

**Standing Committee on Planning and Environment:
Inquiry into urban vegetation and wildlife corridors, and the integration of biodiversity
conservation in land use planning in the ACT and its sub-regions.**

**Submission by the ACT Commissioner for the Environment
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The following comments address only some of the matters being investigated by the Committee.

**1. Availability and adequacy of information for identifying and assessing urban nature
conservation requirements and wildlife corridors in relation to developing land use policy**

Most of the areas planned for Canberra's ongoing urban development are 'lowland' areas whose original vegetation would mostly have been grassy woodland and temperate grassland communities, with riparian vegetation along major water courses, and open forest communities on hills and ridges.

Most of the less disturbed areas of open forest on hills and ridges are protected as part of Canberra Nature Park, and provide important 'focal areas' for connecting wildlife corridors for many 'forest' dependent species.

Information about grassy woodland and temperate grassland vegetation—those communities most likely to be affected by urban development—is relatively good, and has been summarised in the Lowland Woodland Conservation Strategy (EACT 2004a) and in the Lowland Native Grassland Conservation Strategy (EACT 2005). Both these strategies provide a good framework for developing land use policies to ensure the protection of these communities (including the two listed ecological communities), their component flora and fauna, and the general needs for corridors to provide connectivity for dependent faunal species. However, land use policies need to have a measure of flexibility in their application to allow responsiveness to new biological/ecological information that will become available from activities such as ongoing scientific research and monitoring programs.

By comparison with lowland grassland and grassy woodland ecosystems, information about riparian communities is poor. The riparian conservation strategy, currently under development by Environment ACT, will provide a better context for the protection of these communities and their role in Canberra's network of conservation reserves and wildlife corridors, when it is completed. However, land use planning will need to be cognisant of information gaps identified in the strategy.

Planning for nature conservation and wildlife corridors in new 'greenfields' areas, such as the Molonglo valley, will need to follow but be based on more detailed biological survey work in these areas. Land use planning for new urban areas must be responsive to the knowledge arising from these surveys to ensure appropriate conservation outcomes are achieved.

Unless one has been developed during the last six months, there is no agreed, centrally available and up-to-date map of actual land use for the ACT. My office has endeavoured to produce such a map in previous State of the Environment (SoE) reports it has prepared for the ACT, with the latest for the 2003 SoE Report being the most accurate. This was based on planned land use in the

Territory Plan and the National Capital Plan, data layers for conservation, forestry, tenure and community facilities, digitised aerial photography, and detailed local knowledge of agricultural and other minor areas provided by a former Parks and Conservation officer. The land use categories and sub-categories identified for these maps are shown in Table 1 below.

As part of its work in preparing the 2004 SoE Report for the Australian Capital Region, my office has contracted a private firm (Agrecon) to generate land use maps for the entire region based on satellite imagery. These maps are being used as data sources for SoE indicators such as vegetation cover, land use and land degradation. My office is using the maps to assess changes in land use in each local government area within the region between reporting periods (i.e. between 1997 and 2000, and between 2000 and 2004). The land use categories and sub-categories identified for these maps are shown in Table 1 below. Each council in the Australian Capital Region will be able to use the landuse maps for its area as a resource to assist in planning for a range of purposes. The maps for the entire region provide a powerful tool to assist planning for wildlife corridors and to support the development of coordinated landuse policies within the region, e.g. through bodies such as the Regional Leaders' Forum (see section 3 of this submission). My office would be happy to organise an on-line demonstration of these maps for the Committee, or provide it with hard copy samples, as useful.

Table 1. Categories used for regional state of the environment report landuse maps

Primary landuse category	Sub-category
Agriculture	Cropping
	Estimated grazing
	Horse Paddocks
	Horticulture
	Mixed farming
	Rural residential
	Woodland Pasture
Bushland	Bushland Forest
	Other
Conservation	National Park
	Nature Reserve
	Environmental protection
	Other Conservation
Quarries	Quarries
Timber Production	Timber production
	Other plantations
Urban	Commercial
	Community facility
	Heritage
	Industrial
	Municipal facilities
	Open space
	Other
	Residential
	Towns & villages
	Transport
	Urban Unclassified
Waterbodies	Waterbodies

I have no relevant knowledge about publicly or privately funded environmental works in the region.

2. Current framework for nature conservation in the ACT, and its adequacy re land use planning in urban areas

The *Nature Conservation Act 1990* is the key legislation for the protection of natural ecosystems and native species in the ACT. It includes provision for the declaration of threatened species, ecological communities and threatening processes, and requires action plans to be prepared for them. Many plant and animal species and two ecological communities listed under the act are associated with urban areas. Species or ecological communities may also be listed under the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999*. Under this act, the Commonwealth Environment Minister is required to assess and approve any actions that are likely to have a significant impact on listed threatened species and ecological communities.

The ACT's tree protection law is intended to protect individual trees that have heritage, landscape, aesthetic or scientific value (including value as faunal habitat) and to protect the values associated with Canberra's 'urban forest' that has resulted from extensive planting of native and exotic trees along streets and in parks and private gardens. To protect both types of values, the law now aims to prevent any unnecessary loss of trees in areas under development pressure, listed heritage precincts and new development estates (EACT 2004b). The focus appears to be primarily on existing mature trees.

A variety of 'instruments' provide the strategic policy and/or management framework for nature conservation in urban areas. They include the following:

- ACT Nature Conservation Strategy (EACT 1997): provides a strategic framework for the protection of ecological communities and species throughout the ACT (urban and non-urban areas) and includes objectives, actions and performance indicators/targets. It covers conservation through reservation, off-reserve conservation, conservation of threatened species and communities, biodiversity monitoring, and management of threats (pest animals, environmental weeds, changed fire regimes, degradation of aquatic systems, decline and loss of native vegetation).
- Canberra Nature Park Management Plan (EACT 1999): provides the management framework for 27 discrete reserves that comprise the park, most of them associated with hills and ridges. It includes management of vegetation, biodiversity, native animals and landscape.
- Action plans for species and ecological communities listed under the *Nature Conservation Act 1990*: each action plan specifies conservation objective/s, outlines threats/conservation issues, and indicates the management and other actions needed to achieve the conservation objectives. They address, as relevant, on and off-reserve actions and actions in urban and non-urban areas.

The recently completed conservation strategies for lowland grasslands (EACT 2005) and lowland grassy woodlands (EACT 2004a) also serve as the statutory action plans for the two listed ecological communities and listed plant and animal species associated with them. The conservation strategies essentially integrate previously separate action plans for the listed ecological community and listed species, and also integrate conservation actions for related communities and species that are not listed as threatened. Each conservation strategy

provides a more holistic approach to the conservation of the ecological community and its associated plant and animal species, and a better basis for integrating conservation actions between conservation reserves and off-reserve areas.

- The Canberra Spatial Plan (ACTPLA 2004): the plan includes general objectives regarding nature reserves and connectivity between, and shows key nature conservation areas that existed at the time the plan was developed and wildlife corridors to be maintained/developed in the future (Map 7). The wildlife corridors specified in the plan are presumably ‘translated’ into planning policy.
- Planning principles within the Territory Plan, as articulated in DV231: DV231 includes a number of principles related to nature conservation/biodiversity protection; they are summarised in Attachment 1. In this context the intended scope of the principles is appropriate, i.e. they include conservation reserves, the protection of threatened species and ecological communities, declining fauna, off-reserve wildlife habitat and wildlife corridors.

While each of the above ‘instruments’ has its individual strengths, in terms of land use planning—particularly in urban areas—weaknesses/gaps exist. These include the following:

- there appears to be no policy/plan that is focused on the ‘urban forest’ of the future, i.e. that provides explicit objectives about the nature of the urban forest to be achieved through deliberate tree plantings (native or exotic) in new suburbs
- there appears to be no policy/plan that is focused on ensuring a ‘supply’ of significant trees for the future in open space areas, including ensuring that appropriate tree species are planted now to provide continuity of faunal habitat as the current ‘crop’ of mature trees eventually die or are removed for human safety reasons
- while the individual lowland woodland and grassland conservation strategies each provide an integrated framework for protecting the ecosystem/dependent species, there is no framework that specifically integrates the two individual strategies
- the Spatial plan provides no contextual planning framework for ‘secondary’ wildlife corridors (i.e. corridors within suburbs that also provide cross linkages between the primary corridors). Although wildlife corridors would often coincide with open space areas, the plan’s open space objective does not explicitly recognise their biological role (either as an important part of the wildlife corridor network, or in relation to local areas with conservation values that are, or may warrant being incorporated into, the urban open space network).
- The planning principles in DV231 are not always compatible, may result in inadvertent perverse outcomes, sometimes duplicate each other, and have some important gaps (see ‘comments’ column in Appendix 1). Some principles would also be applied in an ad-hoc manner because of the absence of relevant Canberra-wide, long-term policy objectives.
- None of the above include an ecologically sustainable basis for valuing natural ecosystems/biodiversity; protection of these is currently assessed primarily in terms of opportunity costs of development.

The above gaps and weaknesses strongly suggest there is a need to develop a plan that provides an integrated, coherent framework for land use planning in relation to nature conservation/biodiversity protection in Canberra, encompassing both native species and ecosystems and Canberra’s native/exotic urban forest. It is needed:

- to provide clarity about the overall biodiversity/nature conservation outcomes the Government wishes to achieve for Canberra in the long-term, with broad targets and strategies for achieving them

- to integrate relevant matters in existing management plans, action plans, strategies, tree protection laws etc
- to ensure integration of biodiversity/nature conservation objectives/outcomes between planning for new developments (e.g. Gungahlin; Molonglo), planning for major urban renewal projects (e.g. East Basin) and planning related to the evolution of older suburbs (e.g. in areas like Canberra's inner north).

It would be appropriate for such a 'Green Plan' to be a formal part of the Canberra Plan, and have the same status as the Spatial Plan, Social Plan and Economic White Paper. This would ensure that the Canberra Plan explicitly addresses all three sustainability elements (social, economic and environmental) and would provide a more transparent basis for Government decision-making involving significant tradeoffs between the existing natural environmental and ongoing development of urban areas/infrastructure.

The 'Green Plan' could also include generic nature/conservation planning principles, that build on those in DV231, to provide a consistent framework for the development and application of suburb-specific principles. Some examples of generic principles and how they might be applied for suburb-specific principles are provided in Attachment 2.

3. Transboundary issues with local councils and NSW Government concerning land use planning and biodiversity considerations

Much of the nature conservation/biodiversity work carried out in the ACT takes a regional perspective. For example, the ACT Nature Conservation Strategy takes a regional approach, and the listing of threatened species and ecological communities under the ACT's *Nature Conservation Act 1990* takes account of the regional context of the species/communities.

A regional planning framework has been developed explicitly to address biodiversity in a regional context (Fallding 2002). I have no knowledge about the extent to which this planning framework is used by either the ACT or NSW governments or local governments in the region.

The Office of the Commissioner for the Environment (OCE) prepares state of the environment reports for the ACT that have consistently taken a regional perspective. At the request of the Regional Leaders Forum, since 1997 OCE has also prepared state of environment reports for local governments in the Australian Capital Region and prepares a regional overview of issues. The SoE reports collate information on about 40 indicators (see Attachment 3) and synthesize this information in a discussion around the following six issues:

- Air quality
- Catchment quality
- Biodiversity
- Climate
- Resource use
- Community well being.

OCE published regional SoE reports in 1997 and 2000 and is currently preparing the 2004 SoE report for the Australian Capital Region. The 2000 regional SoE report and early sections of the 2004 regional SoE report can be accessed on the OCE website at the following url

<<http://www.environmentcommissioner.act.gov.au/rsoc.html>>.

To date neither the Regional Leaders Forum nor individual councils have actively used the regional SoE reports to help inform land use planning either between or within local government areas. There is considerable scope for the Regional Leaders Forum to take a stronger role in regional land use planning, supported by the findings of regional SoE reports. As noted under section 1 of this submission, mapping products being prepared for the 2004 regional SOE report can significantly assist the development of coordinated policies in the region for a variety of land uses, including nature conservation.

References

EACT (1997) *The ACT Nature Conservation Strategy*, Environment ACT, Canberra.

EACT (1999) *Canberra Nature Park Management Plan*, Department of Urban Services Conservation Series No. 14.

EACT (2004a) *Woodlands for wildlife. ACT Lowland Woodland Conservation Strategy*, Action Plan No. 27, Environment ACT, ACT Urban Services.

EACT (2004b) *Tree Protection Bill 2004: The Way Forward*, EACT ppt presentation.

EACT (2005) *A vision splendid of the grassy plains extended. ACT Lowland Native Grassland Conservation Strategy*, Action Plan No. 28, Environment ACT, ACT Government.

Fallding, M. (2002) *planning framework for natural ecosystems of the ACT and NSW Southern Tablelands*, Natural Heritage Trust, NSW National Parks and Wildlife Service and Land & Environment Planning.

Analysis of principles in Variation of the Territory Plan No. 231 (DV231)

Section No in DV231	Specific principle in DV231	Comments
General 2.3.1 d	Maintain and enhance natural systems and protect key natural areas	• principle generally consistent with nature conservation/biodiversity protection
General 2.3.1 k	Develop a landscape that is ... conducive to a variety of uses and natural experiences, with a character that retains the inherent site values and cultural associations	• principle generally consistent with nature conservation/biodiversity protection
General 2.3.1 l	Create a landscape pattern that ... correlates closely with the broader natural landscape setting	• principle generally consistent with nature conservation/biodiversity protection
General 2.3.1 m	Maintain and create an open space system which is representative of local natural environments (e.g. forest on protected hills, woodland on hill slopes, grassland on lowlands and wetlands in valleys and drainage lines)	• principle could have inadvertent perverse outcomes, e.g. mass plantings of trees to create forests in open space areas whose primary value is related to a woodland vegetation structure
2.3.2 Environment—Nature Conservation	Establish conservation areas and provide for management arrangements which are sufficient to conserve threatened fauna, woodlands and grasslands	• ‘sufficient’ sounds like a lowest common denominator approach • principle needs to cover flora, fauna and ecological communities (threatened <u>and</u> non-threatened)

Section No in DV231	Specific principle in DV231	Comments
2.3.2 Environment—Nature Conservation	Ensure land uses adjacent to conservation areas do not have significant adverse impacts on threatened species	• should be aiming for no adverse impacts (not just significant ones) in the short- and long-term • same intent is needed re ecological communities and ecosystem processes (e.g. water flow, vegetation structure and change over time, nutrients etc) • adjacent land use principles/policies need to address the full range of potential ‘pressures’ from adjacent areas (including impacts of garden escapes, inappropriate recreational use (e.g. off-road mountain bike tracks, walking/jogging trails), impact of dogs (scaring/chasing kangaroos), collection of bush rocks (in addition to weed incursion, predation by domestic pets, rubbish dumping, inappropriate access and removal of plants/timber listed on page 17)
2.3.2 Environment—Water	Encourage reduction in water consumption by the use where appropriate of native plant species, preferably indigenous to Gungahlin	• better to focus on the use of native species appropriate to the original vegetation type (rather than indigenous to the suburb—won’t always have enough propagation material from local plants) • native plant species don’t necessarily use less water than non-native species; many exotic species planted in Canberra have proven quite drought tolerant and are not invasive; principle should focus on using appropriate <u>drought-tolerant</u> plant species (which may be native or exotic, depending on the purpose of the plantings)
2.3.3 Cultural planning—Amenity	Provide spaces, which are useable and pleasant, with spaces for quiet reflection and casual meeting.	• principle also needs to allow for specific cultural plantings (e.g. the ‘Haig Park’ areas of the future)
2.3.7 Stormwater	Provide for a diverse range of vegetation types and wildlife habitats within the stormwater system and incorporate wildlife links where possible	• principle needs a broader contextual objective about vegetation types generally, to ensure the vegetation types contribute to the desired ‘urban forest’ of the future, and that inappropriate vegetation types are not developed
2.3.10 Conservation	Provision is made for the conservation of threatened species and ecological communities through reserving land for nature conservation purposes. The main principles are:	• also need a principle related to off-reserve conservation, i.e. that recognises the conservation role of urban open space
2.3.10 Conservation	Establish conservation areas which are adequate in area, with a sufficient buffer from development areas	• need to include consideration of shape for management purposes • overlaps with principles under 2.3.2

Section No in DV231	Specific principle in DV231	Comments
2.3.10 Conservation	Establish conservation areas with suitable management arrangements to protect flora and fauna	• overlaps with principles under 2.3.2
2.3.10 Conservation	Make the conservation areas part of the overall landscape character by ensuring their visual integration into the open space system	• intent of principle is appropriate
2.3.10 Conservation	Ensure land uses adjacent to conservation areas do not have a significant impact on reserve	• overlaps with principles under 2.3.2 • need to address more obvious significant impacts <u>and</u> more subtle impacts whose effects often become obvious <u>only</u> in the longer-term
2.3.10 Conservation	Where appropriate, edge roads are to be used to provide an interface between development and significant conservation areas	• need a more general principle about ensuring appropriate ‘buffer’ uses, of which edge roads may be one use
2.3.10 Conservation	Management practices are implemented within the reserve areas to improve the ecological condition and its habitat value for threatened and declining woodland birds	• principle could result in inadvertent negative outcomes; our knowledge is often insufficient to know what is needed to ‘improve’ habitat; principle should aim to maintain <u>and if possible/feasible</u> improve habitat • principle needs to apply to the component species of a reserve’s ecosystems as well as threatened or declining species located there • critical that this planning principle does not ‘usurp’ management based on objectives, strategies etc in relevant statutory plans (e.g. action plans)
2.3.12 Urban open space	Ensure that the open space network is designed to provide opportunities for wildlife movement corridors ...	• intent of principle is appropriate • needs to link with a Canberra-wide policy secondary corridors as well as for primary corridors shown in Spatial Plan • need to ensure other urban open space principles are compatible with this (see comments under next principle)

Section No in DV231	Specific principle in DV231	Comments
2.3.12 Urban open space	Ensure open spaces are planted with appropriate local native species, including grasses where practicable	• where wildlife movement corridors is an objective for urban open space, need to ensure that ‘amenity’ plantings will use native species appropriate to the original vegetation type and be consistent with the vegetation structure of the target wildlife species (i.e. if a corridor is for open woodland birds, it’s important not to plant trees/trees too close together, make sure there are scattered low shrubs, supplement the ground layer with appropriate native grasses and herbs if relevant to the diet; other types of plantings could be quite inappropriate) • important not to exclude the possibility of planting exotic trees in some open space areas (and along roadsides) to allow ‘cultural plantings’ for the future (see 2.3.3 above) • important to protect existing significant trees that provide faunal habitat (and visual amenity etc) and maintain current saplings and/or plant seedlings/saplings to ensure the supply of significant trees for the future
2.3.14 Landscape	Establish a landscape that relates to the natural environment and promotes biodiversity by the use of local plant material and the incorporation of a variety of plant community and habitats	• principle could be at odds with other principles (e.g. if develop plant communities inappropriate to particular conservation objectives for open space) • doesn’t allow for any non-native plantings in appropriate areas (see 2.3.3 above)
2.3.14 Landscape—conservation areas	Make the conservation areas part of the overall landscape character of the East Gungahlin area by ensuring their visual integration into the open space system of the area.	• duplicates earlier principle under 2.3.10
2.4.1 General principles — suburban	The landscape setting and values ... are to be recognised and enhanced. Boundary hills and significant internal ridges within the urban fabric are to be protected from development and planted with native vegetation. Significant trees are to be incorporated into the urban fabric where possible.	• protection of boundary hills and significant internal ridges within the urban fabric from development highly appropriate • native only options not necessarily appropriate everywhere (see 2.3.3 above) • retention of significant trees needs to be a ‘higher level’ generic principle

Examples of generic planning principles for biodiversity/nature conservation

Generic principles		Example of application of generic principle to suburb-specific principle
'What' principle	'How' principle	
Establish conservation reserves and provide for management arrangements which protect the reserves' nature conservation values (including threatened species and their habitats; threatened ecological communities, their component flora and fauna; ecosystem processes).	Establish conservation reserves with an area and shape appropriate to their management.	
	Manage reserves consistent with relevant statutory action plans and/or management plans.	
Ensure land uses adjacent to conservation reserves are compatible with protecting reserves nature conservation values.	Buffer reserves from development areas in a manner appropriate to reserve values.	Use edge roads to provide an interface between development and significant conservation areas...
	Implement appropriate policies and/or urban design elements to address the impacts of threatening processes (e.g. weed incursion, garden escapes, inappropriate access and/or recreational use, impact of pets, collection of bush rocks, rubbish dumping, removal of plants/timber)	Establish and implement appropriate domestic pet policy (e.g. restrict dogs and cats in suburbs adjacent to reserves)... Establish and implement appropriate domestic garden policy (e.g. restrict use of potentially invasive plants species in suburbs adjacent to reserves)...
Use the open space network to provide opportunities for wildlife movement corridors.	Establish secondary wildlife movement corridors to link primary corridors specified in the Spatial Plan.	
Maintain long-term continuity of suitable habitat within wildlife corridors.	Protect existing significant habitat trees and provide for their future replacement.	Protect existing trees and implement an appropriate long-term replacement program
	Supplement existing remnants of native vegetation with appropriate native plant species that provide food for target wildlife.	Supplement local remnants with grass and forb species appropriate to lowland grassy woodland ...

**Indicators used in state of the environment reporting
for the ACT and the Australian Capital Region**

Indicator	Issue
Air Emissions - emissions of air pollutants identified under the National Pollutant Inventory compared with relevant specified threshold amount of substances; and number of authorised/licensed discharges exceeded by type and quantity	Air Quality
Aquaticmacro-invertebrates - aquatic health at river test sites based on the composition of their macroinvertebrate fauna as assessed by the AUSRIVAS model	Conserving Biodiversity; Catchment Quality
Changed Fire Regimes - area of native vegetation which has been subjected to an inappropriate fire frequency and intensity, areas with changed ecology as a result of fire, and planning/management actions to protect ecology from inappropriate fire	Conserving Biodiversity; Catchment Quality; Air Quality
Community Health - top 10 causes of death, incidences of identified illnesses and substance abuse by selected groups (ie age, gender and indigenous)	Community wellbeing
Community Participation - Participation in community organisations and in major events, sporting activities and other cultural events	Community wellbeing
Contaminated sites - number and area of contaminated sites assessed according to the relevant NEPM, nature of contaminant, and proportion of contaminated sites remediated or well-managed	Catchment Quality
Discharges to waters - Volume number type and mass loads of licensed and other (unlicensed/illegal/accidental) discharges into groundwater, streams and lakes; and number of discharge licenses exceeded by type and volume	Catchment Quality
Drinking water quality - proportion of tapwater samples meeting the relevant guidelines for drinking water quality	Community wellbeing
Ecoinvestment - annual expenditure and sources of funds spent by business, communities and the government on preventing and repairing identified environmental problems	Conserving Biodiversity; Catchment Quality; Community wellbeing
Ecomanagement - progress on implementation of management plans, agreements and covenants in use, and their effectiveness	Conserving Biodiversity; Catchment Quality;
Economy - economic growth, value and volume of primary, secondary and tertiary industries products/services and number of people employed in each industry	Human wellbeing; Conserving Biodiversity
Ecosystems - change in extent and condition of terrestrial and aquatic native ecosystems/habitat for each biogeographic subregion, details of change (especially of clearing or revegetation), adequacy of protection in public and private lands and evidence of reduction in Pressures	Conserving Biodiversity
Education - Educational levels of the population; schools and their catchments, their location and student-teacher ratio	Community wellbeing
Energy Consumption - gross and per capita energy consumption within each sector from each source	Resources Use
Greenhouse Contributions - emissions of gases from human activities contributing to the enhanced Greenhouse effect and activities to reduce the Greenhouse effect	Climate
Groundwater levels - area and proportion of land where groundwater levels are shallow and whether groundwater levels are falling stable or rising	Catchment Quality

Groundwater quality - extent and severity of groundwater pollution and levels of salinity	Catchment Quality
Harvesting Native Species - proportion of native plant and animal material removed and controls on illegal and legal removal	Conserving Biodiversity
Hazardous waste - amounts of each type of hazardous waste and disposal, according to NEPM	Resources Use
Health services - number of GPs per '000 residents in relation to national average, length of waiting list and waiting times for selected services	Community wellbeing
Heritage - type and number of sites, objects or places nominated, on interim listing and on the heritage register and numbers assessed as well-managed	Community wellbeing
Housing - number of households supported by rental assistance or public housing - homeless figures; housing affordability and housing demand	Community wellbeing
Indoor Air Quality - percentage of residents that smoke, percentage of households with natural gas, and percentage of houses built after a certain time (tighter buildings), and OH&S stats on workplace airquality (include legionnaires)	Air Quality; Community wellbeing
Infrastructure - capacity, condition, age and life expectancy of each type of infrastructure; total expenditure (capital expenditure maintenance and upgrades) on each type of infrastructure as a proportion of total asset value and for which planning for risk and future needs are in place	Community wellbeing; Resources Use
Land degradation - area and proportion of land assessed as being degraded by erosion, salinity, acidity, structural decline or any other form of degradation, and amount rehabilitated, compared with targets	Catchment Quality
Landuse - the area (in hectares) and proportion of land subject to each landuse type, and appropriateness of those uses	Catchment Quality; Conserving Biodiversity; Resources Use
Native Species - change in number of species that are considered to be common, uncommon, rare, vulnerable, endangered and extinct, details of change (esp decline) and evidence of reduction in threatening processes identified in action plans	Conserving Biodiversity
Noise - total number and types of noise complaints and exceedences of any relevant guidelines, and abatement measures implemented	Community wellbeing
Outdoor Air Quality - concentrations of Criteria Pollutants in the Ambient Air Quality National Environment Protection Measure	Air Quality
Ozone Depletion - concentration of ozone in upper atmosphere and extent of the ozone hole, intensity and wavelength of UV-A, B and C radiation at surface, amounts of ozone depleting substances (ODSs) imported, used and emitted, and effectiveness of import and use controls	Community wellbeing
Pest Animals - distribution and abundance of each pest animal species, areas with significantly changed ecology as a result of pest animals and effectiveness of control actions	Conserving Biodiversity; Catchment Quality
Pest Plants - distribution and abundance of each pest plant species, areas with significantly changed ecology as a result of pest plants, and effectiveness of control actions	Conserving Biodiversity; Catchment Quality
Population - population count and distribution based on latest Census and Census updates and population density	Community wellbeing; Catchment Quality; Conserving Biodiversity; Resources Use
Riparian condition - distribution of streams with riparian zones that have been assessed as being in good, moderate and poor condition	Catchment Quality

Safety - property and personal crime rates by victim numbers and arrests/apprehension/resolution, and perceptions of community safety	Community wellbeing
Socio-Economic Equity - % of population within specified groups	Community wellbeing
Solid Waste - types and amount of solid waste that are actually recycled or reused or that go to landfill, compared to waste reduction targets; plus amount of material illegally dumped	Resources Use; Catchment Quality
Surface water quality - distribution of water quality monitoring sites for which water quality has been assessed as good, moderate and poor compared with targets	Catchment Quality
Transport - use, effectiveness and efficiency of each mode of transport and transport demand management measures	Resources Use
Water demand management - legislative and other mechanisms (incl.water allocations) dealing with current and future demand for water, and their effectiveness	Catchment Quality; Resources Use
Water use - volumes of single-pass and recycled water used by each sector (domestic, commercial, industrial, rural) and for environmental flows, in relation to total available water	Resources Use; Catchment Quality
Weather - rainfall, temperature and wind statistics and variability, and extreme events	Climate; Catchment Quality; Resources Use; Conserving Biodiversity