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PLAN of MANAGEMENT

GREEN and GOLDEN BELL FROGS

NATIONAL BIODIESEL SITE

PORT KEMBLA

July 2012

1.0 Introduction

Green and Golden Bell Frogs *Litoria aurea* was once abundant along the eastern coast of New South Wales but has undergone a significant decline here and elsewhere over the past forty years (White and Pyke 1996). It is now considered 'endangered' in New South Wales and is specifically protected under the NSW *Threatened Species Conservation Ac*t 1995 and the Commonwealths *Environmental Protection and Biodiversity Conservation Act* 1999. Several populations of Green and Golden Bell frog remain in the Illawarra area and some of these are centred around Port Kembla. Many of the areas of habitation at Port Kembla are used or disused industrial sites.

On the northern side of Port Kembla, Green and Golden Bell Frogs have been located in two main areas, namely the Port Kembla Coal Terminal and Greenhouse Park. The Port Kembla Coal Terminal has developed a Plan of Management (Biosphere 2010) that protects the frogs while still permitting the terminal to function effectively as a coal export facility. Green and Golden Bell Frogs are a highly mobile species that are permanently resident in the north Port Kembla area and probably move in and out of the various industrial sites nearby in search of food and shelter sites.

In June 2012, National Biodiesel Pty Ltd engaged Biosphere Environmental Consultants Pty Ltd to prepare a Plan of Management (POM) for a re-development site a north Port Kembla. The aims of this POM are to:

1. identify all potential Green and Golden Bell frog habitat areas in or near the National Biodiesel site,

2. establish safe movement areas in or around the site that will prevent the isolation of existing Bell frog communities at north Port Kembla, and

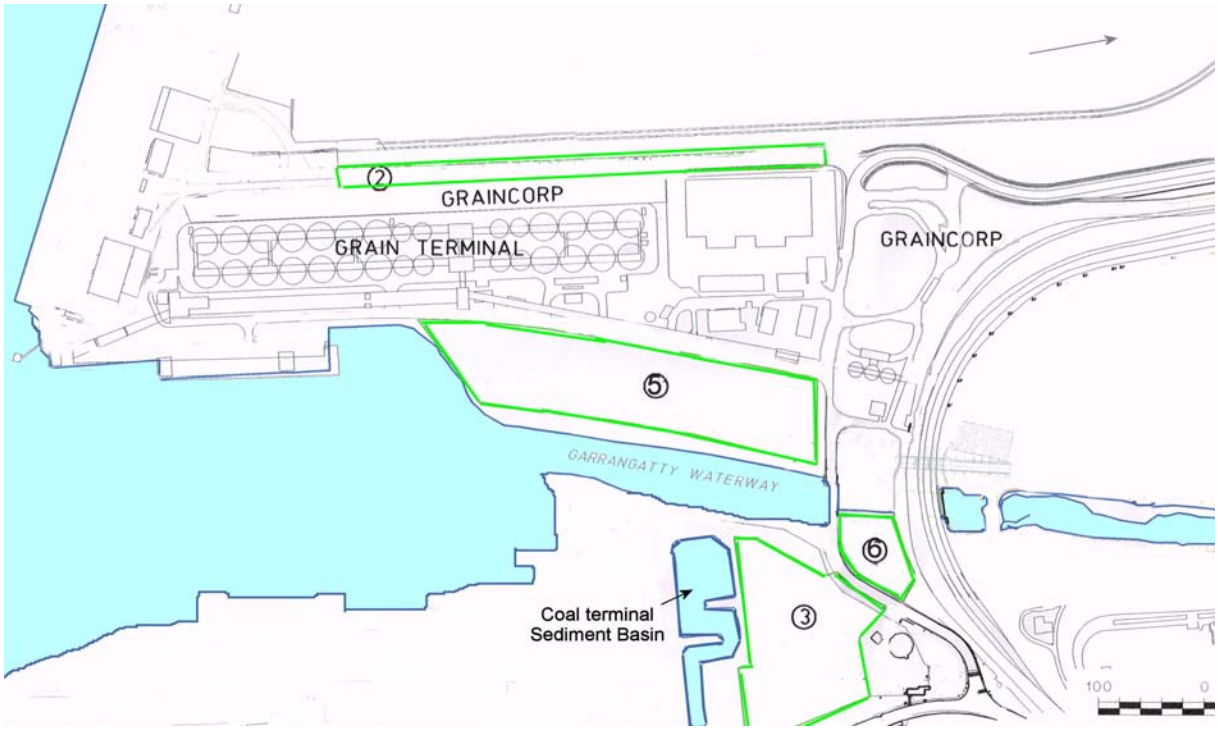
3. recommend a series of measures that will protects the frogs from harm during the construction of the site, and

4. recommend procedures that will assist with the conservation of the frogs at north Port Kembla while still allowing the National Biodiesel site to operate as a function refining and export site.

2.0 National Biodiesel Site

The National Biodiesel site comprises four main areas (areas 2,3,5 and 6: Figure 1). The site is located on either side of the Garrangatty Waterway on the northern side of the inner harbour of Port Kembla. The area is an industrial site and is located on re-claimed land that has previously been levelled, compacted and sealed (Figures 2 and 3).

Figure 1: National Biodiesel Site at north Port Kembla



Area 2 is a long, narrow strip of land alongside the Graincorp access road. This site is 1.2 Ha in area and will be developed as a parking area only. Area 3, located on the eastern side of the Garrangatty Waterway, will become the Biodiesel Refinery site and has an area of 1.8 Ha. Area 5, located on the western side of the Garrangatty Waterway, will become the Soybean Crushing Facility; Area 5 has an area of 4.14 Ha. Area 6, the northernmost site with an area of 0.38 Ha will become the location of the administration buildings.

Figure 2: Area 3 National Biodiesel Site

Figure 3: Area 6 National Biodiesel Site

Figure 4
Area 2 National Biodiesel Site

Figure 5
Area 5 National Biodiesel Site

3.0 Biology of the Green and Golden Bell Frog

The Green and Golden Bell Frog is an aquatic breeding species that generally requires a water body that is shallow (i.e. <1m deep), still or moving slowly (e.g. ponds), unshaded and free of fish, has an area of open water (ie., free of floating and/or emergent vegetation), and contains water that has low salinity (i.e. <8 ppt) and is warm (i.e. $>20^0$ C) during the spring/summer breeding season. In addition, this species breeds opportunistically and responds to certain types of habitat disturbance that trigger movement and breeding. This disturbance, which may include changes in water depth, salinity or amounts of aquatic vegetation, can be naturally or artificially induced. The Green and Golden Bell Frog forages mostly on the ground or on low vegetation, utilising areas with either little vegetation or sparse tree cover (Pyke and White 2001).

During the day they may shelter from predators or inclement conditions, under water, in or under thick low vegetation, and under rocks fallen timber, or various kinds of human-created debris. During prolonged dry or cold periods, they seek more permanent shelter habitat, such as large rocks or rock piles, timber stacks or other large ground cover items (White 2005).

The first Bell Frogs found at north Port Kembla were found in the Port Kembla Coal Terminal in 2008, these frogs were apparently seeking over-winter shelter sites when they were found.

4.0 Green and Golden Bell Frogs at north Port Kembla

After the discovery of Green and Golden Bell Frogs in the Port Kembla Coal Loader in 2008,surveys for these frogs commenced in the Coal Terminal and on land nearby land, in particular, Wollongong STP, Wollongong Golf Course, Green house Park, JJ Kelly Park and land along the Tom Thumb lagoon (Biosphere 2010). These surveys demonstrated that habitat for Green and Golden Bell frogs was widely available at north Port Kembla and that there were several apparent frog movement corridors across the area; in particular the edges of Garrangatty Waterway, the edges of Tom Thumb lagoon and open drains along the Wollongong Golf Course and between Greenhouse Park and JJ Kelly Park (Figure 6).

From 2008 to the 2010, Green and Golden Bell frogs were detected in a few sites in the Port Kembla Coal Terminal and a Plan of Management (Biosphere 2010) was developed whereby sites deep inside the terminal were no available to the frog but a large detention basin at the northern end of the terminal was modified and managed to become habitat for these frogs. The frogs are now permanently resident in this area.

In 2010, two breeding ponds for Green and Golden Bell frogs were established in Greenhouse Park. Bell frogs are sighted from time to time in these ponds but they are not permanently resident there (A. White pers. obs.).

No Green and Golden Bell frogs have been sighted on the National Biodiesel land.

Figure 6
Green and Golden Bell frog Habitat and Movement Corridors at north Port Kembla

5.0 Green and Golden Bell Frog Habitat on the National Biodiesel Site

In early June, the National Biodiesel site was surveyed by Dr White with the aim of determining if potential habitat for the Green and Golden Bell frog was present. While most of the land consist of hardstand, the site is located either side of the Garrangatty Waterway, a noted frog movement corridor. Area 3 (Biodiesel Refinery site) is located immediately north of the northern Sediment Pond, a permanent habitat site for the Green and Golden Bell frog.

On the basis of this inspection, no habitat for Green and Golden Bell frogs was found in areas 2 and 5 but margins areas were present in areas 3 and 6. The only potential habitat in area 6 consists of land alongside the Garrangatty Waterway that could be sued as a potential movement thoroughfare. Area 6 contains an overgrown sediment basin (Figure 7) that could provide shelter habitat for the frogs. In addition, the land alongside the Garrangatty Waterway may also be used as a movement corridor by the frogs (Figure 8).

Figure 7: Overgrown Sediment Basin in Area 6.

Figure 8: Potential Movement Corridor along Garangatty Waterway

6.0 Management of the Green and Golden Bell Frogs

The management of the Green and Golden Bell frogs at the National Biodiesel Site is predicated on four main points:

1. Green and Golden Bell frog habitat on the site is minimal (and may not be used at all).

2. The National Biodiesel Site lies on either side of the Garrangatty Waterway which is a potential movement corridor for Bell frogs.

3. The National Biodiesel Site (area 3) lies immediately north of the Northern Sediment Pond in the Port Kembla Coal terminal. This pond is a permanent habitat site for the frogs and is presumed to be the main dispersal point for Bell frogs moving around the north Port Kembla area.

4. Considerable construction activity will occur on the National Biodiesel site as the site is developed and operated. These activities are likely to be highly hazardous for frogs in the area.

As there does not appear to be permanent habitat for Green and Golden Bell frogs on the site, and the impending extent of industrial activity on the site, it would not be in the interests of the conservation of this frog to try to develop habitat for this species on site. Instead, it is proposed that the site be isolated from Bell Frogs before construction works commence in order to protect any frogs that should stray near the site.

6.1 Frog-exclusion fences

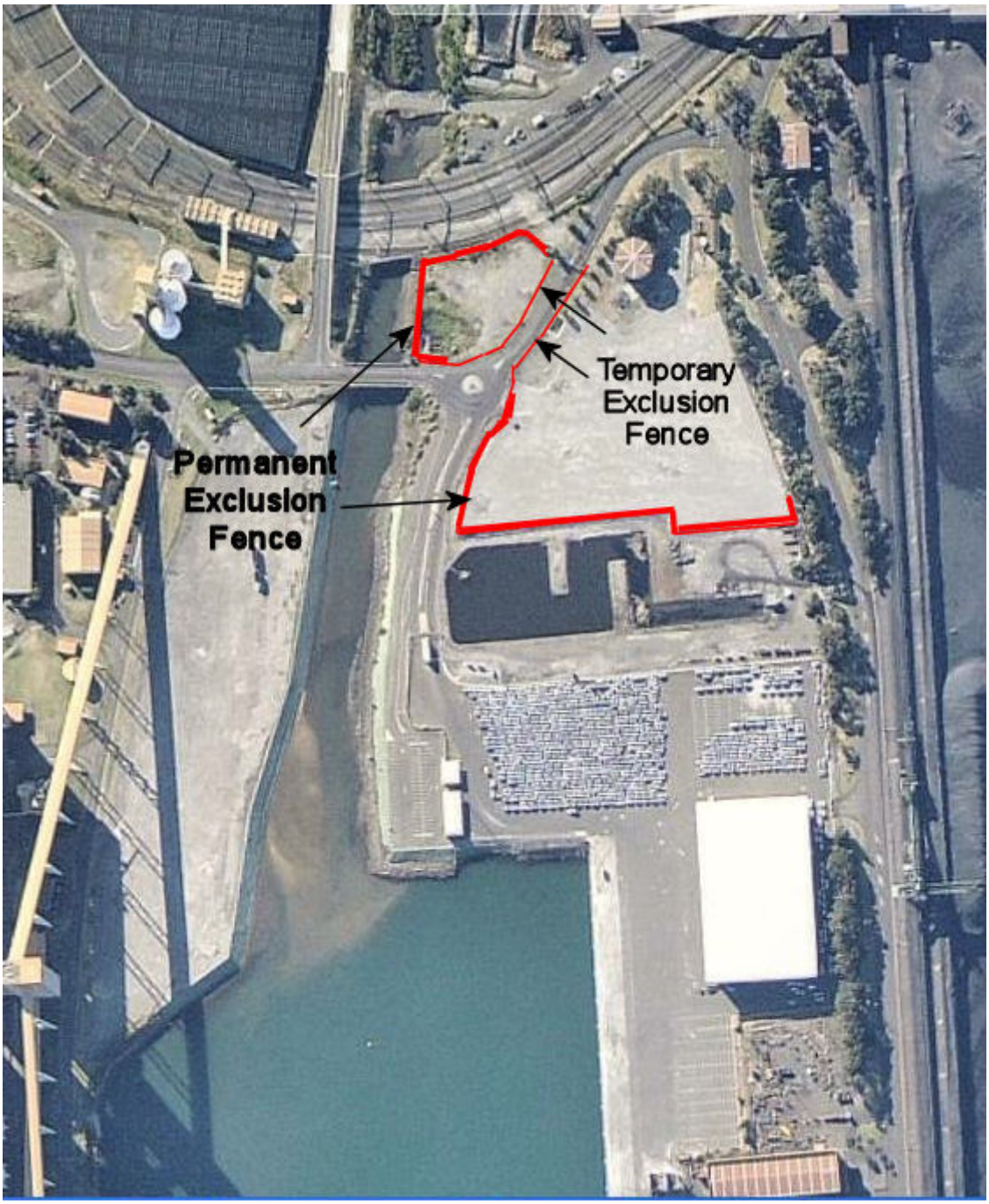
To protect the frogs from heavy machinery and construction vehicles, it is proposed that a frog-exclusion fence be erected around parts of areas 3 and 6 (Figure 9). The frog exclusion fence will keep the frogs out of hazardous areas but still allows dispersal to other Bell frog habitat areas nearby. It is proposed that the frog-exclusion fence located along the southern and western boundary of Area 3 become a permanent exclusion fence, as should the exclusion fence along the northern boundary of area 6.

The frog-exclusion fences on either side of Tom Thumb Road do not need to be permanent but will need to be in place before construction works can commence.

The material that forms the permanent frog-exclusion fences can be attached perimeter security fences and will need to be maintained to ensure that it is not holed or damaged. Gates will need to be put in place and the frog-exclusion fence can extend along the gate, the base of the frog fence can be weighed down using heavy chain attached to the mesh fabric. In all other places, the base of the frog fence will be buried.

Figure 9

Location of Frog Exclusion Fences



6.2 Frog Clearances

Once the frog-exclusion fences have been erected it is proposed that frog clearance surveys be carried out in Area 6 at night in order to remove any Bell frogs from the site should they be present. If Bell frogs are found in Area 6 they will be relocated to the nearby northern Sediment Pond and released. The surveys will be carried out by a competent and qualified herpetologist. Only after the area 6 has been surveyed and the site is found to be clear of Bell frogs will construction work be permitted to

commence. The herpetologist will issue a letter of clearance at the completion of the surveys.

It is recommended that frog clearances be undertaken over two nights when survey conditions are suitable (ie. when it is not too cold or dry).

6.3 Maintenance of Frog Movement Corridors

Green and Golden Bell Frogs are a very mobile frog species. They have been recorded undertaking long distance movements overnight and over sustained wet periods (Pyke & White 2001). This mobility allows Bell Frogs to periodically move between neighbouring sites. At present, it is believed that the upper Garrangatty Waterway and the associated channels provide the most likely movement corridors for Bell frogs to move about north Port Kembla. For this reason, the locations of the frog-exclusion fences have been must also still permit frog movement around the site (and in particular, to and from the northern sediment pond in the Coal terminal).

6.4 Chance Discovery of Bell Frogs

Large areas of the port site at north Port Kembla are open to Bell Frogs and there is always a chance that a frog will be found on Tom Thumb Road or in the capped parts of the sites. If Bell frogs are found, they are to be captured. Placed in a secure container (with water available) and the project herpetologist immediately contacted.

The herpetologist will examine the frog, record its sex, body weight, snout-vent length and microchip the frog (if it is not already microchipped). The frog will also be checked for signs of injury or disease. Diseased or injured will be treated as recommended by a frog qualified veterinarian. If the frog is not injured it will be released in the northern sediment pond.

If dead bell fogs are a found, the corpse is to be retained, placed in a sealed plastic bag and the copse frozen. The project herpetologist will arrange for an autopsy to be carried out on the frog including testing for chytrid.

As the collection of living frogs on site may occur when the project herpetologist is not on site, the site foreman will be trained in the correct handling and holding procedures for frogs. The site foreman will also have frog containers (pet packs) on site and will be the immediate point of contact with the project herpetologist.

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Dr. Arthur White

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