

Ironbark Creek Catchment

Ironbark Creek is the largest tidal creek draining to the Hunter River in the City. Its catchment covers some 12,500 hectares and has a diversity of landuse, including urban and limited rural residential, industrial and commercial, important transport and communication corridors, recreation, conservation, agriculture, mining, forested land and wetland.

The Creek flows from the hills in the south of the catchment, through the suburb of Wallsend before winding its way over a large floodplain known as Hexham Swamp and entering the Hunter River at Sandgate. Hexham Swamp is a fresh water and estuarine wetland which was once the largest predominantly freshwater wetland on the near north coast of New South Wales. The sensitive nature of the wetland and its ecological importance has been recognised with its identification as a State Environment Planning Policy No 14 Coastal Wetland or as it is often referred a SEPP 14 Wetland.

Given it is the receiving waters of Ironbark Creek this provides a number of challenges for the way in which we live in this catchment. Figure 9 shows the Ironbark Creek catchment boundary, major suburbs, transport network and the Hunter Water stormwater channels.

Landuse and Urban Development

Urban development since 1824 has resulted in the clearing of approximately 2,000 hectares of land, or approximately 16% of the catchment which is now categorised as urban land. The catchment also consists of 3,800 hectares of swamp land and 6,700 hectares of forests and rural lands. Mount Sugarloaf and the northern section of the Sugarloaf Range extending to Blackhill dominate the western part of the catchment. Most of this area remains forested. The area to the east of Sugarloaf Range and along the southern boundary of the catchment is generally low undulating hills.

Much of these eastern and southeastern margins have been developed as residential areas, reflecting the constraints on development imposed by Hexham Swamp and the associated floodplains of the Hunter River. Some urbanised lands are affected by flooding in several localities around the wider Ironbark Creek catchment.

In 1991 the population in the catchment was approaching 40,000. Ninety-two per cent of the population, live within the Newcastle City Council area and the balance live mainly in the City of Lake Macquarie Council area. A very small number live in the Cessnock City Council area of the catchment. The catchment is the principal location for new urban development of Newcastle in the Minmi-Maryland corridor.

Much of Newcastle's present and future potential urban living areas are within Ironbark Creek Catchment. Urban development has put considerable quantities of sediment and nutrients into the creek and receiving wetlands. The enriched water has encouraged unwanted aquatic plants such as Alligator Weed, which now chokes large reaches of the creek.

Major residential areas are expected to be established in parts of the catchment over the next 30 years. Most of this will occur in the Maryland-Minmi corridor but development is also planned at Cardiff Heights, Wallsend, Wallsend South, Glendale and Beresfield. Rural-residential development is expected for the Mt Sugarloaf, Stockrington and Minmi areas.

Recreation and conservation are important landuses in the catchment. About 30 per cent of the area is dedicated specifically to these uses. Hexham Swamp Nature Reserve, Mount Sugarloaf Reserve, Jesmond Bushland, Shortland and Waratah Wetlands and the former Wallsend Brickworks constitute the main parcels of recreation and conservation land.

Although agriculture is continuing to decline in the area, cattle grazing is carried out over much of the western parts of the catchment. The continuous operation of floodgates on Ironbark Creek since 1971 has prevented entry of tidal water into the swamp system and allowed a large proportion of the Hexham Swamp to also be grazed seasonally. The Hexham Swamp Rehabilitation Project will attempt to reverse these impacts. The project includes the modifying the operation of the floodgates to restore tidal flows, regeneration of wetland native flora and fauna habitats across the swamp and voluntary purchases of effected properties. Improvements to biodiversity, habitat, fish nursery stocks etc are envisaged.

Such changes in the receiving water of the Ironbark Creek catchment will impact on stormwater treatment train decision making for the whole catchment.

Coal mining has been an important industry in the catchment for almost a century and a half. Gretley Colliery, immediately west of Wallsend, is the only mine now in operation. There is a proposal for a small open cut mine in the future.

Jesmond and Wallsend have major commercial centres. Smaller centres are located at Elermore Vale and Warabrook. The industrial areas of Hexham, Sandgate, Wallsend and Jesmond are principally involved in local service, automotive, engineering, transport and storage activities. The Hexham dairy factory is the only processing industry.

The Main Northern Railway line skirts the northeastern edge of Hexham Swamp, parallel to the Hunter River and an abandoned colliery railway crosses the swamp. The Seahampton to Minmi segment of the Sydney to Newcastle F3 Freeway and the link road between the Freeway and Wallsend traverse the catchment as do several high voltage transmission lines, two water supply lines and a natural gas pipeline. The improved accessibility afforded by the Freeway is likely to generate land use changes, which could in turn place additional pressures on the catchment.

Flood Regimes

The construction and the subsequent one way operation of floodgates over the past two decades at the confluence of Ironbark Creek and the Hunter River have resulted in major environmental and landuse changes.

The floodgates at Ironbark Creek have reduced the likelihood of Hunter River floods inundating Hexham Swamp, and almost eliminated tidal exchange, allowing an increase in grazing areas within the Swamp.

Simultaneously, the severely limited tidal exchange that has resulted from leaving the gates in a lowered position, even when the Hunter River is not in flood, has degraded the estuarine ecosystem associated with the Creek. A freshwater system with reduced areas of inundation has largely replaced the previous extensive mangrove and saltmarsh plant communities. This has also reduced the nursery areas for fish, prawns and other marine organisms.

Previous planning practice did not allow the full consideration of the flood environment, resulting in the development of areas that today would be considered inappropriate. Many flooding problems have now been 'locked in' to the catchment, which has made the management of these problems very difficult.

The nature and extent of flooding has also been altered by the process of urbanisation. Flooding from local run-off has become worse as urbanisation increases the extent of 'hard surfaces' (concrete, roads, roofs, paved areas) in upland areas, creating much greater and faster downhill flows. In more recent years many developments have been required to control their runoff to arrest this process.

The Blue Gum Hills Stormwater Management Strategy (1996) has addressed the need for an integrated system of urban stormwater management in the proposed developments of the Minmi-Maryland area of the catchment. A program of review and adaptive management change is in place as a quality control process, in an attempt to improve the catchment performance post development.

Water Quality

Water quality in Ironbark Creek is characterised by high nutrient levels with consequent excess plant growth and undesirable variability in dissolved oxygen. The reduced tidal exchange has resulted in oxidation of acid sulphate soils, lowered pH levels in several tributaries and raised soluble iron levels in the local waterways. (Ironbark Creek TCM Strategy, 1996)

A briefing from Louise Ormerod (pers. com., 1999) based on her PhD outcomes, as well as her experience gained within urban catchments over the last twelve years, indicated a number of sediment sources within the Ironbark Creek catchment associated with landuse and the channel. Dr Ormerod's PhD thesis reported on her studies of Ironbark Creek Catchment using heavy metals and caesium-137 as sediment tracers.

These sediment sources included:

- Topsoil sources within remnant bushland areas eroded by sheet or rill erosion;
- Subsoil sources, or gully erosion within remnant bushland, associated with walking and bike trails. These were especially bad on steep slopes;
- Urban sources, including material found within urban gutters and drains, and from construction sites within the catchment. Urban gutters and drains were thought to combine all major sources from urban areas; and
- Channel Banks. Erosion associated with altered hydrological responses.

Channel sources were found to be the major source of sediment within floodplains and the channel. The second major source tended to be from urban sources. Fine sediments from urban areas are generally flushed through the stream system and are probably deposited within the Hunter Estuary or in Hexham Swamp when overbank flooding occurs there. Because these sediments are the most highly polluted (Horowitz, 1985, Foster and Charlesworth, 1996), they may be toxic to downstream aquatic biota. Gully and topsoil sources were found to be more significant in the upstream portion of the study where drainage lines flowed through a remnant bushland area, near the John Hunter Hospital.

The Ironbark Creek Ecosystem report (1993) indicated that:

"Water quality in Ironbark Creek is moderate to highly eutrophic. The creek is characterised by high phosphorous levels, undesirable variability in dissolved oxygen and excessive plant growth. Poor quality is evident in tributaries where tidal exchange and salinity have been diminished. Floodplain drainage has also resulted in acid sulphate soil oxidation affecting several tributaries by lowering pH levels and contributing significant quantities of soluble iron to the waterway. In upper catchment areas most drainage channels are observed frequently trapping a substantial amount of litter."

A comprehensive and integrated set of recommendations to rehabilitate and conserve the estuarine, aquatic and terrestrial ecosystems, manage the risks of flooding, reduce nutrient loads and other pollution and erosion were delivered in the Ironbark TCM Strategy (1996).

Site visits have indicated that a number of potential pollution sources exist in the catchment including, but not limited to:

- Fertiliser use in open space within the catchment;
- Erosion and subsequent sedimentation problems due to unsealed roads and tracks within bushland and urban areas;
- Grass clippings and garden waste dumping in close proximity to channels;
- Sedimentation loads from denuded stream banks, roads and median strips and landscaping stock piles; and
- Large sealed areas around shopping centres and an extensive road network sourcing sediments, litter, heavy metals, grease and oil pollution.



Photo 11: Exposed road verges provide one of many sediment sources which enables the material to make its way through the stormwater system and eventually pollutes the wetland (receiving water body) here in Ironbark Creek catchment. Sediment is also a major issue in Throsby and Cottage Creek catchments.

As part of the Hexham Swamp Rehabilitation Project a water quality monitoring program has been established by Hunter Central-Rivers Catchment Management Authority.

Ecology

Development within the catchment has had numerous impacts on the ecology of the area. A large proportion of the open forest community has been cleared in the upper reaches of the catchment. Forested areas, which remain, are mainly spotted gum - ironbark open forests with wet sclerophyll and rainforest species in protected gullies. (Ironbark TCM, 1996)

An assessment of Hexham Swamp in 1992 noted a dominance by common reed, coupled with significant reduction of estuarine communities and community diversity. Between the 1970s and 1992, the aerial extent of mangroves had been reduced from 180 to 20 hectares. (Ironbark TCM, 1996)

According to the Ironbark TCM Strategy (1996), a total of 207 species of birds have been recorded in the catchment including the endangered Regent Honeyeater and another eight species considered vulnerable or rare. Six migratory bird species, protected under government agreements with China and Japan inhabit wetlands in the catchment.



Photo 12:

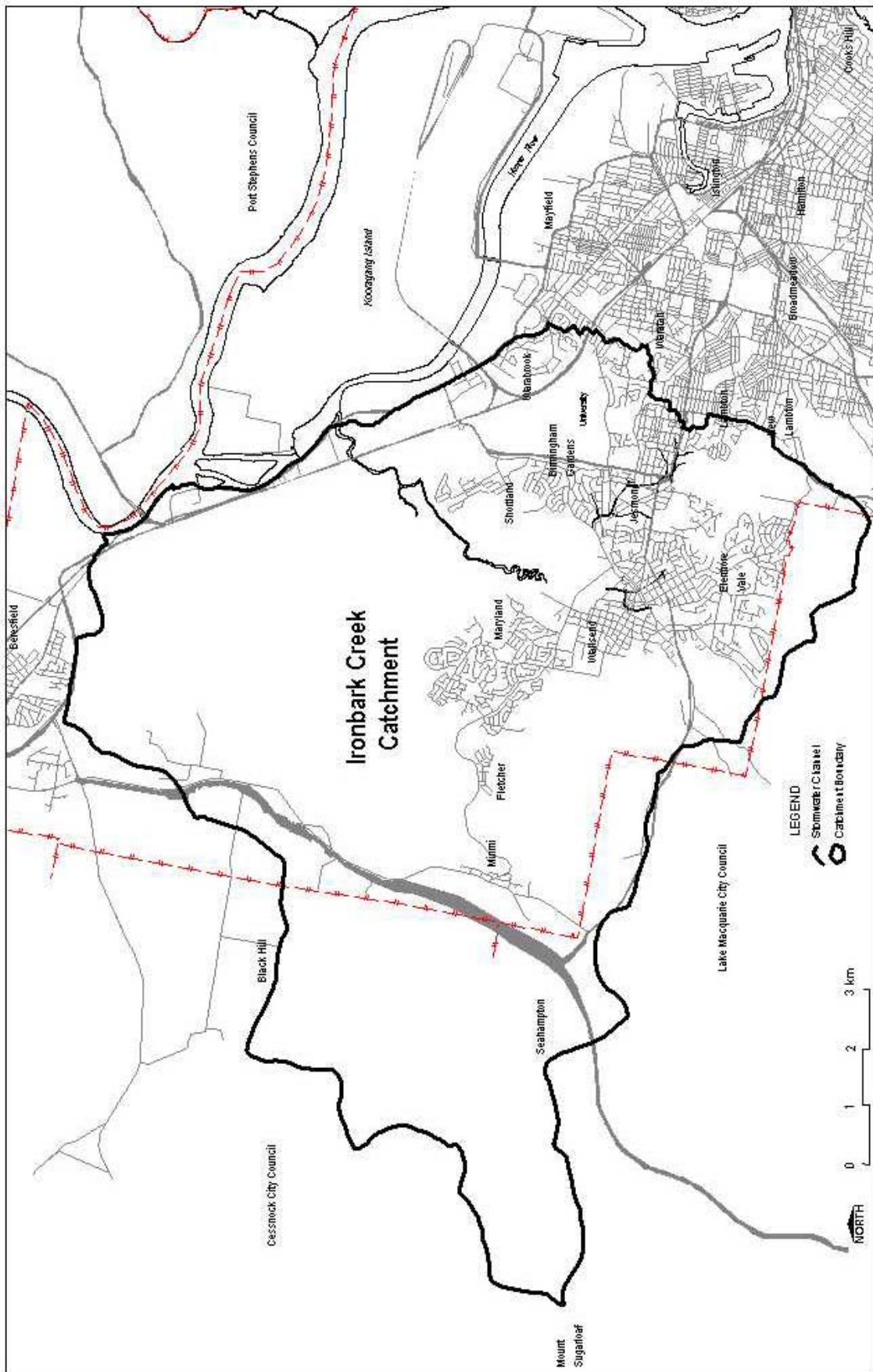
Council's Creeks *Alive* program offers residents the opportunity to get involved in water bug monitoring of their local creeks. All this data along with Council's creek condition assessments is collated to form a 'health report card' for Newcastle's creeks.

Photo 13:

Local residents meet at George McGregor Park, Elmore Vale for a guided nature walk through the Park before commencing improvement works. This is one of many sites within Ironbark Creek catchment where active community groups are supported by Council's Creeks *Alive* Community Support Officer to improve their local creek riparian areas.



Figure 9: Ironbark Creek Catchment



Ironbark Creek Catchment

There have been limited studies into the mammal and reptile species in the catchment. NPWS records indicate that 53 mammal and 14 reptile species are expected to occur in the catchment. Nine of the mammal species are listed as endangered and include terrestrial mammals and bats. Eleven frog species, including the endangered Green and Golden Bell Frog, have been recorded, mainly in the freshwater communities at the western side of Hexham Swamp.

A study in 1992 (in Ironbark TCM, 1996) recorded 32 species of fish and 6 species of prawn or shrimp in Ironbark Creek. 11 of the fish species were freshwater species, 20 were saltwater and 1 was euryhaline (Sea Mullet).

Total Catchment Management

The Ironbark Creek TCM Committee was a robust and active whole of government response to catchment issues that impact on natural resources, including water quality within the catchment and receiving waters. This committee has now been superseded by the Newcastle Catchment Management Forum, as a committee of the Hunter Central-Rivers Catchment Management Authority under NSW government restructure of the Department Infrastructure & Natural Resources. The Newcastle Catchment Management Forum continues to oversee the delivery of natural resources management, however it's charter now covers all the catchments within the Newcastle LGA boundary.

In line with the findings and objectives of the Ironbark Creek TCM Strategy, Council adopted the Blue Gum Hills Stormwater Management Plan covering the areas for proposed urban residential development in the Wentworth Creek sub-catchment. Council's DCP 50 – Stormwater and Water Efficiency will also add to the enforcement suite for stormwater management design and onsite controls, using current best practice methodology. Community members, Landcare and Bushcare groups work throughout the catchment actively pursuing areas of TCM strategy.

Drainage Channels

Hunter Water controls 2.8 km of stormwater channels in the Wallsend-Plattsburg area. These channels contain the Creek through the commercial area of Wallsend, and lead into Ironbark Creek, south of Minmi Rd. They were constructed primarily in the 1930s with some works continuing in 1989.

Hunter Water also controls approximately 5 km of stormwater channels in Dark Creek sub-catchment. These channels drain the more urban areas of the catchment such as Jesmond and North Lambton, and eventually feed into the lower, natural reach of Dark Creek and onto Ironbark Creek. They were also constructed primarily in the 1930's with some works continuing in 1979.

Hunter Water's responsibility also involves the maintenance of the drainage system so that there is no interruption to the flow in the system and the Corporation's assets and the public is not in any danger. The maintenance details include:

- Maintenance of the grounds along the drains, in a three weeks cycle from September to April inclusive and a five weeks cycle from May to August. This includes a minimum distance of three metres measured horizontally from the outside edge of the stormwater channel or as specified;
- Cleaning of the inside of the channels;
- All clippings are collected and removed from the site, including the clippings that have fallen into the drain; and
- Reporting on volumes of any trash and silt removed.