), and in the 1850s they were granted pre-emptive rights to purchase homestead blocks of up to 260 hectares (640 acres)<sup>7</sup>. Land was valued at a flat rate of £1 per acre, and almost all squatters took advantage of the opportunity to own at least a portion of their runs. This provided them with the long-awaited incentive to undertake various property improvements (fences, houses, woolsheds, watering points), and further changes to the Goulburn Valley landscape ensued as a result.

Land purchases tended to be followed by fencing (Forth 1985), and labour to construct fences was available as the gold rushes petered out in the mid-1850s. Post-and-rail and other forms of log fences were constructed where trees were abundant, and fences could also be made of brush. The large 'Toolamba' run was one of the first to be fenced, and was divided in the 1860s by brush fences into paddocks eleven kilometres long and eight kilometres wide (Morvell 1983, p. 22). Fencing of smaller paddocks was still too labour-intensive at this time, however, and on less affluent runs fences were constructed only around homestead blocks or to delineate run perimeters (Bossence 1963, p. 25; Williams 1988).

Although expensive, fencing had clear stock husbandry advantages. Fewer shepherds were required, stock diseases could be controlled, and selective breeding could be undertaken (Barr & Cary 1992, p. 85; Forster 1965, p. 40). It also allowed for the regular stocking of back-country areas, as dams could be dug or bores sunk in paddocks away from natural surface water (Dingle 1984, p. 81).

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<sup>7</sup> This provision reflected the fact that lot sizes in Victoria had been based from the outset on the surveying convenience of one square mile (i.e., 640 acres)(Powell 1970b).



Fencing had environmental consequences, however, that were less beneficial. Squatters had greater incentive to retain well-bred (and hence more valuable) stock during dry seasons, but they damaged their pastures and risked erosion in doing so (Barr & Cary 1992, pp. 19-20). Many squatters also stopped using fire to rejuvenate native pastures, since fences burnt easily and were expensive to replace. In some areas where regular burning was stopped, rapid regrowth of scrub and woodland vegetation occurred. Settlers in the 1870s who took up land in the Kyabram district - the lightly timbered country of Ham's map (Figure 4.4) - reportedly had to clear dense scrub from their holdings before they could plant their crops (Bossence 1963, p. 40, p. 46). Williams (1988) adds that the impact of fencing on local woodlands would have been quite devastating, as vast quantities of timber were required to keep the sheep confined to paddocks.

Other improvements that came with increased security of tenure included the provision of better water supplies. Bossence (1963, p. 25) noted that various dams and waterholes around Merrigum could still be seen in the 1960s as evidence of the squatting occupation, and twenty-five dams are known to have been built on the 'Toolamba' run (Morvell 1985, p. 23). The dams apparently encouraged increases in stocking rates, not only of sheep and cattle, but also of native animals. Provisioned with reliable water supplies and no longer hunted by the Aborigines, kangaroo populations thrived (e.g., James 1938, p. 17). Powell (1976, p. 30) notes that this was in spite of these animals having the "singular bad fortune" to belong to each of the three major classes of native animals recognised by the squatters - that is, 'vermin', 'edible' and 'game.'

#### **4.6 Discussion: A socially unsustainable system**

The arrival of the squatters and their stock in the Goulburn Valley in the late 1830s transformed a stable, closed ecosystem of savannah woodlands and native grasslands, soft-footed marsupials and Aboriginal hunter-gatherers, into an open extensive-pastoral system in which European settlers and introduced species of animals and plants were the dominant components. It was a bifurcation point in both the environmental and the social history of the region, which proved to be a tragedy for the Aborigines, but also had deleterious consequences for the land as the natural endowment of the Goulburn Valley was transformed for the first time into extractable - and exportable - resources. The arrival of the squatters also marked the beginning of a period (that is perhaps only now drawing to a close) of separation between resource use policy makers and resource users in the Goulburn Valley, and of systemic dysfunction arising from conflicting goals and ineffectual feedback processes between these two groups and the biophysical environment.

In systemic terms, the squatting phenomenon was considerably more complex, and much shorter lived, than the relationships that endured between the Aborigines and the regional environment. At its outset,

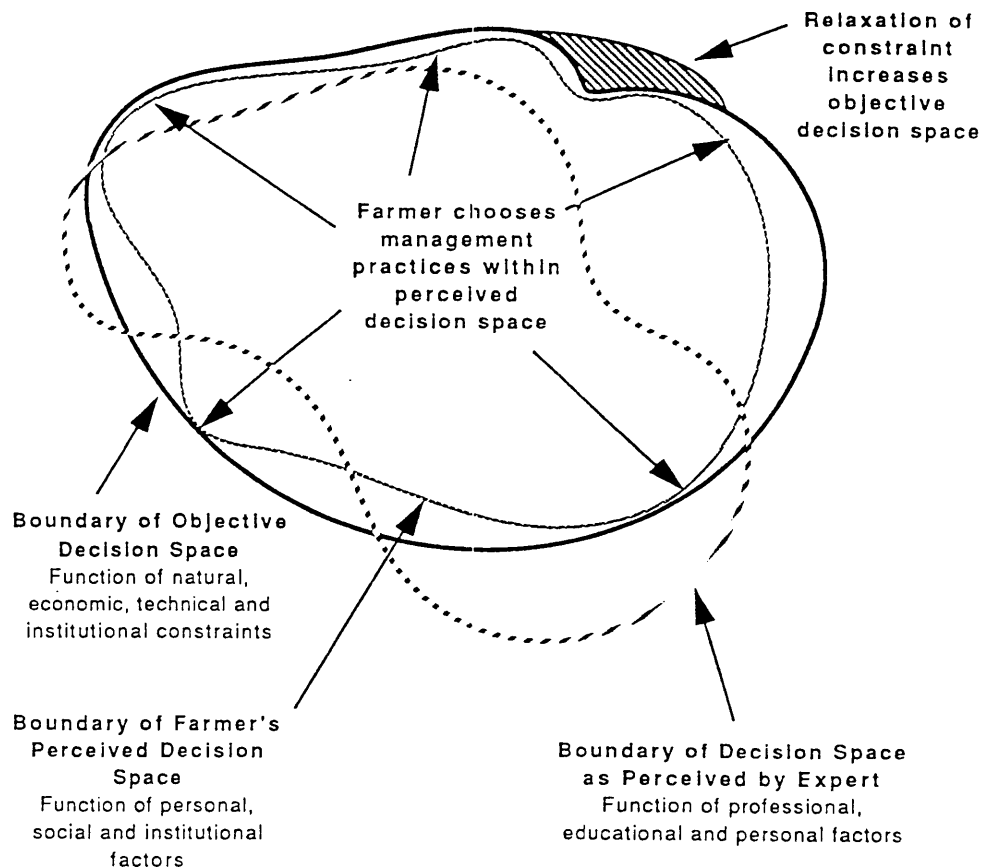
the new system included an official, or policy-making component (i.e., the Colonial Office in London), as depicted in the model in Chapter 1, as well as an additional official component represented by the various New South Wales Governors, and the collective group of land users known as the squatters. It thus comprised what Heathcote (1965) termed a 'three-tier' resource appraisal system, with a hierarchical regulatory structure in which the Colonial Office comprised the highest-order component, and the squatters the lowest (Rappaport 1977). The two official components were succeeded in 1851 by the single entity of the Victorian Government, but this handing over of legislative responsibility represented only a relatively minor structural change in the system, as the essential goals of the Colonial Office - to prevent the squatters from amassing large estates and to keep the land available for eventual yeoman farmers - remained a feature of land use policy in Victoria throughout the entire squatting period.

The existence of a bureaucratic level of decision-making complicated the feedback relationships between the land users (i.e., the squatters) and the land resource. The settlement regulations imposed by the Colonial Office existed as part of the squatters' decision-making framework, and served to limit their activities beyond the 'objective' boundaries determined by economic and environmental constraints (Figure 4.8)(Hollick 1990). It was a further complication that the policy makers in London were physically remote from the environment where their policies were being implemented. Colonial governors in Sydney provided some measure of official feedback, and contributed to such structural adjustments as the opening up of the Port Phillip District to settlement and the Crown Lands Occupation Act of 1836, but they were too far removed, both physically and politically, to be capable of changing the perception held in London that Australia could be farmed like Europe. As Rappaport (1977) suggests, the information had to pass through too many nodes, exposing it to distortion and weakening its impact.

The erroneous bureaucratic perception of the Australian environment is a particularly remarkable feature of the squatting period. Rooted in ignorance and prejudiced by expectation, colonial land use policy was instituted in London on the basis of a predetermined socio-political-ideological agenda, and what was assumed to be a benignly arable environment. This view persisted even as contrary information became available, and as responsibility for land use decision-making was transferred to the colony itself. Some legislative concessions were made to accommodate the squatters, as pastoralism was deemed to be of economic value as an interim resource use system, but these were limited in extent, and do not reflect any substantial deepening of knowledge of the biophysical environment of south-eastern Australia. Rather, the belief persisted at the official level that "sheep would gradually be forced to retreat before the plough" (Burroughs 1967, p. 119).

This failing can perhaps be explained by Senge's (1990, p. 174) observation that new information is often not acted upon because it conflicts with deeply held mental models, or perceptions, that limit thought and action to what is already familiar. Alternatively, new information (a form of systemic 'disturbance') may not bring about structural changes in social systems because perception is conditioned by cultural

Figure 4.8: Conceptual model of farmer decision-making (from Hollick 1990).



phenomena, and new or 'foreign' information may thus be beyond a system's cognisance (Capra 1996, p. 269; Pigram 1972; see page 11). The officials in the Colonial Office, and in the new Victorian Government, may not have been receptive to the information available about the capabilities and limitations of the Australian environment because it did not conform to their strongly held agrarian ideals. This form of 'cognitive dissonance' (Mitchell 1979, p. 130) would have been compounded by the remoteness of London from the colony (and of Melbourne, as the seat of the Victorian Government, from the farther districts of the colony), and the resultant lack of direct experience of policy-makers with the land (Brookfield 1969). As a result, they "failed to make the mental adjustment necessary to grasp the precise nature of a very different environment" (Burroughs 1967, p. 119).

In effect, the Colonial Office attempted to manage the internal structure of the land use system in order to adapt it to the perceived environment of south-eastern Australia. Order and behaviour were thus determined from within the system on the basis of essentially abstract goals, rather than as responses to external environmental realities. New information from the colony would have invoked primarily negative feedback processes in response, as the intention in London was to produce predictable or desired patterns of behaviour on the part of the land users, in order to maintain the stability of the existing system (Parker & Stacey 1995, p. 17, p. 38). As Worster (1994, p. 10) observes, however, it is nature that

determines the conditions for success of land use systems, and the land use policies devised wishfully by the Colonial Office seemed destined to fail as the sub-system represented by the squatters moved towards achieving a stability of its own. Speculation suggests that in the wake of the 1847 Orders-in-Council, the system overall might even have devolved into a legitimate (i.e., culturally acceptable) pastoral-based system (as it ultimately did in the Western District of Victoria). However, for reasons discussed in the next chapter, however, this scenario never eventuated in the Goulburn Valley, as external events - notably the gold rushes - served to intervene and the Orders were never enacted.

In contrast to the Colonial Office perception of the Australian environment, that of the squatting fraternity was derived from direct exposure to the land. As Brookfield (1969) observes, such experience provides the best match between perception and underlying reality, and the early colonists who attempted to make their livelihood from the land quickly understood, via processes of trial and error, both its potential and its limitations. This understanding was strongly influenced by economic and cultural factors (European appraisals of the Goulburn Valley were thus remarkably different from the Aboriginal inventory of the region's resources), but it was also based on broad environmental realities. The innovative approach of grazing rather than farming the land appeared accordingly to be a sensible strategy for personal economic gain - at least from the squatters' perspective, although it defied the traditional social values espoused by the Colonial Office, and was an irreparable disaster for the Aborigines.

If the advent of squatting was a positive adaptation to the south-eastern Australian environment (in the sense that the European occupants of the land were willing to adopt new forms of resource use appropriate to colonial conditions), it was nevertheless damaging to local ecosystems. This was recognised by a few squatters at the time (Bride 1969, pp. 168-69; Curr 1883), but the turnover of runs was high, and the squatting period in its entirety lasted little more than thirty years, so that most environmental changes would have been insidious - that is, beyond the temporal 'learning horizon' of the squatters (Senge 1990, p. 23). Bolton (1981, p. 83) observes that it took "about twenty years of grazing before erosion was noticeable enough for concerned comment among pastoralists." Similarly, it took some time for the squatters to realise that land regularly grazed or trampled upon by flocks of sheep could not be restored to its original condition, even if it was rested for a period (Bolton 1981, p. 57). Ross (1882) charged that most squatters failed to notice pasture changes because they were ignorant of the species composition of their grasslands. Barr and Cary (1992, p. 15) suggest alternatively that the squatters failed to notice the decline of their pastures not only because the process was slow and subtle, but also because financial problems and natural hazards (droughts, floods, stock diseases) were probably "more pressing", so that environmental concerns (if any) were overwhelmed by other cognitive priorities.

Damaging the landscape obviously would not have been the squatters' conscious intention, and Powell (1976, p. 29) considers the degradation wrought during the squatting era to have been merely a "negative contribution" in the trial and error procedures of the years of pastoral pioneering. Dovers (1992) argues,

however, that the underlying ideology of the squatters was to exploit the natural resources of the land with scant concern for resources or environmental management, and according to the thinking of the time, it would have been irrational for them to have done otherwise (Worster 1985, p. 92). The resources of the land - initially the pastures, later the soils, trees and water - were there for the taking: in the words of one early commentator, "the hand of God has spread a rich feast of fat things upon the soil, of which man and beast instinctively partake..." (*Port Phillip Magazine*, 1843, p. 97). Whereas the Aborigines had used the land also, and changed it in the process, the squatters set in motion changes that far outpaced any before as the land became a source of resources to feed a greater market capitalist system. For the Goulburn Valley, the squatting period may be seen accordingly as the first stage in the transformation of the natural resources of the region into commodities that could be extracted and taken elsewhere - and the regional environment showed the first signs of impoverishment.

The overall environmental impacts of the squatting period were nevertheless smaller than might have resulted from such a resource use system (Dwire *et al.* 1999). Ironically, the lack of environmental cognisance on the part of the squatters was counterbalanced to some extent by the continued lack of receptivity by the colonial administrators to feedback from land users, so that the resultant environment changes were effectively limited. Had squatting been officially sanctioned from the outset, the effects on the environment are likely to have been substantially greater, as is evident from the "improvements" that occurred in the later years of the squatting era, when token land ownership provisions and promises of greater overall tenure, as well as a ready supply of labour, encouraged the squatters to expend more effort into tree-clearing, fencing and other landscape modifications. The early squatters, by contrast, were merely "casually destructive" (Bolton 1981, p. 58).

The squatting system, in any case, proved to be unsustainable not for environmental reasons, but because it was not culturally viable. As Firey (1960, p. 27) observed, a resource use process must be not only ecologically possible and economically gainful, but it must valued by a society in terms of its culture, and hence must conform to its beliefs and activities. Pastoralism was tolerated in Victoria for economic reasons, but it was not compatible with the long term goals of the policy-makers (i.e., the highest-order component of the system), who continued to ignore environmental realities in favour of a persistent agrarian ideology and other related political considerations which gained in momentum as the colony grew. As will be seen in the next chapter, the vision of agricultural settlement was enshrined in a series of Land Acts drafted by successive Victorian Governments in the 1860s, and the squatters of the Goulburn Valley were eventually forced off the land by legislative means.

#### 4.7 The end of the squatting era

For want of either cash or legal opportunity, few Goulburn Valley squatters ultimately managed to purchase land beyond their homestead blocks, and most were displaced by small farmers after major legislative changes were enacted at the end of the 1860s. Pastoralism was still legally permitted, but runs could once again be held only under annual licence and could be easily forfeited. At the same time, liberal payment terms were granted to settlers prepared to cultivate the land. This left most squatters with the few hundred acres they actually owned as their pastoral licences were cancelled during the 1870s to complete the transition to agricultural settlement. In the Goulburn Valley, the licences of 'Toolamba', 'Ardpatrick', 'Arcadia' and other large runs along the river were cancelled between 1878 and 1880 (Billis & Kenyon 1974; Martin 1955, p. 16), and the squatting period effectively came to a close in the region.

Sheep and cattle grazing continued to be an important industry in the Goulburn Valley, nevertheless, although it was conducted primarily on smaller holdings (requiring extensive tree clearing) and on mixed farms in association with agricultural enterprises. From the 1890s it was also undertaken in both dryland and irrigation areas of the Goulburn Valley in the form of dairying.

In the twentieth century, grazing was the cause of extensive erosion problems in dryland areas of the Goulburn River catchment in the 1930s; it was revolutionised and revitalised by pasture improvement practices of the 1950s; and it is now seen as one of the contributing causes of the overall salinity problems emergent in the Goulburn Valley in recent decades (see Chapter 8). Its overall impacts on the environment of the region are relatively insignificant, however, when compared to the changes in the landscape that were brought about by the settlers who came to the region in the wake of the squatters - the 'selectors' and irrigationists.