

# TIME LAPSE & CONCRETE PIPES:

*some surprises from two years of frog pipe monitoring*



# Monitoring Site

- Sapphire to Woolgoolga Pacific Highway upgrade
- Operational July 2014
- 2 dedicated frog pipes to mitigate impact on Federally listed (Vulnerable) giant barred frog (*Mixophyes iteratus*)
- RC pipes: 1050mm diam., 56m long, mulch floor
- Either side & above tributary of Woolgoolga Creek



## Methods

- Oct – Apr 2015/16 and 2016/17
- Reconyx cameras - SC950 (IR flash) & HC550 (white flash) in security housing
- Mounted on obvert, 5m inside each pipe end facing out
- Time lapse – 1 pic/min between 1800 & 0500 hours



# Results

## Frogs:

- 7 spp. at 5.2 detections/week
- Confirmed crossings: giant barred frog, greater barred frog, eastern stony creek frog, striped marsh frog



Giant barred frog



Striped marsh frog



Eastern stony creek frog

## Reptiles:

- 11 spp. at 2.5 detections/week
- Confirmed crossings: carpet python, small-eyed snake, golden-crowned snake, eastern water dragon



Carpet python



Golden-crowned snake



Eastern water dragon

## Mammals:

- 16 spp. at 12.9 detections/week
- Confirmed crossings: echidna, brown antechinus, long-nosed bandicoot, northern brown bandicoot, common brushtail possum, common ringtail possum, red-necked wallaby, swamp wallaby, water rat, bush rat, swamp rat, black rat, house mouse, cat, red fox



Long-nosed bandicoot



Brown antechinus



Echidna



Common brushtail possum



Cat



Swamp wallaby

# Discussion/Management Implications

## Pipe use:

- 34 species recorded using
- 23 species Confirmed crossings
- Crossings unlikely by large mammals (eastern grey kangaroo) and small frogs and small reptiles

## Method:

- Time lapse enabled detection of species largely missed by PIR camera traps (e.g. small species, ectotherms)
- Time lapse 'movement trails' assisted crossing confirmation

## Pipes as crossing structures:

- RC pipes should be more readily considered in crossing structure mix as part of mitigation package



# Acknowledgments

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# Analysis – Determining Crossings

## Definite Crossing (+90% certainty):

- Same species, both ends, same direction within 30 min (mammals) & 60 min (reptile & frog)
- Directional movement one end & proportional 'disturbance trail' in same direction at other end within 30 min (large snakes & >medium-sized mammals)

## Probable Crossing (75-90% certainty):

- Directional movement into pipe at one end & not detected at other end & not photographed exiting entry end

## Non-crossing Movements:

- No directional movement into pipe or entered, turned around and exited

