

Little Llangothlin Nature Reserve

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- 1. Date of compilation:** 01/01/98 (date on original is from earlier version)
- 2. Country:** Australia
- 3. Name of wetland:** Little Llangothlin Nature Reserve
- 4. Geographical coordinates:** Latitude: 30°05'S Longitude: 151°47'E
- 5. Altitude:** 1,360 metres above mean sea level
- 6. Area:** 258 ha

7. Overview:

The Little Llangothlin Nature Reserve (LLNR) contains one of the few high altitude freshwater lagoons remaining on basalt soil on the New England Plateau of New South Wales. The LLNR is part of the larger New England Lagoons system which includes 29 lagoons and swamps depressions (Appendix 1), and extends over 100 km along the Great Dividing Range from Uralla to Llangothlin.

The LLNR is a significant wetland providing a range of habitats for waterfowl and other fauna, and is particularly important as providing a drought refuge for waterbirds.

- 8. Wetland type:** Inland wetlands O and P (O is dominant)
- 9. Reasons for inclusion:** 1a, 2a and 2c
- 10. Outline map of site:** An outline of the Ramsar site appears on the appended map

11. Name and address of compiler:

NSW National Parks and Wildlife Service
Conservation Assessment and Planning Division
PO BOX 1967, Hurstville NSW 2220, AUSTRALIA

12. Justification of Criteria:

The LLNR is part of the larger New England Lagoons system which includes 29 lagoons and swamps depressions, and extends over 100 km along the Great Dividing Range. LLNR is one of the few lagoons that remain in a near-natural condition, consequently is a good representative example for this particular biogeographical region.

LLNR provides habitat for a number of species listed as vulnerable under the *NSW Threatened Species Conservation Act 1995*. Also, the Reserve contains several plant species that are regionally uncommon. Moreover, the lagoon contains the only known location of the genus

Rhabdoceol, a planktonic flatworm, and the copepod crustacean *Ectocyclops rubescens*.

13. General location:

Approximately 14km north of Guyra and 5km east of the New England Highway in north east New South Wales, Australia.

14. Physical features:

The LLNR includes Little Llangothlin Lagoon (LLL) of approximately 120 ha, and part of the much smaller Billy Bung Lagoon (BBL) as well as a major portion of the catchment of both lagoons.

The New England Lagoons are found on the highest and oldest part of the Tablelands landscape. LLNR is on tertiary basalt country and the slopes of both BBL and LLL are strewn with basalt blocks. Basalt weathers to red and brown clay soils. Immediately east of the LLNR are outcrops of Permian granite. At the eastern margin of LLL is a lunette forming an embankment characterised by a light grey silt core, and overlain by coarser granite-derived sand which is admixed with fine ironstone gravel towards the northern end. Laterite and detrital ironstone are present at the lagoon outlet (Walker 1976).

The New England Lagoons are a very unusual system in terms of their location and geomorphology, increasing their significance. Lagoons are not usually found in a fluvial landscape at the extreme upper limit of streams systems, nor do they survive when the surrounding landscape has been highly eroded as has occurred at this site (Walker 1976).

The LLNR is situated on a minor drainage divide between the headwaters of the Mann and Oban Rivers. BBL occupies the headwater reaches of the Oban River, draining directly into LLL.

Annual average rainfall at Guyra (nearest recording station) is 865mm, of which the greater proportion falls in summer (Bureau of Meteorology 1993). However, in recent years seasonal rainfall has been variable, subsequently fluctuating water levels are a feature. Average winter minimum temperature at Guyra is 0.2°C and the average summer maximum temperature is 22.4°C (Bureau of Meteorology 1993).

LLL, together with other lagoons of the New England Lagoon system, has seasonally variable water chemistry, which is partly accounted for by rainfall and partly by biotic factors (Briggs 1980). The order of cationic dominance in LLL is $\text{Na} \cong \text{Mg} > \text{Ca} > \text{K}$ (based on milliequivalents per litre), which is similar to that in many other Australian water bodies (Briggs 1980). Briggs (1980) reports that it is probable that the dominant anion in LLL is bicarbonate, which is different from most other Australian water bodies, which are commonly dominated by the chloride ion.

When full the water depth in LLL ranges from 0 to 2m, BBL is normally more shallow (maximum depth of 0.75m). LLL only dries in extreme drought and BBL is a temporary lagoon. The lagoons' drying cycle may have increased since European settlement, especially after the opening of a narrow drainage ditch at the southern end of the lunette associated with LLL. This ditch was filled in 1989 and water levels raised 0.6m. Water levels now fluctuate naturally

according to seasonal conditions.

The lagoons' location close to the Mann-Oban divide means its catchment is extremely small and this is particularly unusual for a wetland of this type (Walker 1976). The stream flowing from the lagoon outlet crosses the Nature Reserve boundary and passes through cleared grazing country before joining the Oban River.

15. Hydrological values:

The New England Tablelands are placed between the temperate and tropical zones and subsequently have a relatively unusual rainfall pattern - rain falls throughout the year, with slightly more falling in summer.

Each lagoon in the New England Lagoon system differs in depth and vegetation types, therefore, the deeper lagoons serve as important drought refuge for flora and fauna. LLL is a particularly important lagoon in this system because of its depth and size. As a system the New England Lagoons provide a permanent water source in all years except during extreme droughts.

16. Ecological features: LLL consists of a permanent lagoon with mud flats on the northern shore. BBL consists of a semi permanent marsh/swamp.

There is a succession and zonation of plant communities in the LLNR from submerged communities in the lagoon, to a floating leaved stage, to sedge-meadow to terrestrial vegetation. The deepest parts of LLL are occupied by sedge swamps dominated by *Eleocharis sphacelata*. The deeper waters to the south of the lagoon also support an aquatic community of submerged plants dominated by *Potamogeton ochreatus*, *Utricularia australis*, and *Chara* sp. In the shallow water there is a zone of wet meadow swamp (*Myriophyllum variifolium*) and sedge swamp (*Eleocharis pusilla*, *Limosella australis*, *Crassula helmsii*, and *Carex inversa*). Towards the land in waterlogged and occasionally flooded soil there is a zone of wet grass swamp (*Glyceria australis* with *Stellaria angustifolia*, *Eleocharis acuta*, and *E. dietrichiana*). The main communities in BBL are wet swamps. The shallower edge of BBL support a diverse community dominated in part by *Eleocharis dictrichana*, with *Brachycome radicans*, *Hydrocotyle tripartita*, *Stellaria angustifolia*, *Spiranthes sinensis*, *Eryngium vesiculosum*, and *Restio stenocoleus*.

LLL is encircled by a zone of dry grass swamp (*Glyceria australis*) and grass meadows (*Holcus lanatus* and *Carex gaudichaudiana*). Remnant snow gum communities (dominated by *Eucalyptus pauciflora* with some *E. stellulata*) occur around the lagoons and isolated mountain gum (*E. dalrympleana*) are found on the higher areas of the reserve. The lunette to the east of the lagoon also supports snow gum woodland with peppermints (*E. acaciformis* and *E. nova-anglica*) occurring closer to the lagoons margin. The shrub layer is dominated by *Acacia dealbata*, whilst the ground cover is dominated by grasses and pasture species such as introduced phalaris (*Phalaris aquatica*), fescue (*Festuca arundinacae*), cocksfoot (*Dactylis glomerata*), and white clover (*Trifolium repens*), and native tussocky poa (*Poa seiberana*), redgrass (*Bothriochloa macra*) and kangaroo grass (*Themeda australis*).

Palynological studies have been conducted at LLL and are providing indications of vegetation

patterns prior to and following European settlement (Pisanu, Haworth & Gale 1992).

17. Noteworthy flora:

LLNR is one of the few areas containing wetland vegetation of the New England Tablelands, therefore, plant communities contained within the Nature Reserve are regionally significant.

Myriophyllum alpinum and *Myriophyllum simulans* have been recorded at LLL, their presence is regionally uncommon (Sheringham and Westaway 1995). The rare plants *Discaria pubescens* (Australian Anchor Plant) and *Thesium australe* occur in LLNR. The later is inadequately conserved in existing National Parks and Wildlife Service estate, especially on the Tablelands, increasing the significance of the LLL population.

In the area surrounding LLNR there are several plant communities that are regionally uncommon and these are listed in Appendix 3.

18. Noteworthy fauna:

The LLNR regularly supports large numbers of waterbirds and waders including ducks, swans, coots, moorhens, ibis, egrets, terns, stilts, and plovers (Appendix 2). Some of these species breed in the Nature Reserve along with the White-breasted Sea Eagle (*Haliaeetus leucogaster*). LLNR also provides habitats to support vulnerable and rare species such as the Comb-crested Jacana (*Irediparra gallinacea*) and the Blue-billed Duck (*Oxyura australis*). It also provides a transitory habitat for the vulnerable and rare magpie goose (*Anseranas semipalmata*) and Freckled Duck (*Stictonetta naevosa*). LLNR is an important drought refuge for many species, particularly waterbirds of the New England Tablelands (White 1987).

LLNR provides habitats for many species of frogs (Appendix 2) including endangered species such as the Painted Burrowing Frog (*Neobatrachus sudelli*). LLNR also provides potential habitat for the endangered New England Bell Frog (*Litoria castanea*) that is restricted to the New England Tablelands.

Both lagoons contain the only known location of the genus *Rhabdocoel*, a planktonic flatworm, and the copepod crustacean *Ectocyclops rubescens*. Timms (1970), who surveyed the zooplankton population in 103 reservoirs and lakes in north east NSW, recorded *Boeckella major* (at the northern limit of its range), *B. montana*, *Lynceus macleayana*, and ostracod species in either LLL and BBL or both.

19. Social and cultural values:

The variety of habitats and the high significance of the area for waterbirds makes LLNR a valuable location for scientific research and teaching. Palynological, geochemical, and lithostratigraphic studies of the lagoon and lunette are providing valuable contributions to determining the geological history and historic climates of the area and the impacts of European farming on catchments. LLL is being used for education and research visits by schools and universities and there is considerable potential for increased use for this purpose. Access to LLNR for these purposes will ultimately improve the management of the wetland and ensure that its ecological characteristics are conserved.

Archaeological surveys have concluded that aboriginal activity in the area was common. Artefacts have been found on the lunette associated with LLL and the area surrounding LLL (Davidson 1982). Davidson (1982) also reports that open sites occur in moderate density. The lunette associated with LLL is especially important in this area because it provides a datable context for archaeological remains.

20. Land tenure:

The Ramsar site is a Nature Reserve dedicated under the *National Parks and Wildlife Act 1974*, surrounding land is Freehold. Llangothlin Lagoon (LL), which is approximately 2km away, is Crown Land and dedicated as a Wildlife Management Area (land deemed to be dedicated for the purpose of providing suitable land for the taking or killing of fauna as game) under the *National Parks and Wildlife Act 1974*. The southern and eastern margins of LL are leased for grazing domestic stock.

21. Current land use:

The lands within the Ramsar site are permanently dedicated as a Nature Reserve and used as a nature conservation area. Land areas surrounding the Ramsar site are primarily used for grazing with some cultivation in the catchment of the lagoons for potatoes and oats. The population within the catchment of LLNR is very low because the land use is pastoral. Guyra, the nearest town, has a population of approximately 2,000.

22. Adverse factors affecting the ecological character of the site:

Nature conservation will remain the primary land use for LLNR and continued research and enhanced education use is proposed. To accommodate this, a small carpark or parking bay at the boundary of the reserve is planned, along with interpretative signage and a toilet.

The original vegetation in LLNR was cleared prior to its dedication and consequently pasture species have established in the Nature Reserve but are considered a minor threat.

Haworth and Gale (1993) have reported that in the last 40 years erosion rates in the surrounding catchment have increased sevenfold, and the nature of the eroded material has changed to include more topsoil. Erosion is considered a moderate threat to LLNR because of siltation of the lagoon bed. Siltation, in turn, may affect waterbird distribution since Briggs (1976) has shown waterbird distribution is related to plant community characteristics, which is determined by water depth and the slope of the ground surface of the lagoon.

Dieback of Eucalyptus species, nitrification, weed infestation, and feral animals are minor threats to the site.

23. Conservation measures taken:

LLNR was gazetted in December 1979 and was formerly part of a farming, grazing, and dairying property. All agricultural activities have ceased within the LLNR which has resulted in limited regeneration of vegetation especially the shrub layer. A drainage ditch at the southern end of the lunette was filled in 1989 to restore the historical water regime of LLL.

NSW National Parks and Wildlife Service (NPWS) has undertaken weed control measures for

blackberry (*Rubus ulmifolius*) and nodding thistle (*Carduus nutans*). Methods employed include manual removal and spraying with herbicides, where appropriate, avoiding any contamination of the wetlands. Biological control of blackberry has been trialed in the reserve, while research into biological control of nodding thistle using the rosette weevil (*Trichosirocalus horridus*), being conducted in the Glen Innes area can be extended to the reserve.

NPWS has undertaken fox control measures using commercially manufactured foxbaits and bait stations. An ongoing rabbit control programme has also been initiated employing both poisoning and fumigating techniques. In cooperation with surrounding neighbours the LLNR has been fully surrounded with stock proof fencing.

The lighting of fires is banned within the LLNR and public access into the Nature Reserve is limited.

LLNR provides habitat for bird species covered under the JAMBA and CAMBA agreements.

The NPWS has prepared a draft Plan of Management for the LLNR, this plan has not yet been adopted.

24. Conservation measures proposed but not yet implemented:

The draft Plan of Management for LLNR addresses numerous conservation and management initiatives to preserve and enhance the area for nature conservation. These include investigating and monitoring water quality, implementing a revegetation program for the catchment and further assessment into appropriate weed removal techniques, preparation and ongoing implementation of a feral animal control program, development of a fire control program, and monitoring Aboriginal sites.

LLNR has been nominated for listing on the Register of National Estate and is currently being assessed by the Australian Heritage Commission.

25. Current scientific research and facilities:

The New England Lagoons have been the subject of numerous research projects. Currently the following research is being carried out at sites within the Ramsar site:

- A PhD on the co-existence of *Juncus articulatus* and *Glyceria australis* in wetlands in relation to fluctuating water regimes;
- A PhD on the co-existence of three *Eleocharis* spp. in LLL and BBL, this study will examine the abundance, distribution and performance;
- Ongoing research on the geomorphology of LLL; and
- *Thesium australe* population dynamics.

There are no research facilities in LLNR however a university (University of New England) is located in Armidale approximately 50 km away.

26. Current conservation education:

LLNR is utilised for educational visits by schools and universities.

LLNR has great potential to illustrate to the general community the affect of clearing catchments on sedimentation rates.

27. Current recreation and tourism:

LLNR has not been promoted as a recreational area and up until now access has been restricted to researchers, birdwatchers, and educational institutions, which collectively have a low impact on the site. There are no plans to promote the area as a recreational site, nor as a tourist destination.

28. Jurisdiction:

Territorial: Government of New South Wales

Functional: New South Wales National Parks and Wildlife Service

29. Management authority:

NSW National Parks and Wildlife Service (Northern Region and Zone, Glen Innes District)

District Manager, PO BOX 281, Glen Innes NSW 2370, Australia

Phone: 02 6732 5133, Fax: 02 6732 5130

30. References

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Appendix 1: New England Lagoons on the New England Plateau of New South Wales, Australia.

Llangothlin
North Llangothlin
Little Llangothlin
Billy Bung
Abbey Green
Tubbamurra
Mother of Ducks
Dittons
Everetts Flat
Waterview
Elmwood
Brockley Swamp
Little Brockley
East Brockley
Kolara
Upper Edenglen
Lower Edenglen
Saumarez
Hillwood
Pansyfields
Wyanbah
Green Wattle
Nandewar
Pinegrove
Strahle
Thomas
Barleyfield
Loch Abbra
Kyoma

Appendix 2: Animal species recorded in Little Llangothlin Nature Reserve, New South Wales, Australia.

Common Name	Scientific Name
Birds	
Australian Grebe	<i>Tachybaptus novaehollandiae</i>
Little Pied Cormorant	<i>Phalacrocorax melanoleucos</i>
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>
Pied Cormorant	<i>Phalacrocorax varius</i>
Great Cormorant	<i>Phalacrocorax carbo</i>
Australian Darter	<i>Anhinga melanogaster</i>
Australian Pelican	<i>Pelecanus conspicillatus</i>
Cattle Egret	<i>Ardeola ibis</i>
Intermediate Egret	<i>Ardea intermedia</i>
White Egret	<i>Ardea alba</i>
White-faced Heron	<i>Ardea novaehollandiae</i>
Pacific Heron	<i>Ardea pacifica</i>
Royal Spoonbill	<i>Platalea regia</i>
Yellow-billed Spoonbill	<i>Platalea flavipes</i>
Magpie Goose	<i>Anseranas semipalmata</i>
Sacred Ibis	<i>Threskiornis aethiopica</i>
Straw-necked Ibis	<i>Threskiornis spinicollis</i>
Glossy Ibis	<i>Plegadis falcinellus</i>
Black Swan	<i>Cygnus atratus</i>
Freckled Duck	<i>Stictonetta naevosa</i>
Wandering Whistling Duck	<i>Dendrocygna arcuata</i>
Maned Duck	<i>Chenonette jubata</i>
Pacific Black Duck	<i>Anas superciliosa</i>
Australian Shoveler	<i>Anas rhynchotis</i>
Grey Teal	<i>Anas gibberifrons</i>
Chestnut Teal	<i>Anas castanea</i>
Pink-eared Duck	<i>Malacorhynchus membranaceus</i>
White-eyed Duck	<i>Aythya australis</i>
Blue-billed Duck	<i>Oxyura australis</i>
Musk Duck	<i>Biziura lobata</i>
Swamp Harrier	<i>Circus approximans</i>
Whistling Kite	<i>Haliastur spenurus</i>
Little Eagle	<i>Hieraaetus morphnoides</i>
White-breasted Sea-Eagle	<i>Haliaeetus leucogaster</i>
Wedge-tailed Eagle	<i>Aquila audax</i>
Black-shouldered Kite	<i>Elanus notatus</i>
Brown Falcon	<i>Falco berigora</i>
Nankeen Kestrel	<i>Falco cenchroides</i>
Australian Hobby	<i>Falco longipennis</i>
Brown Quail	<i>Coturnix australis</i>
Comb-crested Jacana	<i>Jacana gallinacea</i>

Dusky Moorhen
Purple Swampphen
Eurasian Coot
Masked Lapwing
Red-kneed Dotterel
Black-fronted Dotterel
Red-necked Stint
Latham's Snipe
Marsh Sandpiper
Common Greenshank
Black-winged Stilt
Whiskered Tern
Crested Pigeon
Yellow-tailed Black Cockatoo
Eastern Rosella
Crimson Rosella
Red-rumped Parrot
Pallid Cuckoo
Horsfield's Bronze-Cuckoo
Laughing Kookaburra
Southern Boobook Owl
Tawny Frogmouth
Welcome Swallow
Fairy Martin
Black-faced Cuckoo-shrike
White-winged Triller
Flame Robin
Brown Flycatcher
Rufous Whistler
Grey Shrike-thrush
Jacky Winter
Willie Wagtail
Australian Reed-warbler
Golden-headed Cisticola
Superb Blue Wren
White-browed Scrubwren
Yellow-rumped Thornbill
Buff-rumped Thornbill
Brown Thornbill
Mistletoebird
Noisy Friarbird
Noisy Miner
Yellow-faced Honeyeater
Grey-breasted White-eye
Varied Sittella
Brown Treecreeper

Gallinula tenebrosa
Porphyrio porphyrio
Fulica atra
Vanellus miles
Erythrogonys cinctus
Charadrius melanops
Calidris ruficollis
Gallinago hardwickii
Tringa stagnatilis
Tringa nebularia
Himantopus himantopus
Chlidonias hybrida
Ocyphaps lophotes
Calyptorhynchus funereus
Platycerus eximius
Platycercus elegans
Psephotus haematonotus
Cuculus pallidus
Chrysococcyx basalis
Dacelo novawguineae
Ninox novaeseelandiae
Podargus strigoides
Hirundo neoxena
Cecropis ariel
Coracina novaehollandiae
Lalage sueurii
Petroica pheonica
Microeca luecophaea
Pachycephala rufiventris
Colluricincla harmonica
Rhipidura fuliginosa
Rhipidura leucophrys
Acrocephalus australis
Cisticola exilis
Malurus cyaneus
Sericornis frontalis
Acanthiza chrysorahoa
Acanthiza reguloides
Acanthiza pusilla
Dicaeum hirundinaceum
Philemon corniculatus
Manorina melanocephala
Lichenostomus chrysops
Zosterops lateralis
Daphoenositta chrysoptera
Climacteris picumnus

Striated Pardalote
Spotted Pardalote
Diamond Firetail
European Goldfinch
Common Starling
Magpie-Lark
Dusky Woodswallow
Grey Butcherbird
Australian Magpie
Pied Currawong
Australian Raven

Amphibians

Brown Froglet
Brown Froglet
Eastern Pobblebonk
Spotted Marsh Frog
Painted Burrowing Frog
Red-backed Frog
Dusky Toadlet
Smooth Toadlet
New England Bell Frog
Bleating Tree Frog
Green Tree Frog
Broad-palmed Frog
Peron's Tree Frog
Verreaux's Tree Frog

Reptiles

Eastern Long-necked Tortoise
Copperhead
Alpine Water Skink
Three-toed Skink
Grass Skink
White Skink
Eastern Water Skink

Mammals

Long-eared Bat
Great Pipistrelle
Eastern Grey Kangaroo
Swamp Wallaby
Walleroo
Echidna
Brush-tailed Possum
Feral Cat
Brown Hare
Rabbit
Fox

Pardalotus striatus
Pardalotus punctatus
Emblema guttatum
Carduelis cadeulis
Sturnus vulgaris
Grallina cyanoleuca
Artamus cyanopterus
Cracticus torquatus
Gymnohina tibicen
Strepera graculina
Corvus coronoides

Crinia parinsignifera
Crinia signifera
Limnodynastes dumerilli
Limnodynastes tasmaniensis
Neobatrachus sudelli
Pseudophryne coriacea
Uperoleia fusca
Uperoleia laevigata
Litoria castanea
Litoria dentata
Litoria fallax
Litoria latopalmata
Litoria peronii
Litoria verreauxii

Chelodina longicollis
Austrelaps superbis
Eulamprus kosciusko
Saiphos equalis
Lampropholis delicata
Egernia whitii
Eulamprus quoyii

Nyctophilus timoriensis
Falsistrellus tasmaniensis
Macropus giganteus
Wallabia bicolor
Macropus robustus
Tachyglossus aculeatus
Trichosurus vulpecula
Felis catus
Lepus capensis
Oryctolagus cuniculus
Vulpes vulpes

Appendix 3: Regionally uncommon plants communities occurring in the area surrounding Little Llangothlin Nature Reserve.

Species Name	Location
<i>Amphibromus sinuatus</i>	Llangothlin Lagoon
<i>Brachycome radicans</i>	Llangothlin Lagoon
<i>Carex chlocantha</i>	Llangothlin Lagoon
<i>Carex incomitata</i>	Llangothlin Lagoon
<i>Carex tereticaulis</i>	Llangothlin Lagoon
<i>Isolepis producta</i>	Llangothlin Lagoon
<i>Juncus sanwithii</i>	Llangothlin Lagoon
<i>Linum marginale</i>	Llangothlin Lagoon