**TOWRA POINT – HUMAN IMPACTS**

Botany Bay Homebush Bay migratory transport irreversible

spilling jet fuel emissions contaminated refraction

seagrass reclamation deterioration impermeable isolated

**Caltex Oil Refinery**

The oil refinery has produced petrol, …………………….., butane and a range of other products. There is a real risk of tankers ……………………. oil into the Bay, and this has already happened several times. In 1979 there was a major oil spill in the area which had a width of approximately 3km. This affected 100ha of mangroves. The refinery is also permitted under law to release a range of ………………………… including groundwater, water pollution and sludge among other things. The refinery has announced it will be closing. A risk will be the of the buildings and rehabilitation of the site to remove chemicals.

**Airport**

The airport is located opposite Towra Point Wetland on the northern side of…………………………….. . The area consists of a great deal of cement (an …………………………………….. surface), meaning that any runoff will carry with it oils and jet fuel directly into the bay. In addition the noise of the aircraft flying overhead disturbs the…………………………………… birds that using Towra Point as a breeding ground. The construction and dredging required to create the third runway resulted in a significant decline in the amount of …………………………………. in Botany Bay. This also resulted in the reclamation of shorebird habitat (such as that for the Little Tern), and resulted in a decline of some migratory birds in Towra Point in the same period.

Sediment deposition and the speed of waves have also been affected by the creation of the third runway. Wave ………………………………….. off the hard surface of the third runway has increased the speed of water hitting sections of Towra Beach.

**Industrial development**

A wide range of industrial activities have cause ………………………………….. damage to Botany Bay and Towra Point Wetlands. Historically, tanning and wool scouring occurred in the area because they were………………………………….. from the original settlement in Port Jackson/ Sydney Harbour. The area was first used as a port in 1880 and sandmining began in the 1930s. In the 40s and 50s Boral and the Australian Oil Refinery began using the bay to ……………………………….. oil. During the 70s there was extensive dredging and land ……………………………………… around the bay. Sandmining, toxic chemicals discharge and dredging and all changed the shapes and chemical composition of the bay.

*Orica*

Companies such as Orica have ……………………………………. groundwater and the sands aquifer below the wetlands with chemicals. Orica has also had an impact on …………………………………………………… Wetlands.

photosynthesise natural weeds phosphorous replenish

population recreational alkalinity residential artificially

aquatic fertilisers housing run-off response

**Residential development**

Residential areas reduce the areas available for ………………………. vegetation, change natural water flow and increase local …………………………………….. pressure. Ornamental gardens in yards also provide a threat as invasive ………………………… can escape from gardens and compete with native vegetation.

**Groynes**

These …………………………………. constructed sea walls trap sand being carried inland by the waves. Most of these sea walls were constructed during the 1960s and 70s and were a ……………………………… for reducing beach erosion along Silver Beach. This is particularly an issue as Towra Beach is eroding and this cuts off a source of sand to …………………………. sand on Towra Beach.

**Creeks and stormwater**

Stormwater run-off from ………………………………………. areas can contain fertilisers, pesticides, oils and chemicals such as paint, etc. This run-off enters the bay and can impact on the floral and faunal …………………………… species living there. It can change the pH of the water (acidity and ……………………….). Fertilisers can result in an increase of ………………………………………… in the water cause algal blooms. Oils and chemicals can smother aquatic plants and animals. This makes it difficult for plants to ………………………………………… and can make it difficult for birds to fly and frogs (and other amphibians) to breathe.

**Canal developments**

Waterfront canal ………………………………. developments like Sylania Waters clear wetlands, change river banks to hard impermeable surfaces, and increase population pressure close to the river and bay.

**Golf courses and recreational parkland**

Golf courses and other forms of ……………………………………….. parkland create somewhat of a buffer between the bay and residential and industrial land uses. However, these land uses involve the clearing of natural vegetation resulting in increased …………………………. (compared to natural vegetation) and reduced habitat areas. Natural vegetation is replaced by grasses such as Kikuyu. Efforts to keep the grass green and of a good playable standard result in the use of …………………………… which can flow into the bay or nearby creeks.

droppings disturbances overflow nutrients

trample increased propellers

**Sewage treatment plant**

Sewage ………………………………… in rainy periods can result in untreated sewage enter the Botany Bay. This contains high levels of……………………………. and can result in algal blooms as a result of eutrophication.

**Pathways and pathway erosion**

Pedestrian movement in and around the Reserve creates pathways of erosion. Pedestrians who don’t stay on the pathway will ……………………………. and kills plants, making the pathway wider.

**Horse stables**

Nearby horse stables provide a risk of horses trampling on vegetation as they walk through the surrounding area. It is possible that their ………………………………… may contain cuttings or seeds of invasive plants.

**Boating**

The use of recreational boats in the bay results in damage to aquatic vegetation and ………………………………. rates of erosion. The ………………………………….. on boats chop up sea grass in shallow water. This can have a long-lasting impact as seagrass take a long time to recover from …………………………………………….. High speed boats and sea craft such as jet skis create wash which causes erosion along the beaches.

**On the map on the next page, label where each of the human impacts is likely to occur.**

