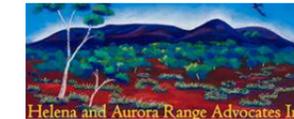


# HELENA AND AURORA RANGE (BUNGALBIN) NATIONAL PARK PROPOSAL

A jewel in the Great Western Woodlands



# A proposal for the creation of the Helena and Aurora Range (Bungabbin) A-Class National Park



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This report was jointly prepared by the Helena and Aurora Range Advocates,

The Wilderness Society WA, and The Wildflower Society of WA.

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**FRONT COVER IMAGE:** The Helena and Aurora Range from J5 | Paul Pichugin

# CONTENTS

|  | Page |
|--|------|
| INTRODUCTION   | 2    |
| THE PROPOSAL   | 3    |
| BOUNDARY OF THE PROPOSED HELENA AND AURORA RANGE (BUNGALBIN) NATIONAL PARK | 4    |
| BRIEF HISTORY OF SCIENTIFIC RECOGNITION OF THE HELENA AND AURORA RANGE     | 6    |
| The Red Books and Beyond   | 6    |
| 1962-1994  | 6    |
| 1980-1994: Attention on Banded Iron Formation (BIF) Ranges                 | 7    |
| 1995-2006  | 8    |
| 2007 The Landmark EPA Bulletin 1256  | 9    |
| 2008-2013  | 10   |
| 2014-2017 EPA rejects mining proposal                                      | 12   |
| Further support for protection   | 13   |
| INDIGENOUS CULTURAL HERITAGE SIGNIFICANCE                                  | 16   |
| AESTHETIC AND LANDSCAPE VALUES   | 17   |
| NATURAL HERITAGE VALUES: BIODIVERSITY AND GEODIVERSITY                     | 18   |
| Biodiversity values  | 18   |
| Threatened and Priority flora  | 18   |
| Threatened and Specially Protected fauna                                   | 18   |
| Endemic flora  | 18   |
| BIF dependent flora  | 18   |
| BIF dependent fauna  | 18   |
| Priority Ecological Community  | 20   |
| Species richness   | 20   |
| Geodiversity values  | 20   |
| The Helena and Aurora Range: a Banded Iron Formation                       | 21   |
| Formation of Banded Iron Formation, meta-sedimentary rocks and BIF ranges  | 21   |
| Current processes on The Helena and Aurora Range and its surrounds         | 21   |
| EUROPEAN EXPLORATION OF THE HELENA AND AURORA RANGE                        | 22   |
| SCIENCE DECLARATION  | 24   |
| THREAT OF MINING   | 26   |
| WHERE TO FROM HERE   | 27   |
| A National Park for the Yilgarn  | 27   |
| PROTECTION OF OTHER BIFS   | 28   |
| CONCLUSION   | 28   |
| REFERENCES   | 29   |



**IMAGE:** From inside a cave | Greg Warburton



**IMAGE:** Pebble Dragon (*Tympanocryptis cephalus*) | Paul Pichugin



**IMAGE:** Western Pygmy Possum (*Cercartetus concinnus*) on *Grevillea georgeana* (Priority 3) on Helena Aurora Range. | Jiri and Marie Lochman

# 1 INTRODUCTION

The Helena and Aurora Range is a part of the traditional lands of the Kalamaia Kapurn (or Kalamayi Gubrun) people, to whom it is known as Bungalbin. The range is located in the Great Western Woodlands (Map 1) and Coolgardie Bioregion (Thackway and Creswell 1995), approximately 400 km east of Perth and 100 km north of Southern Cross.

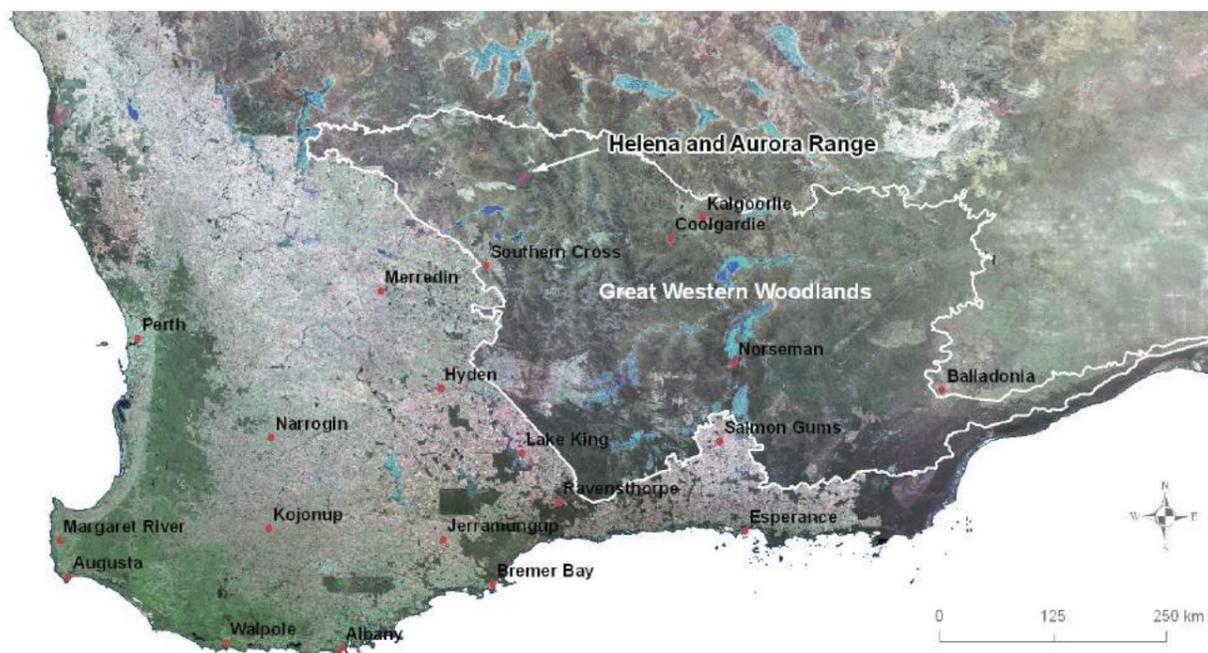
The Helena and Aurora Range is the tallest and largest Banded Ironstone Formation (BIF) range in the Coolgardie Bioregion, being up to 702m above sea level (rising 200m above the surrounding woodlands). The main range extends over a distance of ~13 km, lying in a north-east - south-west direction, as well as ~22 km of low BIF hills extending out to the Northwest (towards Mt Jackson Range). It is located in an otherwise relatively flat landscape with other BIF ranges situated at a distance of approximately 20 km (Hunt Range) to 55 km (Mt Finnerty, Koolyanobbing and Mt Manning Ranges).

Helena and Aurora Range (Bungalbin) has been recognised as being of exceptional conservation value since 1979, when the first biological survey was conducted on this range. However, even to this day, Helena and Aurora Range remains inadequately protected: Its current status as “Conservation Park - Other than Class ‘A’” leaves this unique range exposed to the ongoing threat of permanent loss and damage through mining and lack of management.

With so many of WA’s other outstanding ‘banded ironstone’ ranges destroyed or in the process of being destroyed, its time to right the balance and protect this exceptional example for future generations.

*“The concentration of conservation values associated with the Helena and Aurora Range established that, for its size, the range is one of the more significant biodiversity assets in WA”*

- Environmental Protection Authority WA, Report 1256 2007



Map 1: Location of Helena and Aurora Range (Bungalbin) in the Great Western Woodlands

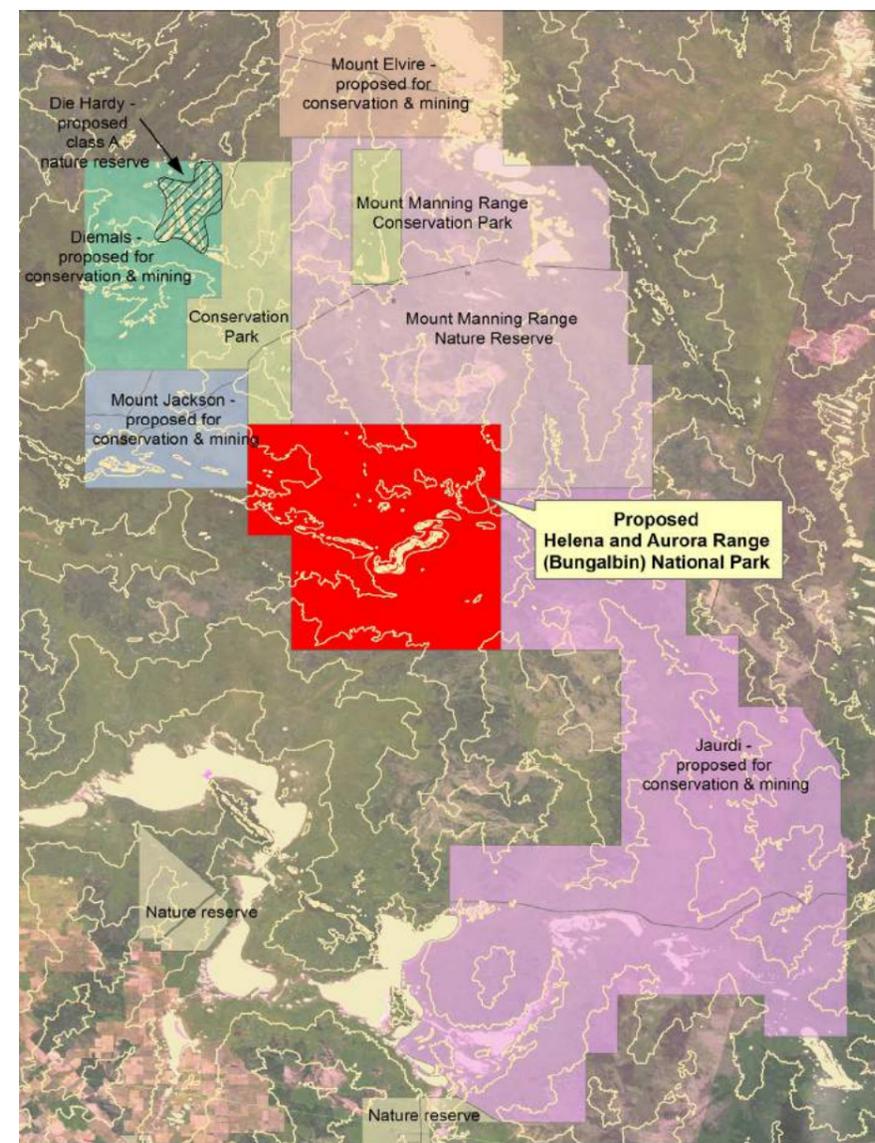
# 2 THE PROPOSAL

Over several decades there have been repeated recommendations from scientists, government agencies, Traditional Owners and conservation organisations for the full protection of The Helena and Aurora Range (Bungalbin).

Adequate and secure protection of the Helena and Aurora (Bungalbin) Range’s exceptional conservation values requires its gazetting as a Class ‘A’ National Park, with the consent and joint management of its Traditional Owners.

**Specifically:**

- Declaration of the area as shown on Map 2 as a “Class A” National Park under the Land Administration Act 1997, to be vested in the Conservation and Parks Commission.



**Legend**

- Proposed Helena and Aurora Range (Bungalbin) National Park boundary
- Salt lakes
- Contours (every 50 m)

0 15 30 Km

Map 2: Proposed Helena and Aurora Range (Bungalbin) National Park boundary and the Mt Manning Reserve

- Joint management of the Park with the area’s Traditional Owners under Sections 8A and 56A of the CALM Act, including the establishment of an Indigenous Rangers group for the park.
- Management planning involving Traditional Owners and scientists to address issues of access to culturally and ecologically sensitive locations.
- Cancellation of any mining interests by use of Sections 19 and/ or 111A of the Mining Act 1978, as the government has done in relation to mining proposals near Margaret River and Horizontal Falls.
- Development of a tourism plan to encourage visitation based on learning about and appreciating the natural and cultural values of the range.

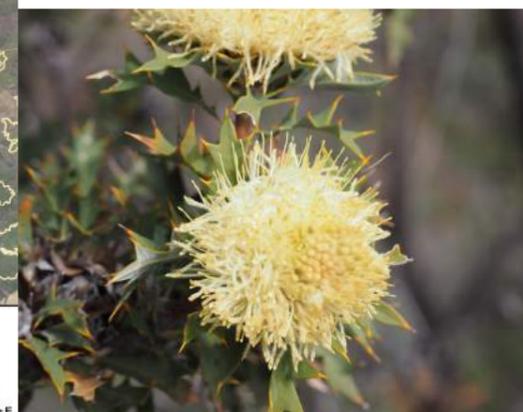


IMAGE: Tree Dryandra (*Dryandra arborea*) is a banded ironstone specialist species found on the range | Ian Hooper

### 3 BOUNDARY OF PROPOSED HELENA AND AURORA RANGE (BUNGALBIN) NATIONAL PARK

The optimal Helena and Aurora Range (Bungalbin) National Park boundary may need to include additional areas based on ecological and cultural values following further consultations with the Traditional Owners, scientists and conservation organisations/departments. The proposed boundary within this report,

- a. Includes the low hills that move out from the main range to the north west for ~15 km (including the 'J5' deposit), part of which is not included within the current conservation park boundary (Reserve no. 48470);
- b. Includes the old Aurora mine site located South of Bungalbin Hill to be managed for its historical mining heritage values.



IMAGE: *Tetradlea aphylla* subsp. *aphylla* endemic to the range | Brian Moyle



IMAGE: Euro or Wallaroo (*Macropus robustus*) found at the range | Jiri Lochman 5



IMAGE: View of the Range from J5 | Paul Pichugin

### The Red Books and Beyond

From 1962 to 1994 there was a strong impetus to develop a science-based conservation reserve system for Western Australia, and indeed in Australia. Both Helena and Aurora Range and Mt Manning Range were recognised early on as being of great conservation significance: in the early sixties in the case of Mt Manning and in the late seventies in the case of Helena and Aurora Range (when further biological surveys were conducted in the eastern Goldfields) (Australian Academy of Science, 1964; Dell et al., 1985a).

Despite Mt Manning Range, located to the north of Helena and Aurora Range, being recommended to be included in the conservation reserve system in the early 1960's, when the Mt Manning Nature Reserve was finally created in 1979 it excluded Mt Manning itself – which was instead designated ‘conservation park’ to allow for future mining.

Nevertheless, the recommendation and formation of the Mt Manning Reserve has been crucial to the recognition of the high conservation value of Helena and Aurora Range and the strong push for its conservation.

Helena and Aurora Range was first recommended to be included within the Mt Manning Reserve in 1980 (Keighery, 1980); it was again recommended for protection in 1989 by Henry-Hall (Henry-Hall, 1989); and again in 1994 in the “Goldfields Region Management Plan 1994-2004” (DEC, 1994).

**In December 2005, Helena and Aurora Range was formally included within the Mt Manning Reserve when it was vested as Conservation Park – Other than Class ‘A’ together with Mt Manning Range Conservation Park (Reserve no. 48470).**

This lesser category of reserve was adopted by government to allow for mining as a potential land use.

In 2007, after it had been declared a lowly conservation park, Helena Aurora Range was recommended to become a Class ‘A’ Nature Reserve by the EPA (EPA Bulletin 1256 – see below). This advice was not implemented by government.

### A brief history of official advice and recommendations follows.

#### 1962-1994

As early as 1962, the Mt Manning Range area just 50 km north of Helena and Aurora Range, was recommended as a reserve by the Western Australian Subcommittee of the Australian Academy of Science Committee on National Parks (Australian Academy of Science, 1964). This was followed by the Reserves Advisory Council recommending that Mt Manning Range area be made a reserve to protect flora and fauna in 1969.

The development of a reserve system for conservation in Western Australia took on new momentum and direction with the formation of the Environmental Protection Authority (EPA) in 1971. One of the first actions of the EPA was to review and update the recommendations made in 1962 by the Subcommittee of the Australian Academy of Science (WA), in respect to WA's national parks and nature reserves. The Conservation Through Reserves Committee (CTRC) was appointed by the EPA to conduct this review and make recommendations to the EPA published in a series of ‘Green Books’ (Conservation Through Reserves Committee, 1974). The EPA then published the resulting ‘Red Books’ with recommendations to the Government in 1976, 1978, 1981 and 1984.

The CTRC's recommendations were presented within 12 Systems (areas) of Western Australia. For example Perth/Swan Coastal Plain is within System 6 and the Helena and Aurora Range and Mt Manning Range are within System 11: Goldfields (Environmental Protection Authority, 1975). There were two recommendations for the Mt Manning area:

1. That the Mt. Manning Range area as shown in Fig. 11.0 be declared a C Class reserve for the Conservation of Flora and Fauna, vested in the Western Australian Wild Life Authority;
2. That the West Australian Wild Life Authority be asked to examine the possibility of extending the boundaries to include Mt. Jackson and The Die Hardy Range. (Conservation Through Reserves Committee, 1974).

Mt Manning Nature Reserve was gazetted as a Class C reserve in September 1979 for the purpose of

conserving flora and fauna (vested in what is now the Conservation Commission of Western Australia). However, the Mt Manning Range itself was excluded due to mining interests.

In 1990 a “Resolution of Conflict” policy was developed and used by the Red Book Task Force towards resolving conflicts between conservation and mining interests. This policy continued to develop and in 1991 the category of ‘conservation park’ was introduced via the CALM Act to enable lands to be reserved for conservation whilst also leaving open options for mining.

The EPA's recommendations for additional nature reserves and national parks in Western Australia were again reviewed in 1993. The objective of the Red Book recommendations was always to establish reserves initially as ‘Class C’ and then upgrade to ‘Class A’ as appropriate or when possible.

#### 1980-1994: Attention on Banded Iron Formation (BIF) Ranges

A biological survey conducted in the eastern Goldfields during 1979 to 1981 by the WA Museum and Department of Fisheries and Wildlife included the Helena and Aurora Range and Mt Jackson Range. Many new plant species were found and it was noted that none of this area was within the reserve system.

*“The Aurora Range including Bungalbin Hill, represents the highest and largest example of ... banded ironstone formation in the eastern Goldfields.” (Newbey and Hnatiuk, 1985)*

The attention on banded ironstone formation ranges (or “BIF” ranges) and their unique flora was also highlighted in 1980 by botanist G.J. Keighery in an article in the *Western Australian Naturalist* (Keighery, 1980).

Keighery highlighted the need for ‘Bungalbin Ranges’ to be conserved and included in the Mt Manning Nature Reserve.

*“The Conservation Through Reserves Committee’s (1974) report recommended that the Mt Manning/Die Hardy and Mt Jackson ranges be reserved. I consider an extension to include the Bungalbin Ranges an absolute necessity.”*

This awareness came with his involvement in the WA Museum survey initiated in 1979.

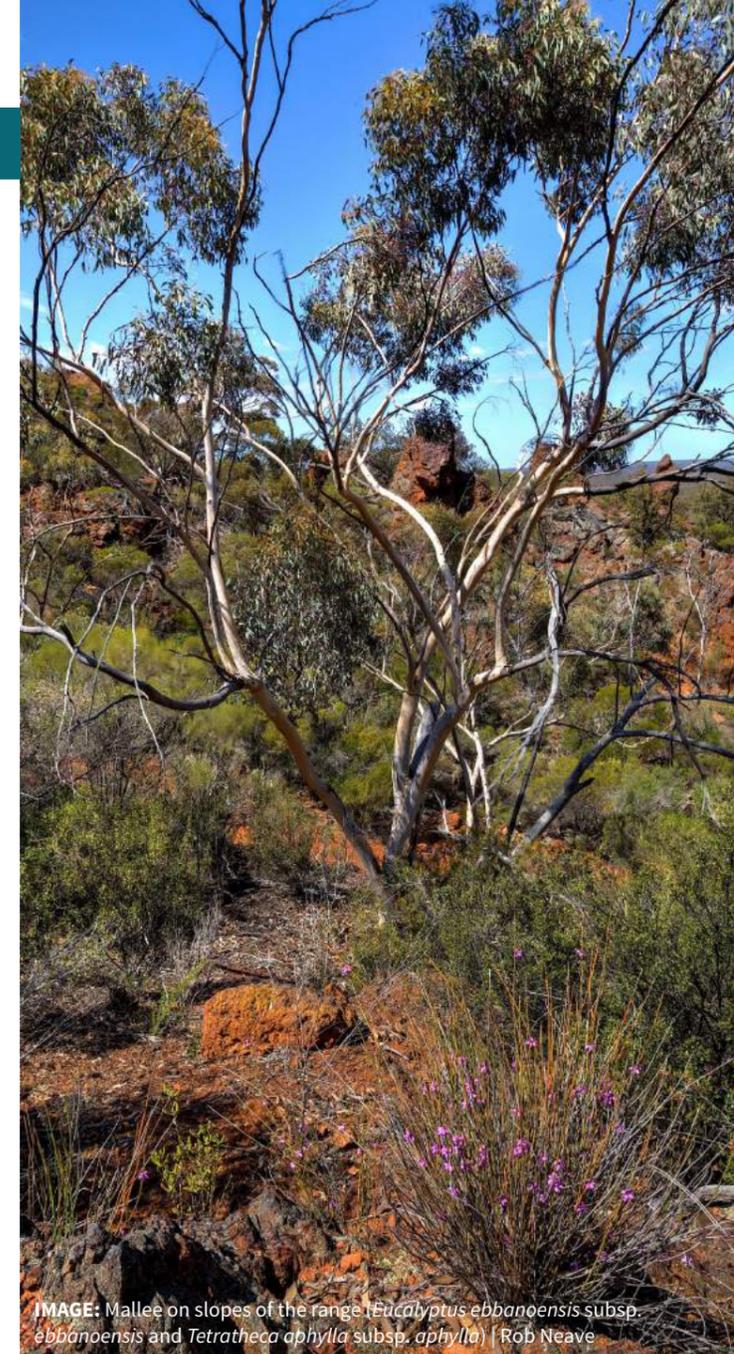


IMAGE: Mallee on slopes of the range (*Eucalyptus ebbanoensis* subsp. *ebbanoensis* and *Tetrateca aphylla* subsp. *aphylla*) | Rob Neave



IMAGE: *Acacia shapelleae* (P1) | Geoff Cockerton

In 1989, Henry-Hall presented a review of biological data supporting the inclusion of Helena and Aurora Range (and Mt Jackson Range) into the Mount Manning Nature Reserve. It was presented to the Red Book Task Force.

In 1993, the Red Book Review was published to record the progress in creating the conservation reserves as recommended by the four Red Books published from 1976 to 1984. The early omission of Helena and Aurora Range from the Red Book Recommendations in 1976 (for System 11) was due to a lack of available information. However, new conservation reserves proposals were not included in the 1993 Red Book review unless they represented updates of existing Red Book recommendations (Environmental Protection Authority, 1993). It was left to the Department of Conservation and Land Management's regional planning process to implement any new conservation reserve proposals that they had identified, presumably including Helena and Aurora Range.

Finally, in 1994, the Department of Conservation and Land Management produced a management plan for the Goldfields region, "Goldfields Region Management Plan 1994-2004", with the recommendation to extend Mt Manning Nature Reserve southwards to include Helena and Aurora Range and to be given 'Class C' status (Department of Conservation and Land Management, 1994).

### 1995-2006

#### 1995 Biological survey on Helena and Aurora Range

In 1995, further biological surveys were conducted on Helena and Aurora Range including flora and fauna. These surveys were conducted by the Department of Conservation and Land Management (CALM) (Gibson et al. 1997; Lyons and Chapman 1997).

#### 2004: The Helena and Aurora Range - 'Class A' Reserve (for a couple of days)

On 28 October 2004, Hon. Dr Judy Edwards, Minister of the Environment, in a media statement, announced that Helena and Aurora Range would become a 'Class A' Nature Reserve along with Die Hardy Range, Yokradine Hills and Boondine Hills, all as part of an expanded Mt Manning Range Nature Reserve. This policy announcement was under an agreement to

allow the mining of Windarling Range and Mt Jackson Range.

A few days later Cabinet overturned this decision, adopting the policy of making these areas 'conservation parks' that would potentially allow mining (subject to EPA assessment and Ministerial approval).

#### 2005: The Helena and Aurora Range (Other than Class 'A') Conservation Park created

The Helena and Aurora Range Conservation Park (No. 48470) was vested on 14 December 2005. With an area of approximately 134,345ha (Department of Environment and Conservation, 2008) it was originally Class C, although it is now classified as Other than Class 'A', under the Land Administration Act 1997. This means that Helena and Aurora Range is available for mining subject only to "consultation" between the Mines Minister and the Minister for Environment. The Conservation Park is vested in the Conservation Commission of WA and managed by (the now) Department of Biodiversity, Conservation and Attractions (formerly DPAW; formerly CALM; formerly DEC).

#### 2006: Drafting of the Northern Yilgarn Conservation Reserves Management Plan

As the Mt Manning Reserve was expanded it became known as the 'Northern Yilgarn Conservation Reserves'. The areas included were Mt Manning Range Nature Reserve (No. 36208), Mt Manning Conservation Park (No. 48470), Helena and Aurora Range Conservation Park (No. 48370), proposed Jaurdi Conservation Park, proposed Mt Elvire Conservation Park and proposed Die Hardy/Jackson/Windarling Range Reserves.

The Department of Environment and Conservation drew up a management plan for these areas on behalf of the Conservation Commission of Western Australia over a period of three years, 2006 to 2008. This document was ultimately in response to five or more documents that identified existing and proposed reserves for the Northern Yilgarn and the identification of areas within pastoral leases that would contribute towards establishing a comprehensive, adequate and representative reserve system. The four main documents were:

- EPA (1975) Conservation Reserves of

#### Western Australia System 11 (Red Book)

- DEC (1994) Goldfields Region, Regional Management Plan 1994-2004
- EPA (2007) Advice on areas of the highest conservation value in the proposed extensions to Mt Manning Nature Reserve Bulletin 1256
- Government of WA (2008) Strategic Review of the Banded Iron Formation Ranges of the Midwest and Goldfields

The public was able to register their interest and provide comments on the Northern Yilgarn management plan throughout the drafting period. Meetings were held with interested parties and public meetings planned. The draft management plan was finally submitted as an Issues Paper to the Management Plan Review Committee in March 2008 and released for public comment in April 2008 (Department of Environment and Conservation, 2008).

#### 2007: Landmark 'EPA Bulletin 1256'

In May 2007 an EPA report was published titled, "Advice on areas of the highest conservation value in the proposed extension to Mount Manning Nature Reserve" (EPA Bulletin 1256).

Bulletin 1256 was commissioned by the Minister of the Environment in 2005 following the approval of the



IMAGE: Exquisite & ancient banded ironstone formations | Paul Pichugin



IMAGE: Wongai Ninggai (*Ningai ridei*) inhabits the range | Jiri Lochman

expansion of the Koolyanobbing iron ore mine site (Portman Iron Ore Ltd) to Windarling and Mt Jackson Ranges. The objective of the report was to determine the areas of highest conservation value within the proposed extensions to Mount Manning Nature Reserve.

It was recognised that while the Banded Ironstone Ranges contained many of the rare and endemic flora and plant communities in the region, they were also the focus of exploration and mining, particularly for iron ore and to a lesser extent for gold and nickel.

The EPA’s recommendations were listed in order of priority, with the first recommendation referring to Helena and Aurora Range:

*“Reserve area [part of Helena and Aurora Range as shown in Map [3] (see right)] as an ‘A Class’ Nature Reserve for protection of high concentrations of endemic rare flora and priority ecological communities, exceptional landforms, threatened fauna habitats, mature eucalypt woodlands that are declining in the Wheat belt and Aboriginal heritage.” (Recommendation No. 1 on Map 3) (EPA, 2007).*

This recommendation was based on the EPA’s assessment that all eight of the EPA’s ‘key reservation factors’ were present on Helena and Aurora Range:

1. Rare flora endemic to BIF range
2. Endemic rare flora in sand plains, woodlands or other habitats
3. Important habitat for specially protected fauna
4. Excellent representation of woodland, sand plain and other inadequately reserved vegetation and animal habitats
5. Aboriginal Heritage sites
6. Substantial landforms with significant visual amenity
7. Historical significance
8. Geo-heritage significance

However, once again, the exceptionally high importance placed on Helena and Aurora Range, this time by the EPA, has not been reflected in subsequent government decisions on the area.

**2008-2013**

2008: Strategic Review of the Conservation and

**Resource Values of the Banded Iron Formation of the Yilgarn Craton, August 2008**

Consists of three documents.

- *Strategic Review of the Banded Iron Formation Ranges of the Midwest and Goldfields. Executive Summary and Actions Arising. Endorsed by Government, October 2007.*
- *Banded Ironstone Formation Ranges of the Midwest and Goldfields. Interim Status Report, Biodiversity Values and Conservation Requirement. Department of Environment and Conservation, September 2007*
- *Strategic Review of an Iron Ore Industry in the Yilgarn Region (with Focus on the Midwest). Regional Setting and Benefits, Mineral Prospectivity, Economic Benefits, Social Benefits and Impact. Department of Industry and Resources.*

2009: Draft Management Plan (also see 2006)

In 2009, the Draft Northern Yilgarn (Mt Manning Range, Mt Elvire and Jaurdi) Conservation Reserves Management Plan was submitted to the Minister for Environment and then submitted to Cabinet. Currently, the document is still with government, progressing through changes and updates, and is due to be released late in 2013 for public comment.

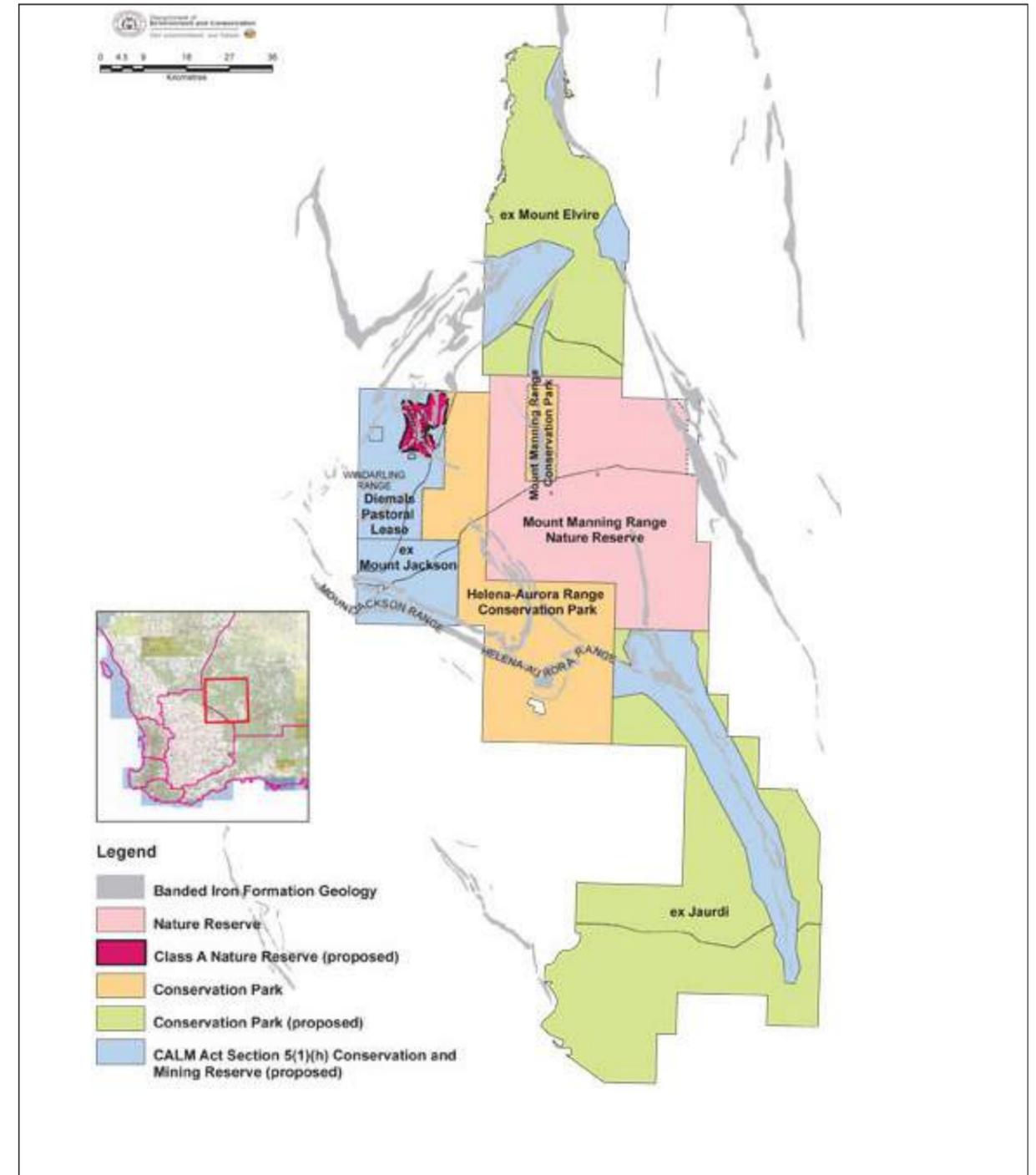
2010: Ministerial Media Statement: New conservation, mining arrangements for Mt Manning

On 1 September 2010 a Ministerial Media Statement was released jointly by then Environment Minister Donna Faragher and then Mines and Petroleum Minister Norman Moore, titled “New conservation, mining arrangements for Mt Manning”.

Described as the result of the two departments (DEC and DMP) identifying, “a balanced way to move forward to address conservation and mining values in the area”, the outcome was not favourable for Helena and Aurora Range, nor for most other BIF ranges (see Map 3).

The revised conservation reserves within the Mt Manning area included the following proposed tenures:

- Mt Manning Range Nature Reserve to be ‘modified’ to remove a section in the north east for mining;



**Map 3.** Western Australian Government proposed boundaries and tenure for conservation reserves within the Mt. Manning area announced in September 2012.

Source: DEC website 2012, as announced on 1st September in a media statement “New conservation, mining arrangements for Mt Manning” by Environment Minister Donna Faragher and Mines and Petroleum Minister Norman Moore.

- The Mt Manning Range itself retained as a Conservation Park [allows mining];
- Helena and Aurora Range to be retained as a Conservation Park [allows mining];
- Mt Finnerty Range (former Jaurdi Pastoral Lease), Hunt Range, Johnson Range (Diemals Pastoral Lease), Windarling Range (Diemals Pastoral Lease), Mt Jackson Range (former Mt Jackson Pastoral Lease) and areas of the former Mt Elvire Pastoral Lease to be reserves for conservation and mining under section 5(1)(h) of the Conservation and Land Management (CALM) Act 1985 [allows mining];
- Areas of the former Mt Elvire and Jaurdi Pastoral Leases (not including Banded Ironstone Formation geology) to be Conservation Parks (not 'Class A') [allows mining];
- Die Hardy Range to be a Class A Nature Reserve, excluding a mineralised portion in the South-East, when the area is relinquished from the Diemals pastoral lease or when the lease expires in 2015.

**2014-2017**

**2014: EPA commences first assessment of the mining proposal and announces level of assessment**

Mineral Resources referred the “J5 and Bungalbin East Iron Ore Project” to the EPA in July 2014. During a public comment period 1043 submissions were received. The EPA recommended that the J5 and Bungalbin East proposal be assessed at API Category B (environmentally unacceptable) and recommended mining not be permitted.

**2016: Minister for the Environment directs EPA to assess J5 and Bungalbin East mining proposal as a PER (Public Environmental Review)**

Following an appeal period and the Appeal Convenor’s report, the (then) Minister for the Environment Albert Jacob directed that the EPA assess the J5 and Bungalbin East Iron Ore proposal at the level of a Public Environmental Review (PER).”  
 - The proponent’s PER was released for public comment on 5 September 2016 for a period of eight weeks. The EPA received a total of 1487 submissions - almost all opposing mining.

**2017: EPA (Report 1599)**

The EPA released its second assessment report on the J5 and Bungalbin East Iron Ore proposal in June 2017 with the recommendation that the mine proposal was environmentally unacceptable and should not be implemented. This was based on the high biodiversity, landform and social values of the range and that the proposed impacts were not considered to be manageable.

The high biodiversity values included unmanageable impacts to rare and endemic flora, unique vegetation associations (PEC) and new species of Troglifauna. Landform values highlighted that proposed impacts were significant and irreversible and would

*“... compromise the integrity of the largest, highest and steepest BIF Range in the Mount Manning Region ...”*

Social values included impacts to Registered Aboriginal Heritage sites and other heritage values relating to nature-based tourism and recreation. It was also noted that the high biodiversity, social and landform values are intrinsically linked.

The EPA report also reiterated the EPA’s view that the Helena and Aurora Range should be protected as an A Class conservation reserve:

**Class A formal reservation**

*“Previous EPA and government recommendations have recognised the high conservation value of Yilgarn BIF ranges and the importance of protecting examples of outstanding BIF landforms and their ecosystems in entirety...To date, no Yilgarn BIF ranges are protected from mining in secure class A conservation estate and an imbalance between conservation and development in the Yilgarn Region remains...The Helena-Aurora Range supports the highest biodiversity significance of any of the BIF ranges in the Mount Manning Region along with other significant environmental values which require protection in entirety. The EPA advises, on the basis of the new information provided in the [Environmental Review Document] and the [Response to Submissions], the case for inclusion of the Helena-Aurora Range in class A formal reservation is now even more compelling.”*



MAP 4: Showing the contours of the Range | Produced by John Lang



IMAGE: Grevillea (Grevillea georgeana) | Rob Neave



IMAGE: View to Bungalbin Hill | Paul Pichugin



Landscape view highlighting the panoramic beauty of the range. Photo: Paul Pichugin

*“Bungalbin country is special to our people with rich spiritual dreaming stories, songs and dances about it. Our old people loved and respected this beautiful area knowing also the special places and secrets held within, and our people would care for them. Bungalbin also loved our old people because it knew one day they would return and it would welcome them.”*

- Trevor Donaldson: Traditional Custodian and descendant of King Billie (Nyuumanging or Nyuumanii)



IMAGE: Kalamaia Kapurn warriors near Bullfinch, south of Bungalbin, 1910 | Royal Historical Society WA



IMAGE: Brian Champion, Elder, Kalamaia Kapurn (Gabrun) People and Traditional Owner of Bungalbin



Bungalbin is a very significant cultural landscape feature for the region’s Kalamaia Kapurn people. The EPA’s assessment of the proposal to mine the range again highlighted that significance via the documentation of numerous known and likely Aboriginal heritage sites. The entire, intact range however is of high cultural heritage importance.

Despite previous attempts to register a native title claim over Bungalbin, as of November 2017 there are no registered (or determined) Native Title claims over the range (Map 5).

However, a new Native Title claim prepared up by the Kalamaia Kaalaako Kapurn Native Title claimant group is currently in the initial registration stages. There are clearly Traditional Owners and Indigenous communities who are the custodians for this remarkable area and their rights, interests and wishes must be respected.

In its 2007 report on the significance of the Mt Manning/Helena and Aurora Range region, the EPA stated:

4.6. Aboriginal significance

*“There are many Registered Aboriginal Sites scattered throughout the Mount Manning study area, with the highest concentrations at locations in Table 11. Those at the Helena and Aurora Ranges, especially Bungalbin Hill seem to have the greatest significance. Many geographic features in the MMR also have mythological significance (Henry-Hall 1989). There are two native title claims, the Wutha People (WC99\_010) and the Central West People (WC99\_029). The Gabrun and Kalamaia Kabu (sic) are included within the Central West People.” (EPA 2007)*

Map 5. Current Native Title claims in the Yilgarn region (Source: National Native Title Tribunal: “Native Title Vision” mapping page)

The Helena and Aurora Range has been described as the “Jewel in the Crown” of the BIF Ranges in the Yilgarn. Some of the characteristics of the range which have led to this title being bestowed are:

- Highest land for 100s of kilometres
- Rolling ranges with prominent ridge lines that twist and turn
- Outcropping BIF columns, cliff faces and caves
- Steep faces and gullies for fauna and flora habitat
- Views unchanged by human impacts
- Scenery in its own right
- Wooded hillsides
- A study area for geoheritage and evolutionary processes

It has surrounding eucalypt woodlands of Salmon Gum and Gimlet (to name a few) beyond which extends a very biodiverse Sandplain.

The Helena and Aurora Range is the largest example of BIF in the eastern Goldfields. It is a large range in the context of south west Western Australia as well as the tallest and largest Banded Ironstone Formation (BIF) Range in the Coolgardie Bioregion, being up to

704m above sea level (200m above the surrounding woodlands) and the main range made up of uniquely convoluted hills extending over a distance of 13km(lying in a north-east - south-west direction), as well as ~15km of low BIF hills extending out to the northwest (towards Mt Jackson Range).

It is located in an otherwise relatively subdued landscape with other BIF ranges situated at a distance of approximately 20km (Hunt Range) to 55km (Mt Finnerty, Koolyanobbing and Mt Manning Ranges) visible on the horizon from the top of Helena and Aurora Range..

The geographic complexity of the landscape is linked to the presence of highly diverse endemic flora and it being a biodiversity hotspot.

These landscape features are relatively easily accessible to visitors and have historical significance. The earliest European exploration took place in 1861. Now it is an easy day’s drive from Perth.

As early as 1985, the concept of conserving ‘landform’ was discussed in Dell et al. (1985). Eight landform units were identified from surveys within the Jackson and western half of Kalgoorlie map sheets, of which four were noted as not being represented within reserves [in 1985] including the landform category: “Hill (banded ironstone formation)”.



IMAGE: Woodlands for as far as the eye can see | Paul Pichugin

**Biodiversity values**

Biodiversity refers to the flora and fauna of an area. The banded ironstone (BIF) ranges on the Yilgarn Craton are thought by ecologists to have acted like islands. As the climate became drier the BIF ranges are likely to have provided more sheltered habitat with more reliable water availability, eventually supporting groups of refugia species that do not occur elsewhere.

The biodiversity of the Helena and Aurora Range can be measured by its species richness (total number of plant and animal species) and number of endemic species, as well as its intactness and rarity. There are also the flora and fauna that are dependent on the BIF habitat of Helena and Aurora Range. Without the range, these species would not be present within the local area. Helena and Aurora Range contributes to the local, regional, state and national biodiversity.

Based on available information, the threatened and priority flora and fauna on Helena and Aurora Range have been itemized below, as well as those species that are endemic or considered to be BIF dependent:

**Threatened and Priority flora**

There are two **Declared Rare Flora (DRF)** on Helena and Aurora Range:

- *Tetratheca aphylla* subsp. *aphylla* (listed as Threatened (or Rare) in WA and Vulnerable by the Commonwealth) (see right) and
- *Leucopogon spectabilis* (listed as Threatened (or Rare) in WA and Critically Endangered by Commonwealth) (see right).

Both of these plant species grow in the crevices of the BIF rock on Helena and Aurora Range.

Currently there are fourteen **Priority plant species** (listed in WA). These are:

- Two sedge species, *Lepidosperma bungalbin* (P1) known as Bungalbin Swordsedge and *Lepidosperma ferricola* (P3) meaning iron loving, often growing among BIF boulders in gullies on the slopes where water must ‘cascade’ over the rocks during heavy rainfalls.
- One grass species, *Neurachne annularis* (P3), that grows in a similar way to a spinifex in clumps, circles and half-circles forming the dominant understory over large areas of the Range.

- One *stenanthemum*, *Stenanthemum newbeyi* (P3)
- One lamiaceae (‘mint’ family), *Spartothamnella* sp. *Helena and Aurora Range* (PG Armstrong 155-109) (P3), yet to be described, named and published by taxonomists. Has white flowers and small, bright red fruits.
- Two acacia species, *Acacia adinophylla* (P1) and *Acacia shapelleae* (P1)
- One pea species, *Mirbelia ferricola* (P3)
- One dryandra species, *Dryandra arborea* (P4) known as the Yilgarn Dryandra and restricted to growing on BIF outcropping and ranges. (referred to as *Banksia arborea* by the WA Herbarium, the *Dryandra* having been roused together with the *Banksia*)
- Two grevillea species, *Grevillea georgeana* (P3) and *Grevillea erectiloba* (P4).
- One eucalypt species, *Eucalyptus formanii* (P4).
- One eremophila (Scrophulariaceae) *Eremophila hamulata* [previously known as *Eremophils* sp. McDermind Rock (AP Brown 3615) (P1)
- One brassica (Brassicaceae) *Phlegmatospermum eremaeum* (P3)

**Threatened and Conservation Significant fauna**

There is one Threatened Fauna species (listed in WA) on Helena and Aurora Range:

- Malleefowl (*Leipoa ocellata*),

There are four conservation significant fauna species (listed in WA) on Helena and Aurora Range:

- Fork-tailed Swift (*Apus pacificus*) International Agreement Migratory
- Rainbow Bee-eater (*Merops ornatus*) International Agreement Migratory
- Peregrine Falcon (*Falco peregrinus*) Specially Protected
- Tree-stem Trapdoor Spider (*Aganippe castellum*) Priority 4

**Endemic flora**

Based on current available information there are five endemic plant species on Helena and Aurora Range including



IMAGE: Little Long-tailed Dunnart (*Sminthopsis dolichura*) | Jiri Lochman.



IMAGE: Critically endangered *Leucopogon spectabilis* | Ben Eckermann



IMAGE: Threatened and vulnerable *Tetratheca aphylla* subsp. *aphylla* | Ian Hooper



IMAGE: Mitchell's Hopping-mouse (*Notomys mitchellii*) | Jiri Lochman.



IMAGE: *Neurachne annularis* (P3) | Amy Matheson

- *Tetratheca aphylla* subsp. *aphylla* (T),
- *Leucopogon spectabilis* (T),
- *Lepidosperma bungalbin* (P1),
- *Acacia adinophylla* (P1), and
- *Acacia shapelleae* (P1).

### BIF dependent flora

There are at least ten banded ironstone formation (BIF) dependent flora including the two DRF species (*Tetratheca aphylla* subsp. *aphylla* and *Leucopogon spectabilis*) plus eight of the Priority species including *Dryandra arborea* (P4), *Stenenthemum newbeyi* (P3), *Acacia adinophylla* (P1), *Acacia shapelleae* (P1), *Mirbelia ferricola* (P3), *Grevillea georgeana* (P3), *Lepidosperma ferricola* (P3) and *Lepidosperma bungalbin* (P1).

There is also *Neurachne annularis* (P3) that is strongly associated with the BIF debris slopes on Helena and Aurora Range (not found in the tall open woodlands or shrubby sand plains nearby), however, may occur on other types of landforms elsewhere.

### BIF dependent fauna

Two BIF dependent fauna; Peregrine Falcon and Little Woodswallow are both dependent on the BIF outcropping for nesting sites.

A further six species are dependent on BIF habitat including Western Yellow Robin, Golden Whistler, Shy Hylacola, Woolley's Pseudantechinus, and Long-tailed Dunnart (P4) (Department of Environment and Conservation, 2008).

### Priority Ecological Community

One priority ecological community has been identified on Helena and Aurora Range. It is listed as:

*Priority Ecological Community (PEC); Helena and Aurora Range vegetation complexes (banded ironstone formation). Threats: iron ore mining Priority 1. (listed in WA).*

### Species richness

Botanical surveys of Helena and Aurora Range and its immediate surrounds have listed a total of 382 native flora species (NatureMap search November 2014). Given the size and complexity of the Helena and Aurora Range, further surveys are likely to locate

additional plant species.

Based on the fauna surveys by Dell et al. (1985), Lyons and Chapman (1997) and Ecologia (2014) a total of 161 fauna species have been identified as occurring on the Helena and Aurora Range. This includes; 87 bird species, 46 reptile species, two frog species and 26 mammal species (nine marsupials, nine bats, four rodents as well as dingo, fox, feral cat and rabbit). It is likely that further biological surveys will find additional fauna species.

### Geodiversity values (geology and landform)

Geodiversity refers to the bedrock, landform and soil of an area. Their features, assemblages, systems and processes are included. The uniqueness of the geodiversity values is also considered important.

The two main features of Helena and Aurora Range that make up part of its geodiversity are (1) that it is the highest land form in the region and (2) that it is made up of distinctive Banded Iron Formation (BIF) outcropping, caves, and rock faces. Helena and Aurora Range is also a unique land form in its own right with its own distinctive form; lying in a north-east to south-west direction, with its steep sided often convoluted hills. The size of the range and its extensive Banded Iron Formation outcropping provide significant habitat for flora and fauna not found on the woodlands and sand plains below, including refugia for plants that prefer wetter climates. As such, the geodiversity of Helena and Aurora Range greatly adds to the biodiversity of the area. A description of the geology of Helena and Aurora Range and the processes that brought about its formation are described below including some features distinctive to Helena and Aurora Range.

### Helena and Aurora Range: a Banded Iron Formation

Helena and Aurora Range is referred to as a Banded Iron Formation range. It is the tallest range in the Coolgardie Bioregion standing at 684m (Bungalbin Hill) to 704m high above the Australian Height Datum (AHD) at its highest points. This is approximately 200m to 280m above the surrounding plains. The bedrock of Helena and Aurora Range includes metamorphosed and deformed basalt, banded ironstone formation, chert, and quartzofeldspathic

rock types, surrounded by relatively undeformed granitoid bodies. The regolith includes well developed duricrust overlying a typical saprolite profile.

From a broader view, Helena and Aurora Range is within the southeastern part of the Marda-Diemals greenstone belt, in the Southern Cross Granite-Greenstone Terrane of the Archaean Yilgarn Craton. A craton having attained stability for a long period of time. The Marda-Diemals greenstone belt includes two, steeply dipping greenstone successions, the lower of which is characterised by mafic volcanic rocks and BIF. This lower succession is further subdivided into three sub-units, of which the middle one is characterised by BIF and chert. The lower association is primarily basalt.

Greenstones are metamorphosed, deformed and steeply dipping belts of mafic to ultramafic volcanic rock, associated with sedimentary rocks located between granite and gneiss bodies within, in this case, the Archaean Yilgarn Craton. These are ancient geological materials (formed around 2.6 billion years ago) before complex life-forms evolved and well prior to any glaciation.

Duricrust formed much more recently, when laterisation occurred in the Cainozoic (1.8 to 65 million years ago). This was a process of hardening at or near the earth surface, usually including relatively low iron content (compared to BIF) as well as silica and alumina.

### Formation of Banded Iron Formation, metasedimentary rocks and BIF ranges.

Banded Iron Formation is iron rich chert, where chert is predominantly silica. The banding occurs where the concentration of oxidised iron in the minerals changed over time as it was formed. BIF is considered to have formed via a sedimentary process under the sea. One possible explanation of this process is that it occurred as oxygen levels rapidly increased (through the activity of phyto-plankton) following a time of very low oxygen levels. Iron precipitated out as insoluble iron oxides forming sediment on the sea floor. The sedimentary BIF was altered via pressure and or heat to become metasedimentary rock. This was followed by a great uplifting at the earth's surface such that the BIF jutted upwards and became exposed as the lateritic duricrust on top of the BIF eroded away.

BIF is more erosion resistant than the rest of the greenstone and combined with the uplifting have formed the BIF ranges we see today. In most areas of Helena and Aurora Range, the BIF was uplifted from the south, dipping to the north and north-west. The BIF outcropping on Helena and Aurora Range shows signs of great weathering (oxidation) over time. Regolith studies show that the topographically highest BIF outcrops have not been lateritised and remained unaffected by the local development of duricrust, which is unusual among the BIF ranges in the Coolgardie Bioregion.

Some of the features of the exposed banded ironstone formation (BIF) that are beneficial to plants include, the presence of crevices and a degree of porosity in the rock. Fine soil and plant seeds collect as winds and water (from rainfall) move over the rock surfaces and BIF with high iron content can hold water, thereby potentially providing a source of water to plants. These two features enable plant seeds to germinate within BIF rock crevices, their roots to find purchase and the plants to grow and survive using the available resources. It is in this way that the BIF



IMAGE: Banded Iron Formation | Rob Neave

on Helena and Aurora Range supports the two endemic threatened plant species *Tetratheca aphylla* subsp. *aphylla* and *Leucopogon spectabilis*.

### Current processes on Helena and Aurora Range and its surrounds

In the current day, the land form of Helena and Aurora Range, being an extensive, steep, tall, convoluted series of hills, has processes that affect the surrounding areas, as well as the land form itself. The primary process is weathering, from rainfall and the sun, creating water runoff, erosion, splitting of rocks via heating and cooling, as well as potential chemical reactions in the

soils (via rain, organic material and ground water).

The soils on the Helena and Aurora Range consist of predominantly red sands, skeletal on the ridges, upper and mid slopes, and shallow on the colluvial lower slopes. The soils on the adjacent flat plains are comprised to large extent of the materials on the Helena and Aurora BIF Range. However, the clay content is usually greatly increased, as the grains that make up the soils become finer, and the soil profiles much deeper and more complex.

*“Along with high biodiversity values, the landforms of the Helena and Aurora Range also have significant social values including aesthetic, recreational, cultural and scientific values...The Department of Parks and Wildlife considered the Range’s complex landform to be an integrating factor as it is closely related to biodiversity, amenity, recreational tourism and heritage...The Helena and Aurora Range is significant in terms of its biodiversity values and prominence (size, area, height), it contains areas of significant slope, elevation and aspect and is the focal point for recreation and tourism in the region.”*

- Environment Protection Authority (EPA) Report 1599  
June 2017



IMAGE: Hikers enjoying the ranges for recreational use | Rob Neave

### A brief summary of European exploration on The Helena and Aurora Range is itemised below

In 1861 an expedition comprising of the Dempster brothers (Charles Edward and Andrew), Charles Harper and Barnard Drummond Clarkson were the first European explorers, with Correll (Aboriginal), to document the Helena and Aurora Range – which they named the “Kennedy Range”. [Brooker 2006]

This expedition also named what is now Bungalbin Hill, “Mount Kennedy”, after Arthur Edward Kennedy – governor of the Swan River Colony from 1855 – 1862. However, this name had already been given to another WA peak by explorer Francis Gregory in 1858, so was not adopted.

In 1895 Surveyor E.H. Absolon recorded the Aboriginal name as Bungalbin.

The range itself was left unnamed by the colony until 1876 when Alexander Forrest named it Helena and Aurora Range, most likely after Helena Aurora Monger, the daughter of John and Henrietta Monger.

Two gold mines are close to the range, being Aurora Mine (now abandoned) and Mt Dimer mine.

In the 1950’s & 1960’s BHP did exploration drills for iron ore around the range and opened up many of the tracks that are used today.

Due to the remoteness of the Helena and Aurora Range, the area is relatively untouched. This makes it a well known area to naturalists, campers and four wheel drivers.

There is huge potential for tourism in this region with eco-tourism/European history/Aboriginal culture-based guided tours, featuring Aurora mine, Bungalbin Hill, Pittosporum Rock, Kurrajong Rock, Jaurdi Station, 71 Mile Rock, Mt Elvire Homestead, Mt Jackson Homestead, Wallaroo Rocks just to name a few.

The Range is mentioned in 4WD magazines and guides, one being the “4WD Days in the Goldfields”- the Roly Dimer Tour.



IMAGE: Hikers enjoying the ranges for recreational use | Rob Neave



IMAGE | Rob Blakers

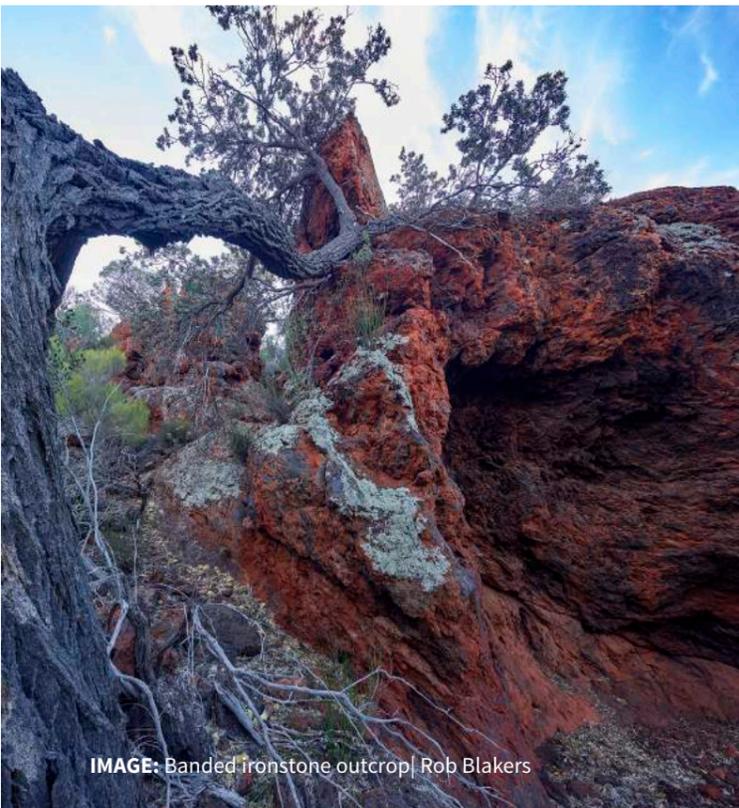


IMAGE: Banded ironstone outcrop | Rob Blakers

**An open letter to the Western Australian Premier Mark McGowan,**

**The Western Australian Environment & Disability Services Minister Stephen Dawson and**

**The Western Australian Minister for Mines and Petroleum; Commerce and Industrial Relations; Electoral Affairs; Asian Engagement Minister Bill Johnston**

We, the undersigned scientists, call upon the Government to protect the Helena and Aurora Range (Bungalbin) from mining and upgrade protection over the range to a Class "A" National Park.

We endorse that the EPA and other government bodies have recommended protection for this ancient, unique range of global heritage significance for over 50 years. The natural values found in this area have been formally recognised by scientists since the 1980's, and since then there have been repeated calls for protection, including a 2007 EPA report on the region, the 2012-2013 EPA annual report and most recently in the EPA report on the current mining proposal (2017).

The Helena Aurora Range is a significant, intact geo-heritage feature of the Banded Ironstone Formation Ranges of the Yilgarn Region of Western Australia. These Ranges are remnants of a landscape dating back over 2.6 billion years, meaning that they are among the most ancient landforms on earth.

The Helena and Aurora Range is a refuge for both threatened flora and fauna. It boasts significant aboriginal heritage sites and is home to a unique ecological community with species found nowhere else. In summary, the biodiversity of the range that has been described to date includes:

**2 Declared rare endemic flora species** (*Tetratheca aphylla* subsp. *aphylla* and *Leucopogon spectabilis*) plus 3 other endemic plant species

**1 Threatened fauna species,**

**4 Conservation significant fauna species,**

**10 BIF-dependent flora species,**

**14 Priority plant species,**

**152 Native fauna species**

**350 Native plant species**

After decades of science-based recommendations for the full and secure protection of the Helena and Aurora Range (Bungalbin), in light of the threats facing the range and excellent opportunity for joint management with Traditional Owners, the time has come for the WA government to act responsibly and protect this exceptional feature of our environment for future generations.

With so many of WA's other outstanding banded ironstone ranges destroyed or in the process of being destroyed, it's time to get the balance right and protect this exceptional intact biodiversity hotspot for future generations.

Yours sincerely,

**The undersigned Scientists**

**John Bailey**, Emeritus Professor, School of Veterinary and Life Sciences, Murdoch University

**Stephen Hopper**, Professor of Biodiversity & Conservation Biology, CENRM & School of Biological Sciences at University of Western Australia

**Carmen Lawrence**, Professor in Psychology, School of Psychological Science, University of Western Australia

**Harry F. Recher**, FRZS, AM, Senior Fellow, The Australian Museum, College St., Sydney, Adjunct Professor, Veterinary and Life Sciences, Murdoch University, Murdoch, WA. Professor Emeritus, School of Natural Sciences, Edith Cowan University, Joondalup, WA

**Fiona Stanley**, Professor Child Health & Epidemiology, Telethon Kids Institute and the University of Western Australia.

**Hans Lambers**, Professor in Plant Biology, School of Biological Science, University of Western Australia

**Dr Denis Saunders** AM Retired CSIRO Chief Research Scientist, Member Wentworth Group of Concerned Scientists

**Professor Richard J Hobbs**, IAS Distinguished Fellow, School of Plant Biology, University of Western Australia

**Peter W G Newman**, Professor of Sustainability, Curtin University Sustainability Policy Institute

**David M Watson**, Professor in Ecology, Institute for Land Water and Society, and School of Environmental Sciences, Charles Sturt University

**Judit Szabo**, PhD, Adjunct Researcher, Avian Conservation, Charles Darwin University, Darwin, Australia

**Andrea Gaynor**, Associate Professor of Environmental History, The University of Western Australia

**+ 50 other signatories** which can be viewed at [greatwesternwoodlands.com/harscience](http://greatwesternwoodlands.com/harscience)

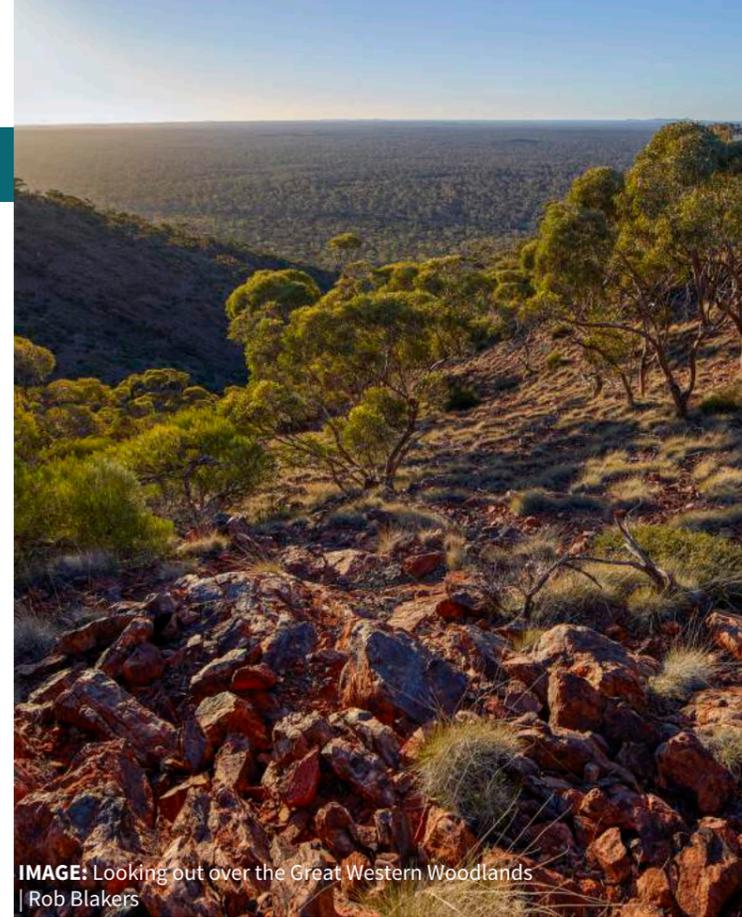
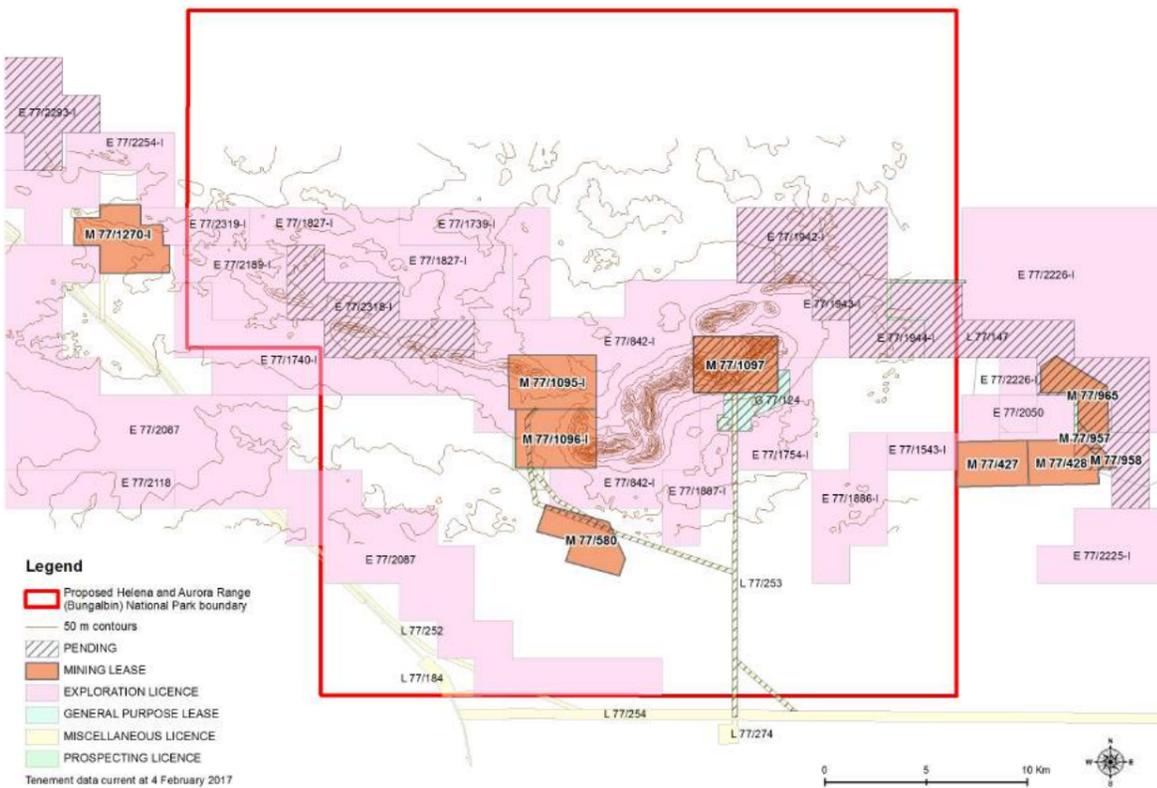


IMAGE: Looking out over the Great Western Woodlands | Rob Blakers



As the map above shows, there are currently many mining tenements in the Helena and Aurora Range area (see Map 6). There are seven crucial tenements covering almost the entire Helena Aurora Range itself: three active Exploration Licences, three active Mining Leases, and one pending Mining Lease. All of these key seven tenements are held by Mineral Resources Ltd. They are:

- E 77/1420; EL 77/842; E 77/1097
- M 77/1095; M 77/1096; M 77/580
- M (pending) 77/1097

All of these leases need to be removed, via the Mining Act 1978, at the same time as the new National Park is created.

The WA Department of Environment and Conservation report (DEC, 2007) within the “Strategic Review of the Conservation and Resource values of the Banded Iron Formation of the Yilgarn Craton” (Government of Western Australia, 2008) states that the removal of entire or portions of BIF ranges has irreversible, permanent effects. This includes removal of much of the range and creation of waste rock dumps, a by-product of mining, which do not provide habitat comparable to the removed BIF range.

This has a direct effect on plants and animals dependent on BIF range habitat (land form/ geology and the plants and fauna that coexist on it). Geological processes that are affected or changed by the removal of BIF ranges include: run off from the BIF range; changes in wind and exposure patterns; nutrient and soil input. Other biological processes that are affected or changed include introduction of weed species and changes in the abundance of key plant and animal species.

### A National Park for the Yilgarn

Over many decades there have been consistent recommendations from scientists, government agencies, Traditional Owners, local residents and conservation organisations for the protection of the Helena and Aurora Range (Bungalbin).

Currently no BIF range in the Yilgarn region is protected as an ‘A Class’ reserve. As increasing numbers of people visit the Helena and Aurora Range and as the need for regional economic diversification and sustainability grows, the range offers an outstanding opportunity. A new National Park would be a long-term asset to the local and wider WA community.

As there is only one other national park within several hundred kilometres of the Helena and Aurora Range, namely Boorabin NP, creation of the Helena and Aurora Range National Park would add an important social asset to a region otherwise deficient in them.

Secure protection of the Range’s exceptional conservation values requires its gazetting as a Class ‘A’ National Park, with the consent of its Traditional Owners and under a joint management agreement with them.

*“I’ve been very familiar with mining from the early 1960’s when they developed the iron ore mines out at Koolyanobbing. Sadly it’s a fallacy to say that mining companies bring wealth into these areas. In fact it’s almost just the opposite. The district in the end will be the loser because it will have nothing left. There is a future in tourism but it’s important you leave something there for the tourists to see. That’s why it’s so important we preserve the uniqueness of this particular Range and a national park would be the ideal way to go.”*

- Mr Romolo Patroni OAM.  
Yilgarn Shire Councillor for 37 years  
and President for 26 years.

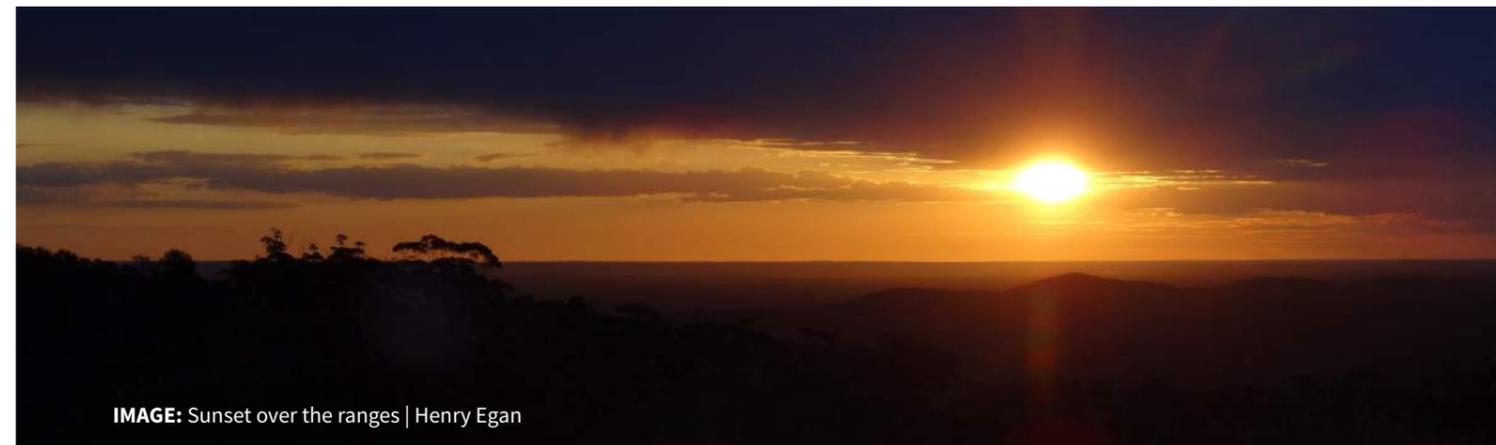


IMAGE: Sunset over the ranges | Henry Egan

There are other Banded Ironstone Formation (BIF) ranges that have high conservation value within the Yilgarn region and many of these are currently being mined or have mining tenements over them. For example, Mt Manning Range itself, for which the Mt Manning Nature Reserve is named, is not actually protected from mining, having been gazetted as a lowly conservation park. This anomaly and others like it must be addressed.

Helena and Aurora Range is considered to have the highest conservation value among the BIF ranges in the central Yilgarn; it is pristine and yet is under imminent threat from mining interests. For these reasons, the Helena and Aurora Range is the immediate focus and the most appropriate BIF range to be recommended for Class A National Park status.



IMAGE: Crested Bicycle Dragon | Laura Corbett



IMAGE: Peregrine Falcon (*Falco peregrinus*) | Shapelle McNea

## 13 CONCLUSION

After decades of soundly-based recommendations for the secure protection of the Helena and Aurora Range (Bungalbin) it is time to get the job done.

A new national park will be a wonderful new feature and long term asset for the Yilgarn and a demonstration of WA's commitment to protect its greatest natural and cultural assets.

With so many of WA's other outstanding 'banded ironstone' ranges destroyed or in the process of being destroyed, it's time to right the balance and protect this exceptional example for future generations.

Creating the new national park with the full involvement of its Traditional Owners will also be a watershed moment in correcting the history of European dispossession of the Kalamaia Kapurn people.

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