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Ms Julia Morris
Committee Secretary
Standing Committee on Climate Change, Environment and the Arts
PO Box 6021
Parliament House
CANBERRA ACT 2600

Dear Ms Morris

Inquiry into Australia's biodiversity in a changing climate

Please find enclosed a submission from the South West Catchments Council to the new inquiry into Australia's Biodiversity in a changing climate.

If you have any queries in relation to this submission please contact me on _____ or
via _____

Regards

Damien Postma
Chief Executive Officer

TITLE: INQUIRY INTO AUSTRALIA'S BIODIVERSITY IN A CHANGING CLIMATE
A submission by the South West Catchments Council Inc

SWCC region

The South West Catchments Council (SWCC) is a non-statutory body set up jointly by the Western Australia and Australian Government to coordinate natural resource management in the South West Region of WA. SWCC covers 33 local government areas, an estimated 5.1 million ha, a population of approximately 195,000 and includes the major centres of Mandurah, Bunbury and Busselton, Margaret River, Manjimup and Narrogin. The region boundaries are based on the surface water catchments of the major river systems including the Serpentine, Murray, Collie, Brunswick, Margaret, Blackwood, Warren and Frankland and as such encompasses a diversity of resource based activities such as mining, agriculture, fishing, forestry, energy and ecotourism¹.

SWCC derives the greatest amount of its investment from a negotiated bid with the Australian Government through its Caring for our Country (CfoC) initiative that seeks to achieve an environment that is healthy, better protected, well-managed and resilient, and provides essential ecosystem services in a changing climate.

Twenty year (long-term) outcomes have been developed, articulating the Australian Government's aspirations for the protection and management for each of the national priority areas. These outcomes help to focus investment on achieving national priorities and avoid spreading the funds so thinly that the improvements cannot be measured or reported. Nested within the national outcomes are short-term, five year outcomes and short term targets for years 2009-10 2012-13. To this end, the regional body has negotiated with the Australian Government an investment program or a suite of integrated projects that will deliver against individual or multiple targets in the South West Region and will contribute to the achievement of the short-term national outcomes at the national level. One of its programmes is the "South West Biodiversity Protection Program 2009-11". This program is well placed to provide a submission to the Senate Inquiry on behalf of the regional body.

SWCC targets

Biodiversity and Natural Icons

- To increase by at least 400,000 hectares, over the next two years, the area of native habitat and vegetation that is managed to reduce critical threats to biodiversity and enhance the condition, connectivity and resilience of habitats and landscapes in priority regions.
- To suppress rabbit populations over the next three years to densities that are low enough to allow regeneration and recovery of critically endangered and endangered species and communities in identified priority areas.

- To reduce the impact and spread of Weeds of National Significance over the next two years. Priority will be given to collaborative activities that address outliers, containment lines, and strategic management of core infestations where appropriate.

Coastal environments and critical aquatic habitats

- To address the threats posed by invasive plant and animal species to the ecological character of Ramsar listed wetlands, over the next two years.
- To address the threats posed by invasive plant and animal species to the environmental values of high priority non-Ramsar high conservation value aquatic ecosystems, over the next two years.

Community skills, knowledge and engagement

- To ensure all regional natural resource management organisations assist local communities, including indigenous, landcare and coastcare groups over the next two years to access knowledge and skills in managing natural resources, including providing easily accessible, free information to groups and individuals and providing training opportunities to local groups.
- To increase the opportunities for short-term members or visitors to contribute to and partake in the protection and management of natural resources.

2. Context

As the major community natural resource management organisation in the south west of Western Australia, staff have built a substantial knowledge and technical base as it applies to the national priority areas (as defined by CfoC). It is from this base that the submission has been formed.

The 'ecosystems' that SWCC has experience with includes:

- a. Listed communities according to the EPBC Act 1999 which SWCC directly supports:
 - Corymbicalophylla-Kingia Australia (Marri-Tall Grasstree) woodlands of the Swan Coastal Plain
 - Corymbicalophylla-Xanthorrhoea-preissii (Marri - Grasstree) woodlands and shrublands of the Swan Coastal Plain
 - Shrubland Association on Southern Swan Coastal Plain ironstones (Busselton Area)
 - Sedgeland in Holocene dune swales of the southern Swan Coastal Plain
 - Perched Wetlands of the Wheatbelt region with extensive stands of living sheoak and paperbark across the lake floor (Toolibin Lake)
 - Lake Muir-Byenup Ramsar wetland.

- b. EPBC Act 1999 listed communities within SWCC where SWCC has indirect association:
- Aquatic Root Mat Communities numbers 1-4 of caves of the Leeuwin-Naturaliste Ridge
 - Thrombolite (microbialite) Community of a Coastal Brackish Lake (Lake Clifton)
- c. Communities currently referred under the EPBC Act for consideration for listing:
- Claypans of the Swan Coastal Plain National policy areas
- d. Communities within the South West NRM Region not currently supported by Government funding:
- Jarrah-Marri forests
 - Scott Plain Ironstones
- e. Communities with Australian Government designation re. special values:
- Lower Blackwood High Conservation Value Aquatic Ecosystems

3. Definitions and terms

Every effort has been made to use terminology consistent with scientific definitions. SWCC receives funding based on the Caring for our Country Business Plan 2011-12². The current plan includes a Glossary of terms pages 90-93; usage of terms in this submission follows the definitions of terms as in this document.

In particular,

Biodiversity: the variety of all life forms on earth - the different plants, animals and micro-organisms and the ecosystems of which they are a part.

Community: a group of people who live in the same area or have shared interests.

Condition of native vegetation: the capacity to support the full range of native species that might be expected to use a stand of vegetation of a particular type under natural circumstances. Any native vegetation

patch can be assessed relative to the average characteristics of a mature and long undisturbed patch of the same vegetation type.

Connectivity: The location and spatial distribution of natural areas in the landscape to provide species and populations with access to resources (food, breeding sites and shelter), increase habitat availability and facilitate population processes (dispersal, migration, expansion and contraction) and enable ecological processes (evolution, water, fire and nutrients). In fragmented landscapes, connectivity is most likely to occur where there are a series of close habitat areas arranged like 'stepping stones'.

Critically Endangered: A native species or ecological community deemed under the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC)* as facing an extremely high risk of extinction in the wild in the immediate future.

Ecological Character description: ecological character descriptions are prepared using the *National framework and guidance for describing the ecological character of Australia's Ramsar Wetlands* and are endorsed by the Australian Government. An ecological character description is a description of a wetland at a given point in time, which can be used to assess change in the ecological character of these sites. It provides information about the environmental features and services of the site.

Ecological communities: interacting organisms living together in a specific habitat.

Ecosystem: a biological community of interacting organisms and their physical environment. Ecosystems are identified at various scales.

High Conservation Value Aquatic Ecosystems (HCVAE): includes rivers, wetlands, floodplains, lakes, inland saline ecosystems, groundwater dependent ecosystems and estuaries. An aquatic ecosystem with high conservation values are those recognised through a number of key agreements and convention at the national level including Ramsar Convention, United Nations Convention on Biological Diversity, World Heritage Convention, Japan Australia Migratory Bird Agreement, Bonn Convention on Migratory Species and China Australia Migratory Bird Agreement.

Matters of national environmental significance: nationally or internationally important flora, fauna, ecological communities and heritage places as defined under the EPBC Act 1999.

Nationally threatened species and ecological communities: Threatened species or threatened ecological communities are those threatened with extinction or destruction. The term 'threatened' encompasses, from most to least likely to become extinct; critically endangered; endangered; and vulnerable. They are listed under the EPBC Act 1999.

Natural resource management: the sustainable management of Australia's natural resources (our land, water, marine and biological systems) to ensure our ongoing social, economic and environment wellbeing.

Refugia: isolated places where more widespread species previously survived. This isolation may be due to climatic change, geography, or human activities such as changed land use. Refugia act as places where species can contract to or disperse from as environmental conditions change. Some examples of refugia include islands, caves, wetlands, gorges, mountains and remnant vegetation patches.

Resilience: the capacity of an ecosystem to tolerate disturbance without collapsing into a qualitatively different state that is controlled by a different set of processes. A resilient ecosystem can withstand shocks and rebuild itself when necessary. Resilience in social systems has the added capacity of humans to anticipate and plan for the future.

Weeds of National Significance: Weeds of National Significance are 20 weed species agreed by the Australian and all state and territory governments. They are priority species for sustained nationally coordinated action under the Australian Weeds Strategy.

- b. For information presented in this submission every effort has been made to provide references. The topic is so broad and diffuse that anecdotal points of view will be inevitable and again every effort will be made to identify these.
- c. Reference to climate variability is based on the following publications
 - i. CSIRO (2009) Groundwater yields in south-west Western Australia. A report to the Australian Government from the CSIRO South-West Western Australia Sustainable Yields Project. CSIRO Water for a Healthy Country Flagship, Australia
 - ii. CSIRO (2009) Surface water yields in south-west Western Australia. A report to the Australian Government from the CSIRO South-West Western Australia Sustainable Yields Project. CSIRO Water for a Healthy Country Flagship, Australia
 - iii. CSIRO (2009) Water yields and demands in south-west Western Australia. A report to the Australian Government from the CSIRO South-West Western Australia Sustainable Yields Project. CSIRO Water for a Healthy Country Flagship, Australia.
 - iv. IOCI Climate Variability and Change in South West Western Australia Indian Ocean Climate Initiative Panel 2002.

4. Terms of reference

4.1 Matters related to terrestrial and freshwater biodiversity

- a. Recovery Plans for Marri-*Kingiaaustralis* woodlands³ and Marri-*Xanthorrhoea preissii* woodlands and shrublands⁴ published in 2000 do not mention climate variability as a threatening process but do refer to changed hydrological

regimes; *“Altered periods or depths of ponding may affect the timing of growth of herbs in the understorey, and may also effect the species composition of the community by favouring different plant species⁴”*. Continued negative climate change will have serious impacts on these communities, resulting in modifications and losses of species composition. Observation about change to native bush, in particular occurrences of these TECs due to ‘drought effects’ has been conveyed to SWCC by stakeholders (P. Jacobs, pers. comms 2011).

- b. Regarding claypan communities -*“Seasonal wetlands are generally evenly spread across the Swan Coastal Plain (except in the north where rainfall decreases). While most of these seasonal wetlands are connected to the regional groundwater, a series of wetlands are found on clay substrates that rely solely on rainfall to fill, and then dry to impervious pans in summer. These seasonal clay-based wetlands are locally referred to as ephemeral clay pans or clay flats (Gibson et al., 2005) and comprise the Clay Pans of the Swan Coastal Plain ecological community. The ecological community is composed of both clay pan basins and clay flats, but can be collectively termed as clay pans. A distinctive feature of the clay pan wetlands that comprise the ecological community is the suite of geophytes and annual flora that germinates, grows and flowers sequentially as these areas dry over summer, producing a floral display for over three months. The clay pans have very high species richness, a number of local endemics and are the most floristically diverse of the Swan Coastal Plain wetlands⁵”*. Any changes due to climate variability will have a high impact on these communities.

Recovery Plans for the Busselton Ironstones Threatened Ecological Community published 2005 do not record climate variability as a current threatening process. The community is described as a “ground water dependent ecosystem⁶” and as such will be deleteriously affected by ongoing climate variability where water is less available to the community. Some evidence is accruing that a trend of a change in flowering times and species composition is observable now.

- c. The Interim Recovery Plan 2008-13 No 28 for the Aquatic Root Mat Communities numbers 1-4 of caves of the Leeuwin-Naturaliste Ridge places a strong emphasis on the *“decline of groundwater table as a key threatening process likely to cause irreversible changes in the short to term to the ecosystem complex⁷”*. This is supported by observations of guides of the Augusta Margaret River Tourist Association in regard to water levels in the caves.

- d. Several listed critically endangered or endangered threatened species may be affected by continued climate variability cycles.
- i. With regard to Black Cockatoos climate change is an additional threat that can exacerbate other processes related to food and roosting needs⁸.
 - ii. Two frog species endemic to the South West, *Geocrinia alba* and *vitellina* are found in the Lower Blackwood High Conservation Value Aquatic Ecosystem (HCVAE) and in moist riparian habitat. Any reduction in water availability poses serious threats to their breeding opportunities as does increase in weed incursions also as a result of climate variability.
 - iii. *Reediaspathaceae* occurs in 27 distinct populations. It is a Gondwanan relict and found on waterlogged soils. Serious implications for the sustainability of the species will result from any changes to the hydrology of this ground water dependent ecosystem. *“Groundwater abstraction poses a major threat to Reedia. Groundwater in the region is increasingly being drawn for use in local agriculture, viticulture and urban water supply. Any significant tapping of local groundwater systems that maintain Reedia wetlands will risk drying out the waterlogged environments in which Reedia grows⁹”*.
 - iv. Wetlands in the South West of Australia provide refuge and breeding sites for the listed Australasian Bittern. *“The main identified threats to the Australasian Bittern are: reduction in extent and quality of habitat due to the diversion of water away from wetlands (primarily for irrigation as well as groundwater extraction); the drainage of swamps; the loss or alteration of wetland habitats¹⁰”*.

e. Ramsar Wetlands

i. Lake Muir

Continued climate variability will have impacts on the internationally significant Muir-Byenup Ramsar wetland system such as alterations to the natural groundwater and surface water regimes. Consequences include changes to the quantity and timing of water draining into the lake, increases in salinity and declining water tables exposing acid sulphate soils which in turn will affect surrounding vegetation and aquatic ecosystem components¹¹.

The draft management plan 2011, states that peat swamps in the vicinity of the wetland, which are rare in Australia and in particular WA, and an important habitat for native plants and animals, have the potential to become acidic due to the exposure of acid sulphate soils. Peat swamps are also at risk of burning during drier parts of the year, exposing acid sulphate soils that then release acid and heavy metals into surrounding waters and soils¹¹.

The lake supports permanent wet areas for dense stands of *Baumea articulata* and other sedges, some of the biggest areas of this type in WA¹¹. Florabank lists *Baumea articulata* as a truly aquatic species which provides valuable habitat for waterbirds. With decreasing rainfall

due to climate change, these sedgeland communities could be severely impacted.

ii. Toolibin Lake

Lake Toolibin has extremely high conservation significance as one of the last remaining inland freshwater lakes in the south-west of Australia. It is the only remaining example in south-western Australia of a wetland with extensive woodlands of *Casuarina obesa*, and provides an important breeding habitat for numerous and diverse waterbirds, including rare species. It is classified as a 'Wetland of International Significance' under the Ramsar convention.

A recovery plan was drafted in 1994 then 1998 and another is expected this year. Changed hydrology has been a consistent concern with most actions related to reducing further deterioration. This culminated in 2008 in the completion of the "Surface Water Redistribution Process" which along with ground water pumping endeavours to maintain a water balance that will assist the health and condition of the native vegetation on the lake floor.

This is a major input of energy and money to maintain an ecosystem service and one where continued climate variability may impact in a negative way.

In the eastern part of the region officers report that Marri trees (redgum) are dying in Foxes Lair and Jarrah trees at Dryandra dying due to moisture stress. Evidence is also seen at Gleneagle and North Bannister where trees are dying due to long term low rainfall deficit. Overall tree decline and tree death is observed across the Wheatbelt.

Reduction in animal numbers due to lack of resources for them to eat/use for survival, such as flowering plants, which are not flowering as well due to lack of rainfall. Further, Changes in vegetation and species composition, such as outliers are retreating due to changes to their range

f. High Conservation Value Aquatic Ecosystem (HCVAE)

The hydrological regime of this aquatic ecosystem is maintained through seasonal flows from direct precipitation and runoff and artesian discharge from the Leederville and Yaragadee aquifers causing the main channel of the Lower Blackwood River to flow permanently. The summer flows of the Lower Blackwood River are "completely dependent on discharges from the Yarragadee and Leederville groundwater formations"¹². Tributaries of the Lower Blackwood River may be seasonal or permanent depending on whether they receive groundwater discharge.

The HCVAE has many recognised values including the critically endangered *Geocrineaalba* and the vulnerable *Geocrineavittalina* and the threatened *Reediaspathaceacommunities* addressed previously. "The site provides a diversity of aquatic and micro-aquatic habitats that are vital to numerous fish and invertebrate species. The terrestrial habitat (dominated by jarrah-marri)

woodland and the riparian habitat within the site are important ecological values to be protected. The tributaries within the site also provide refuge and breeding areas for a diverse range of biota¹².

The main drivers of the ecology of these systems are climate and geomorphology, and hydrology. Altered hydrology regimes through decreased rainfall and recharge and increased abstraction from groundwater sources would have detrimental impacts on this area and its values.

g. Weeds of National Significance (WoNS)

i. Lantana

This Weed of National Significance typifies the response that some weeds may show in the light of continued climate variability, *"In Western Australia the Mediterranean climate and the prevalence of poor or sandy soils is considered the major constraint on spread. However, lantana has demonstrated a capacity to invade sensitive riparian systems and other environments where soil moisture is available year-round¹³"*. It is thought that summer rainfall events increase soil moisture and enable flowering events which will assist the weed in becoming naturalised in these new environments.

h. Native forests

Giles Hardy and Ray Froend¹⁴ have drawn attention to substantial deaths of jarrah, marri and some wandoo along the Darling Scarp and in the Jarrah Forest zone. Jarrah and marri are key SW forest ecosystem trees. Decline associated with an increase in vulnerability due to drought has also been noted in flooded gum, tuart and peppermint. Recent Landgate satellite imagery showing vegetation trends in the SW between 1990 and 2010 indicate a major negative trend over most of the SW forests. The State Centre of Excellence on Climate Change, Woodland and Forest Health¹⁴ reports that a number of forest and woodland ecosystems are *"suffering from varying degrees of decline"* Their research findings question whether long term changes are upon us and subsequent declines in ecosystem services should be expected. The immediacy of these problems and the scale of the observations pose questions and solutions that are unprecedented in size and scope for this generation of planners and the community.

SWCC and Department of Environment and Conservation officers have made comment, from their observations over time that vegetation in Buller Reserve is showing unprecedented signs of stress and 'dieback'.

4.2 Matters related to connectivity between ecosystems and across landscapes that may contribute to biodiversity conservation.

Climate change modelling indicates that the current range of many species will contract in a southern or south westerly direction. For many of these species to persist, it will be necessary for populations to relocate over time in response to changing climatic conditions. Landscape fragmentation results in barriers which impede and, for a significant number of species, prevent this migration.

Environmental Protection Bulletin No 8; South West Regional Ecological Linkages, October 2009

Australia's Biodiversity Conservation Strategy 2010-2030 shows recognition of the need to increase connectivity and has two targets to address this situation.

- i. By 2015, 1,000 km² of fragmented landscapes and aquatic systems are being restored to improve ecological connectivity.
- ii. By 2015, four collaborative continental-scale linkages are established and managed to improve ecological connectivity.

Other authors also recognise that trend; Dunlop M, Brown P. 2008. *Implications of climate change for Australia's National Reserve System: a preliminary assessment.* (Prepared for the Federal Government by CSIRO scientists).

Opportunities are beginning to appear. For example, the 2012 Caring for our Country Business Plan reflects concern in relation to continued fragmentation of native vegetation and seeks renewal through landscape scale conservation that improves the connectivity and condition of native vegetation and contributes to improving biodiversity assets at a landscape scale.

It is important that regional bodies be provided with the resources to address some of these responses with sound planning and on-ground investments.

4.3 Matters related to how climate change impacts on biodiversity may flow on to affect human communities and the economy.

The area of ecosystem services has not received the same level of attention that other areas of natural resource management have. It is with regard to changes to these services that continued climate variability will cause serious economic and social consequences. These matters are wide ranging and include things like habitat for species, water catchment services, changed fire regimes, aesthetics, and tourism. Further these implications will affect the wider community and have implications at all levels of government. There is increased recognition about these matters but far from a comprehensive well planned coordinated response mechanism in place.

4.4 Matters related to strategies to enhance climate change adaptation including promoting resilience in ecosystems and human communities.

As a natural resource management body SWCC has opportunities to promote resilience with regard to some of the ecosystems. It employs mitigation activities to

control weed invasions, buffer TEC's, support community with knowledge and skills, revegetation projects, and riparian restoration works. Within the bounds of the terms of the Caring for our Country initiative these works are small and themselves fragmented across the region.

Future planning e.g. SWCC's revised NRM strategy, has taken a wider view and expanded the range of works to include activities to improve resilience (for example, corridor works, landscape scale restoration and linkages projects).

However, **current low levels of resources and restrictive targets** as defined in the business plan limit the scale to which SWCC can engage meaningfully with the wide range of NRM issues in the SW, many of which are exacerbated by climatic drying.

The regions provide excellent linkages between Governments, particularly local and federal, as well as local NRM communities.

Some of the areas that regions could greatly assist the debate include;

- Local community workshops and capacity building
- Interpret and promoting government policy
- Integrated planning activities across community, Shire and region
- Linking with industry and business in project development
- Provide recognition to local champions that lead
- Advise, link and seek defined research projects with organisations that leads to science based research
- Coordinate and collaborate with communities at the project level.

4.5 Matters related to mechanisms to promote the sustainable use of natural resources and ecosystem services in a changing climate.

It is apparent that are a number of near or permanent changes to some of our natural resources in the South West region of Western Australia that are very close to thresholds which, should current trends continue will see extinctions as highly likely. This paper cites changes to our native forests, water bodies, aquatic caves communities, and some individual species as being those most likely to undergo change in the near future. These problems, now more than ever have a regional context. As such, **regional solutions for regional problems** is an opportunity worth serious consideration. Regional bodies offer a number of advantages in this regard. They have good linkages with State Government agencies, strong connections with rural community groups such as local catchment (sub-regional) and Landcare

groups, good relationships with non-government organisations, have lines of communication with local Shires and the backing of the Australian Government. The potential to utilise the full resources of the regional bodies has not been realised. Funding streams are tight and targeted with the SWCC Board's ability to make decisions in the wider context restricted. Governments could make greater use of the strength of the community connections that regional bodies offer in dealing with these looming problems.

4.6 Matters related to an assessment of whether current governance arrangements are well placed to deal with the challenge of conserving biodiversity in a changing climate.

In matters related to the EPBC Act, the South West Catchments Council is working with state agencies to control and protect some communities for the medium term (3-5 years). Staff have built significant expertise and technical knowledge and can manage projects. In the context of *regional solutions for regional problems* given improved resources additional projects can be implemented.

NRM governance has become increasingly complex over time and will require people with good analysis, able leadership and good knowledge. Well governed regional bodies such as SWCC provide the best chance to broker solutions within the complex socio-economic environment that is continuing to develop.

4.7 Matters related to mechanisms to enhance community engagement

Much is said about community capacity building and engagement but the importance of this cannot be understated. The community is slowly awakening with regard to its understanding of NRM and its willingness to become a collaborator and partner. The important role of volunteers is recognised but understandings of best practices to recruit and keep these people is lacking.

The Caring for our Country initiative allowed past strong 'local NRM planning' to lapse, but it is essential for effective implementation of NRM that interventions are made at this scale as part of an integrated system.

"The more that place-based plans reflect the integration of ecosystem processes and the integration of delivery organisations in that place together, the more effective they will be¹⁵".

The South West Catchments Council is a community non-statutory organisation and as such is committed to working with its community and has a desire to strengthen its engagement with the diversity of community groups. Should problems continue to surface SWCC is best placed to be proactive with regard to *regional solutions for regional problems*. It also recognises the limitations placed on it by governments to adequately resource this need but continues to strive to improve this.

References

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2. Caring for our Country Business Plan 2011-12, Commonwealth of Australia.
3. *Corymbiacalophylla-Kingiaaustralis* woodlands on heavy soil (Swan Coastal Plain type 3a- Gibson et al. 1994), Interim Recovery Plan No. 59 200-2003 V. English, J. Blyth
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5. Extract of Draft Advice to Minister Sustainability, Environment, Water, Population and Communities from the Threatened Species Scientific Committee on an Amendment to the list of Threatened Ecological Committee under the Environment Protection and Biodiversity Conservation Act 1999: Clay Pans of the Swan Coastal Plain.
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9. Approved conservation advice for *Botaurispoiciloptilus* (Australasian Bittern) (s266B of the Environment Protection and Biodiversity Conservation Act 1999). Approved by the Minister February 2011.
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11. Protecting critical aquatic ecosystems; Lower Blackwood River. Caring for our Country Business Plan 2011-2012. Australian Government.
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