

7 Non-Indigenous History

The resources of the river red gum forests and floodplains along the River Murray have sustained European settlement since 1836. This chapter explores key themes of European history and locations of significant cultural heritage.

European explorers, travellers and settlers have responded in various ways to the physical environment of the study area. Their responses have, in turn, shaped the cultural landscape of the river red gum region. The post-contact history of the study area can be traced through the key stages of settlement including pastoralism, gold seeking, selection and closer settlement. Records of the various waves of settlers who made homes for themselves, and the government infrastructure, which has supported European settlement, survives in many places, today.

The most enduring legacies of the first white explorers and overlanders are the names they chose for places and features of the study area. Markers and cairns trace their physical tracks. These memorials are typified by cairns to Sturt east of Merbein, to Hume and Hovell at Myrtleford and to Mitchell at Mount Hope. Substantial homes define the later squatting era. For the most part, little remains of the original pastoral complexes except for tanks, sheep washes and small graveyards, for example on the former Boort run. The remains of a stub fence belonging to Tyntynder station can be seen on a section of the Murray Valley Highway north of Swan Hill.

Gold discoveries in the early 1850s in the Ovens Valley brought thousands of prospectors to the areas of Myrtleford, Rutherglen, Wahgunyah and other places just outside the study area. The physical evidence of the fevered hunt for gold is found today in many places within these townships and in the nearby forests.

The riverboat or paddle-steamer industry, focused on the port of Echuca, played an important role in transporting timber and wool to markets—a role consolidated by the building of the railway in 1864 connecting the town to Melbourne. The intact wharf, port area and paddle-steamer of Echuca provide an evocative link with that period of history. Markers noting distances were used for navigation and can still be seen along the banks of the River Murray.

The era of selection, especially under the *Land Act 1869*, saw the subdivision of the study area into wheat and sheep farms, and has broadly defined land subdivision and land-use since that time. Many farmhouses built at this time of settlement survive today. Several townships surveyed during selection continue to serve their farming hinterland while all that remain of other settlements are sites—some on public land—of schools established under the state system of education from 1872, lone community halls, churches and cemeteries.

Roads and railways connected communities within the study area with larger townships and markets. Part of an early coach road between Swan Hill and Wentworth can be seen at Wood Wood, north of Swan Hill. Surveying of

railways often initiated the establishment of townships and, in some cases, resulted in towns being moved to take advantage of rail services. Rochester was moved from east of the Campaspe with the opening of the Echuca line in 1864, and Pyramid Hill was moved in 1883 when the Kerang line was built. A chimney, cemetery and a commemorative plaque mark the former Pyramid Hill town site.

Other lines were built to transport raw products. In 1899, a narrow gauge railway between Wangaratta and Whitfield, perhaps initially used for timber, later transported local produce such as tobacco. Parts of it can still be seen today, as can the Kerang-Koondrook light rail which opened in 1924 and transported timber from the River Murray region. Bridges were also important connections between regions. Significant bridges in the study area include those over the Goulburn River, for example, Stewarts Bridge at Kanyapella, McCoys Bridge at Wyuna and Yambuna Bridge between the two.

Water supply to the study area started with the establishment of irrigation trusts from 1883. A pump shaft and canal at Murchison hint at an ambitious scheme by the United Echuca and Waranga Waterworks Trust to irrigate a large tract of land between the Goulburn and Campaspe Rivers in 1885. The old Cohuna headworks (from around 1889) can be seen on the River Murray at Gunbower Island. Much of the irrigation infrastructure constructed by the State Rivers and Water Supply Commission for closer settlement from the early 1900s is still in use. This infrastructure demonstrates how water was brought to the area and, after the effects of waterlogging and salinity were realised, how surface water was drained away. The Waranga channel, surveyed in 1905, is a significant example of how water is transported for stock, domestic and irrigation use through the one system. Flumes were erected in the 1920s to carry water across the Mallee and can still be seen at Miralie. Large pumping stations to raise water to channel levels are evident at Mildura, Redcliffs, Merbein, Millewa and Robinvale.

Several former forest mill sites are known with other forest activities, such as grazing, exemplified by the muster yards in the Barmah State Forest. Arbuthnots mill at Koondrook and Murrays mill in Echuca are still in use as timber mills on public land. These themes are explored in more detail below.

SETTLEMENT

European settlement of the study area commenced in 1836 and may be characterised by a number of themes including exploration, settling, transportation, water management, industries and recreation. Each of these are important for understanding the history of the region and are described in detail below.

Explorers and Overlanders

The earliest recorded European view of the study area was by Hamilton Hume and William Hovell on an exploratory expedition from New South Wales to Corio Bay. They crossed a large river they named the Hume (the Murray) near the site of present day Wodonga in 1824 (Figure 7.1). They crossed the Hume again and the

Mitta Mitta above their junction, and named the Ovens, near present day Everton, and the Goulburn, near Cathkin (Powell & Duncan 1982).

Charles Sturt charted the course of the River Murray in 1830 below the junction with the Murrumbidgee and gave the river its present name in honour of George Murray, British Secretary of the State for the Colonies (Davison et al. 1998). Surveyor General Major Thomas Mitchell made an exploratory excursion through the area in 1836. Mitchell named the Loddon, Campaspe and Avoca Rivers on this expedition. Mitchell made several errors in identifying rivers, naming a stream at Swan Hill, the Goulburn when it was actually the Marraboor (Little Murray) River which connects the Loddon River and River Murray. He also named a watercourse the Yarrayne, which was already known as the Loddon. On two later occasions he crossed this same stream again, this time identifying it as the Avoca (Mitchell 1839).

Following the positive reports of earlier explorers, Edward John Eyre made for Port Phillip and Adelaide in December 1837 with 300 cattle from near the site of present day Canberra. Eyre crossed the Goulburn and headed to the Loddon River but became hopelessly lost. He eventually arrived in Adelaide some seven months after his date of departure. In January 1838 Joseph Hawdon and Charles Bonney drove a mob of cattle from Howlong (near Albury) to Adelaide via the Goulburn River and River Murray. They travelled close to today's site of Echuca. Hawdon's experience of the country crossed by Mitchell was coloured by the hues of a hot summer. From the vantage point of Mount Hope in February he described the vastness of the plains being of the 'worst description' (Hawdon 1952).

Sturt returned in 1838 to drive his cattle along the Murray crossing to the left bank at Barmah Forest and moving on to Adelaide using the tracks of Hawdon and Eyre. By 1866, it was estimated that 350,000 sheep were being moved along this route (Holmes 1948). The first overlanders were able to ford the rivers they came across with reasonable ease, suggesting dry conditions. The routes taken by these explorers and overlanders are today marked by cairns and plaques (Figure 7.1). The intensive use of the River Murray track led to clashes between Aboriginal people and overlanders. The worst of these collisions occurred at Rufus River (Lake Victoria) during 1841 when 4–5 overlanders and at least 30 Aboriginal people were killed in battle (Sinclair 2001).

Pastoralism

It was Mitchell's triumphant view of the country he crossed, published and widely promoted, that brought a wave of squatters to the Port Phillip district. The advance of pastoralism was rapid, especially in the years 1838–40 after the official opening of the Port Phillip District in 1836. 'The Major's Line', the track left by Mitchell's 1836 expedition, marked a clear path followed by overlanding graziers searching for the abundant natural pastures Mitchell had labelled 'Australia Felix'. Translated from the Latin as *happy* or *fortunate southern land*, this was used by Mitchell to describe the lands of the Port Phillip district, and later the Colony of Victoria. The Major's Line acted as a kind of internal boundary line for the province. It was used by subsequent overlanders and runs were defined in relation to the line. Parts of the

Figure 7.1 Cairn near Wodonga commemorating the 1824 exploration route of Hume and Hovell.



track were still visible in the 1850s and can still be seen near Heathcote today with the name remaining in use in the 1880s.

Many squatters arrived in the study area by striking out from Mitchell's tracks and river crossings. Land within the study area was taken up for sheep and cattle grazing from as early as 1835. Bonegilla station (near present day Wodonga) was claimed by William Wyse on behalf of Charles Ebden in that year. White settlement was halted when overlanders encountered resistance by Aboriginal people along Mitchell's route on the Broken River in April 1838. For two to three months after conflicts at Faithfull's Creek near Benalla, in which eight white men and several Aboriginal people were killed, there was open warfare between 'blacks and whites' in this region (Christie 1979).

Runs were taken up on the best land along the rivers of the study area. A general trend saw the River Murray plains taken up from Ebden's run to the Goulburn, then west along the Murray. The lower reaches of the Campaspe, Loddon and Avoca Rivers were taken up to the north along those river courses with the plains being settled in later years. Runs were also taken up along the Murray in an easterly direction from South Australia. The

Figure 7.2 Murray Downs homestead (NSW) near Swan Hill.



vast Neds Corner run was established on the South Australian border by Ned Bagot in 1857.

The 1847 Order-in-Council provided for the issuing of leases through the Colonial Secretary which enabled squatters to take up the choicest agricultural land and river frontages. By 1850, most of the country of the study area was divided into sheep stations. Homesteads were located on river and creek frontages and boundaries were defined by blazed trees, ploughed furrows and the deployment of stock. Squatters and their herds and mobs were quick to make their mark on the land. The rapid introduction of domestic animals with hard hooves affected vegetation cover and soils as did introduced grasses.

Evidence today of the period of squatting occupation include homesteads which still stand at the sites of the Strathmerton, Wharparilla, Restdown Plains, Terrick Terrick, Mount Hope and Madowla Park (formerly Lower Moira) runs. Remains of sheep wash areas are found in various locations such as those at Woolshed Lake near Boort. Murray Downs (NSW) and Tyntynder homesteads near Swan Hill, and Burramine homestead near Yarrowonga are open to the public, and the Swan Hill Pioneer Settlement also evokes this era (Figure 7.2).

Gold Mining

Alluvial gold was discovered in the study area in 1852, in the 'Buffalo Ranges' of the Ovens district. Subsequent goldfields were opened at Myrtleford in 1853, Eldorado in 1854 and Wahgunyah and Rutherglen in 1858. The major gold discoveries in nearby areas such as Bendigo, Rushworth and Beechworth also had significant implications for settlement in the study area. The vicinity

of Myrtleford was dredged from 1908. Cyaniding of deep lead dumps was undertaken at Wahgunyah and Rutherglen between 1937–1950 (Heritage Victoria 2005). The impact of gold mining on affected parts of the region was devastating. Vegetation was cleared and topsoil turned over. Trees were felled to line drives and mine shafts and to stoke boilers. Creeks and rivers were polluted, silted, and riverbanks eroded and removed. Material reminders of the gold era exist today in the areas of Myrtleford and Wahgunyah (DNRE 1999).

Selection

Agriculture in the study area began in earnest with the passing of the Land Acts in 1860, 1862, 1865 and 1869. The aim of the Land Acts was to settle a class of yeomen farmers on small holdings across the colony of Victoria. The motives that fed the pursuit of this ideal were complex and varied, but the clear objective of the Land Acts was to break the squatter stronghold. Each consecutive Act brought with it conditions that made it more difficult for squatting interests to select land. Despite this, squatters had actually consolidated their holdings by 1869 by manipulating how the Acts were implemented by 'dummying' (nominal selectors acting on behalf of someone else) and 'peacocking' (selecting prime land such as waterways and fertile areas so as to make surrounding land untenable).

Most of the Riverine Plain of the study area was divided into 320 acre farms under the *Land Act 1869*. This Act required lessees to live on the selection for at least two and a half years, and within three years build a house, to fulfil residency conditions. They also had to fence the selection, cultivate at least ten per cent of the land, and improve their selection through clearing vegetation,

constructing of water storages and erecting outbuildings. If all the conditions were met, at the end of three years the selection could be purchased. By the dry year of 1876 however, farmers in the area were experiencing difficulties. The onset of drought, continuous cropping and the depletion of soil nutrients, the invasion of rabbits, low commodity prices, and the reorganisation of marketing and handling facilities to provide for local consumption, all impacted on farmers. These years of hardship brought another wave of change to the landscape. Many selectors left the land enabling those who were already established to buy up neighbouring properties to increase their holdings. By 1885, those who managed to stay had established an expanding wheat industry on the plains.

In 1883, the Mallee was chosen as the new frontier for the Land Acts in an effort to rid the area of rabbits and to preserve the land for the Crown for disposal in 1903. Under the *Mallee Pastoral Leases Act 1883*, the Mallee was divided into 'fringe' and 'interior' sectors. The 'fringe' sector comprised 500–1200 acre to 20,000 acre blocks. The 'interior' land was divided into 'A' and 'B' blocks of 60 to more than 500 square miles. 'A' blocks fronting water sources (mostly the River Murray) were expanded through grazing licences and were made available on twenty year leases. 'B' blocks were leased for five years. Those farmers able to endure the hardships of establishment experienced more favourable conditions in ensuing years. Subsequent Land Acts of 1901, 1911 and 1915 saw the Mallee Pastoral Leases divided up when they expired. The stump-jump plough and the mallee roller helped clear, large tracts of the Mallee for wheat farms by the 1920s. In an attempt to boost exports during the onset of the depression in 1929, the Commonwealth Government initiated a 'grow more wheat' campaign. By 1930 this had resulted in a huge increase in wheat production accompanied by a collapse in prices. In the early 1930s, the clearing and bare-fallowing had caused wind erosion and billowing dust storms across the Mallee and northern Victoria.

Some Mallee Pastoral Leases were retained so that not all Mallee land passed into private ownership. An example of such a lease was that issued for the Berribee property, a soldier settler block, now part of the Murray Sunset National Park.

Figure 7.3 Big Lizzie, built to remove mallee vegetation can now be seen along the Calder Highway at Barkly Square, Red Cliffs (see Figure 12.3).



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Closer Settlement

The drive to settle more people on the land continued with a number of closer settlement schemes made attractive and accessible through government support. The first of these was in response to the 1890s depression. The *Settlement of Land Act 1893* established villages to settle unemployed people from Melbourne on the land 'to bring idle hands and idle land together'. The Act provided settlers with one to twenty acres and cash advances while they cleared and began farming. Village settlements were set up in the study area in the areas of present day Nyah–Vinifera, Wood Wood and Kunat Kunat, and at Echuca East. The *Closer Settlement Act 1898* allowed the government to acquire large estates by agreement with the owner, subdivide them, and sell the small blocks under an instalment plan. However, it was not until closer settlement was linked with irrigation schemes administered from 1905 by the State Rivers and Water Supply Commission (SRWSC) that intense farming of smaller blocks began in earnest.

By 1913, in preparation for closer settlement, land near Shepparton, Swan Hill, Nyah, Cohuna, Merbein, Bamawm, Nanneella, Koyuga, Tongala, Rochester and Cornella Creek had been subdivided into blocks averaging 27–86 acres (Priestley 1984). But a Royal Commission in 1916 concluded that the results of closer settlement did not justify the expense. Blocks were too small or infertile, too few settlers from overseas had been attracted and those who did arrive had insufficient capital or experience (Broome 1984).

The Discharged Soldiers' Settlement Acts of 1917–24 in conjunction with the Closer Settlement Acts of 1915, 1918 and 1922 formed the legislative basis for Australian soldier settlement. More land was made available for farming through the resumption of old Crown grazing leases, Mallee blocks and the compulsory and voluntary purchase of large properties. Further irrigation channels were established in 1919–20 and soldier settlers took up irrigation blocks in the areas of Swan Hill, Shepparton, Rochester, Kerang, Woorinen, Nyah, Tongala, Red Cliffs, Robinvale, and in the Mallee. New technology enabled soldiers to pursue dairying, intensive cropping or fruit-growing.

A Royal Commission on Soldier Settlement in 1925 found that the scheme was mostly a failure due to a settlers' lack of capital and experience, the inadequate size of blocks and drainage problems. The War Service Land Settlement Agreement of 1945, however, continued to establish soldiers returning from World War II on farms. Dryland farms were allocated for soldier settlement in the Mallee and at Rochester. Irrigated blocks at Robinvale were also made available. Soldier settlements were provided in the Murray–Goulburn Irrigation Area around Cobram and Numurkah with the development of 120,000 acres of irrigated blocks for fruit growing and dairying. War memorials and road names in many districts attest to the profound impact distant conflicts had on the history of the study area.

The siting of major defence facilities at Bonegilla in 1940 and Bandiana in 1942 stimulated local farm production. These permanent camps consisted of rows of huts, canteens, kitchens, ablution and toilet blocks. Some of the facilities at Bonegilla were used for a Migrant

Reception Centre established in 1947. After the war Bonegilla camp housed 300,000 migrants during their first months or years in Australia. It closed in 1971 (Priestley 1984). The Kiewa Hydro Electricity Scheme and expansion of the Hume Reservoir provided employment for large numbers of post-war immigrants who subsequently settled in the area.

The study area, like most of rural Victoria, experienced a loss of population from the 1930s. The 1950s saw a return to better times with good seasons, extension of irrigation, control of rabbits and record prices for wheat and wool.

OTHER THEMES

Transport and Communications

One of the first heavily used tracks was the overland route between Sydney and Melbourne, with the section from Albury becoming known as the Port Phillip road. After the 1836 Faithfull Creek conflicts, mounted police parties were stationed along the track. Eventually towns were established as part of a military strategy to secure the route. The towns of Albury and Wangaratta were surveyed in 1839 as part of this strategy (Pennay & Pennay 1998). A mail run operated between Melbourne and Sydney from 1838.

Early tracks made by the movement of stock between markets and stations were stamped on the landscape from the late 1830s. On his 1838 journey, Sturt referred to the overland path made by Hawdon and Eyre as a 'high-road' (Holmes 1948), and indeed, the Murray became the most favoured route by which to deliver stock to the market of Adelaide from New South Wales. Some stock-routes were included in the first surveys as Three Chain Roads. An 1853 map of Victoria shows 'roads' or 'bush tracks' following the rivers of the study area and diverging to the head stations of the district's pastoralists (Ward & Lock 1853). Other more permanent tracks were turned into roads along bullock wagons and coaches routes.

By the late 1850s it was becoming increasingly obvious that the task of road making in Victoria was beyond the ability of one central body. The responsibility for road works was thus handed over to local districts with support given through government grants, rates and tolls under the *Roads Act 1853*. The *Local Government Act 1863* allowed municipalities to become boroughs and enabled larger road districts to become shires. Much of the early activity undertaken by local government authorities involved removing trees and stumps from roads, constructing kerbs, channels and pavements in red gum, and building of drains. Until 1860, most Central Roads Board funds were used to construct a road north to the River Murray via the gold diggings at Mount Alexander. The road terminated at Hopwood's punt at Echuca and is known today as the Northern Highway.

Bridges replaced punts as the arrival of railway lines increased traffic flows. A flurry of bridge building occurred on the rivers within the study area in the 1870s and 1880s. Stewarts Bridge, for instance, built across the Goulburn River at Kanyapella, was opened in 1879 and is still in use today although a new bridge is under construction (Figure 7.4).

Figure 7.4 Stewarts Bridge was constructed across the Goulburn River at Kanyapella in 1879.



Rivers

The major rivers and streams of the study area were important trade routes for the developing agricultural economy of the region. Squatters who moved into the region from 1836 used river crossings made by Hume and Hovell and Mitchell. As wool and meat production increased to supply Victoria's goldfields, punts were established to transport livestock across the waterways. Colonial parliaments were granted the right to impose custom duties on goods coming in from other colonies in 1850. Ports with associated infrastructure were established at Echuca, Swan Hill, Albury and Wahgunyah to oversee the collection of custom duties.

Trade on the Murray–Darling river system served South Australia, western New South Wales, the Riverina, and northern Victoria. Steamboats or paddle-steamers were introduced to the Murray in 1853 for commercial trade and operated principally between Goolwa and Echuca. Albury was the upper navigable limit of the Murray navigation, being reached by a paddlesteamer in 1855. To ensure safe navigation, 'snagging' steamers cleared the river of snags. Echuca became the major port of the trade being visited by 189 boats between 1866 and 1875 (Ward 1992). Red gum, valued for its durability, strength and resistance to air, water and insects, comprised the bulk of trade. Timber was sent to Melbourne, Sydney, Adelaide and to the British colonies such as India for railways. Later, wool and wheat were also significant. Boat building and maintenance was another significant river activity. A total of 124 steamboats and barges were built at Echuca between 1858–1913 with the industry peaking in the 1870s (Ward 1992).

The Goulburn River was made navigable through desnagging by 1875. Steamers and barges engaged in regular trade between Echuca and Shepparton, and hauled timber, railway sleepers and logs for the fellers and saw millers in the red gum forests near the Goulburn–Murray junction.

River traffic declined in the 1880s with the building of railway lines to the region. By 1888, with the exception of red gum collection in the Barmah–Millewa forests, commercial traffic above Echuca had all but ceased. Trade between Shepparton and the Murray ceased in 1890. River transport from the western Riverina ended when rail lines were opened from Echuca to Balranald in 1926. Today paddle-steamers operate as a tourist attraction on the River Murray, principally from Echuca, Swan Hill and Mildura.

Railways

Significant changes were mooted for the colony of Victoria when the Surveyor General, Captain Andrew Clarke, was authorised to survey for railways throughout the central portion of the colony in 1855. Routes had been opened as far as Ballarat and Sandhurst by 1862 and then to Echuca by 1864, establishing the town as a major inland transport hub between river trade and the emerging rail network. A railway bridge over the River Murray for the line between Deniliquin and Moama was opened at Echuca in 1878. The Melbourne–Wodonga line reached Wangaratta and Wodonga in 1873 and branch lines were opened to Beechworth and Myrtleford in 1883. Albury was linked with Sydney in 1881. The Melbourne–Swan Hill line opened in 1890. The Mallee railway network to Yelta, Morkalla and the Nowingi line were constructed between 1891–1923. After demands from closer settlers, railway lines were extended to serve other communities. The railways continued to convey passengers and goods well into the 1950s when diminishing returns caused by the declining rural population and competition from road traffic lead to closures. Further closures took place in the 1970s, the late 1980s and early 1990s.

Water supply and management

Pastoralists

Squatters in the area watered their stock at rivers, creeks and Aboriginal soaks. With cycles of dry seasons and increasing stock numbers, river and creek systems were modified to meet the growing number of stock. Dams, or tanks, were excavated and levees built across rivers to create weirs. Frederic Godfrey at Boort station in 1850 made a cutting from the Loddon River to the Kinypanial Creek allowing water into a former swamp creating Lake Boort. He also constructed a weir at the inlet to Lake Boort on the Kinypanial Creek, remains of which are still in evidence.

Goldminers

Creeks were dammed or diverted by channels and races to provide the water for puddling and washing gold. Race-holders often made a better living selling water than the diggers did seeking gold. The availability of water not only affected activity on the goldfields but also their hinterlands. By 1865 goldmining activity, especially in the Bendigo area, had silted up the Loddon and Campaspe Rivers and many creeks, rendering them unfit for drinking. Sludge in the Ovens River filled up creeks and alluvial flats downstream and accounted for surface elevation through the Tarrawingee and Wangaratta districts down to the River Murray.

Goldmining raised the issue of managing public resources for the 'perpetual benefit of the people' rather than for the benefit of a minority. Editorials in local and city newspapers raised questions about the ownership of water and condemned the continued pollution of water sources by mining activity. By 1860, the need to improve control of access to and use of water throughout the Colony was judged a priority. Reserves protecting water frontages of watercourses were introduced under the *Land Act 1860*.

Wells and Dams and Other Schemes

Wells were sunk in towns and on farms as the first

attempts at supplying water to growing populations. Waterworks were constructed in towns. Standpipes, which provided water from local water supplies, were a feature of early settlements. Creeks and rivers were accessed where possible. Swamps were drained and dams were built by farmers. Community tanks, often waterholes once used by squatters, were fenced and new ones sunk eight to nine miles apart by local government throughout the study area for both stock and domestic use. Government dams can still be seen on the Murray Valley Highway at Tongala. Selection from 1860 and the settlement of the Mallee provided stock and domestic water supplies via open channels. Water trains delivered water to the Mallee until the channel system of supply was finished in the 1920s.

Irrigation Trusts

A series of dry years in the late 1870s led to the formation of the Water Conservancy Board in 1880. In 1881, all unalienated land within one-and-a-half chains of watercourses was reserved. Water trusts were constituted under the *Water Conservation Act 1883* and given authority to carry out water supply projects. The *Irrigation Act 1886* vested in the Crown the right to the use of water in any stream, lake or swamp, and provided that no riparian rights could be established in the future which might prevent the use of water for irrigation.

Water supply and irrigation schemes instigated by Trusts at this time often relied on weirs built on rivers or creeks. Water was diverted from these storages down natural watercourses or constructed channels. An example of such a scheme was that undertaken by the Loddon United Water Trust in 1882. The Trust constructed a weir at Bridgewater to divert the Loddon River through sluice gates to a main channel running across country linking with Bullock Creek to the east with subsidiary channels to Myers and Piccaninny Creeks, to Serpentine township and to Bears Lagoon and Calivil. To supply the west side of the Loddon River, a timber weir was built below the off-take of Kinypanial Creek in 1885 to direct water via channels to Lake Leaghur and Lake Boort. Remains of this weir can be seen today.

Private irrigation schemes were set up in 1886 by the Californian Chaffey brothers in Mildura and at Renmark in 1887. Due to financial difficulties, the Chaffey Brothers Irrigation Company was disabled in September 1892. In December 1895 the Mildura Irrigation Trust Act was passed by the Victorian Government establishing the First Mildura Irrigation Trust, that exists today. The Chaffey's house, Rio Vista was built in Mildura in 1889 and is open to the public as a museum.

In 1887 the first national irrigation storage project was started—the Goulburn Weir. Work began on a second Goulburn River water storage, the Waranga Basin, formerly Gunns Swamp, in 1902. With farmers reluctant to take up irrigation and problems with irrigation infrastructure, most trusts were in financial difficulty by the turn of the century—a situation which paved the way for state ownership and management of water.

Centralised Control

The *Water Act 1905* made three significant policy changes in the management of water. First, irrigation

and rural water supply became the responsibility of a central 'expert' Commission. Second, the beds and banks of most watercourses were 'nationalised'. Third, properties were given a fixed water right attached to a compulsory minimum payment (Powell 1989). Land for irrigation districts was purchased by the SRWSC at White Cliffs (Merbein), Swan Hill, Cohuna and Nyah along the River Murray, at Rochester, Bamawm and Nanneella along the Campaspe, and at Shepparton, Koyuga and Tongala in the Goulburn Valley (Dingle 1984). Tresco was re-developed as an irrigation area in 1913. These areas were supplied mainly from the Murray and Goulburn Rivers or their tributaries. Irrigation infrastructure established in the study area in this era included the Waranga Western Main Channel (1909) and a siphon under the Campaspe River north of Rochester. Wood powered the steam and gas pumps used for irrigation in the Sunraysia region until the late 1950s. During the irrigation season, the pumps consumed 32 to 35 tons of wood per 24 hour day, and stockpiles of several thousand tons were frequently maintained (Powell 1993).

Under the terms of the River Murray Waters Agreement of 1915, all run-off into the Murray system above Albury was to be shared between New South Wales and Victoria, with provision made for agreed minimum quantities to pass down to South Australia. The River Murray Commission was appointed in 1917 to implement the River Murray Waters Agreement and coordinate the construction of locks on the Murray to ensure sufficient depth of water for river transport. Other works undertaken included the building of the Torrumbarry Weir in 1924, the Hume Weir begun in 1919 and the Yarrawonga Weir completed in 1939. Water from these storages greatly increased irrigation in the Murray Valley.

In 1945, the SRWSC embarked on a post-war construction expansion. By the 1960s irrigation waters were supplied to the study area from Waranga and Eildon (Goulburn River), and Torrumbarry (the River Murray) storages, as well as from the Campaspe and Loddon Rivers. Approval was given in 1960 for the Lake Cooper-Greens Lake project to store 20,000 acre feet of unwanted flood and drainage water (Webb & Quinlan 1985).

In 1984, the Rural Water Commission was established to operate and maintain most of the State's water supply system, including storages and watercourses. In 1992, with the establishment of the Rural Water Corporation, regions were consolidated and greater local management powers given to Regional Management Boards. Rural water authorities were created in 1994. Current water management is described in more detail in chapter 15.

While irrigation has massively changed the economy and society of the study area, it has also had a significant environmental impact. Land was subdivided and fenced into smaller holdings. Channels were built on the highest ground, often on sand dunes that marked the banks of former rivers. The building of channels and levee banks in addition to roads and railways has interfered with natural flooding and drainage processes and altered winter flood hazards. By 1911, salt-affected

land caused by rising water tables induced by irrigation was in evidence near Cohuna. By the early 1930s salt was threatening more than 300,000 ha of irrigation country around Kerang (Powell 1993). Drainage channels were constructed for a more regular watering regime to leach out the salt. Surface drains often followed the routes of the beds of prior streams. In 1990, more than sixty percent of the Campaspe West irrigation area had water tables within two metres of the soil surface. In 1988, the Salt Action: Joint Action program was put into place to evaluate and ameliorate secondary salinity in Victoria (ECC 1997). Major surface drains continue to take irrigation water into local swamps and the River Murray. The effects of water regulations on the biodiversity of the study area are detailed in chapter 5 and 15.

Industries

River Trade

As described above, river trade centring on the port of Echuca made a significant contribution to the local economy from 1858 until 1888 when a decline occurred in favour of railway transportation routes. Imports peaked in the years 1875 (£2,206,620), 1880 (£2,502,750) and 1881 (£2,278,248). Exports were significantly high in 1878 (£352,990) and 1885 (£349,212) (Priestley 1984).

Agriculture

The trend post World War II has been to extend farm sizes, increase mechanization and reduce farm employment in response to the global trade in horticulture and agriculture .

Grazing and Cropping

The first industries in the study area were those developed by the squatters. Those able to access the gold-mining markets were involved chiefly with cattle raising. Other pastoralists were involved in raising sheep for wool. Selectors taking up land in the study area from the 1860s, and later soldier settlers, grazed sheep and cattle as a supplement to their cropping activities. Grazing licences, issued from 1869 under the Land Act of that year, allowed the holder to depasture livestock upon any park lands, reserves or other Crown lands. Many of these licences were issued for the forests of the study area. The growing of wheat was the mainstay of agricultural activity on the Riverine Plain of the study area before the introduction of irrigated horticulture from 1910. Some areas located principally in the western section of the study area, are still employed for cropping activities, however grazing and dairy industries dominate agriculture (see chapter 13).

Dairying

The centrifugal cream separator, invented in the 1870s, established a factory-based dairy industry. From the mid 1880s, settlers took their milk and cream to a centrally located butter factory or creamery. With the advent of irrigation from 1910, dairying took place on 50–100 acre farms with a carrying capacity of 12–15 cows milked by hand. Superphosphate, introduced in the 1930s, increased the carrying capacity of the land and hence milk production. Technological advancement of the industry, including the milking machine, refrigerated holding vats and transport, the herringbone shed and

bulk milk collection, further increased production. More recently, dairy deregulation has led to rationalised and larger farming units. Dairying remains an important industry within the study area, particularly around the Kerang, Echuca and Shepparton districts see chapter 13.

Horticulture

Viticulture enterprises centred on the areas of Mildura, divided into irrigation blocks by the Chaffey brothers in 1886, and Mulwala from the 1890s. Irrigation today continues to support vineyards, as well as the cultivation of fruit, olives, nut groves and vegetables in Victoria. Major production areas are the Goulburn Valley, Robinvale–Mildura, Swan Hill and Cobram areas. Tobacco and hops are grown in the King, Kiewa and Ovens valleys. Each region has its own characteristics and produces a range of different products (see chapter 13).

Forestry

Timber Production

The river red gum forests of the study area have been utilised for timber production over the years of European settlement, and before that time, were extensively used by Indigenous people. The first white settlers harvested timber for fence posts, housing and fuel. The cypress pine of the Riverine Plain and the Mallee, for instance, was sought for constructing outbuildings and fence posts. Similarly, swamp woodlands in the study area were felled for construction materials and fuel. The exploitation of red gum forests was most evident during the paddle-steamer and gold eras, especially with the operation of quartz reef mining during the 1860s and 1870s. Estimates suggest that on average, a steamer burnt half a tonne of fuel an hour in its boilers (LCC 1987). The massive demand for timber for boat building, underground timbering and fuel for boilers had taken a significant toll on forests by the early 1870s.

Early sawmills were established at sites where timber grew. Commercial sawmills were established along creeks, rivers and on swamps. With the opening of the railway from Melbourne to Echuca in 1864, several mills set up in the area to provide red gum to the export markets of the British colonies which were heavily engaged in railway and wharf building (Priestley 1984). In some parts of the study area timber tramways transported logs to mills. The remains of a timber tramway are in evidence east of Echuca.

Foresters experimented in planting non-endemic species especially from the 1930s. Softwood plantations were established near Myrtleford between about 1930 and 1980. Commercial forestry is conducted today in both hardwood and softwood plantations on private and public land using modern machinery, in contrast to the hard physical labour of hand felling. Forestry on public land in the study area is discussed in more detail in chapter 14.

Charcoal Burning

Charcoal burning occurred during the gold rush to meet demand for blacksmiths. By the early 1900s, goldmining companies were attempting to reduce firewood consumption by introducing steam boilers and gas-producer plants to power crushing batteries. These plants were fuelled by charcoal. The industry received

Figure 7.5 Alf (left) and Frank Corry, near Moira Lakes, early 1900s River Murray.



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another boost during World War II when charcoal became a vital alternative to liquid fuel used in the military, such as kerosene. Today charcoal burning is still conducted in red gum forests, but is a small industry largely used for specialised purposes.

Forest Management

The *Land Act 1865* enabled reserves to be declared for 'the protection and growth of timber.' Timber reserves were put aside, and from 1866 state forests were established. Timber reserves were to be used by settlers until the supply was exhausted, while state forests could only be used by approved licensed timber millers and fellers. Under this legislation, the Moira, Barmah and Yielima state forests were proclaimed in 1870. Further reserves were created at Gunbower, Nyah and Walpolla.

An export duty was placed on red gum in 1877 causing some mills to close, however red gum forests on the Murray continued to be heavily exploited for saw logs. Such was the ongoing denuding of the forests that a series of bills to actively conserve forests, repair damage and encourage growth were presented to Parliament in 1879, 1881, 1887 and 1892 (DSE 2003h). None of these bills were enacted by successive governments because of their commitment to land settlement and pressure from interested parties (Dingle 1984).

The 1901 Royal Commission on State Forests and Timber Reserves noted that the Barmah Forest had been cut over several times, and that at the current rate of cutting would yield no more than five years supply (Fahey 1987). In 1908 the first effective forests legislation in Victoria, the *Forests Act 1907*, came into operation. A Department of Forests was formed to more effectively manage forest resources. The Forests Commission was established in 1919. Initiatives such as fire protection, thinning and coppicing and reforestation of forests were put into place in the 1920s and 1930s (Fahey 1987).

Fisheries

The collapse of the Murray cod fishery is one of the earliest, least known and most dramatic examples of poor natural resource management in Australia's history. In 1855 Joseph Waldo Rice established the Murray River Fishing Company at Moira Lake and along the River Murray to Picnic Point—probably the first inland commercial fishing enterprise. By 1869 the company was netting the lakes and over two hundred miles of the river. The majority of the fish were Murray cod but also included golden perch, silver perch and goldfish (not carp). Murray cod typically weighed over a hundred pounds. In the late 1860s the catch varied seasonally between 1 to 6 tons per week equating to an annual figure of approximately 160 tonnes of fish. At the time the company was criticised for taking large quantities of fish during the spawning season and there was conflict between commercial, recreational and Indigenous fishing.

By the 1890s, the catch had declined substantially with an annual catch of about 35 tonnes, primarily of golden perch. In 1896 the Victorian Government introduced a closed season, aimed at protecting Murray cod (Leslie 1995; King 2005). Current limits such as closed seasons, size and number apply to fishing for Murray cod in NSW, South Australia and Victoria. There are now no commercial fisheries based on the River Murray, however recreational fishing attracts many visitors to the region (Figure 7.6, chapter 11).

Other Industries

Other industries in or near the study area included salt harvesting and gypsum extraction across the Mallee, and the quarrying of granite at Mount Hope. Chapter 16 describes these industries in more detail.

Recreation

Leisure activities enjoyed by European settlers have centred on the natural features of the study area. The River Murray and its tributaries have been the focus of

social interaction since the first days of settlement. Sand bars attracted swimmers who bestowed them with familiar names such as 'St. Kilda'. Favourite swimming holes in later years sported other facilities. Horseshoe Bend near Swan Hill, for example, was a popular swimming place made more so by the addition of a floating platform in the 1920s. Picnics were traditionally held on Boxing Day and New Year's Day. Some of the earliest picnics were those organised by the Officer family of Murray Downs station near Swan Hill in the 1870s. A punt was provided to ferry children to the other side of the river where they were transported to a nearby lake to play games. Sunday School picnics were held regularly at Pental Island. The information centre at Torrumbarry Weir gives a sense of riverside recreation from the 1920s onwards.

Fishing, camping and water skiing have proved popular recreational pursuits. Yacht clubs have been formed at Lake Boga and Lake Mulwala. The forests of the study area have continued to provide popular picnic spots (Figure 7.7), as have the weirs built for water storage. Current recreation and tourism on public land in the study area are described in more detail in chapter 11.

Figure 7.6 Murray cod fishing on the River Murray.



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Figure 7.7 Picnicking on the River Murray in the 1930s.



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