

## CHAPTER 18

## Pond-edge Planting for Habitat Enhancement and Improvement of Park Users' Experience in Punggol Park

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### ***Introduction***

Punggol Park underwent redevelopment by the National Parks Board's Parks Development branch in 2014, which included the re-landscaping of the sparsely planted pond edge to enhance the biodiversity of the pond. The project was completed in 2016. However, the newly introduced aquatic plants for the re-landscaping were badly attacked by animals.

The habitat enhancement project was introduced in 2017 to enhance the biodiversity in Punggol Park. The objectives were to increase the population of plant species along the pond edge and increase the population of odonate species.

### ***Methods***

A trial planting was done in 2016 to identify the badly attacked aquatic plant species (Lam, 2016). The aquatic plant species planted in 2014 are listed in Appendix 1.

The plants were closely monitored after a few days. It was observed that *Cyperus haspan* and *Pontederia cordata* were badly attacked by Apple Snails (Phylum Mollusca) (Quek *et al.*, 2014) and Terrapins (*Trachemys scripta elegans*) (Lam, 2016). These identified species were not able to survive the attack of the predators.

The species planted in 2014 that survived, such as *Cyperus alterfolius* and *Thalia dealbata*, were added to the existing ones (see Appendix 2). Other species such as *Cymbopogon citratus* and *Typha latifolia* were introduced to the pond. These newly added plants were planted on the opposite site of the pond between November 2017 and May 2018 (Fig. 1). These plants were monitored until they became established; this took about four weeks (see Appendix 2). No drastic loss of plants was found after the establishment period (Fig. 2 & 3).

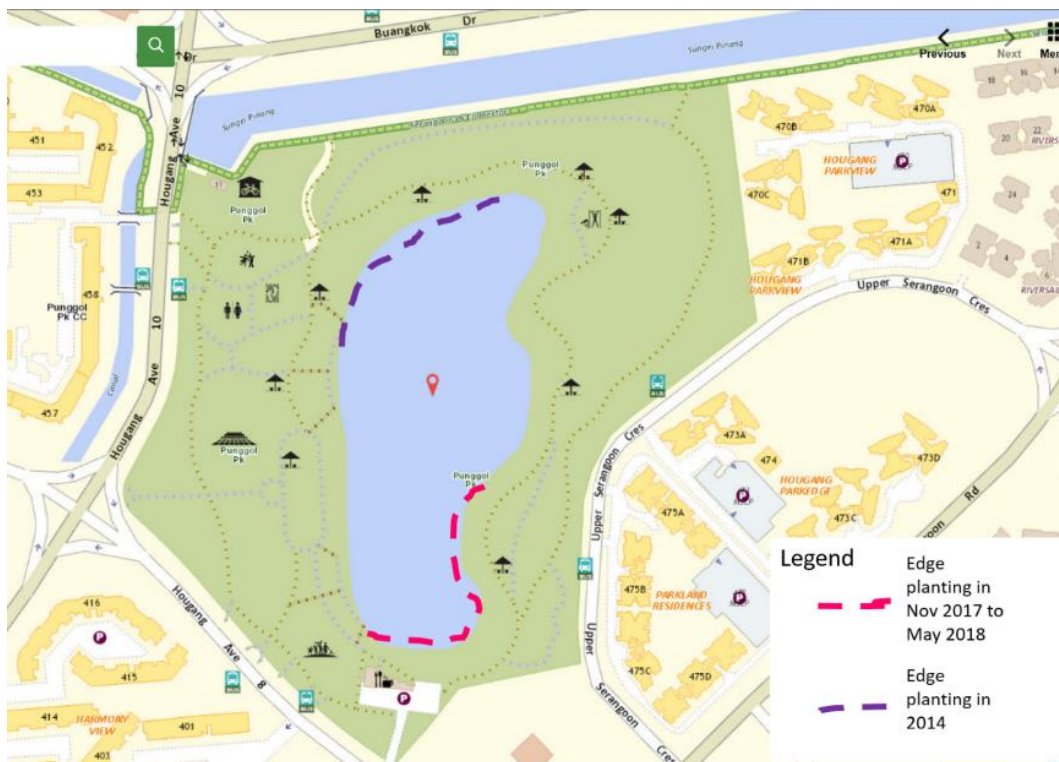


Fig. 1. Locations of planting in 2014 and new planting from November 2017 to May 2018.



Fig. 2. The sparsely planted pond edge in October 2017. (Photo credit: Isnarti Jamari)



Fig. 3. View of the same pond edge taken in August 2018 after enhanced planting. (Photo credit: Isnarti Jamari)

### ***Results and monitoring***

Ten odonate species were recorded in the baseline survey done in 2010 (see Appendix 3) (Ngiam *et al.*, 2010). After the habitat enhancement in 2018, a survey was carried out at the edge of the pond. Sampling was conducted during cloudy weather on 8 August 2018 from 1045 hrs to 1150 hrs. The survey methodology used for odonate species was to walk around a pond/wetland slowly and visually identify the odonates. Eight dragonfly and damselfly species were sighted (see Appendix 4).

Although the number of species observed was fewer compared to those in 2010, a new species, the Common Scarlet (*Crocothemis servilia*) was added to the species list found at Punggol Park pond. This could be due to the time of and the weather conditions during the survey.

Two more surveys were conducted in the last quarter of 2018. One was conducted at the later part of the day to increase the probability of detecting other species that foraged during those hours.

The results of the surveys carried out in 2018 and subsequently are presented in Appendix 5.

The number of species was fewer for the late afternoon survey on 12 October 2018 than during the earlier hour of the day. This could be due to the cloudy weather when the survey was conducted. There were no new species recorded too. However, on the sunny morning of 20 December 2018, two new species, White-barred Duskhawk (*Thobymis tillarga*) and Blue Percher (*Diplacodes trivialis*), were sighted. These species were not recorded during the baseline survey in 2010.

### ***Conclusions and lessons learnt***

Punggol Park pond has the potential to be a suitable habitat for odonates. Addition of other types of aquatic plants like emergent and sub-emergent plants will enhance the pond habitat further and therefore enhance the species diversity and population size of odonates in Punggol Park pond. Looking at the records, the weather plays an important role on the species sighted during the survey.

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### ***References***

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**Appendix 1: Aquatic plants species planted in 2014 Redevelopment Project**

<b>Common name</b>	<b>Scientific name</b>
Umbrella Sedge	<i>Cyperus alternifolius</i>
Dwarf Papyrus Sedge	<i>Cyperus haspan</i>
-	<i>Lepironia articulata</i>
Pickerel Weed	<i>Pontederia cordata</i>
Powdery Alligator Flag	<i>Thalia dealbata</i>
Alligator Flag	<i>Thalia geniculata</i>
Narrow-leaf Cattail	<i>Typha angustifolia</i>
Dwarf Cattail	<i>Typha haspan</i>

**Appendix 2: Aquatic plants species planted in 2018**

<b>Common name</b>	<b>Scientific name</b>
Umbrella Sedge	<i>Cyperus alternifolius</i>
Powdery Alligator Flag	<i>Thalia dealbata</i>
Narrow-Leaf Cattail	<i>Typha angustifolia</i>

**Appendix 3: List of dragonfly and damselfly species in baseline survey recorded in August 2010**

<b>Common name</b>	<b>Scientific name</b>
<u>True Dragonfly/Anisoptera</u>	
Emperor	<i>Anax guttatus</i>
Common Flangetail	<i>Ictinogomphus decoratus</i>
Trumpet Tail	<i>Acisoma panorpoides</i>
Common Amberwing	<i>Brachythemis contaminata</i>
Common Parasol	<i>Neurothemis fluctuans</i>
Variiegated Green Skimmer	<i>Ortbetrum sabina</i>
Common Chaser	<i>Potamarcha congener</i>
Banded Skimmer	<i>Pseudothemis jorina</i>

**Appendix 3: List of dragonfly and damselfly species in baseline survey recorded in August 2010 (Cont'd)**

<b>Common name</b>	<b>Scientific name</b>
<u>Damselfly/Zygoptera</u>	
Blue Sprite	<i>Pseudagrion microcephalum</i>
Common Bluetail	<i>Ischnura senegalensis</i>

**Appendix 4: List of dragonfly and damselfly species recorded on 8 Aug 2018**

<b>Common name</b>	<b>Scientific name</b>
Common Amberwing	<i>Brachythemis contaminata</i>
Banded Skimmer	<i>Pseudothemis jorina</i>
Variiegated Green Skimmer	<i>Orthetrum sabina</i>
Blue Sprite	<i>Pseudagrion microcephalum</i>
Common Bluetail	<i>Ischnura senegalensis</i>
Common Flangetail	<i>Ictinogomphus decoratus</i>
Common Scarlet	<i>Crocothemis servilia</i>
Common Parasol	<i>Neurothemis fluctuans</i>

**Appendix 5: List of dragonfly and damselfly species recorded on 12 Oct 2018**

<b>Common name</b>	<b>Scientific name</b>
Common Parasol	<i>Neurothemis fluctuans</i>
Common Amberwing	<i>Brachythemis contaminata</i>
Blue Sprite	<i>Pseudagrion microcephalum</i>
Common Flangetail	<i>Ictinogomphus decoratus</i>
Banded Skimmer	<i>Pseudothemis jorina</i>
Common Bluetail	<i>Ischnura senegalensis</i>
Variiegated Green Skimmer	<i>Orthetrum sabina</i>
Common Scarlet	<i>Crocothemis servilia</i>

**Appendix 6: List of dragonfly and damselfly species recorded on 20 Dec 2018**

<b>Common name</b>	<b>Scientific name</b>
Variegated Green Skimmer	<i>Orthetrum sabina</i>
Common Amberwing	<i>Brachythemis contaminata</i>
Common Flangetail	<i>Ictinogomphus decoratus</i>
Banded Skimmer	<i>Pseudothemis jorina</i>
White-barred Duskhwak	<i>Tholymis tillarga</i>
Blue Sprite	<i>Pseudagrion microcephalum</i>
Common Bluetail	<i>Ischnura senegalensis</i>
Common Scarlet	<i>Crocothemis servilia</i>
Blue Percher	<i>Diplacodes trivialis</i>