

5 Conclusions and recommendations (A Bryant, D Steller and D Connolly)

The conclusions and recommendations outlined in this chapter have been developed through detailed analyses of the results of this study (see Section 3), with specific reference to a number of key information sources and related initiatives, including:

- the contextual implications set out in Context for Regional Biodiversity Planning of this report
- current species lists and data held by the NPWS in the NSW Wildlife Atlas
- the other Georges River catchment environmental studies
- results of a series of workshops conducted late in 2000 with stakeholders to develop a framework for the management of biodiversity values at the catchment scale (see Appendix D)
- Recovery Plans and Threat Abatement Plans being prepared by the NPWS, especially the Cumberland Plain Endangered Ecological Communities Recovery Plan (NPWS, in prep.)
- guidelines being prepared by the NPWS to assist councils in developing local strategies for the management of biodiversity values
- comments submitted by stakeholders over the past two years.

5.1 Data management

The management of biodiversity data has been a key issue throughout the development of this study, and all stakeholders have been keen to ensure that the data are:

- accessible—that the data is stored in a way that maximises its accessibility by the different user communities
- adaptable—the management framework must accommodate future data improvements, including the incorporation of the aquatic biodiversity data collected in Aquatic biodiversity of the Georges River catchment
- alive—that it is both updateable and updated
- understandable—that the complex data layers are resolved into layers of information that can be understood by those who will ultimately use the data for planning processes and ground actions.

For the purposes of establishing a data management protocol there were three user communities identified for this data:

- the scientific community—authorities, organisations and individuals with a sophisticated understanding of scientific data and data interpretation
- the land management community—authorities, organisations and individuals with land (and therefore biodiversity) management responsibilities
- the general community—the broader community, whose interests in the information are generally of a more specific and less complex nature (including an interest in the regional status of key species).

Except in some specific cases involving threatened species (specific locality information which may only be obtained with NPWS approval) the purpose of managing biodiversity data for different user communities was one of ensuring the information was understandable, not one of limiting access. As much of the data is inherently complex, requiring specialist knowledge to interpret, and requires significant data handling capabilities in terms of both hardware and software, a decision was made to provide information resulting from this study in the following ways:

- a written report to provide background, supporting and methodological information about the study, as well as summarise results and detailed information about key components of the biodiversity of the Georges River catchment
- maps identifying areas of regional significance for the management of biodiversity values to be developed and made available in both hard copy and online. Councils, as the key users, and DIPNR, would be custodians of large-scale versions of these maps, whilst smaller scale reproductions would be released with the written report. Online the maps would also be available via the Internet along with the written report. Where possible the data will be made available through existing biodiversity and natural resource data services such as the Biodiversity Information Network.

5.2 Vegetation—ecological communities

The decline of ecological communities in the Georges River catchment has become increasingly well documented, with the data arising from this study emphasising the dramatic losses of distribution of many ecological communities. This is especially evident for those communities of the shale-derived soils of the Cumberland Plain and transitional soils in the vicinity of the Georges River corridor itself.

This study has presented a model for the management of biodiversity in the Georges River catchment based upon landscape management, with the goal of protecting as much of the remaining vegetation in the Georges River catchment as possible. This approach recognises that the individual components of the system are dependent upon the ecological processes that are at work within their communities, and to divorce the components from the processes that support them is counterproductive. With this in mind, there is a need to concentrate economic and social resources on those patches that are both viable and in good condition, but also to identify the Critically Endangered areas with a view to protecting these from extinction. As a result, the recommendations of this report place emphasis on the protection and management of high-quality patches of vegetation.

Conservation issues—ecological communities

- Vegetation communities on shale-derived soils (Cumberland Plain)—These communities have undergone dramatic distribution declines since European settlement, with resulting declines in the flora and fauna they support. Retention of these remnants is critical if the biodiversity of the region is to persist into the future. As such, the model discussed in this report identifies all patches greater than 5 ha in size as being Core habitat.
- Transition habitats—Transitional habitats are often extremely productive and provide habitat opportunities to support highly diverse communities. The evidence collected during this study indicates that the transitional habitats of the Georges River catchment are consistent with this model, including forests and woodlands along the Shale/Sandstone transition zone and in terrestrial-aquatic transition zones (alluvial and riparian communities). As a result, concentrated conservation effort in these areas may provide greater outcomes in terms of total biodiversity conservation than would similar conservation effort in other communities.

- The Woronora Plateau—The Woronora Plateau continues to provide a very important regional resource in terms of biodiversity conservation. However, incremental degradation and the potential for future reductions in the relative conservation status of portions of this land (particularly in relation to lands currently managed by the Commonwealth Government) present very real threats to both regional and interregional conservation aims. The Woronora Plateau provides an important macro-scale corridor linking the Sydney Basin southwards, and this corridor value must be carefully maintained. Future development in the Georges River catchment is likely to impact on these communities, particularly around the fringes (see transitional habitats above). This development must be carried out in a way that is sympathetic to the regional conservation goals and the specific values of these lands.

5.3 Species diversity—fauna

The Georges River catchment contains a wide variety of habitats and therefore a great diversity of fauna species and assemblages, with some 352 vertebrate species recorded in the study area. It is easily broken down into two main ecological and geomorphological units: the Cumberland Plain and the Woronora Plateau. Whilst there are species that occupy both habitats, these two areas display significant differences in species composition and assemblage.

Relatively few records of selected species were obtained during the surveys, particularly those species confined to the Cumberland Plain. This result is partly due to the difficulty in detecting rare and cryptic species through systematic surveys and partly due to a reflection of the high level of degradation that much of the Cumberland Plain has suffered. In exception to this generality, a large number of bat species that are of conservation concern were found to persist in the remnants of the Cumberland Plain. It appears that although it is fragmented and degraded the remaining vegetation still holds considerable value for these threatened species.

In addition, many species that are currently considered common on the Cumberland Plain may become locally or regionally endangered in the future if current land practices continue. Also, semi-degraded areas not currently being utilised by more sensitive species have the potential for habitat improvement and subsequent recolonisation in the future.

The outcomes of an assessment of conservation values are determined by the criteria used for assessment. A systematic assessment of the fauna and vegetation values is provided in this report, however a number of features have emerged from this study to pinpoint some initial conservation priority issues for fauna values within the Georges River catchment:

Conservation issues—ecological communities

- Vegetation communities on shale-derived soils (Cumberland Plain)—These communities have been shown to support statistically different bird, reptile and bat assemblages to those of the Woronora Plateau. Retention of these remnants is critical if the biodiversity of the region is to persist into the future.
- Remnant bat habitat (Cumberland Plain)—Remnants of vegetation on the Cumberland Plain support a diverse bat assemblage, including many threatened species not found on the Woronora Plateau.
- Alluvial Woodland (Cumberland Plain)—This appears to retain particular value for diurnal birds.
- Transition Forests—These have been shown to support unique faunal assemblages. These forests also provide the most important habitat for both the Koala and Squirrel Glider within the Georges River catchment.

Conservation issues—species and site-specific

- Koala—The Georges River catchment population is one of the few populations on the coast and ranges in New South Wales south of Sydney and is probably one of the larger populations.
- Broad-headed Snake—The Woronora Plateau contains a significant portion of the predicted high-quality habitat for this species within the Sydney Bioregion.
- Grey-headed Flying-fox—The colony in Cabramatta Creek is one of only three roosts known in the Sydney Area.
- Green Tree Frog—There is a colony at Moorebank brickworks.
- Green and Golden Bell Frog—Colonies are present at Lt Cantello Reserve, Chipping Norton Sandmine, East Hills Golf Course and Darkes Forest.

The assessment also indicates that at a broad level a number of priority species have overlapping habitat requirements. These include the Heath Monitor, Broad-headed Snake, Giant Burrowing Frog and Red-crowned Toadlet. These species are unique to the sandstone environments of the Georges River catchment.

5.4 Species diversity—flora

The history of land use, including early grazing activities and subsequent urbanisation, has resulted in a dramatically modified landscape across the Sydney Basin. In particular, this has impacted on the ecological communities of the Cumberland Plain portion of the Georges River catchment. The broad-scale loss of vegetation across the Cumberland Plain has resulted in many of the ecological communities becoming areas of conservation concern.

The flora of the Georges River catchment have been impacted in much the same way, however the highly localised nature of some flora species, particularly smaller, herbaceous species such as orchids, creepers and shrubs, means that they can be most subject to localised losses. As such, many species of flora in the Georges River catchment are considered to be threatened, especially those species whose distributions are limited to habitat on the Cumberland Plain.

The seven species selected for targeted attention in this report are all listed as Endangered under the TSC Act, and have been chosen to represent the rarest flora of the Georges River catchment. During the course of this study areas of potential habitat

were surveyed with a view to locating new populations of each of these species. Of the seven species, new populations were located for only one species—the orchid *Pterostylis saxicola*, for which five new species locations were found. The continued lack of records of *Pterostylis gibbosa* has led the NPWS to presume that this species is now extinct on the Cumberland Plain, with the nearest known location in the Illawarra, and the presence of the shrub *Gyrostemon thesioides* in the Georges River catchment was not confirmed. The locations of known existing populations were confirmed for the remainder of the species.

The results of these targeted surveys present a bleak picture for the state of those threatened flora that are rare on the Cumberland Plain as they suggest that the known populations of many of these species are likely to be represent most of the remaining populations in existence. The conservation implications are therefore more pressing for the known populations, however it also emphasises the need for site specific survey work associated with new development and local environmental survey efforts to target rare flora.

Conservation issues—ecological communities

- Endangered Ecological communities—The flora of Endangered Ecological communities are the most likely to be threatened as a result of past uses of land in the Georges River catchment. As such, any protection measures taken to ensure the protection of these communities will also result in benefits for the protection of associated flora.
- Potential habitat—The need for detailed surveys for species of concern to precede development in areas of potential habitat is essential, particularly within ecological communities that have close associations with these species of Threatened flora (Endangered and Vulnerable), must be considered.

Conservation issues—species and site-specific

- Known populations—Known populations of each Threatened species (TSC Act), and NOT limited to those species selected for attention in this study, need to be carefully managed, with preference given to Endangered species and to Vulnerable species with known populations under immediate threat.
- Habitat restoration—Where opportunities for the restoration of habitat or populations arise as a result of local conservation efforts, land management efforts, or proposed development, these opportunities must be taken.

5.5 Recommendations

It is recommended that:

- findings presented in this report be considered during all land use (and species) management and planning processes associated with the Georges River catchment
- conservation priorities identified in this report should be considered in strategic planning to protect regional biodiversity values, including the implementation of a regional network of areas for the management of biodiversity values outside the reserve system
- the allocation of economic and social resources to conservation efforts be prioritised to protect and manage Critically Endangered communities and species, and communities that are currently in good condition
- specific habitat protection measures be taken, as set out in this report, in relation to the management of regionally significant species, including those that are considered to be threatened under State and Commonwealth legislation.

6 References

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