Australian Government
Department of the Environment and Energy

Referral of proposed action

Proposed action title:

Warragamba Dam Raising (WaterNSW)

1 Summary of proposed action

1.1 **Short description**

WaterNSW is intending to undertake a dam raising project for the Warragamba Dam in the Hawkesbury-Nepean Valley. This will consist of adding around 14 metres to the height of the dam wall with no change to current full supply level (FSL). The additional 'air space' created by the raising will be used for flood controlled releases.

The proposed construction works would be accompanied by changes in operational procedure associated with release of flood water stored within Lake Burragorang.

1.2 **Latitude and longitude**

	Latitude			Longitude		
location point	degrees	minutes	seconds	degrees	minutes	seconds
1	-33	52	54.8760	150	35	39.6096
2	-33	53	08.5488	150	35	54.5640

NOTE: The coordinates given are for the Warragamba Dam wall where the works will be undertaken. The extents of potential impact zones are shown in Figure 1-1 and Figure 1-2.

1.3 **Locality and property description**

The Project will occur at Warragamba Dam, situated in a narrow gorge on Warragamba River, about 65 km west of the Sydney central business district (CBD). The dam is adjacent to the township of Warragamba, within Wollondilly Shire, New South Wales. The upstream reservoir (Lake Burragorang) is created by the damming of Warragamba River with the major tributaries being the Coxs, Wollondilly, Kowmung and Nattai Rivers.

Construction works will be undertaken at the wall of Warragamba Dam. The resultant change to flows associated with the new flood storage capacity and changed operational procedures would cause effects on areas upstream and downstream of the dam.

1.4	**Size of the development footprint or work area (hectares)**	The main construction area(s) would occur within about 1 km of the dam wall. The potential construction site including set down and storage areas would total approximately 30ha or less.
1.5	**Street address of the site**	Crest Road, Warragamba NSW 2752

1.6 **Lot description**

Lot 1124/DP1159978 and Lot 1/DP87998

1.7 **Local Government Area and Council contact (if known)**

n/a (no local government planning approval required)

1.8 **Time frame**

The commencement date for construction (subject to approval) is expected to occur in 2020.
The construction program is estimated to take approximately 4 years for completion.

The start date for operation of the project is estimated to occur by the end of 2024.

1.9	**Alternatives to proposed action**		No

		✓	Yes, please also complete section 2.2
1.10	**Alternative time frames, locations or activities**	✓	No
			Yes, you must also complete Section 2.3. For each alternative, location, time frame, or activity identified, you must also complete details in Sections 1.2-1.9, 2.4-2.7 and 3 and 5 (where relevant).
1.11	**Commonwealth, State or Territory assessment**		No
		✓	Yes, please also complete section 2.5
1.12	**Component of larger action**	✓	No
			Yes, please also complete section 2.7
1.13	**Related actions/proposals**	✓	No
			Yes, please also complete section 2.8
1.14	**Australian Government funding**	✓	No
			Yes, please provide details
1.15	**Great Barrier Reef Marine Park**	✓	No
			Yes, please also complete section 3.1 (h), 3.2 (e)

Figure 1-1 Construction Impact Area

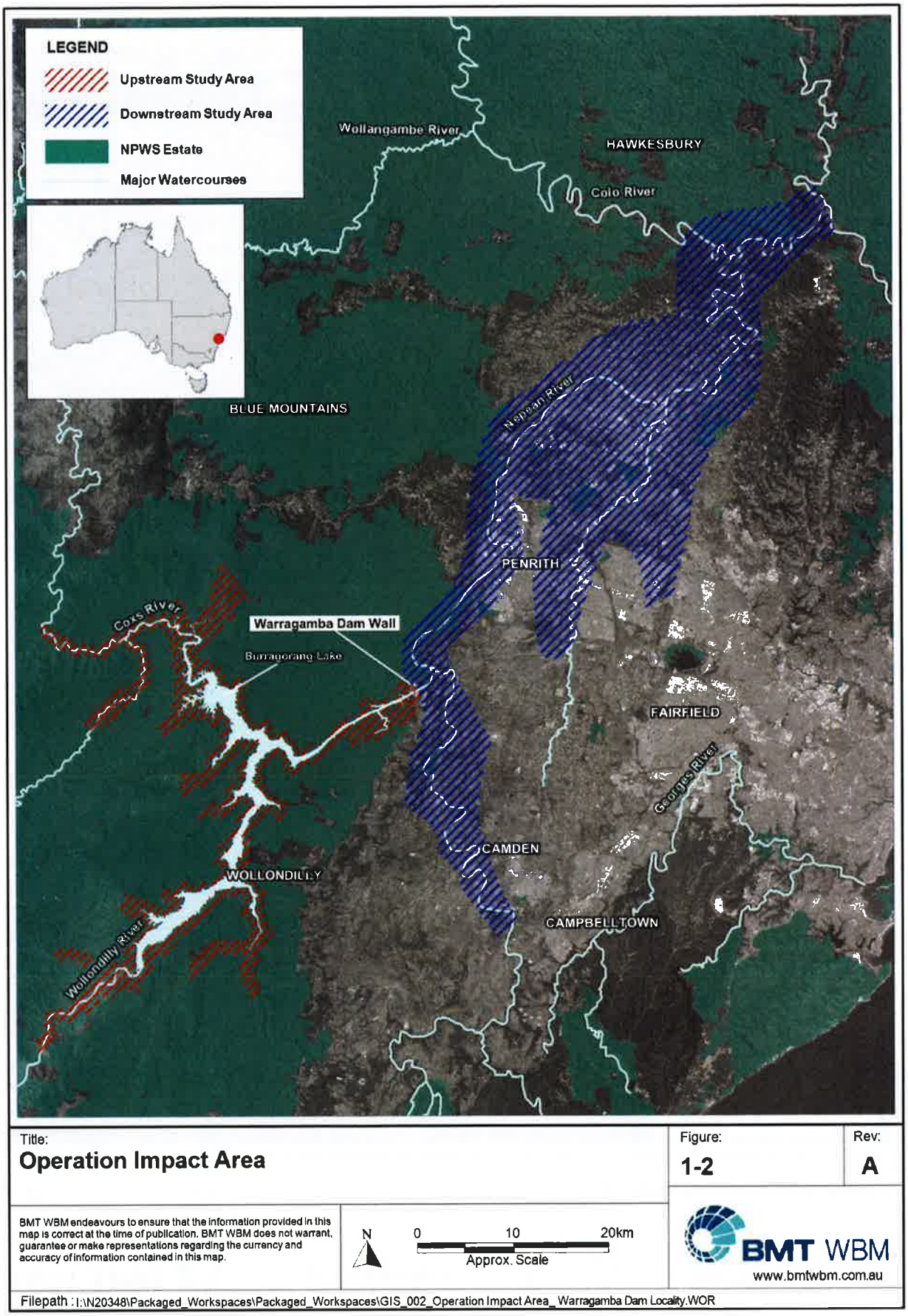


Figure 1-2 Operation Impact Area

2 Detailed description of proposed action

2.1 Description of proposed action

The flood mitigation works proposed at Warragamba Dam involves raising the dam wall to provide additional 'air space' for flood detention purposes. Raising the spillway crest height by around 14 metres would provide approximately 991 gigalitres (GL) of airspace. It will also include the operation protocols for flood mitigation during a flood.

The raising of the Warragamba Dam wall by around 14 metres is intended to provide additional 'air space' or detention storage above the current FSL for the temporary storage of floodwater. The raising of Warragamba Dam wall will include:

- Buttressing the downstream face of the existing Warragamba Dam wall in mass concrete
- Construction of coffer dam and other works for management of flood risk during construction.
- Replacing the existing radial and drum gates with slide gates or narrow spillway for the controlled release of temporarily stored floodwaters
- Modifying the existing auxiliary spillway for extreme flood events
- Building a high level bridge for operational access across the top of the raised dam
- Construction of a temporary works area adjacent to the dam including material storage and concrete batching plant.

All construction activities would be undertaken within the existing footprint of Warragamba Dam and immediate surrounds.

The construction program is estimated to take approximately 4 years for completion. The preliminary construction program is shown in Table 2-1.

Table 2-1 Preliminary Construction Program Summary

Overall activity	Month of program for activity commencement	Month of program for activity completion
Set-up establishment	1	5
Install main diversion coffer dams	5	8
Main dam raising	8	42
New outlet conduits	26	42
Auxiliary spillway modifications – downstream works and stage 1 of new spillway crest	8	32
Auxiliary spillway – stage 2 of new spillway crest and high level bridge	38	45
Disestablishment and site rehabilitation	45	49

This program assumes standard working hours and that some activities, such as deliveries, plant maintenance, selected concrete pours and emergency work, to be undertaken outside standard working hours.

Following the construction of the dam raising, Warragamba Dam will continue to operate as a water supply dam. However, a new operational regime will need to be determined and implemented in relation to flood mitigation and when in non-flood operations. The dam wall raising is for flood mitigation and water will only be above the full supply level during the management of flood events. Figure 2-1 provides a summary overview of the operation for the raised dam with a flood management zone (FMZ).

The aim of the Proposal is to hold back floodwater for longer and provide additional time for evacuation and to reduce the downstream flood peak. The operational scenarios to be assessed will consider a range of downstream target flow rates in the order of gigalitres per day. The operating rules to be adopted will depend on the balancing of upstream and downstream inundation criteria. The potential range of downstream inundation of managed post flood releases from Warragamba Dam are shown on Figure 2-2.

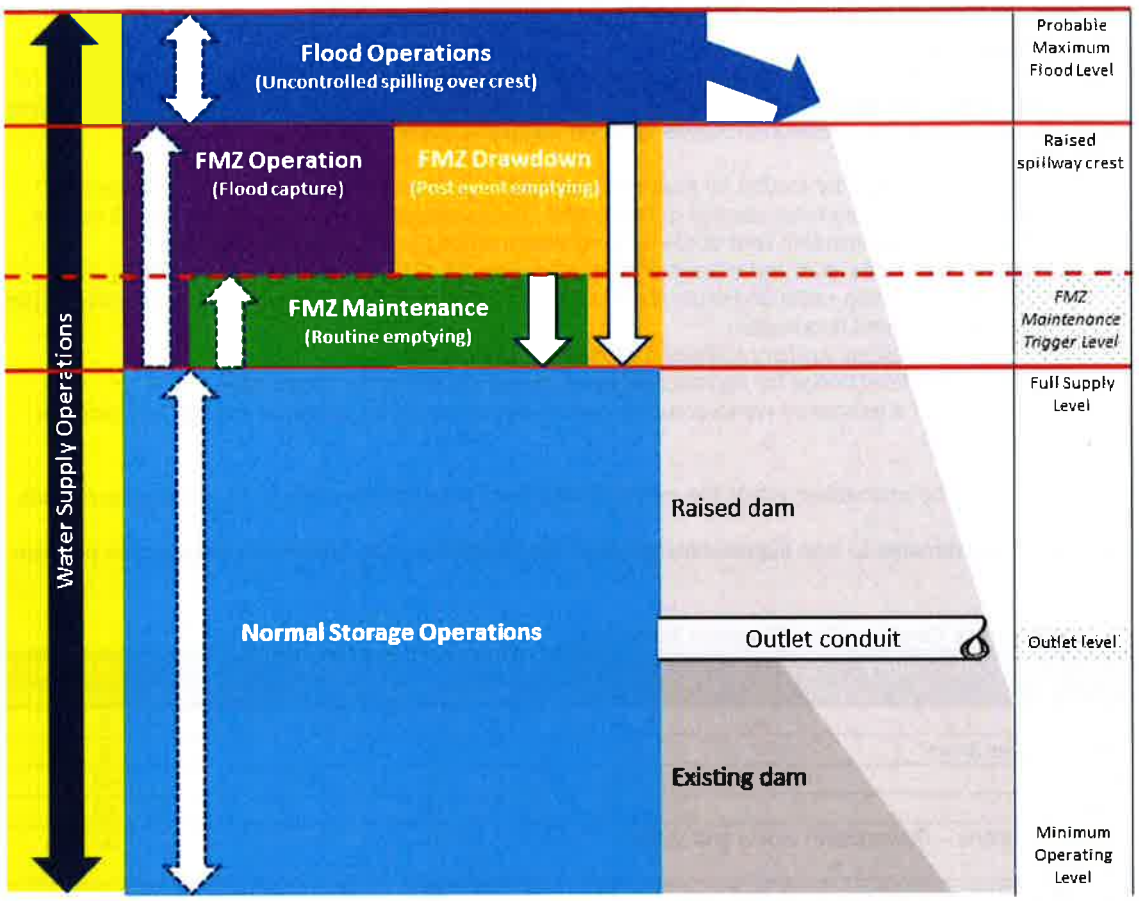


Figure 2-1 Summary of Water Supply Operations for a Raised Dam – Normal Storage Operations, FSL and FMZ Operation, Drawdown and Maintenance

The operation of a FMZ with a raised dam wall will result in lake levels in Lake Burragorang being above full water supply level during flood events compared to the current dam operation. It is estimated that the total duration lake levels would be above full water supply level (which includes the days to fill, days to spill and days to drawdown) ranges between two weeks and five weeks depending on the size of the FMZ, the magnitude of the flood event and the adopted target downstream flow rate.

Inundation extents associated with the 0.02 (2%) annunal exceedance probablity (AEP) and the PMF upstream of Warragamba Dam are shown in Figure 2-3. The predicted extent and duration of temporary inundation is important to defining potential impacts on a range of environmental, heritage, social and economic values. The approximate maximum change to upstream lake surface area based on recent hydrosurvey data of Lake Burragorang is summarised in Table 2-3. The proposed dam wall raise is expected to temporarily increase the existing impoundment area within the upstream reservoir from approximately 75 km^2 ha to a maximum 94 km^2 .

Table 2-3 Estimated Upstream Water Level and Inundation Extent Based on 2014 Lake Burragorang Hydrosurvey

Dam condition	Maximum water level at dam wall (m AHD)	Lake surface area (km^2)	Change to lake surface area relative to existing (%)
Existing	116.72	75.1	0
Proposed 14m dam raise	128.45	93.7	+25%

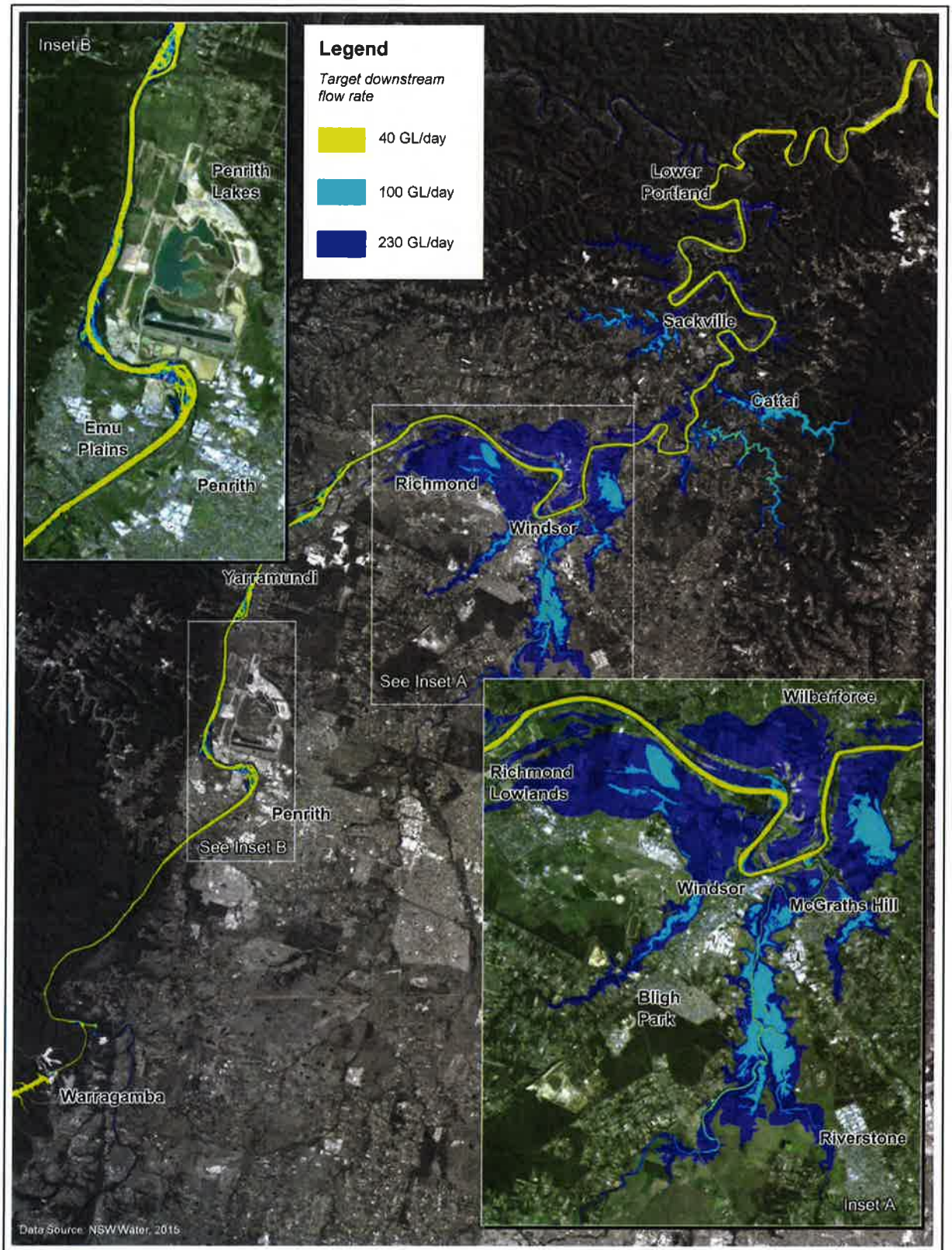


Figure 2-2 Downstream Inundation Extents, Possible Target Downstream Flow Rate Scenarios

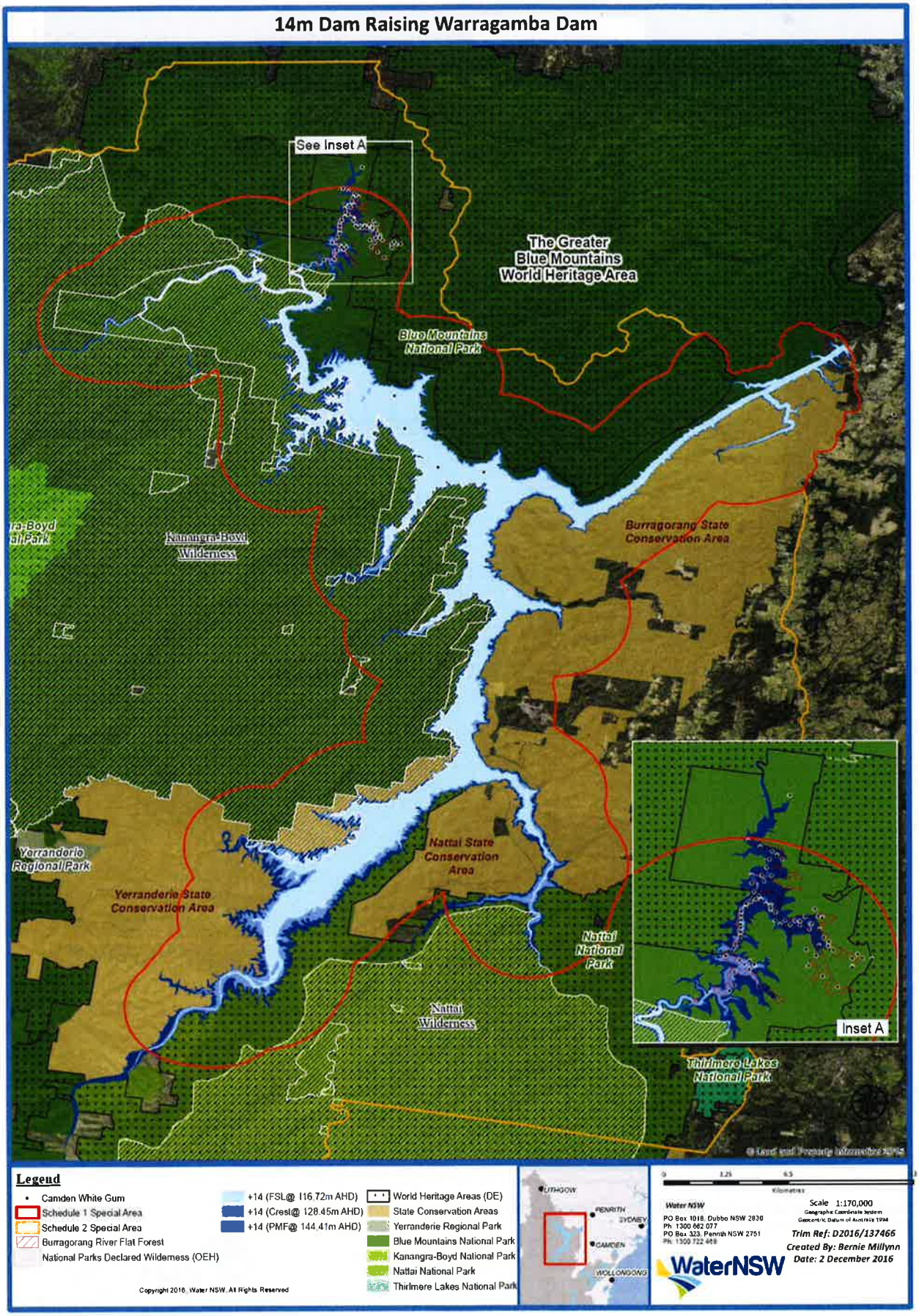


Figure2-3 Upstream Inundation Extents, including Inundation of Environmental Features*

*See Section 3 for discussion of inundation of MNES and other environmental features in the upstream Impact Area

2.2 Feasible alternatives to taking the proposed action

The decision to seek planning approval for raising Warragamba Dam by around 14 metres for flood mitigation is based on this flood mitigation infrastructure option providing highest net benefits to the Hawkesbury-Nepean Valley. This was the outcome of an extensive investigation that included a long list of infrastructure options as part of the 2013 Hawkesbury-Nepean Valley Flood Management Review (2013 Review) and the Hawkesbury-Nepean Valley Flood Management Taskforce 2014-2016 (Taskforce) work. The 2013 Review shortlisted options which were subject to more detailed analysis to reduce flood risk in the Hawkesbury-Nepean Valley, see Table 2-1. The recommendation for raising the Warragamba Dam wall by the Taskforce around 14 metres was because it generated the highest net benefit to the Hawkesbury-Nepean Valley.

There is no simple solution or single infrastructure option that can address all of the flood risk in the Hawkesbury-Nepean Valley. This risk will continue to increase with projected population growth. However, it is possible to reduce and manage the risks through a combination of flood prevention, preparedness, response and recovery. Therefore the proposed dam wall raising is a component of an integrated flood risk management strategy for the Valley that covers a full range of measures to reduce flood risk, including governance arrangements, policy settings, planning, community education and infrastructure.

Table 2-1: Flood mitigation options considered

Flood mitigation option	
Warragamba Dam wall raising	Raise Warragamba Dam up to 30 metres
Change operation of Warragamba Dam	Lower Warragamba Dam Full Supply Level by 5 metres
	Lower Warragamba Dam Full Supply Level by 12 metres
	Operate Warragamba Dam gates to hold back water during a flood
	Operate Warragamba Dam gates to pre-release water ahead of a flood
Downstream mitigation infrastructure	Currency Creek diversion channel
	Dredging of the Lower Hawkesbury River
Construction of a new dam	Assessed by 2013 Review as not feasible
Levees	McGraths Hill
	Peachtree Creek

Raising the Warragamba Dam wall

The 2013 Review examined dam wall raising heights for flood mitigation from 12 metres to 30 metres. Following the 2013 Review, two dam wall raising heights, 14 and 20 metres, were shortlisted for further assessment by the Taskforce. This range was considered to cover the feasible range for addressing risk to life and flood damages in the Valley. It was identified that a 14 metre raising of Warragamba Dam crest would enable sufficient flood mitigation for evacuation of all downstream flood islands and was set as the lower raising height. A 20 metre raising was selected as upper bound for this detailed feasibility assessment to provide greater flood mitigation benefits downstream and some scope for uncertainty such as climate change and growth.

However, based on the results of the cost benefit analysis, the 20 metre dam wall raising provided lower net benefits than the 14 metre dam raising, as the marginal increase in cost going from 14 metres to 20 metres exceeded the increase in flood mitigation benefits. A more detailed assessment of the flood probabilities, climate change and growth impacts will confirm the final height of around 14 metres during the EIS.

Lowering Warragamba Dam Full Supply Level by 5 metres and 12 metres

The 2013 Review recommended further analysis of the potential to change the operation of Warragamba Dam to reduce flood risk. This included options to reduce the current Warragamba Dam Full Supply Level (FSL) to create airspace for flood mitigation. The Taskforce found that although these options reduce risk to life, there are significant water quality and supply costs that meant they were less cost effective than raising of Warragamba Dam by around 14 metres for flood mitigation.

Downstream mitigation options

Mitigation options located downstream of Warragamba Dam would, if constructed, work by improving drainage of water away from the Valley. These included:

- A diversion channel between the Hawkesbury River and Currency Creek near Wilberforce
- Dredging the Hawkesbury River between Windsor and Wisemans Ferry.

Based on 2013 Review assessments undertaken by the Taskforce, including preliminary social, environmental and cultural heritage assessments and additional cost estimate these downstream options had construction costs similar to those of raising Warragamba Dam wall, but without the comparable benefits.

Construction of a new dam

Previous reviews carried out from 1987 to 1995 considered a number of sites alternative to those on Warragamba River for new flood mitigation dams, mostly located in National Parks. These were rejected at the time due to their low cost-effectiveness and significant environmental impacts. New dams were reconsidered in the 2013 Review, which found that there was no new information which would justify further consideration of new dam sites for flood mitigation.

Options to build another dam on Warragamba River were assessed by the Taskforce. However, based on detailed multi-criteria analysis cost, environmental impact and operational impact, the construction of a new dam did not

compare favourably with options to raise the existing dam (in mass concrete or hard fill) and was ruled out. The construction costs associated with these new builds were considered prohibitive, achieving the same dam storage outcomes as raising the existing Warragamba Dam wall but at three times the cost. In addition, uncertainty about the water quality between the new and existing dam reduced the attractiveness of new dam options. For these reasons a new dam was not short-listed for consideration in the final options analysis.

Changed operation of Warragamba Dam

The 2013 Review recommended further analysis of the potential to change the operation of Warragamba Dam to reduce flood risk. These options include:

- changing the operation of dam gates to hold back water for longer during flood events to delay the onset of flooding
- pre-releasing water ahead of flood events to create airspace for flood mitigation.

A preliminary assessment of the effectiveness of these options for reducing flood risk indicated that they were not suitable for detailed cost benefit analysis. This is primarily because the limited effective flood mitigation storage provided by these options only mitigates small flood events, and the options provide negligible flood mitigation benefit for the larger floods that pose a significant risk to lives or property. Other concerns were that they rely on uncertain flood forecasts, increase the reliance on and liability from gate operation, and could under some flood events increase the eventual rate of rise of downstream flooding and the risk to life.

Levees

Based on the recommendations for the 2013 Review, levees at McGraths Hill and Peachtree Creek were identified as cost effective options for providing local flood protection. These were not recommended as part of the Hawkesbury-Nepean Valley Flood Risk Management Strategy as they provide limited and localised benefits, not suitable for inclusion in the regional Strategy.

2.3 Alternative locations, time frames or activities that form part of the referred action

N/A

2.4 Context, including any relevant planning framework and state/local government requirements

The Project is considered State Significant Infrastructure (SSI) under the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act). Any SSI may also be declared to be Critical State significant infrastructure if it is of a category that, in the opinion of the Minister, is essential for the State for economic, environmental or social reasons.
WaterNSW will be seeking declaration of the Proposal as Critical State Significant Infrastructure on the basis that while the raising of the dam wall will significantly reduce the risk of all flooding in the Valley, the expected mitigation will provide significant social benefits to those living within the Valley as well as a key economic benefit for all of NSW. The NSW Department of Planning and Environment will undertake an assessment process in accordance with Division 2, Part 5.1 of the EP&A Act.

As SSI, the development does not require development consent (i.e. planning approval) from local government. In addition, the development is exempt from a number of other approvals that would otherwise apply under NSW legislation. Instead, the intent of these approvals (for the most part) becomes an assessment requirement that forms part of the EIA, with the final approval issued under the EP&A Act taken to cover all these other approvals. The approvals that need to be considered as part of the EIA phase, and those that apply regardless of SSI-designation are listed below.

- Approval under the *Biodiversity Conservation Act 2016* (formerly *Threatened Species Conservation Act 1995*) to impact on threatened species, populations and/or ecological communities;
- Consent under the *Wilderness Act 1987* for works in a Wilderness Area (i.e. Kanangra-Boyd and Nattai Wilderness Areas);
- For impacts to Wild Rivers declared under the *National Parks and Wildlife Act 1974* (i.e. Kowmung, Colo and Grose Rivers) the proponent needs to seek and implement the advice of the Minister;
- Approval under *Fisheries Management Act 1994* to impact on endangered aquatic species, populations and ecological communities;
- Approval under the *Heritage Act 1977* to impact on heritage features;
- Amendments to approval for operational management of flow regime under the *Water Management Act 2000* and *Protection of the Environment Operations Act 1997; and*
- For changes to operational management regimes of a dam, the proponent needs to consult with Dam Safety NSW established under the *Dam Safety Act 2015*.

2.5 Environmental impact assessments under Commonwealth, State or Territory legislation

As noted in s2.4, the Project is considered SSI/Critical SSI and will require EIA under the EP&A Act. The EIA process for SSI is shown in Figure 2-4 below. EIA for Critical SSI is based on the terms of reference set by the Secretary of the Department of Planning and Environment. A copy of the 'Standard Secretary's Environmental Assessment Requirements' (SEARs, i.e. the standard terms of reference for Critical SSI projects) are available here: http://www.planning.nsw.gov.au/Assess-and-Regulate/Development-Assessment/Systems/~/media/129372A5B29A4BCDA30CF1AADA8D7E1A.ashx.

The Proposal has been referred (this form) to the Federal Minister for consideration of a controlled action under the EPBC Act.

If the Proposal is deemed to be a controlled action, it will require assessment under one of the assessment tools provided for in the EPBC Act. In accordance with the Bilateral Agreement reached between the NSW and Commonwealth Governments , an Environmental Impact Statement (EIS) under the EP&A Act for SSI can also be used for an EIS under the EPBC Act for a controlled action, where directed by the Federal Minister. For this reason, a single EIS process under the EP&A Act for SSI is expected to be applied for the Proposal rather than two separate assessment streams. Once the EIS has been prepared, it will be assessed by relevant NSW departments in accordance with the Bilateral Agreement and consultation with the Commonwealth government department followed by submission to the Federal Minister for final approval.

NOTE: The EIA process under the EP&A Act for SSI has been approved as an accredited assessment process in accordance with the Bilateral Agreement between the Commonwealth and NSW governments.

2.6 Public consultation (including with Indigenous stakeholders)

There are three main periods of stakeholder consultation relevant to the Proposal:

1. Engagement on flood management programs that predated the Hawkesbury-Nepean Valley Flood Management Taskforce.
2. Engagement by the Taskforce and State Agencies that occurred as part of the development of the Hawkesbury-Nepean Valley Flood Management Strategy, including selection and design of the Proposal.
3. Current and future consultation planned in relation to the Proposal.

Additionally, while not directly connected to the Proposal other consultation activities that have previously occurred and those that are proposed are outlined below.

Previously Undertaken

Consultation activities to educate the Hawkesbury-Nepean Valley community on flood risk have been undertaken for many years. The Hawkesbury-Nepean Valley Floodplain Management Strategy 1997-2004 recommended ongoing community programs to raise awareness of flood and improve understanding so the community can make better decisions about preparing for and responding to flood emergencies. Since this strategy was introduced, various public education campaigns have been delivered including State Emergency SES's launch of the FloodSafe program.

In 2012, the Hawkesbury-Nepean Valley experienced flooding which saw Warragamba Dam spill for the first time in 14 years. This helped raise awareness of the potential impacts of flooding and in response the NSW Government commenced the Hawkesbury-Nepean Valley Flood Management Review. The review identified one priority area for action was increasing flood awareness and preparedness amongst the community.

Most recently, the Taskforce has been working with key stakeholders (including local councils, flood and water management agencies, the insurance industry and other state government agencies) with the immediate priority of building a flood resilient and prepared community within the Hawkesbury-Nepean Valley.

Consultation activities undertaken by the Taskforce have been guided by the Communications and Community Engagement Strategy which sets the high level objectives and principles for engagement. It is understood that more specific communication strategies will be developed for activities under the Hawkesbury-Nepean Valley Flood Management Strategy, including the Proposal.

Initial consultation has also been undertaken by the Proponent with key regulatory agencies for the EIS process including the Commonwealth Department of Environment and Energy (DEE) and NSW Department of Planning and Environment.

Proposed

The following presents an overview of the consultation required for the Proposal in accordance with statutory instruments relevant to the EIA process.

Agency Consultation

The EIS process for the Proposal is overseen by the Minister administering the EP&A Act. In addition to consultation with the Minister and the Department of Planning and Environment, the following government agencies will be engaged throughout the EIA process:

- Office of Environment and Heritage (OEH) in relation to the following matters:
  - Threatened species, populations and ecological communities that may be impacted by the Proposal (in accordance with the TSC Act and NPWS Act);
  - Critical habitat and habitat for threatened species, populations and ecological communities that may be impacted by the Proposal (in accordance with NPWS Act);
  - Impacts on Wilderness Areas* (in accordance with Wilderness Act);
  - Impacts on Wild Rivers (in accordance with NPWS Act); and
  - Heritage features that may be impacted by the Proposal, including Aboriginal heritage features* (in accordance with Heritage Act and NPWS Act).
- NSW Department of Primary Industries (Fisheries) in relation to aquatic species, populations and ecological communities that may be impacted by the Proposal (in accordance with the Fisheries Management Act);

- Department of Primary Industries Water (DPI Water) in relation to amendments to approvals* (if required) associated with changes to operational flow regimes from Warragamba Dam (in accordance with the Water Management Act); and
- Dams Safety NSW regarding changes in operational management of Warragamba Dam (in accordance with the Dam Safety Act).

** For items marked with an asterisk, an additional approval may be required under a separate approvals process, depending upon the findings of the EIA.*

In addition, assuming the Proposal is a controlled action being assessed under the EPBC Act, consultation will be required with the Commonwealth Minister for Environment and DEE.

Public Consultation

Clause 115Z of the EP&A Act provides for a public consultation process in relation to EIAs for SSI. Once submitted to the Secretary, the EIA must be made publically available for at least 30 days. This will be the same period required for assessment under the EPBC Act if the SSI assessment process is used, as per the Bilateral Agreement. If a different assessment process is used, the public consultation requirements will depend upon the nature of the elected process.

Consultation may also be required for approvals outside of the EP&A Act process that are needed for the Proposal. The nature of this consultation will depend upon the approvals required which shall be determined as part of the EIA process.

In addition to statutory required consultation, detailed engagement is also expected to occur subject to a specific engagement plan developed under the Taskforce Communications and Community Engagement Strategy. This will identify relevant stakeholders for consultation, including those identified as part of previous EIA works (e.g. Auxiliary Spillway EIS, Warragamba Dam Raising EIS) and other engagement activities of WaterNSW.

Other Consultation Activities

The study area is included within the Gundungurra Indigenous Land Use Agreement (ILUA). The ILUA establishes a Consultative Committee to provide input into the management of lands and waters in the Agreement Area. In relation to the Committee, it is the responsibility of WaterNSW under the ILUA to:

- Consider, and where appropriate adopt, the recommendations of the Consultative Committee, and advising why recommendations were not adopted
- Share information with the Consultative Committee in relation to future proposals for works
- Notify the Consultative Committee when tenders are publicly sought for work, services or consultancy to be carried out in relation to land and waters in the Agreement Area
- Consult with the Consultative Committee regarding survey and monitoring activities of sites within Agreement Area lands.

Consultation with the Gundungurra People and other associated organisations will occur as part of the EIS process.

2.7 A staged development or component of a larger action

As outlined in the State Infrastructure Strategy 2012-2032 (INSW 2012), the flooding history in the Hawkesbury Nepean Valley (the Valley) can be traced back to the very early years of European settlement -

> *'Despite proclamations as far back as the early 1800s to avoid living in flood affected areas in the Valley, significant development of homes and businesses has occurred. As more development has occurred, NSW has continued to invest in supporting infrastructure, which is also at risk.'*

During the 1980s and 1990s evidence emerged that floods significantly larger than any yet historically recorded could occur in the Valley. This eventually led in the late 1990s to major upgrades of Warragamba Dam to prevent dam break during extreme flooding events to protect Sydney's water supply. However, this decision primarily dealt with dam safety issues and did not fully address the major flood risks to the people and businesses in the Valley and the NSW economy as a whole.

In 2012, extensive flooding across south-eastern Australia, including the Hawkesbury-Nepean Valley, saw Warragamba Dam spill for the first time in 14 years. These events raised community awareness about the potential impacts of flooding.

In 2013, the NSW Government began the Hawkesbury-Nepean Valley Flood Management Review to consider flood planning, flood mitigation and flood response in the Hawkesbury-Nepean Valley. The review found that the current flood management and planning arrangements were insufficient in mitigating the risk and no single mitigation option can address all of the flood risk present in the Valley. Based on these assessments, the most cost effective infrastructure option was to raise Warragamba Dam wall by around 14 metres.

However, while the Taskforce found that raising the dam wall will significantly reduce the risk, it cannot eliminate it, regardless of the raising height. As a result, the dam wall raising must be complemented with other non-infrastructure and policy actions in the Strategy to reduce ongoing flood risk. These actions include:

- Coordinated flood risk management across the Valley now and in the future
- Strategic and integrated land use planning
- Engaging and providing flood risk information for an aware, prepared and responsive community

2.8 Related actions
See Section 2.7.

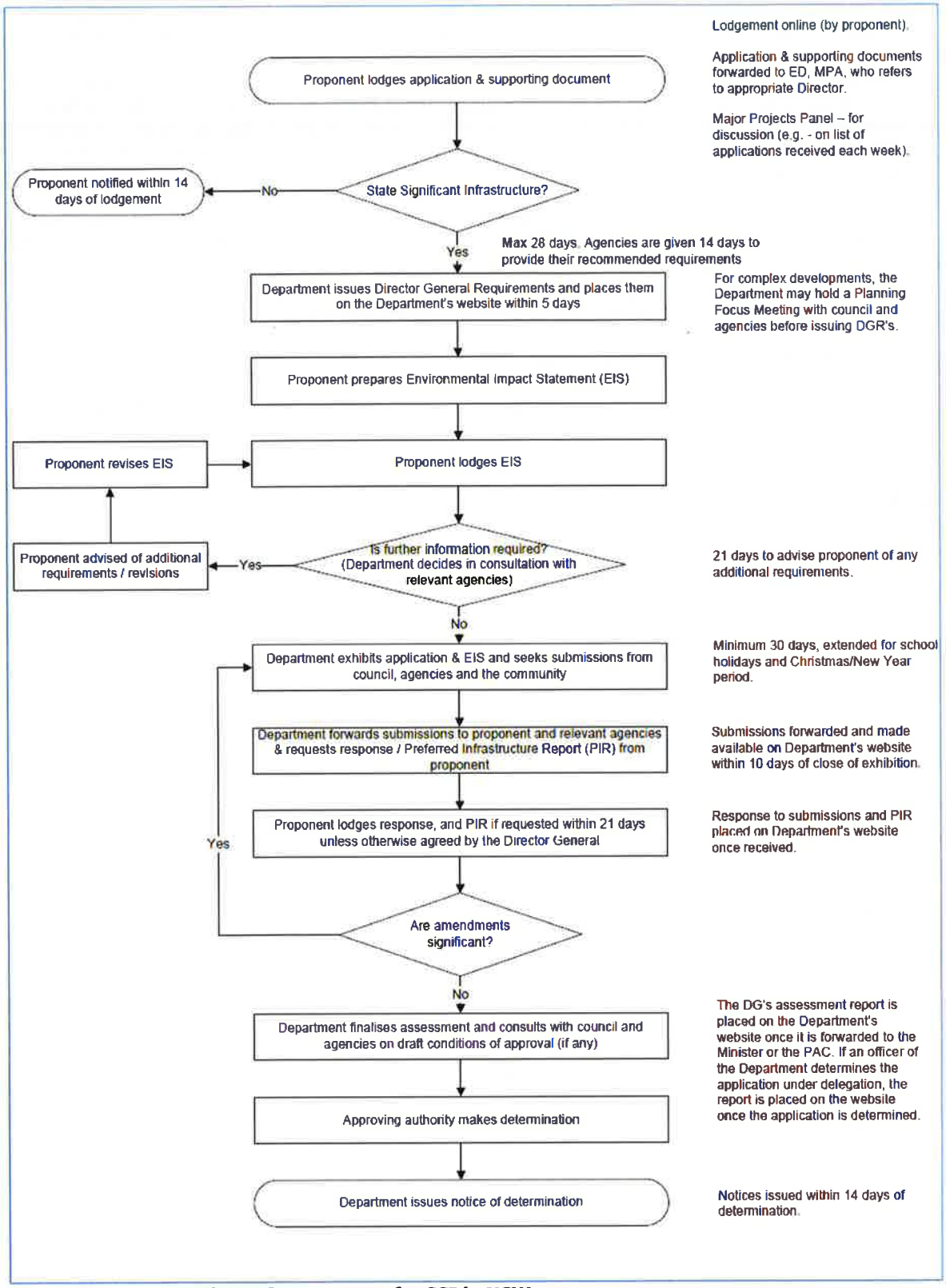


Figure 2-4 Flowchart of EIA Process for SSI in NSW

3 Description of environment & likely impacts

3.1 Matters of national environmental significance

The area(s) to be considered for the assessment of the Proposal have been described in the context of both the stage of the works (construction and operation) and geographic extent of possible effects and impacts. The Project will have two broad impact areas:

- The **Construction Area** includes the area in and around the existing Dam including the dam wall itself, a central drum gate and spillway, four radial gates and auxiliary spillway as well as auxiliary access roads and dam site buildings. The township of Warragamba and areas immediately upstream and downstream of the Dam could be affected by the construction works. The construction may also include impacts on the immediate road network. (see Figure 1-1)
- The **Operation Study Area** includes the areas upstream and downstream of the Dam that could be affected by the future operation of the Dam with a raised dam wall.
    - Upstream of the dam includes but is not limited to Lake Burragorang (i.e. the reservoir formed by Warragamba Dam), and part of the Burragorang State Conservation Area (SCA) and the broader Greater Blue Mountains World Heritage Area (GBMWHA).
    - Downstream of the dam includes the freshwater and estuarine reaches of the river system between Warragamba Dam where it joins the Nepean River near Wallacia (not including the reach of the Nepean River upstream of Warragamba River) and Wisemans Ferry as well as the adjacent riparian zone, floodplain and wetland/lagoon waterbodies (see approximate extent in Figure 1-2).

The Protected Matters Search Tool (PMST) was used to identify potential MNES features within these areas. The PMST results for the combined Construction Area and Operation Area have been included in Attachment C to this referral. These consist of the following:

Upstream of Warragamba Dam

- One World Heritage properties
- One National Heritage place
- Five listed threatened ecological communities (TECs)
- 48 listed threatened species
- 13 listed migratory species

Downstream of Warragamba Dam

- Three World Heritage properties
- Two National heritage places
- Eight listed TECs
- 83 listed threatened species
- 36 listed migratory species.

NOTE: Not all of these matters are considered relevant to the Project, as discussed below.

In the context of the following assessment of MNES, the following key 'mechanisms of change' have been identified for the Project:

- Construction phase activities, including potential drawdown of waters below FSL. These activities will generate noise and if not appropriately managed sediment/pollutants that will be discharged into the local aquatic environment. Construction phase activities may also require some clearing of vegetation communities in the Construction Impact Area.
- Modified flow regime in upstream environment associated with increased retention of floodwaters (in terms of extent, depth and time) as a result of increased flood capacity for the dam and an associated operational release regime. This is expected to cause inundation of riparian vegetation and potential slumping of banks. It will also cause the modification of riffle habitat to run/pool habitat. Preliminary assessments undertaken for the Project indicate that flooding events with an AEP of 0.02 through to the PMF would cause retention times up to several weeks while events with a greater AEP than 0.02 would have retention times less than a couple of weeks. This is dependent upon conditions at the time of flooding, however, and the operational release regime adopted.
- Modified flow regime in downstream environment associated with releases from the raised dam (see above). This is expected to cause minor flooding impacts for small ARI events but overall will have positive/beneficial effects in regards to larger ARI events.

3.1 (a) World Heritage Properties

Description

Of the World Heritage properties and National Heritage places identified in the PMST search, only one is considered relevant to Warragamba Dam raising, based on location. This is the Greater Blue Mountains World Heritage Area (GBMWHA).

The GBMWHA occurs adjacent to the northern and southern banks of Lake Burragorang and also crosses part of the Hawkesbury-Nepean River downstream of Warragamba Dam. The extent of the property excludes the plateau south of the Wollondilly River arm of Lake Burragorang and the area northwest of the Coxs River. The GBMWHA in the context of Warragamba Dam and Lake Burragorang is shown in Figure 3-1.

The listing description of the GBMWHA provided by the UNESCO World Heritage Centre is provided below:

> *The Greater Blue Mountains Area consists of 1.03 million ha of sandstone plateaux, escarpment and gorges dominated by temperate eucalypt forest. The site, comprised of eight protected areas, is noted for its representation of the evolutionary adaptation and diversification of eucalypts in post-Gondwana isolation on the Australian continent. Ninety-one eucalypt taxa occur within the Greater Blue Mountains Area which is also outstanding for its exceptional expression of the structural and ecological diversity of the eucalypts associated with its wide range of habitats. The site provides significant representation of Australia's biodiversity with ten percent of the vascular flora as well as significant numbers of rare or threatened species, including endemic and evolutionary relict species, such as the Wollemi pine, which have persisted in highly-restricted microsites.*

This property has been listed under the following World Heritage nomination criteria:

- Criterion (ix) – to be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals
- Criterion (x) – to contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

As noted in the listing description above, the abundance of eucalypt forest communities within the GBMWHA and the juxtaposition of relict Gondwana species with the Eastern Sclerophyll Open forest biogeographic province contribute to the declaration of the property under these criteria.

The GBMWHA covers an area of 1,034,000 and includes a number of national parks and Wilderness Areas protected under NSW legislation (e.g. Kanangra-Boyd Wilderness Area, Nattai National Park).

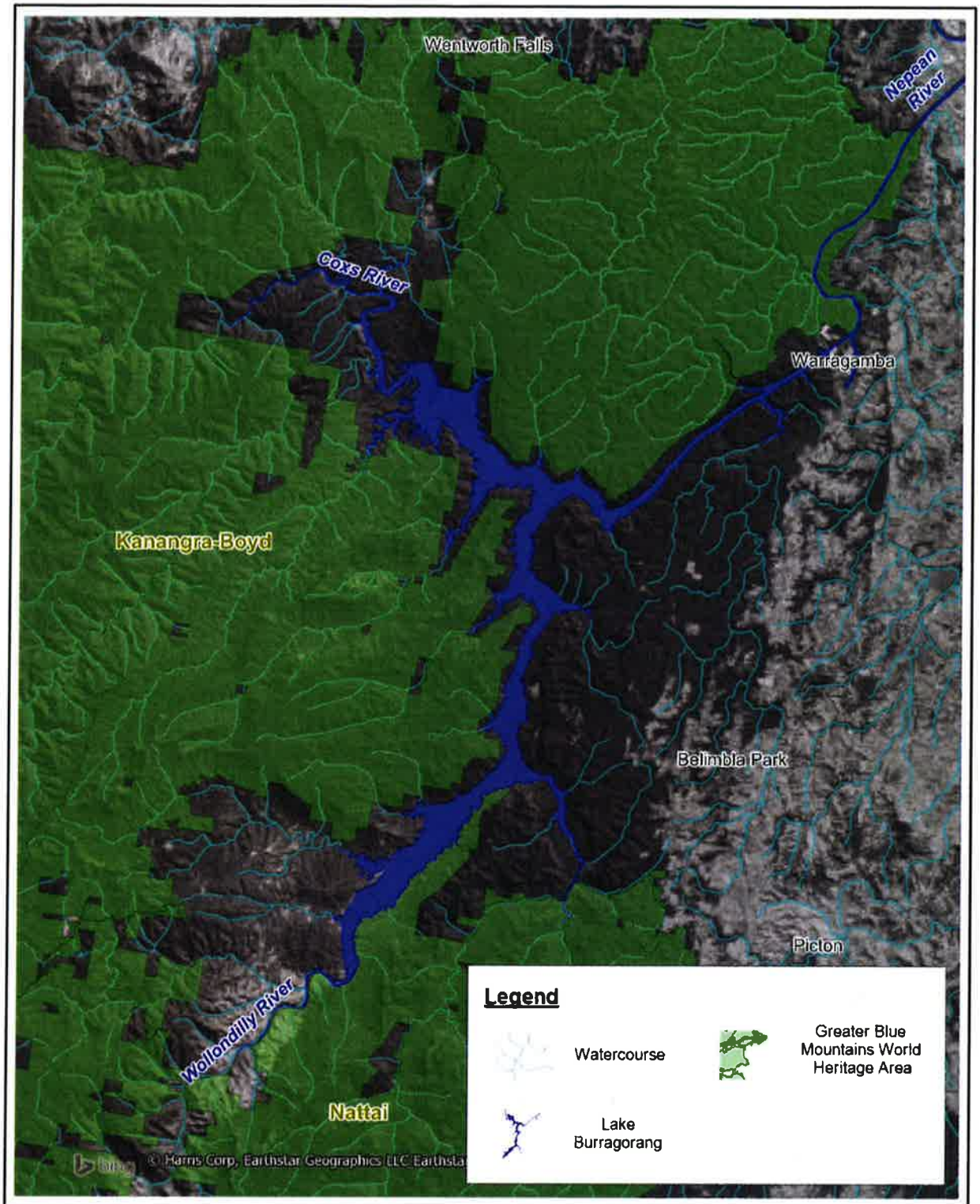
Nature and extent of likely impact

Parts of the GBMWHA may be temporarily inundated by the operation of the FMZ following the raising of the Warragamba Dam wall. Inundation is identified as an impacting process as it has the potential to cause the long-term loss of environmental values in impacted areas, especially during events with less probability than than the 0.02 AEP event. Inundation may also cause change in aquatic habitat in the upper reaches of tributaries within the GBMWHA (e.g. riffle habitat becomes pool habitat during flood operations). See further Section 3.1(d) for a discussion of specific impacts to ecological communities and flora species. It is noted, however, that the inundations extents of the FMZ are likely to represent only a small fraction of the total remnant extent of the GBMWHA (currently 1,034,000 ha); this is expected to be in the order of less than 0.1%.

Table 3-1 provides an assessment of potential impacts from the Project against the significant impact criteria of the *Significant Impact Guidelines 1.1*. Section 3.1(d) provides more detail on potential impacts to threatened species and communities that occur within the GBMWHA. In summary, however, it is noted that the Project may lead to significant impacts to the *E. benthamii* population as well as the potential for establishment of invasive species in TECs.

In considering the assessment in Table 3-1 the following conclusions can be made:

- A **significant impact to the GBMWHA is unlikely** when undertaking an assessment based on biophysical features (e.g. landscapes, hydrology) of the property
- A **significant impact to the GBMWHA is possible** when considering the potential impacts of the Project to the ecological features of the property.



Title:

Greater Blue Mountains World Heritage Area at Warragamba Dam and Lake Burragorang

Figure: **3-1**

Rev: **A**

BMT WBM endeavours to ensure that the information provided in this map is correct at the time of publication. BMT WBM does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

N

0 5 10km

Approx. Scale

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Figure 3-1 Greater Blue Mountains World Heritage Area at Warragamba Dam and Lake Burragorang

Table 3-1 Assessment of impacts to GBMWHA against Significant Impact Guidelines 1.1 criteria

Significant impact criteria	GBMWHA
An action is likely to have a significant impact on the natural heritage values of a World Heritage property if there is a real chance or possibility that the action will	
• damage, modify, alter or obscure important geological formations in a World Heritage property	Inundation is not expected to cause any long-term impacts to existing geological features or landforms that are significant in the context of the GBMWHA
• damage, modify, alter or obscure landforms or landscape features	See above
• modify, alter or inhibit landscape processes	See above
• divert, impound or channelise a river, wetland or other water body in a World Heritage property	Raising of the Warragamba Dam wall will cause increased water heights and change in flows in some tributaries of Lake Burragorang though these impacts will be temporary, extending to a period of several weeks only in flood events with a probability less than 0.02 AEP
• substantially increase concentrations of suspended sediment, nutrients, heavy metals, hydrocarbons, or other pollutants or substances in a river, wetland or water body in a World Heritage property	Inundation caused during flooding may elevate suspended sediment levels in Lake Burragorang and tributaries where flood waters cover areas not currently inundated
• reduce the diversity or modify the composition of plant and animal species in all or part of a World Heritage property	See Section 3.1(d) in terms of potential impacts to threatened species
• fragment, isolate or substantially damage habitat important for the conservation of biological diversity in a World Heritage property	See above
• cause a long-term reduction in rare, endemic or unique plant or animal populations or species in a World Heritage property	See Section 3.1(d) in terms of potential impacts to threatened species
• fragment, isolate or substantially damage habitat for rare, endemic or unique animal populations or species in a World Heritage property	See above
• involve construction of buildings, roads, or other structure, vegetation clearance, or other actions with substantial, long-term or permanent impacts on relevant values	See above
• introduce noise, odours, pollutants or other intrusive elements with substantial, long-term or permanent impacts on relevant values	See above

3.1 (b) National Heritage Places

See description provided in s3.1 (a) for World Heritage properties. The GBMWHA is listed as both a World Heritage property and National Heritage place, listed for synonymous values.

3.1 (c) Wetlands of International Importance (declared Ramsar wetlands)

n/a – Project is not located within the same catchment as a declared Ramsar wetland

3.1 (d) Listed threatened species and ecological communities

Description

Listed threatened ecological communities

Table 3-2 lists the TECs which in the Construction Area and the Operation Impact Area upstream of Warragamba Dam. These represent the communities that may be subject to impact from changes in floodwater retention as a result of the raising of the Warragamba Dam wall. The distribution of these TECs is shown in Figure 3-2.

Other communities identified in the PMST search upstream of Warragamba Dam are not considered relevant based on their mapped occurrence.

Table 3-2 Listed TECs around Lake Burragorang

TEC	Listing status	Details of occurrence
White box-yellow box-Blakely's red gum grassy woodland and derived native grassland	Critically Endangered	1,366 ha
Shale sandstone transition forest of the Sydney Basin Bioregion	Critically Endangered	156 ha

In addition to these TECs, there are a number of other TECs that occur within the Hawkesbury-Nepean Valley, downstream of Warragamba Dam. These are:

- Castlereagh scribbly gum and Agnes Banks woodlands of the Sydney Basin Bioregion (Endangered)
- Cooks River/Castlereagh ironbark forest of the Sydney Basin Bioregion (Critically Endangered)
- Subtropical and temperate coastal saltmarsh (Vulnerable)
- Cumberland Plain shale woodlands and shale-gravel transition forest (Critically Endangered)
- Western Sydney dry rainforest and moist woodland on shale (Critically Endangered)
- Shale sandstone transition forest of the Sydney Basin Bioregion (Critically Endangered)
- White box-yellow box-Blakely's red gum grassy woodland and derived native grassland (Critically Endangered).

Listed threatened species

Table 3-3 lists the threatened species which are expected to occur within the Construction Impact Area and Operation Area. This is based off the results of the PMST search for these areas and screening of habitat requirements for species. Historical sightings of these species from NSW Atlas of Species are shown in Figure 3-3 (upstream of Warragamba Dam only). Other species identified in the PMST search have not been included as their habitat is not supported in either Impact Area.

Table 3-3 Listed threatened species within and around Lake Burragorang

Scientific name	Common name	Listing status	Details of important/significant populations
Flora species			
Acacia bynoeana	Bynoe's wattle	Vulnerable	The total previously recorded population in the Blue Mountains National Park is 16 individuals, split into 8 populations. For this reason, any occurrence of the species is considered to be an important population.
Acacia gordonii		Endangered	n/a
Acacia pubescens	Downy wattle	Vulnerable	n/a
Acrophyllum australe		Vulnerable	n/a
Asterolasia elegans		Vulnerable	n/a
Bossiaea oligosperma	Few-seeded bossiaea	Vulnerable	**Known to occur at Lake Burragorang** ***(occurs primarily on ridgelines)*** n/a
Darwinia biflora		Vulnerable	n/a
Eucalyptus benthamii	Camden white gum	Vulnerable	**Known to occur at Lake Burragorang** As this species has a restricted range, all occurrences (including individual trees) are considered to be significant populations.
Eucalyptus macarthurii	Camden woollybutt	Endangered	n/a
Grevillea parviflora subsp. parviflora	Small-flower grevillea	Vulnerable	n/a
Hakea dohertyi	Kowmung hakea	Endangered	**Known to occur at Lake Burragorang** ***(occurs primarily on ridgelines)*** This species is known from an area of only 18km^2 in Kanangra-Boyd National Park and consists of less than 8,000 individuals. For this reason, any occurrence of the species is considered to be a significant population.
Kunzea rupestris		Vulnerable	n/a
Lasiopetalum joyceae		Vulnerable	n/a
Leucopogon exolasius	Woronora beard-heath	Vulnerable	The species occurs only in seven known locations and, due to historical fragmentation, has developed isolated subpopulations incapable of interbreeding. As a result, any occurrence of the species is considered a significant population
Micromyrtus blakelyi		Vulnerable	n/a
Micromyrtus minutiflora		Vulnerable	n/a
Olearia cordata		Vulnerable	n/a
Persoonia acerosa	Needle geebung	Vulnerable	n/a
Persoonia hirsuta	Hairy geebung	Endangered	As this species is known only from 21 scattered populations, each with typically less than 10 individuals, any occurrence is considered a significant population.
Persoonia nutans	Nodding geebung	Endangered	n/a

Phyllota humifusa	Dwarf phylotta	Vulnerable	**Known to occur at Lake Burragorang** *(occurs primarily on ridgelines)* n/a
Pimelea curviflora var. curviflora		Vulnerable	n/a
Pimelea spicata	Spiked rice-flower	Endangered	This species has an area of occupancy of less than 17 ha, spread across 42 sites. Any occurrence of the species is therefore considered to be an important population.
Pomaderris brunnea	Rufous pomaderris	Vulnerable	n/a
Syzygium paniculatum	Magenta lilly pilly	Vulnerable	n/a
Tetratheca juncea	Black-eyed Susan	Vulnerable	As the species is considered to be extinct in the Hawkesbury-Nepean Valley, any occurrence would be considered significant.
Zieria involucrata		Vulnerable	n/a
Fauna species			
Lathamus discolor	Swift parrot	Critically Endangered	n/a
Anthochaera phrygia	Regent honeyeater	Critically Endangered	n/a
Neochmia ruficauda ruficauda	Star finch (eastern)	Endangered	n/a
Botaurus poiciloptilus	Australasian bittern	Endangered	n/a
Calidris ferruginea	Curlew sandpiper	Critically Endangered	n/a
Grantiella picta	Painted honeyeater	Vulnerable	n/a
Rostratula australis	Australian painted snipe	Endangered	n/a
Heleioporus australiacus	Giant burrowing frog	Vulnerable	n/a
Litoria aurea	Green and golden bell frog	Vulnerable	All current populations are regard to be important populations.
Litoria littlejohni	Littlejohn's tree frog	Vulnerable	n/a
Mixophyes balbus	Stuttering frog	Vulnerable	Due to dramatic declines in population of species in southern range of NSW, occurrence of any individuals would be considered to be a significant population.
Hoplocephalus bungaroides	Broad-headed snake	Vulnerable	n/a
Chalinolobus dwyeri	Large-eared pied bat	Vulnerable	n/a
Pteropus poliocephalus	Grey-headed flying-fox	Vulnerable	n/a
Petauroides volans	Greater glider	Vulnerable	n/a
Dasyurus maculatus maculatus	Spotted-tail quoll (southeastern mainland population)	Endangered	n/a
Isodon obesulus obesulus	Southern brown bandicoot (eastern)	Endangered	n/a
Pterogale pencillata	Brush-tailed rock-wallaby	Vulnerable	Species populations are split into three 'evolutionary units'. Population within vicinity of Lake Burragorang is part of the Central Evolutionary Unit. All populations are highly fragmented
Phascolarctos cinereus	Koala (combined populations of Qld, NSW and ACT)	Vulnerable	n/a
Macquaria australasica	Macquarie perch	Endangered	Population occurs within the tributaries of Lake Burragorang, though this has not been assessed as a significant population.
Pommerhelix duralensis	Dural land snail	Endangered	n/a

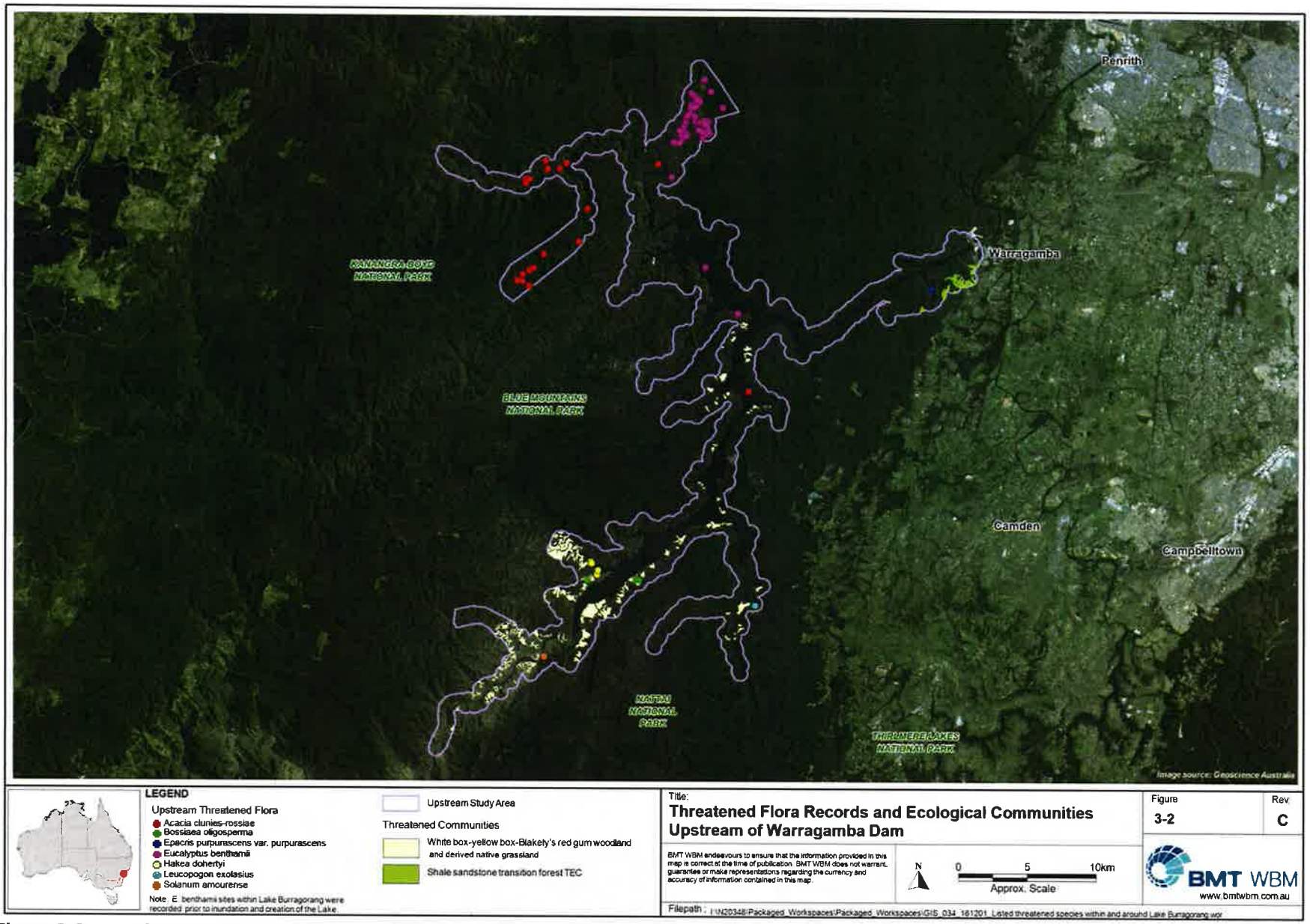

Figure 3-2 **Threatened Flora Records and Ecological Communities Upstream of Warragamba Dam**

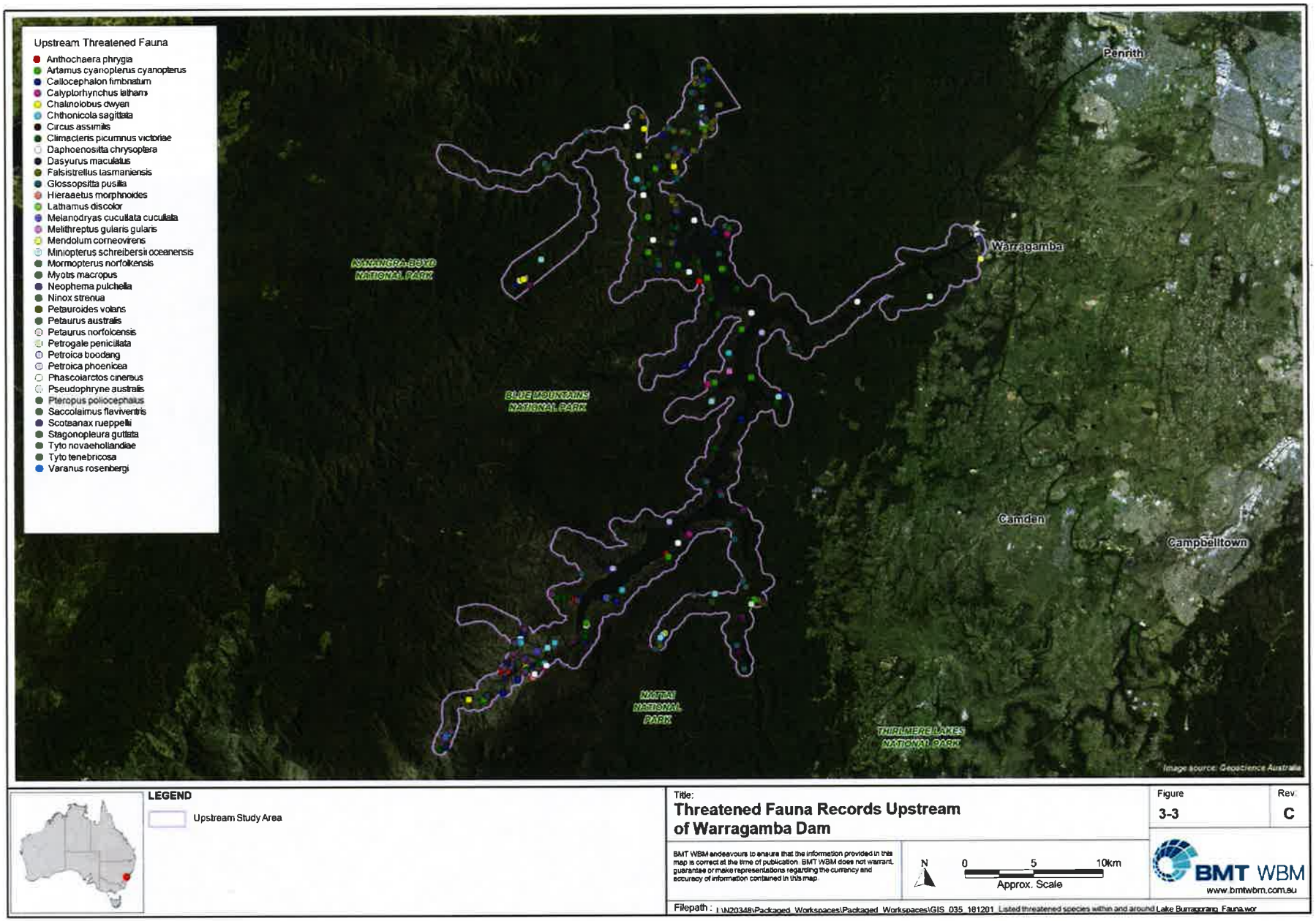

Figure 3-3 Threatened Fauna Records and Ecological Communities Upstream of Warragamba Dam

Nature and extent of likely impact

Listed threatened ecological communities

The raising of Warragamba Dam wall may cause areas of TECs at Lake Burragorang to be temporarily inundated during flood events. The extent and duration of inundation will depend upon the nature of the flood and the operational releases employed at the time. Inundation of shale sandstone transition forest is not expected to occur across more than 0.1 ha of the TEC in the PMF. Up to several hundred hectares of white box-yellow box-Blakely's red gum woodland, occurs within the operational area, representing 1-3% of the total TEC distribution and 40% of the TEC at Lake Burragorang.

Potential waterlogging during inundation events may cause death of plants where it occurs for a period of weeks. For flooding in the events with less probability than the 0.02 AEP and in the PMF where the water level fills the FMZ it is possible that substantial areas of inundated vegetation will be lost. These impacts to a lesser extent may have also occurred without the dam wall being raised. The extent to which these communities may recover will be dependent upon the area and frequency of inundation.

In more frequent flood events (i.e. those with a smaller inundation extent than the 0.02 AEP event) where the dam fills above the current level, inundation may cause some benefit to species through the provision of silt banks and bare areas which provide moist seedbeds for seedlings.

Waterlogging is not considered to be an issue of concern in regards to release of floodwaters as changes in downstream inundation extents (associated with smaller events) will cause only temporary inundation. For larger events, the dam wall raising will actually reduce the extent of inundation and waterlogging.

Alteration of flow regimes associated with flooding has the potential to lead to invasion and success of exotic species in riparian and floodplain habitats. An assessment of the potential impacts of environmental flows on weedy riparian vegetation in the Hawkesbury-Nepean concluded that depth and season of temporary inundation may be the variables with the greatest potential for differential effects on weeds and native plants. This may be an impact for TECs at both Lake Burragorang (i.e. within temporary inundation areas) and downstream (i.e. in areas experiencing changed flood extents). The competition provided by weeds is recognised as a threatening process to these TECs.

Table 3-4 provides an assessment of expected impacts from the Project based on the significant impact criteria provided within the Significant Impact Guidelines 1.1 in the context of Critically Endangered TECs.

Based on the assessment provided in Table 3-4, the following assumptions apply.

- *White box-yellow box-Blakely's red gum grassy woodland and derived native grassland* –a **significant impact could occur** as a result of changes in flow regimes caused by raising of the Warragamba Dam wall leading to establishment of invasive species
- *Shale sandstone transition forest of the Sydney Basin Bioregion*—**no significant impact is expected to occur** due to the small portion of TEC that could be affected
- *Downstream TECs*—the **likelihood of a significant impact is unknown** but would be related to potential spread of invasive species due to changes in flow regimes.

Table 3-4 Assessment of impacts to TECs against Significant Impact Guidelines 1.1 criteria

Significant impact criteria	Assessment for relevant TECs		
	White box-yellow box-Blakey's red gum woodland	Shale sandstone transition forest	Downstream TECs
An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:			
• reduce the extent of an ecological community	Potential to impact up to 2.4% of the TEC during the PMF. While this would represent a reduction in the extent of the ecological community, it is not expected to be a threat to the survival of the community.	Raising of the Warragamba Dam wall will cause, at most, inundation of 0.1 ha of the TEC (in the PMF) representing 0.001% of TEC occurrence. The potential loss associated with this inundation will not cause any impact to the overall extent of the TEC.	Modification of flooding downstream will only increase inundation extents of downstream TECs for short periods and will eliminate inundation during larger events.
• fragment or increase fragmentation of an ecological community	See above	See above	See above
• adversely affect habitat critical to the survival of an ecological community	See above	See above	See above

Significant impact criteria	Assessment for relevant TECs		
	White box-yellow box-Blakey's red gum woodland	Shale sandstone transition forest	Downstream TECs
• modify or destroy abioitic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	See above	See above	See above
• cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species	See above	See above	See above

• cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:
  • assisting invasive species, that are harmful to the listed ecological community, to become established, or
  • causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community
	Changes in flow regime could assist in establishment of invasive species in the TEC. As 1-3% of the TEC could be inundated, it is possible that the Project could lead to greater establishment of invasive species across large patches of the TEC at Lake Burragorang if not managed.	Changes in flow regimes could assist in establishment of invasive species in the TEC. However, as this is anticipated to occur only in the PMF, it is not considered to constitute a significant impact.	There is the potential that altered flow regimes could increase the chance of invasive species establishment in downstream TECs. The extent of this impact has not been quantified and, therefore, the significance of the impact to any TEC is not known.

• interfere with the recovery of an ecological community	See above	See above	See above

Listed threatened species

As for TECs, the key threats to listed threatened flora species is extended waterlogging associated with inundation during flood events with a probability less than the 0.02 AEP where the lake rises above the current full supply level (FSL), and competition from weeds spread by changed flow regimes. Of the threatened flora species known to occur at Lake Burragorang, *E. benthamii* is the most likely to be impacted by inundation effects as *H. dohertyi*, *B. oligosperma* and *P. humifusa* occur upon ridges, outside of the likely inundation zone. As all occurrence of *H. dohertyi* could be a significant population, however, both this species and *E. benthamii* are considered relevant in the context of this referral.

The ability of either species to cope with extended inundation events is not yet known. Multiple *E. benthamii* sites (likely representing up to 20%of the total number of records for the species in the area) could be inundated during the PMF in current dam conditions while further sites (likely up to 40% of total local species records) could be inundated following the raising of the dam wall. Some *H. dohertyi* species may also occur in inundation areas though individuals are currently known only from ridgelines (i.e. outside the inundation area). During lesser events (i.e. more frequent than 0.02 AEP), inundation may lead to increased propagation of these species, especially *E. benthamii*, through the provision of silt and bare areas that act as seedbeds. The net impact to the species is not known, and will depend upon the nature and frequency of inundation events and a further understanding of the tolerance to inundation.

Terrestrial fauna species, including avifauna, are not expected to be impacted by the Project as areas of potential inundation are not known to represent critical habitat for any of these species. Similarly, changes in downstream areas caused by modification of flow regime are not expected to impact on any important habitat areas or populations.

The Macquarie perch occurs within Lake Burragorang, particularly within supporting tributaries. Riffle habitats within tributaries represent important spawning habitat for the species. Inundation caused by flood events in a raised dam scenarios will cause

the temporary loss of these riffle habitats for the duration of elevated water levels. If this coincides with spawning season (typically October to January), the impacts could be significant to the species.

Table 3-5 assesses these impacts for these species against the Significant Impact Guidelines 1.1, while also considering other referral and significant impact guidelines that have been prepared for individual species (e.g. Macquarie perch).

Based on the assessment provided in Table 3-5, the following assumptions apply

- *E. benthamii*—a **significant impact could occur** to the species as a result of death during inundation events lasting weeks
- *H. dohertyi* – a **significant impact could occur** to the species if inundation causes waterlogging and death of species individuals
- *Macquarie perch*—a **significant impact could occur** if extended inundation events coincided with species spawning season
- *Other species*—**no significant impact is expected to occur** as these species are reliant upon habitat directly within areas that are likely to be impacted.

Table 3-5 Assessment of impacts to threatened species against Significant Impact Guidelines 1.1 criteria

Significant impact criteria	Assessment for relevant threatened species			
	E. benthamii	*H. dohertyi*	Macquarie perch	Other flora and fauna species
An action is likely to have a significant impact on an endangered or vulnerable species if there is a real chance or possibility that it will:				
• lead to a long-term decrease in the size of a (important)* population	Waterlogging as a result of extended inundation during flood events with probability less than 0.02 AEP is likely to cause death to *E. benthamii* individuals. As all individuals are considered 'important populations' this may be a significant impact	Waterlogging as a result of inundation is likely to cause death to *H. dohertyi* individuals. As all individual are considered 'important populations' this may be a significant impact.	If inundation occurs during spawning season for the Macquarie perch (i.e. October to January) the success of species reproduction may be affected, leading to long-term declines in species that occur in Lake Burragorang tributaries.	No populations solely or predominantly occur in the expected inundation area
• reduce the area of occupancy of the species (or an important population)*	See above	See above	As inundation will be temporary, it is not expected to cause overall loss of the area available for the Macquarie perch	See above
• fragment an existing population into two or more populations	Loss of individual trees from waterlogging (see above) would affect the fringe of broader populations but is not expected to cause fragmentation	Loss of individual trees from waterlogging (see above) would affect the fringe of broader populations but is not expected to cause fragmentation	See above	Inundation may cause the loss of communities fringing Lake Burragorang but will not cause fragmentation of existing habitat areas
• adversely affect habitat critical to the survival of a species	Areas of potential inundation following the raising of Warragamba Dam may constitute habitat critical to the survival of the species as these areas contain significant proportions of the species (i.e. up to 40%). Further assessments may be required to determine if species in these areas are critical to the long-term maintenance of the species.	Areas of potential inundation following the raising of Warragamba Dam may constitute habitat critical to the survival of the species. Further assessments may be required to determine if species in these areas are critical to the long-term maintenance of the species.	Inundation will cause loss of riffle habitat for a period up to several weeks during particular flood events. This habitat is considered critical during spawning season (i.e. October to January). When inundation occurs during this season, critical habitat may be adversely affected	See above
• disrupt the breeding cycle of a (important)*	See above	See above	See above	See above

Significant impact criteria	Assessment for relevant threatened species			
	E. benthamii	*H. dohertyi*	Macquarie perch	Other flora and fauna species
population				
• modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	See above	See above	See above	See above
• result in invasive species that are harmful to a species becoming established in the species' habitat	Without appropriate management, changes in flow regimes may cause invasive species to be established in existing communities that contain the *E. benthamii*.	Without appropriate management, changes in flow regimes may cause invasive species to be established in existing communities that contain the *H. dohertyi*.	Changes in flow regimes are not expected to cause spread of invasive aquatic species	Changes in flow regimes may cause invasive species to be established in habitat areas – see discussion in regards to TECs
• introduce disease that may cause the species to decline	Changes in flow regimes may cause disease-bearing species to be established in existing communities that contain *E. benthamii*.	Changes in flow regimes may cause disease-bearing species to be established in existing communities that contain *H. dohertyi*.	Changes in flow regimes are not expected to cause spread of invasive aquatic species carrying diseases	See above
• interfere with the recovery of the species	See above	See above	See above	See above

*Some significant impact criteria are modified for Vulnerable species (i.e. *E. benthamii*) to apply only to 'important populations'

3.1 (e) Listed migratory species

Description

A number of migratory species have been identified using the PMST as potentially occurring around Lake Burragorang. In addition, a number of migratory species also occur throughout the Hawkesbury-Nepean Valley, especially within coastal/estuarine wetlands. The entire valley is part of the East Asia-Australasian Flyway for migratory shorebirds, though no important populations or Ramsar wetlands occur in the Hawkesbury-Nepean Valley.

Nature and extent of likely impact

Changes in flow regimes associated with the raising of the Warragamba Dam wall (i.e. within upstream catchment during inundation events) and changes in flood water releases (i.e. in downstream catchments) have the potential to increase the availability of standing water. Standing water attract migratory shorebird species. This is expected to be a potential 'positive impact' (i.e. benefit) of the Project, though the exact nature of the benefit has not been assessed.

As for terrestrial migratory species, inundation of terrestrial habitat at Lake Burragorang during flood events is not expected to represent an impact to migratory species – see Section 3.1(d) for more detail.

3.1 (f) Commonwealth marine area

n/a – Project is not located in and is not expected to impact upon the Commonwealth marine area

3.1 (g) Commonwealth land

n/a – Project is not located on and is not expected to impact upon any Commonwealth land

3.1 (h) The Great Barrier Reef Marine Park

n/a – Project is not located within and is not expected to impact upon the Great Barrier Reef Marine Park

3.1 (i) A water resource, in relation to coal seam gas development or large coal mining development
n/a – Project does not involve coal seam gas or large coal mining development

3.2 Nuclear actions, actions taken by the Commonwealth (or Commonwealth agency), actions taken in a Commonwealth marine area, actions taken on Commonwealth land, or actions taken in the Great Barrier Reef Marine Park

3.2 (a)	**Is the proposed action a nuclear action?**	✓	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment

3.2 (b)	**Is the proposed action to be taken by the Commonwealth or a Commonwealth agency?**	✓	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment

3.2 (c)	**Is the proposed action to be taken in a Commonwealth marine area?**	✓	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(f))

3.2 (d)	**Is the proposed action to be taken on Commonwealth land?**	✓	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(g))

3.2 (e)	**Is the proposed action to be taken in the Great Barrier Reef Marine Park?**	✓	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(h))

3.3 Description of the project area and affected area for the proposed action

3.3 (a) Flora and fauna
Ecological communities of Warragamba Dam and the area surrounding Lake Burragorang are dominated by dry sclerophyll forest and woodland associated with rocky ridges and located on sandstone sand shale geology, along with areas of moist gully and alluvial forest. These areas are capable of supporting a diversity of avifauna, terrestrial fauna and bat species. Section 3.1(d) lists significant threatened species that occur within this area.

Aquatic species occurring within Lake Burragorang and tributaries include the Macquarie perch as well as a number of species of fisheries significance (e.g. long-finned eels, trout).

Downstream of the dam is a variety of differing terrestrial environments, including the Cumberland Plain, freshwater wetlands and riparian communities, and coastal saltmarsh and mangroves. These support a wide diversity of different flora and fauna species.

3.3 (b) Hydrology, including water flows
Annual average rainfall varies greatly across the catchment, with highest rainfall typically occurring in the Blue Mountains. The wettest period in the catchment is between December and March, with the driest in August and September. As a result of this variable rainfall, the major tributaries have differing flow attributes. Despite this, the Warragamba Dam marks a significant divide in distinguishing between the flow duration in each tributary, with those flowing into Lake Burragorang (i.e. upstream of the dam) characteristically different to those downstream of the dam wall.

Across a monitoring period of decades it has been noted that almost all rivers in the catchment all run dry on occasion. Each of the tributaries in the catchment are affected by water extraction (e.g. irrigation extraction, transfer between catchments), which may account in part for these occasions. Other management activities also occur in the catchment, such as wastewater plant discharge.

3.3 (c) Soil and Vegetation characteristics
The landscape surrounding Lake Burragorang is remote and rugged, dominated by relatively recent geologies dissected by major rivers. These have developed fine-grained sedimentary soils through most of the area derived from sandstone. The broad vegetation communities supported in the area are tall moist forest and tall open forest (along ridgelines), and open forests and woodlands. These are described further in NSW National Parks and Wildlife Service technical report, The Native Vegetation of the Warragamba Special Area (2003):
http://www.environment.nsw.gov.au/resources/nature/surveys/030141NatVegWarragambaA.pdf.

3.3 (d) Outstanding natural features
The most unique/outstanding environmental features of the study are the GBMWHA and associated wilderness areas and wild rivers. These are described in more detail in Section 3.2(a) and 3.3(j).

3.3 (e) Remnant native vegetation
Vegetation communities at Warragamba Dam and Lake Burragorang are almost wholly intact, consisting predominantly of dry sclerophyll on sandstone and shale dominated by eucalypts. Downstream of the dam, remnant native vegetation varies considerably. See further Section 3.3(a).

3.3 (f) Gradient (or depth range if action is to be taken in a marine area)
Warragamba Dam is located at approximately 110m AHD, though areas upstream of this range up to 500m AHD in some of the Lake Burragorang tributaries. Areas of higher relief also exist around Lake Burragorang. Downstream, the Hawkesbury-Nepean River continues all the way to sea level (i.e. 0m AHD).

3.3 (g) Current state of the environment
The environment around Lake Burragorang, within the GBMWHA and associated national parks, is in good condition, with large portions declared as 'wilderness' (i.e. untouched). Downstream, the catchment is heavily modified by agricultural and urban development with patches of remnant vegetation communities and wetlands which have variable condition. Warragamba Dam is currently causing environmental impacts in downstream areas through the deprivation of natural flows, both in terms of flow quantity and the nature/variability of flows.

3.3 (h) Commonwealth Heritage Places or other places recognised as having heritage values
Warragamba Dam has significant cultural heritage value, particularly in relation to a number of items directly associated with the dam infrastructure (e.g. main dam wall, apron drainage system, crest gates) or related to its construction (e.g. Warragamba Township, Haviland Park). Of these items, the following are recognised within heritage listings:

- Warragamba Emergency Scheme and Megarrity's Bridge
- Warragamba Dam – Haviland Park
- Warragamba Dam Supply Scheme

Other heritage features in the area include a number of scattered ruins (associated with historical farming properties) of local significance along the Nattai and Wollondilly rivers. This includes the Jooriland wool shed.

3.3 (i) Indigenous heritage values
The Aboriginal Heritage Information Management System (AHIMS) database has a total of 87 Aboriginal objects recorded in the area of Lake Burragorang, including artefacts, arts, modified trees, grinding grooves and burials.

3.3 (j) Other important or unique values of the environment
The banks and vegetation to the south of Lake Burragorang are within the Kanangra-Boyd Wilderness Area while the Nattai Wilderness Area is located approximately 2.5 km southeast of the Wollondilly arm of Lake Burragorang. Wilderness Areas are

declared under the NSW *Wilderness Act 1987* and represent large, natural areas of land that remain essentially unchanged by modern human activity.

The Kowmung, Colo and Grose Rivers are declared as 'Wild Rivers' under the *National Parks and Wildlife Act 1974*. Wild rivers are those that are in near pristine conditions in terms of animal and plant life and water flow, and are free of the unnatural rates of siltation or bank erosion. These rivers are part of the Hawkesbury-Nepean Valley, with the Kowmung draining into Lake Burragorang while the Colo and Grose Rivers are downstream of the Warragamba Dam wall.

The area surrounding Lake Burragorang is composed of a number of national parks, including the Burragorang State Conservation Area, Nattai State Conservation Area, Yerranderie State Conservation Area, Nattai National Park, Kanangra-Boyd National Park, Blue Mountains National Park and Yerranderie Regional Park.

3.3 (k) Tenure of the action area (e.g. freehold, leasehold)

Warragamba Dam and Lake Burragorang is located within the Warragamba Dam Special Area which is established under the *Water NSW Act 2014*. As noted in Section 3.3(j) most of the area around Warragamba Dam (located within the Special Area) is also national park or other reserve tenure. These areas are jointly managed by WaterNSW and NSW National Parks and Wildlife Service.

The land downstream of the Warragamba Dam wall consists of a variety of freehold, leasehold, national park and other tenures.

3.3 (l) Existing uses of area of proposed action

The land within the Warragamba Dam Special Area (which covers all upstream impact areas) is set aside for the purposes of Warragamba Dam and activities by Water NSW. Access to this area is restricted, though there are two walking corridors as part of the trail between Katoomba and Mittagong.

The land downstream of the Warragamba Dam wall consists primarily of agricultural land and urban developments. In addition, there are a number of proposed urban developments within the Hawkesbury-Nepean Valley, including the Penrith Panthers Redevelopment, Riverstone West Industrial Development, Schofields Precinct Development and Marsden Park Development.

3.3 (m) Any proposed uses of area of proposed action

See Section 3.3(l)

4 Environmental outcomes

As described in Section 3.1, the MNES values potentially subject to significant impacts by the Project are:

- *E. benthamii* (Vulnerable species)
- *H. dohertyi* (Endangered species)
- Macquarie perch (Endangered species)
- White box-yellow box-Blakely's red gum grassy woodland and derived native grassland (Critically Endangered TEC)
- GBMWHA (World Heritage property/National Heritage place).

Dependant on their inundation tolerance, the Project has the potential to cause loss of a proportion of *E. benthamii* during large prolonged inundation events. These events, if occurring during spawning season for the Macquarie perch could also impact on species recruitment. The potential for impact on white box-yellow box-Blakely's red gum woodland and the GBMWHA are less certain.

In addition to these, the modification of downstream flow regimes has the potential to cause the spread of invasive species amongst TECs and habitat for threatened species, although this impact is less defined and of lower priority than those to upstream values.

In this context, generic environmental outcomes have been set for the Project. The ability to achieve these outcomes will be subject to further assessment during the development of the Project. These outcomes are listed in Table 4-1 together with *indicative* assessments that will be undertaken to inform the achievement of these outcomes

Table 4-1 Proposed environmental outcomes for the Project

Environmental outcome	Related MNES value	Indicative assessments required
Achievement of an operational flow regime for the dam that minimises inundation time for upstream values	*E. benthamii*, *H. dohertyi* and Macquarie perch populations around/in Lake Burragorang and tributaries Upstream TECs GBMWHA	Assessment of tolerances of upstream communities to inundation impacts Hydrological assessments of potential operational release regimes
Achievement of an operational flow regime for the dam that restores environmental flows for downstream values	Downstream TECs and related values	Hydrological and ecological assessments of potential operational release regimes
NOTE: The achievement of the two above environmental outcomes will require detailed assessments to develop a functioning operational regime that balances the likely trade-offs		
Maintenance of the current extent of *E. benthamii* and *H. dohertyi* populations	*E. benthamii* and *H. dohertyi*	Identification of likely impacts to/loss of *E. benthamii* and *H. dohertyi* populations and assessment of offsetting/replanting opportunities

5 Measures to avoid or reduce impacts

The following mitigation strategies have been identified in relation to the Project in order to control environmental impacts generally. **NOTE**: This includes impacts that are not directly relevant to MNES values; see further Section 4 for environmental outcomes specifically linked to MNES.

- Preparation of an Environmental Management Plan or series of plans that address issues relating to site safety, construction sequencing, pedestrian management, site rehabilitation and emergency responses
- Optimisation of post flood target downstream flow rates to minimise the duration of temporary inundation upstream of the dam
- Implementation of standard operational procedures to manage short-term reduction to water quality and other impacts of flooding on water supply
- Design and construction works should allow for maintenance and where possible enhancement of eel movements
- Minimise disturbance footprints as part of the project design and avoid damage to native vegetation/habitat areas
- Rehabilitation of disturbed areas surrounding site office, material handling and dam construction areas
- Where appropriate, development of species management plans to ensure that works do not lead to significant impacts on populations of threatened flora or fauna species
- Building resilience within floodplain wetland ecosystems present in the Hawkesbury-Nepean Valley currently affected by multiple pressures (e.g. bank stabilisation, vegetation rehabilitation, weed management, reinstatement of fish passage and hydrological functions).

Further mitigation strategies will be developed as part of the assessment and design of the Project.

6 Conclusion on the likelihood of significant impacts

6.1 Do you THINK your proposed action is a controlled action?

	No, complete section 6.2
✓	Yes, complete section 6.3

6.2 Proposed action IS NOT a controlled action.

n/a

6.3 Proposed action IS a controlled action

	Matters likely to be significantly impacted
X	World Heritage values (sections 12 and 15A)
X	National Heritage places (sections 15B and 15C)
	Wetlands of international importance (sections 16 and 17B)
X	Listed threatened species and communities (sections 18 and 18A)
	Listed migratory species (sections 20 and 20A)
	Protection of the environment from nuclear actions (sections 21 and 22A)
	Commonwealth marine environment (sections 23 and 24A)
	Great Barrier Reef Marine Park (sections 24B and 24C)
	A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
	Protection of the environment from actions involving Commonwealth land (sections 26 and 27A)
	Protection of the environment from Commonwealth actions (section 28)
	Commonwealth Heritage places overseas (sections 27B and 27C)

The Project has the potential to cause inundation of *E. benthamii* and *H. dohertyi* populations and Macquarie perch spawning areas for a period of weeks which could impact the overall populations of these species. Inundation could also occur to White Box-Yellow Box, Blakely's Red Gum Grassy Woodland and Derived Native Grassland which could cause both loss of areas occupied by the TEC and the establishment of invasive species. All of these impacts may in turn contribute to an overall impact on the GBMWHA.

See further Section 3.1.

7 Environmental record of the person proposing to take the action

		Yes	No
7.1	**Does the party taking the action have a satisfactory record of responsible environmental management?** **Provide details** WaterNSW is Australia's largest water supplier, including the management of groundwater, regulated and unregulated water. Two thirds of water used in NSW is supplied by WaterNSW. WaterNSW promotes improvements in achievable water quality standards and contributes to the protection of public health and the environment through enhanced catchment protection practices in declared catchments. We undertake research relating to the declared catchment areas under our stewardship and we perform an educative role within the community in relation to water quality and catchment health. IPART undertakes an annual audit of WaterNSW's compliance with requirements of its operating licences. The scope of the audit is determined using a risk based approach and includes environmental management. Water NSW has consistenly achieved full compliance and scored 'high compliance' in this are for the latest period 1 July 2015 - 30 June 2016. See https://www.ipart.nsw.gov.au/Home/Industries/Water/Reviews/Licensing-WaterNSW/Operational-Audit-of-WaterNSW-2015-2016?qDh=2	✓	
7.2	**Provide details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:** **(a) the person proposing to take the action, or** **(b) if a permit has been applied for in relation to the action - the person making the application.** **If yes, provide details**		✓
7.3	**If the person taking the action is a corporation, please provide details of the corporation's environmental policy and planning framework and if and how the framework applies to the action.** Refer to Attachment D for a copy of the corporations environmental policy. Inaccordance with the Policy everyone is responsible for complying with all environmental policies and procedures. The environmental assessment systems under the NSW *Environmental Planning and Assesment Act 1979* are specifically tailored to cater for varying size, nature and complexity of different types of projects and works. These factors will determine which assessment system applies to a particular project or work. WaterNSW has internal procedures to support compliance with the EP&A Act and undertake all activities within the planning framework. The action is being assessed by NSW Department of Environment and Planning consistent with the planning framework.	✓	
7.4	**Has the party taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?** **Provide name of proposal and EPBC reference number (if known)** Chaffey Dam Augmentation and Safety Upgrade, NSW (EPBC 2012/6523)		

8 Information sources and attachments

(For the information provided above)

8.1 References

The information used for this referral is based assessments conducted for/by WaterNSW and Infrastructure NSW. These documents are *Cabinet in Confidence* and therefore cannot be detailed.

8.2 Reliability and date of information

Section 3 was prepared using the documents listed in Section 8.1 together with the following resources:

- Significant Impact Guidelines 1.1 (DEWHA, 2013)
- EPBC Act – Draft referral guidelines for the endangered Macquarie perch, *Macquaria australasica* (DSEWPaC, 2011)
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland National Recovery Plan (DECCW, 2010)
- Outcomes-based conditions policy (Department of the Environment, 2016)
- Outcomes-based conditions guidance (Department of the Environment, 2016).

8.3 Attachments

		✓ attached	Title of attachment(s)
You must attach	figures, maps or aerial photographs showing the locality of the proposed action (section 1)	✓	Figure 1-1 Construction Impact Area Figure 1-2 Operation Impact Area Figure 2-2 Downstream Inundation Extents, Possible Target Downstream Flow Rate Scenarios Figure 2-3 Upstream Inundation Extents, including Inundation of Environmental Features
	GIS file delineating the boundary of the referral area (section 1)		
	figures, maps or aerial photographs showing the location of the proposed action in respect to any matters of national environmental significance or important features of the environments (section 3)	✓	Figure 3-1 Greater Blue Mountains World Heritage Area at Warragamba Dam and Lake Burragorang Figure 3-2 Threatened Flora Records and Ecological Communities Upstream of Warragamba Dam Figure 3-3 Threatened Fauna Records Upstream of Warragamba Dam
If relevant, attach	copies of any state or local government approvals and consent conditions (section 2.5)	n/a	
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if	n/a	

available (section 2.6)		
copies of any flora and fauna investigations and surveys (section 3)	n/a	
technical reports relevant to the assessment of impacts on protected matters that support the arguments and conclusions in the referral (section 3) conclusions in the referral (section 3 and 4)	n/a	
report(s) on any public consultations undertaken, including with Indigenous stakeholders (section 3)	n/a	

9 Contacts, signatures and declarations

Proposed action title: Warragamba Dam Raising and Environmental Flows, WaterNSW

9.1 Person proposing to take action

Name and Title:	David Harper, Project Director
Organisation	Water NSW
Trust deed	□ attached; OR ✓ not applicable
ACN / ABN:	21 147 934 787
Postal address:	WaterNSW GPO Box 1604 Sydney NSW 2001
Telephone:	04038 021 586
Email:	David.Harper@waternsw.com.au
I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:	□ an individual; OR □ a small business entity (within the meaning given by section 328-110 (other than subsection 328-119(4)) of the *Income Tax Assessment Act 1997*); OR ✓ not applicable.
If you are small business entity you must provide the Date/Income Year that you became a small business entity:	
I would like to apply for a waiver of full or partial fees under regulation 5.21A of the EPBC Regulations. Under regulation 5.21A(5), you must include information about the applicant (if not you) the grounds on which the waiver is sought and the reasons why it should be made:	✓ not applicable.

Declaration: I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct.
I understand that giving false or misleading information is a serious offence.
I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.

Signature:  Date: 8/5/17

9.2 Designated proponent

Name of proposed proponent:

ACN / ABN:

Postal address:

Telephone:

Email:

Declaration by the proposed proponent: I ....., the proposed proponent, consent to the proposed designation of myself as the proponent for the purposes of the action described in this referral.

Signature: Date:

Declaration by the person proposing to take the action: I ....., the person proposing to take the action, consent to the proposed designation of..... as proponent for the purposes of the action described in this referral.

Signature: Date:

9.3 Person preparing the referral information (if different from section 9.1)

Name:

Title:

Organisation:

ACN / ABN:

Postal address:

Telephone:

Email:

Declaration: I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct.
I understand that giving false or misleading information is a serious offence.

Signature: Date:

REFERRAL CHECKLIST

HAVE YOU:

- ☐ Completed all required sections of the referral form?
- ☐ Included accurate coordinates (to allow the location of the proposed action to be mapped)?
- ☐ Provided a map showing the location and approximate boundaries of the project area for the proposed action?
- ☐ Provided a map/plan showing the location of the action in relation to any matters of NES?
- ☐ Provided a digital file (preferably ArcGIS shapefile, refer to guidelines at Attachment A) delineating the boundaries of the referral area?
- ☐ Provided complete contact details and signed the form?
- ☐ Provided copies of any documents referenced in the referral form?
- ☐ Ensured that all attachments are less than three megabytes (3mb)?
- ☐ Sent the referral to the Department (electronic and hard copy preferred)

Geographic Information System (GIS) data supply guidelines

If the area is less than 5 hectares, provide the location as a point layer. If the area greater than 5 hectares, please provide as a polygon layer. If the proposed action is linear (e.g. a road or pipeline) please provide a polyline layer.

GIS data needs to be provided to the Department in the following manner:

- Point, Line or Polygon data types: ESRI file geodatabase feature class (preferred) or as an ESRI shapefile (.shp) zipped and attached with appropriate title
- Raster data types: Raw satellite imagery should be supplied in the vendor specific format.
- Projection as GDA94 coordinate system.

Processed products should be provided as follows:

- For data, uncompressed or lossless compressed formats is required - GeoTIFF or Imagine IMG is the first preference, then JPEG2000 lossless and other simple binary+header formats (ERS, ENVI or BIL).
- For natural/false/pseudo colour RGB imagery:
    - If the imagery is already mosaiced and is ready for display then lossy compression is suitable (JPEG2000 lossy/ECW/MrSID). Prefer 10% compression, up to 20% is acceptable.
    - If the imagery requires any sort of processing prior to display (i.e. mosaicing/colour balancing/etc.) then an uncompressed or lossless compressed format is required.

Metadata or 'information about data' will be produced for all spatial data and will be compliant with ANZLIC Metadata Profile. (http://www.anzlic.org.au/policies_guidelines#guidelines).

The Department's preferred method is using ANZMet Lite, however the Department's Service Provider may use any compliant system to generate metadata.

Privacy and Confidentiality Notice

The Department is required under section 74(3) of the *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**) to publish the information (including personal information of the author and/or third parties) provided in this referral on the internet. The information published may include your personal information.

Information including your personal information included in this referral will be used for the purposes of administering the EPBC Act. The information may be provided to various Commonwealth, State and Territory agencies for the purposes of administering the Act or other Commonwealth, State or Territory legislation. For example, if the proposed action (or a component of it) is to be taken in the GBRMP, the Minister is required to provide a copy of your referral to GBRMPA (see section 73A, EPBC Act). For information about how the GBRMPA may use your information, see http://www.gbrmpa.gov.au/privacy/privacy_notice_for_permits.

The Department will collect, use, store and disclose the personal information contained in this referral in a manner consistent with its obligations under the *Privacy Act 1988* and the Department's privacy policy.

The Department's privacy policy contains details about how respondents may access and make corrections to personal information that the Department holds about the respondent, how respondents may make a complaint about a breach of an Australian Privacy Principle, and how the Department will deal with that complaint.

A copy of the Department's privacy policy is available at: http://environment.gov.au/privacy-policy.

The Department is not obliged to publish information that the Minister is satisfied in commercial-in-confidence. If you believe that this referral contains information that is commercial-in-confidence, you must clearly identify such information and the reason for its confidentiality at the time of making the referral. The Minister cannot be satisfied that particular information included in a referral is commercial-in-confidence unless you demonstrate to the Minister (by providing reasons in writing) that:

- release of the information would cause competitive detriment to the person; and
- the information is not in the public domain; and
- the information is not required to be disclosed under another law of the Commonwealth, a State or a Territory; and
- the information is not readily discoverable.

The Department is subject to certain legislative and administrative accountability and transparency requirements of the Australian Government including disclosures to the Parliament and its Committees. While the Department will treat all referral information provided in this referral sensitively, any information contained in or relating to a referral, including information identified by a person as commercial-in-confidence, may be disclosed by the Department:

- to its employees and advisers in order to evaluate or assess a referral;
- to the Parliamentary Secretary;
- within the Department or other agencies where this serves the legitimate interest of the Australian Government;
- in response to a request by a House or Committee of the Parliament of the Commonwealth of Australia;
- where information is authorised or permitted by law to be disclosed; and
- where the information is in the public domain other than by the Department's disclosure of that information.

Attachment C - EPBC Protected Matters Report (D2017/13582)

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 07/11/16 10:40:38

Coordinates
Buffer: 0.0Km

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	1
National Heritage Places:	1
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	48
Listed Migratory Species:	13

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	19
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	5
Regional Forest Agreements:	None
Invasive Species:	53
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

World Heritage Properties		[Resource Information]
Name	State	Status
The Greater Blue Mountains Area	NSW	Declared property

National Heritage Properties		[Resource Information]
Name	State	Status
Natural		
The Greater Blue Mountains Area	NSW	Listed place

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	Endangered	Community may occur within area
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community may occur within area
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	Critically Endangered	Community may occur within area
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion	Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Fish		

Name	Status	Type of Presence
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat known to occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat may occur within area
Litoria littlejohni Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat may occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat may occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Plants		
Acacia bynoeana Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat may occur within area
Acacia pubescens Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat likely to occur within area
Acrophyllum australe [3983]	Vulnerable	Species or species habitat likely to occur within area
Asterolasia elegans [56780]	Endangered	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Bossiaea oligosperma [10059]	Vulnerable	Species or species habitat likely to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Eucalyptus aggregata Black Gum [20890]	Vulnerable	Species or species habitat may occur within area
Eucalyptus benthamii Camden White Gum, Nepean River Gum [2821]	Vulnerable	Species or species habitat likely to occur within area
Genoplesium baueri Yellow Gnat-orchid [7528]	Endangered	Species or species habitat may occur within area
Grevillea parviflora subsp. parviflora Small-flower Grevillea [64910]	Vulnerable	Species or species habitat may occur within area
Hakea dohertyi a shrub [66701]	Endangered	Species or species habitat likely to occur within area
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat may occur within area
Kunzea cambagei [11420]	Vulnerable	Species or species habitat likely to occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat may occur within area
Pelargonium sp. Striatellum (G.W.Carr 10345) Omeo Stork's-bill [84065]	Endangered	Species or species habitat likely to occur within area
Persoonia acerosa Needle Geebung [7232]	Vulnerable	Species or species habitat likely to occur within area
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat may occur within area
Pomaderris brunnea Rufous Pomaderris [16845]	Vulnerable	Species or species habitat likely to occur within area
Prasophyllum petilum Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area
Prasophyllum sp. Wybong (C.Phelps ORG 5269) a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area
Prostanthera cineolifera [11233]	Vulnerable	Species or species habitat may occur within area
Pterostylis saxicola Sydney Plains Greenhood [64537]	Endangered	Species or species habitat may occur within

Name	Status	Type of Presence
		area
Pultenaea glabra Smooth Bush-pea, Swamp Bush-pea [11887]	Vulnerable	Species or species habitat likely to occur within area
Thelymitra kangaloonica Kangaloon Sun Orchid [81861]	Critically Endangered	Species or species habitat may occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Blue Mountains	NSW
Burragorang	NSW
Nattai	NSW
Nattai	NSW
Yerranderie	NSW

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Feral deer		
Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis		
Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus		
House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus		
Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus		
Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus		
Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa		
Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes		
Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides		
Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia		
Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus		
Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides		
Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Cabomba caroliniana		
Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera		
Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera		
Boneseed [16905]		Species or species habitat likely to occur within area
Cytisus scoparius		
Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Eichhornia crassipes		
Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista linifolia		
Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Protasparagus densiflorus Asparagus Fern, Plume Asparagus [5015]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-33.879888 150.593843,-33.887014 150.599679,-33.97475 150.471963,-33.963361 150.449304,-33.982152 150.434884,-34.001509 150.470933,-34.05301 150.431451,-34.07235 150.443811,-34.126935 150.47265,-34.130345 150.425958,-34.09851 150.421838,-34.175803 150.338067,-34.154214 150.296869,-34.060974 150.392999,-34.014316 150.412225,-33.98016 150.401239,-33.899268 150.311975,-33.874187 150.311975,-33.865065 150.358667,-33.935736 150.474023,-33.879888 150.593843,-33.879888 150.593843

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Parks and Wildlife Commission NT, Northern Territory Government
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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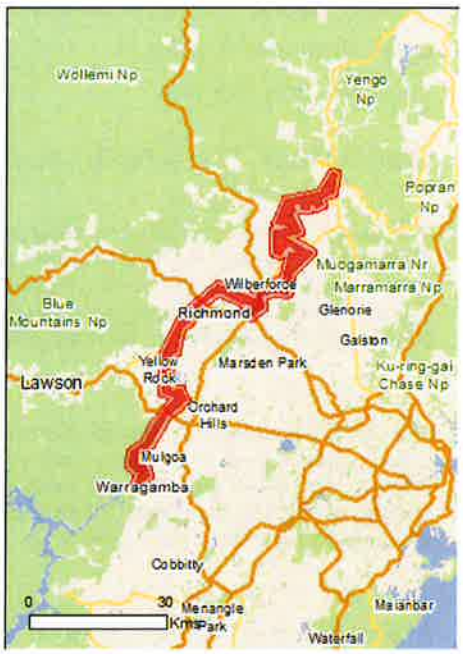
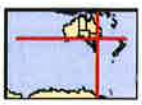


This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 1.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	3
National Heritage Places:	2
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	8
Listed Threatened Species:	83
Listed Migratory Species:	36

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	12
Commonwealth Heritage Places:	None
Listed Marine Species:	41
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	10
Regional Forest Agreements:	1
Invasive Species:	53
Nationally Important Wetlands:	2
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

World Heritage Properties		[Resource Information]
Name	State	Status
Australian Convict Sites (Old Great North Road Buffer Zone)	NSW	Buffer zone
Australian Convict Sites (Old Great North Road)	NSW	Declared property
The Greater Blue Mountains Area	NSW	Declared property

National Heritage Properties		[Resource Information]
Name	State	Status
Natural		
The Greater Blue Mountains Area	NSW	Listed place
Historic		
Old Great North Road	NSW	Listed place

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	Endangered	Community likely to occur within area
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically Endangered	Community likely to occur within area
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Temperate Highland Peat Swamps on Sandstone	Endangered	Community known to occur within area
Turpentine-Ironbark Forest in the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion	Endangered	Community likely to occur within area
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely

Name	Status	Type of Presence to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Name	Status	Type of Presence
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Fish		
Epinephelus daemelii		
Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Macquaria australasica		
Macquarie Perch [66632]	Endangered	Species or species habitat known to occur within area
Prototroctes maraena		
Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus		
Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Litoria littlejohni		
Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat may occur within area
Mixophyes balbus		
Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Other		

Name	Status	Type of Presence
Pommerhelix duralensis Dural Land Snail [85268]	Endangered	Species or species habitat known to occur within area
Plants		
Acacia bynoeana Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat known to occur within area
Acacia gordonii [5031]	Endangered	Species or species habitat likely to occur within area
Acacia pubescens Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat known to occur within area
Allocasuarina glareicola [21932]	Endangered	Species or species habitat likely to occur within area
Asterolasia elegans [56780]	Endangered	Species or species habitat known to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Darwinia biflora [14619]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus aggregata Black Gum [20890]	Vulnerable	Species or species habitat may occur within area
Eucalyptus benthamii Camden White Gum, Nepean River Gum [2821]	Vulnerable	Species or species habitat known to occur within area
Genoplesium baueri Yellow Gnat-orchid [7528]	Endangered	Species or species habitat may occur within area
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat may occur within area
Haloragodendron lucasii Hal [6480]	Endangered	Species or species habitat likely to occur within area
Kunzea rupestris [8798]	Vulnerable	Species or species habitat likely to occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat may occur within area
Micromyrtus blakelyi [6870]	Vulnerable	Species or species habitat likely to occur within area
Micromyrtus minutiflora [11485]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Olearia cordata [6710]	Vulnerable	Species or species habitat likely to occur within area
Pelargonium sp. Striatellum (G.W.Carr 10345) Omeo Stork's-bill [84065]	Endangered	Species or species habitat likely to occur within area
Persoonia acerosa Needle Geebung [7232]	Vulnerable	Species or species habitat likely to occur within area
Persoonia hirsuta Hairy Persoonia [19006]	Endangered	Species or species habitat likely to occur within area
Persoonia nutans Nodding Geebung [18119]	Endangered	Species or species habitat likely to occur within area
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat known to occur within area
Pimelea spicata Spiked Rice-flower [20834]	Endangered	Species or species habitat known to occur within area
Pomaderris brunnea Rufous Pomaderris [16845]	Vulnerable	Species or species habitat likely to occur within area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area
Pterostylis pulchella Pretty Greenhood [6448]	Vulnerable	Species or species habitat may occur within area
Pterostylis saxicola Sydney Plains Greenhood [64537]	Endangered	Species or species habitat known to occur within area
Pultenaea glabra Smooth Bush-pea, Swamp Bush-pea [11887]	Vulnerable	Species or species habitat likely to occur within area
Pultenaea parviflora [19380]	Vulnerable	Species or species habitat likely to occur within area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat likely to occur within area
Tetratheca juncea Black-eyed Susan [21407]	Vulnerable	Species or species habitat known to occur within area
Thelymitra kangaloonica Kangaloon Sun Orchid [81861]	Critically Endangered	Species or species habitat may occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Zieria involucrata [3087]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within

Name	Threatened	Type of Presence area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species

Name	Threatened	Type of Presence
		habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -
Commonwealth Land - Australian Postal Corporation
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Commonwealth Trading Bank of Australia
Commonwealth Land - Defence Housing Authority
Commonwealth Land - Director of War Service Homes
Commonwealth Land - Telstra Corporation Limited
Defence - AIR HEADQUARTERS AUSTRALIA - GLENBROOK
Defence - PENRITH DEPOT (Army Stores)
Defence - RICHMOND - FUEL FARM, DENTAL, MEDICAL
Defence - RICHMOND - MIDDLE MARKER
Defence - RICHMOND RAAF BASE

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur

Name	Threatened	Type of Presence within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche sp. nov. Pacific Albatross [66511]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Agnes Banks	NSW
Blue Mountains	NSW
Cattai	NSW
Dharug	NSW
Maroota Ridge	NSW
Mulgoa	NSW
Parr	NSW
Pitt Town	NSW
Scheyville	NSW
Yellomundee	NSW

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
North East NSW RFA	New South Wales

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Protasparagus densiflorus Asparagus Fern, Plume Asparagus [5015]		Species or species habitat likely to occur within area
Protasparagus plumosus Climbing Asparagus-fern, Ferny Asparagus [11747]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Longneck Lagoon	NSW
Pitt Town Lagoon	NSW

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-33.883368 150.594492,-33.883354 150.594481,-33.882085 150.593462,-33.863414 150.606165,-33.862844 150.593806,-33.853721 150.582133,-33.830338 150.586939,-33.816077 150.613718,-33.7807 150.635691,-33.755013 150.661097,-33.74074 150.67483,-33.734459 150.648051,-33.672194 150.646677,-33.611028 150.684443,-33.558974 150.754481,-33.579571 150.827265,-33.592727 150.822458,-33.595015 150.827265,-33.569845 150.836191,-33.550391 150.876703,-33.562407 150.880823,-33.518911 150.893183,-33.507461 150.89387,-33.506316 150.914469,-33.491429 150.89181,-33.508034 150.878077,-33.505744 150.86503,-33.467947 150.86503,-33.467375 150.896616,-33.461074 150.89387,-33.456491 150.86915,-33.418673 150.887003,-33.407783 150.953608,-33.375105 150.979014,-33.376825 150.987253,-33.40721 150.98176,-33.41638 150.957041,-33.427269 150.959788,-33.431854 150.948115,-33.420965 150.936442,-33.434719 150.934382,-33.434719 150.918589,-33.423258 150.915842,-33.426696 150.900049,-33.436438 150.907603,-33.447897 150.88975,-33.44446 150.902109,-33.47253 150.915842,-33.478257 150.884257,-33.505171 150.939188,-33.541234 150.896616,-33.560118 150.894556,-33.572134 150.893183,-33.569845 150.869837,-33.573278 150.841685,-33.595587 150.845118,-33.611028 150.821085,-33.604166 150.806666,-33.588723 150.816279,-33.587579 150.803232,-33.568129 150.757227,-33.596731 150.714655,-33.618462 150.702296,-33.62761 150.683756,-33.667051 150.67483,-33.672194 150.663157,-33.723037 150.66041,-33.730461 150.66659,-33.729319 150.684443,-33.744737 150.694056,-33.754442 150.683069,-33.77328 150.654917,-33.820641 150.621271,-33.834901 150.597925,-33.85315 150.597239,-33.85144 150.613032,-33.859423 150.618525,-33.869686 150.621271,-33.884508 150.600672,-33.883368 150.594492

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-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
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-Australian Institute of Marine Science
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-Other groups and individuals

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Please feel free to provide feedback via the Contact Us page.

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Commitment:

WaterNSW is committed to preserving the environment by minimising the risk of environmental impacts from its activities, preventing pollution and conducting its operations consistent with the principles of Ecologically Sustainable Development.

Actions:

In support of our environmental commitment and accountability WaterNSW will:

- Identify and control environmental risks and impacts where practicable.
- Influence the activities of ourselves and others to continually improve environmental performance.
- Establish a strong relationship between environmental performance and core business objectives.
- Conserve or enhance the natural, Aboriginal and European heritage values of our assets.
- Promote environmentally responsible practices to our employees, contractors and stakeholders.
- Maintain measures for the efficient use of resources and reduction of pollution.
- Continually review and improve our Environmental Management System.
- Meet all relevant compliance obligations and seek to adopt best practice approaches where practical.

Everyone will:

- Report and record all concerns and incidents to prevent harm to the environment.
- Comply with all environmental policies and procedures.
- Proactively contribute to environmental improvement initiatives.

Managers will:

- Demonstrate leadership in environmental performance.
- Integrate environmental considerations into planning activities.
- Ensure adherence to environmental policies and procedures.

Approved by
The Board of WaterNSW
16 December, 2015

Review Date: December 2017