# Longneck Lagoon Environmental Education Centre

## Module 4 Human Impacts | Stage 6 | Year 11 ESS

| Summary | Total package |
|---|---|
| **Outcomes**<br>*A student:*<br>› develops and evaluates questions and hypotheses for scientific investigation EES11/12-1<br>› designs and evaluates investigations in order to obtain primary and secondary data and information EES11/12-2<br>› conducts investigations to collect valid and reliable primary and secondary data and information EES11/12-3<br>› describes human impact on the Earth in relation to hydrological processes, geological processes and biological changes EES11-11<br><br>**Content:**<br><br>**Salinity and Erosion: Inquiry question:** How does human use of land affect soil?<br><br>*Students:*<br><br>● explain causes of salinisation, including but not limited to: (ACSES024)<br>  – land clearing<br>  – irrigation<br>● investigate the rehabilitation of salinity-affected area(s) by preparing a case study (ACSES070) ✦ ▣ ⮌ ◉<br>● conduct a practical investigation into soil erosion prevention and analyse the efficacy of the method(s) used (ACSES060, ACSES102) ✦ ⚙ ▣<br>● investigate sources and effects of soil contamination, including but not limited to: ✦ ▣ ⮌ ◉<br>  – heavy metal contamination<br><br>**Effects of Introduced Species: Inquiry question:** How do introduced species affect the Australian environment and ecosystems?<br><br>*Students:*<br><br>● outline the biotic and abiotic effects of introduced species<br>● conduct an investigation into a local introduced species, including: ⚙ ⚖ ▣ ▱ ‡<br>  – reason for introducing the species<br>  – biotic and abiotic effects of the species<br>  – area affected by the species | ● 2 optional pre-visit lessons that contribute to depth study (45-50 minutes)<br><br>● On-site excursion – data collection 9.30am – 2.00pm (5 hours) times can be adjusted to suit school times<br><br>● 2 optional post-visit lessons that contribute to depth study (45-50 minutes) |
| | ## About Longneck Lagoon EEC |
| | Longneck Lagoon Environmental Education Centre is located in Scheyville National Park and includes a terrestrial environment (Cumberland Plain Woodland) and a freshwater aquatic environment (lagoon and creek).<br><br>These lesson programs have been prepared by Department of Education teachers in line with the 2018 Stage 6 Earth and Environmental Science syllabus. |

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| <ul><li>– human impacts that favour the introduced species</li><li>– control or mitigation methods</li><li>– economic impact of the species</li><li>– different views about the value of and/or harm caused by the introduced species, including the views of Aboriginal and Torres Strait Islander Peoples ✋ 🌐</li></ul><ul><li>analyse ways in which human activity can upset the balance of ecosystems and favour introduced species (ACSES027) ✦ ⚙ ⚖</li><li>describe ways in which introduced species contribute to the decline or extinction of native Australian species (ACSES081) ✦ ⚙ 🍂 ✳</li></ul> |  |

## Lesson 1 optional pre-visit – Longneck Lagoon and Scheyville National Park

| Inquiry questions | Lesson outline | Resources/links |
|---|---|---|
| **Where is Longneck Lagoon?**<br><br>**What is the land used for around Longneck Lagoon?** | Introduction to Longneck Lagoon and Scheyville National Park.<br><br>**Activity 1:** Students use maps of Longneck Lagoon and surrounding areas and other resources such as Google Maps to determine where in Sydney Longneck Lagoon is situated.<br><br>**Activity 2:** Students conduct a site investigation using the worksheet provided. | Scheyville National Park information sheet on page 4<br><br>Aerial photographic map on page 5<br><br>Google Maps www.maps.google.com<br><br>Site investigation worksheet on page 6 |

# Scheyville National Park

**Location:** 12km North East of Windsor          **Area:** 950 hectares

**Major ecosystems:** 1. Freshwater wetland 2. Open Eucalyptus and Melaleuca woodland

### Brief history

The Longneck area supported a large population of Aboriginal People prior to European settlement in 1794. Evidence of this occupation is found on the lagoon margins with core stone deposits and hearths. During the 1790's Longneck Lagoon and the surrounding woodland became part of the Nelson Common. Large areas of the woodland were extensively grazed until 1971 when Longneck Lagoon and the surrounding woodland were gazetted as a reserve.

### Land use in the Longneck catchment

- Scheyville National Park - educational, scientific and recreational use
- Farming - horse and cattle grazing, poultry farms
- 2-3 hectare properties - hobby farms
- A small urban area formerly attached to the Army Officer Training Camp.

### Major vegetation types

Scheyville National Park has a significant area of remnant shale vegetation which used to cover the majority of the western plains of the Sydney basin – the students will be discovering what kind of community exists as part of their investigation.

There are large stands of *Casuarina glauca* and melaleuca woodlands consisting of *M. nodosa, M. decora, M. styphelioides* and *M. linariifolia.* The shrub layer consists mainly of *Bursaria spinosa* (blackthorn).
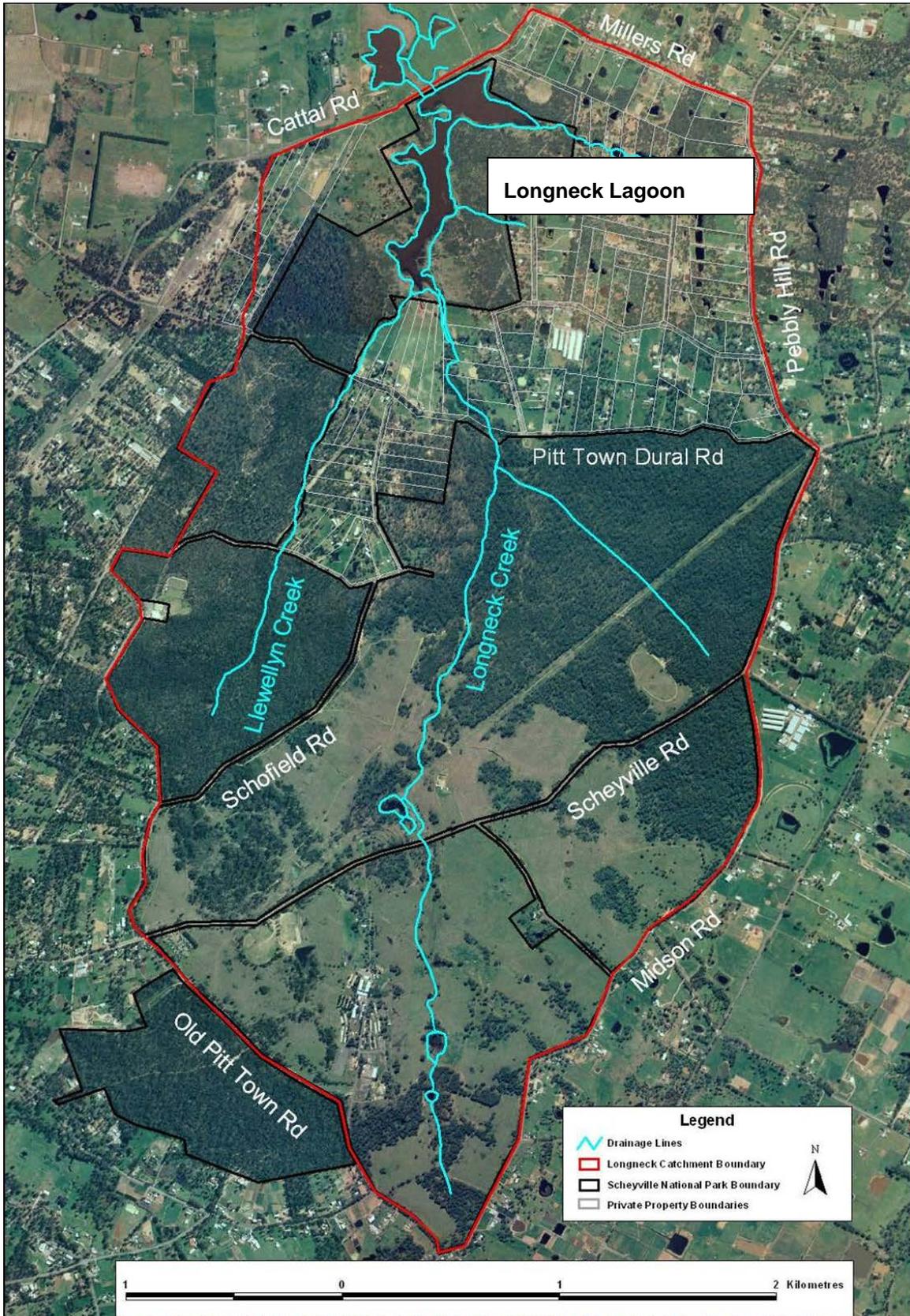
### Soils

Soils in the Longneck area are the result of a number of depositional phases of Tertiary alluvium, which are derived from sandstone and clay.

### Introduced species

There are a significant number of introduced plants including salvinia, willow, blackberry, privet, lantana, prickly pear, pampas grass and various introduced grasses.

Introduced animals include, rabbits, foxes, cats, dogs, Indian myna birds, European carp and mosquito fish.

# Aerial map of Longneck Lagoon catchment



Longneck Lagoon

Millers Rd

Cattai Rd

Pebbly Hill Rd

Pitt Town Dural Rd

Llewellyn Creek

Longneck Creek

Schofield Rd

Scheyville Rd

Midson Rd

Old Pitt Town Rd

**Legend**
Drainage Lines
Longneck Catchment Boundary
Scheyville National Park Boundary
Private Property Boundaries

N

1    0    1    2  Kilometres

# Site investigation

Carry out an investigation of the study site using maps, web resources and other documents. Record your information in the space below each heading.

## Major vegetation
Utilise the Royal Botanic Gardens website to learn more about The Cumberland Plain Woodland. This site will enable you to identify some of the major tree and shrub species you might see at Longneck Lagoon. You can also learn about the major threats to this ecosystem.
https://www.rbgsyd.nsw.gov.au/science/our-work-discoveries/natural-areas-management/ecology-of-cumberland-plain-woodland

Major plant species:


Threats:


## Hydrological features
Refer to the aerial map on page 5, Google Maps or Sixmaps to identify the dominant hydrological features surrounding Longneck Lagoon.
https://www.google.com.au/maps/@-33.5728596,150.8860533,15z
https://maps.six.nsw.gov.au/

1

2

3


## Contour heights
Use the topographical information available on six maps to ascertain the contour levels around Longneck Lagoon. Reflect on the direction and rate of water flow and make a prediction below of how that might be evidenced at Longneck Lagoon.
https://maps.six.nsw.gov.au/etopo.html

I predict that:


## Annual rainfall
Analyse the data available on the Bureau of Meteorology website and comment on rainfall patterns.
http://www.bom.gov.au/climate/averages/tables/cw_067105.shtml

## Lesson 2 optional pre-visit – current and historical land use

| Inquiry questions | Lesson outline | Resources/links |
|---|---|---|
| **How does human use of land affect soil?** | **Land use - historical and current**<br><br>**Activity 1: Current land use**<br><br>Investigate current land use in more depth within the Longneck Lagoon catchment using the aerial photographic map supplied and other online mapping resources such as Google Maps and Sixmaps.<br><br>• List the current land uses and how they might impact on the lagoon and surrounding woodland.<br><br>• From the aerial photographic map, identify the catchment area (red line) and the National Park boundaries (black lines). Notice that the National Park is fragmented. How might this impact on the lagoon area?<br><br>**Activity 2: Historical land use**<br><br>Construct a timeline of the various uses of Longneck Lagoon and surrounding area throughout history.<br><br>• Who are the local Aboriginal People?<br><br>• What impact has European settlement had on the area? | Aerial photographic map on page 5<br><br>www.google.com/maps<br><br>http://maps.six.nsw.gov.au/<br><br><br><br>Weblinks on pages 8 and 9 for:<br><br>Local Aboriginal People<br><br>Scheyville National Park<br><br>Dreadnought Scheme<br><br>Migrant camp |

# Lesson 2 optional pre-visit – current and historical land use teacher resources

**Useful links for the history of the area:**

Languages map http://www.abc.net.au/indigenous/map/

Western Sydney Aboriginal Heritage https://www.westernsydneyparklands.com.au/about-us/aboriginal-heritage/

Scheyville National Park details https://www.nationalparks.nsw.gov.au/visit-a-park/parks/scheyville-national-park

History of Scheyville National Park
http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5053634

Dreadnought Scheme history of the area http://guides.naa.gov.au/good-british-stock/chapter3/dreadnought%20.aspx

Dreadnought Scheme
http://www.migrationheritage.nsw.gov.au/exhibitions/fieldsofmemories/trainingfarm.html

Hawkesbury history of Scheyville
https://www.hawkesbury.nsw.gov.au/__data/assets/pdf_file/0005/85091/Scheyville.pdf

Migrant camp at Scheyville
http://www.migrationheritage.nsw.gov.au/exhibitions/fieldsofmemories/index.html

## Activity 1: Current land use

What is the current land use within the Longneck Lagoon catchment? Brainstorm land uses while looking at the aerial photographic map supplied and other online mapping resources such as Google Maps and Sixmaps.

https://www.google.com.au/maps

https://maps.six.nsw.gov.au/

How might the land use impact the lagoon and surrounding woodland?

From the aerial photograph, identify the catchment area and the National Park boundaries. Notice the fragmentation of the National Park. How might this impact the lagoon area and animal species within it?

## Activity 2: Historical land use

Construct a timeline of the various uses of Longneck Lagoon and surrounding areas throughout history.

- Who are the local Aboriginal People?
- What impact has European settlement had on the area?

**Useful links**
**Salinity**
http://waterquality.montana.edu/energy/cbm/background/soil-prop.html

https://www.qld.gov.au/environment/land/soil/salinity/impacts

http://www.environment.nsw.gov.au/topics/land-and-soil/soil-degradation/salinity/salinity-locations-and-mapping

http://data.environment.nsw.gov.au/dataset/western-sydney-hydrogeological-landscapes-may-2011-first-editionf20fe

http://www.environment.nsw.gov.au/topics/land-and-soil/soil-degradation/salinity


**Erosion**
http://www.fao.org/docrep/v5400e/v5400e0b.htm

http://www.omafra.gov.on.ca/english/engineer/facts/12-053.htm

https://www.qld.gov.au/environment/land/soil/erosion/impacts

http://www.thegeographeronline.net/uploads/2/6/6/2/26629356/soil_erosion_causes_and_effects.pdf

# Lesson 3 optional post-visit – mapping introduced species

| Inquiry questions | Lesson outline | Resources/links |
|---|---|---|
| **How do introduced species affect the Australian environment and ecosystems?** | Recall the introduced species that were observed at Longneck Lagoon.<br><br>**Activity 1:** Using data collected at Longneck Lagoon, plot on a map the location of the introduced species observed. Ensure your map has a border, orientation, legend, title and scale.<br><br>Each of the introduced species found at Longneck Lagoon have come from elsewhere in the world.<br><br>**Activity 2:** Students research a selection of the introduced species they observed at Longneck Lagoon answering the following questions.<br><br>• Where does it come from?<br><br>• When was it brought here?<br><br>• Why was it brought here?<br><br>• How was it brought here?<br><br>• What impact has it had on the environment?<br><br>• What has been done in the past to manage the spread of the species? | Student worksheets<br><br>www.google.com/maps<br>http://maps.six.nsw.gov.au/<br><br><br><br>Weblinks on page 11 |

# Lesson 3 optional post-visit – mapping introduced species
## Teacher resources

**Introduced plants**

http://weeds.dpi.nsw.gov.au/Weeds/Details/110#biosecurity

https://www.pestsmart.org.au/wp-content/uploads/2014/12/nsw-invasive-species-plan.pdf

http://www.environment.nsw.gov.au/lantanaplan/

http://www.environment.nsw.gov.au/LantanaPlan/BiodiversityAtRisk.htm

http://www.environment.nsw.gov.au/lantanaplan/implementation.htm

https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/l-camara.pdf

https://www.westernsydney.edu.au/hie/research/research_projects/the_psyllid_outbreaks_on_cumberland_plain_grey_box

**Introduced animals**

https://www.environment.gov.au/system/files/resources/1910ab1d-a019-4ece-aa98-1085e6848271/files/european-red-fox.pdf

https://www.dpi.nsw.gov.au/biosecurity/vertebrate-pests/pest-animals-in-nsw/foxes/fox-biology

https://www.environment.gov.au/system/files/resources/7ba1c152-7eba-4dc0-a635-2a2c17bcd794/files/rabbit.pdf

http://www.environment.nsw.gov.au/pestsweeds/RabbitFactsheet.htm

http://www.nma.gov.au/online_features/defining_moments/featured/rabbits_introduced

https://www.dpi.nsw.gov.au/fishing/pests-diseases/freshwater-pests/species/carp/general-information

https://www.pestsmart.org.au/wp-content/uploads/2012/03/CPFS6.pdf

# Lesson 4 optional post-visit – introduced species in depth, management plans

| Inquiry questions | Lesson outline | Resources/links |
|---|---|---|
| **How do introduced species affect the Australian environment and ecosystems?** | Recovery plan for Longneck Lagoon ecosystem<br><br>What is a recovery plan?<br><br>• Uses research.<br><br>• Aimed to stop decline of and support the recovery of threatened species or threatened ecological communities.<br><br>• Aim is to maximise long term survival in the wild.<br><br>• Should state what must be done to protect and restore important populations and habitat.<br><br>• Should state how to manage threatening processes.<br><br>• Involves key interest groups and relevant government bodies.<br><br><br>**Activity 1:** Students create their own recovery plans to mitigate threats to the environment by salinity, erosion or a threatened species at Longneck Lagoon. | Student worksheets<br><br><br>Weblinks found in Teacher resources |

# Lesson 4 optional post-visit – recovery and management plans

**Extra resources/examples:**

Federal Australian Government about recovery plans
http://www.environment.gov.au/biodiversity/threatened/recovery-plans


Excerpt about what a recovery plan is from U.S. Fish and Wildlife Service
https://www.fws.gov/endangered/esa-library/pdf/recovery.pdf


Cumberland Plain Woodland recovery plan
http://www.environment.nsw.gov.au/research-and-publications/publications-search/cumberland-plain-recovery-plan