

'Rapid Surveillance for Vector Presence' (RSVP): COVID-19 impacts on an 'early warning' system

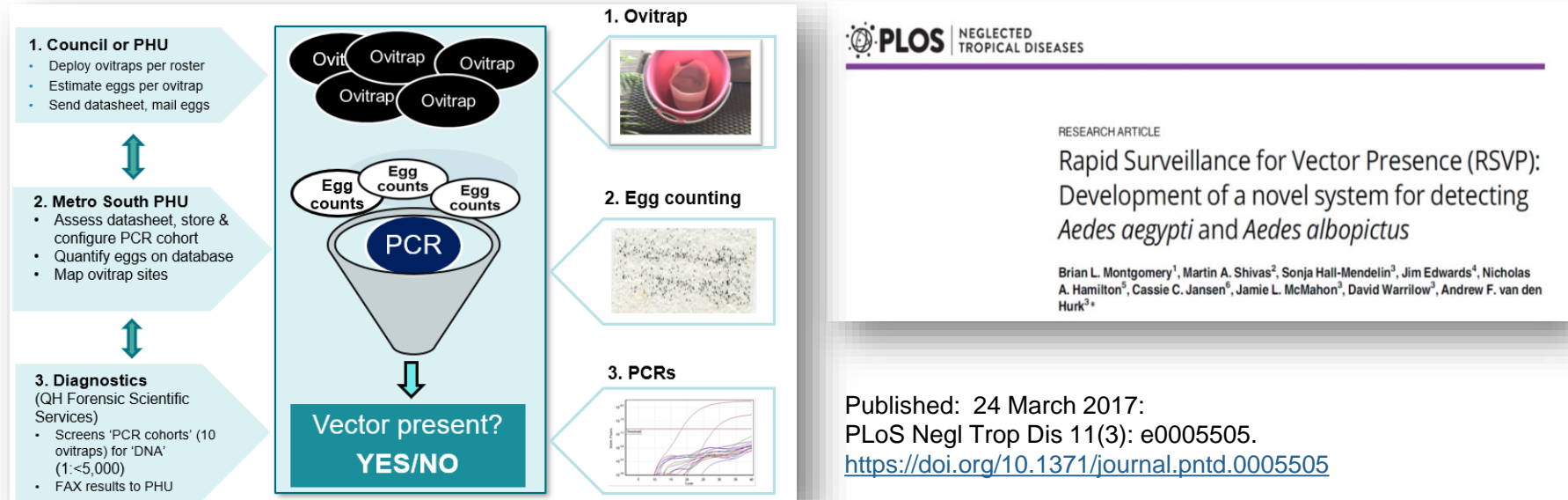
MCAA Conference: 24 Aug 2023

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ICARE² values



RSVP links ovitraps to molecular diagnostics to expedite presence-absence surveys for target species



RESEARCH ARTICLE

Rapid Surveillance for Vector Presence (RSVP): Development of a novel system for detecting *Aedes aegypti* and *Aedes albopictus*

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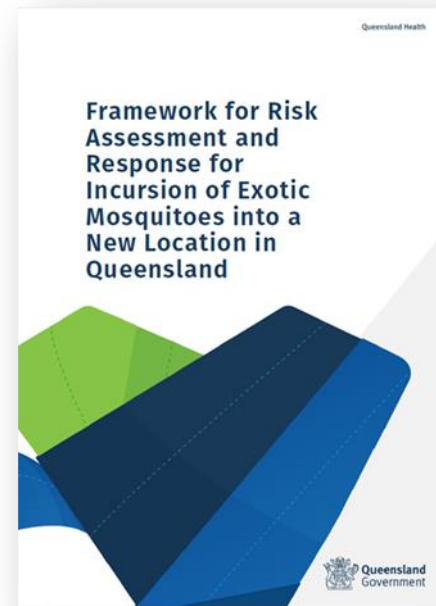
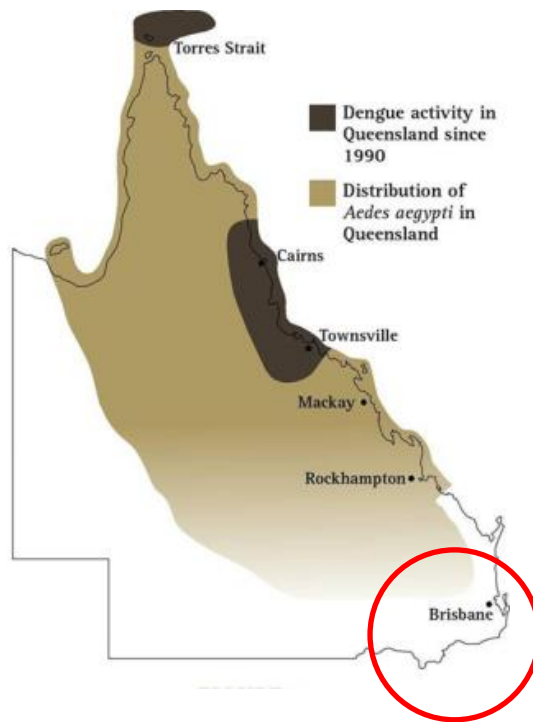
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PLoS Negl Trop Dis 11(3): e0005505.
<https://doi.org/10.1371/journal.pntd.0005505>

Ae. aegypti and *Ae. albopictus* in/near SEQ

Detections are an organizational risk. Old maps static - based on infrequent larval survey

RSVP Ovitrap:

- Time efficient (less staff to survey)
- Maximise sensitivity by increasing
 - 'window' of sampling opportunity
 - 'unit of size' sampled
 - sample site numbers
- Cost effective by using PCR
- Quick turn-around time (no rearing & microscopy)
- Sustainable, annual
- Scalable, transition easily from surveillance to an eradication context



RSVP: Partnerships with councils in and near SE Queensland (SEQ)

Managed by Metro South Health (MSH) for Queensland Health. **12 councils in SEQ**



Councils (voluntary and dynamic subscription)

- Supply and assemble ovitraps
- Plan a seasonal trapping roster
- Estimate egg counts/trap upon collection (optional)
- Set, collect and submit eggs to MSPHU as per agreed SOP

Queensland Health

- Provide SOP, project management and compile prospective FSS diagnostic roster
- Provide advice and operational support
- Conduct PCR diagnostic tests
- Fund diagnostic testing
- Feed back FSS results
- Annual Report
- RSVP Support Officer

MSPHU
PHU
QHFSS Virology
CDB
PHU
MSPHU
MSPHU

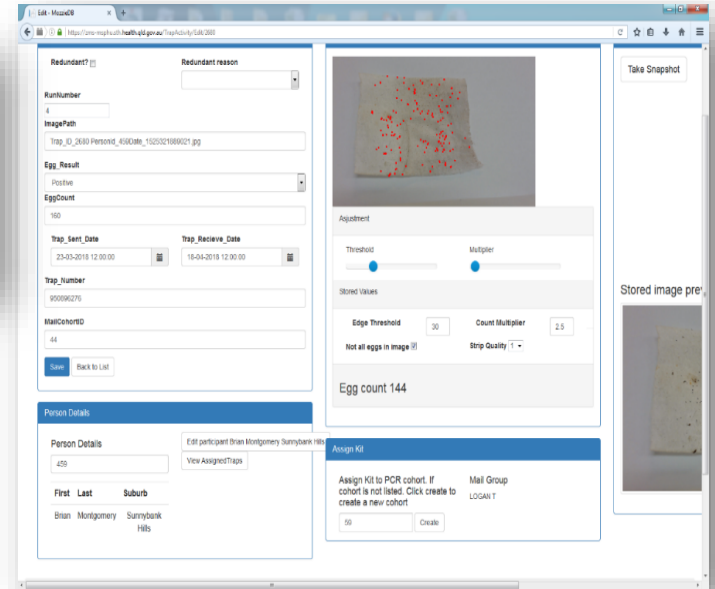
RSVP Support Officer: Councils *Outside MSH*

Temporary, part-time (0.4 FTE)

Role: Extension with council technical staff, automated egg quantifications per ovitrap, database entry and mapping

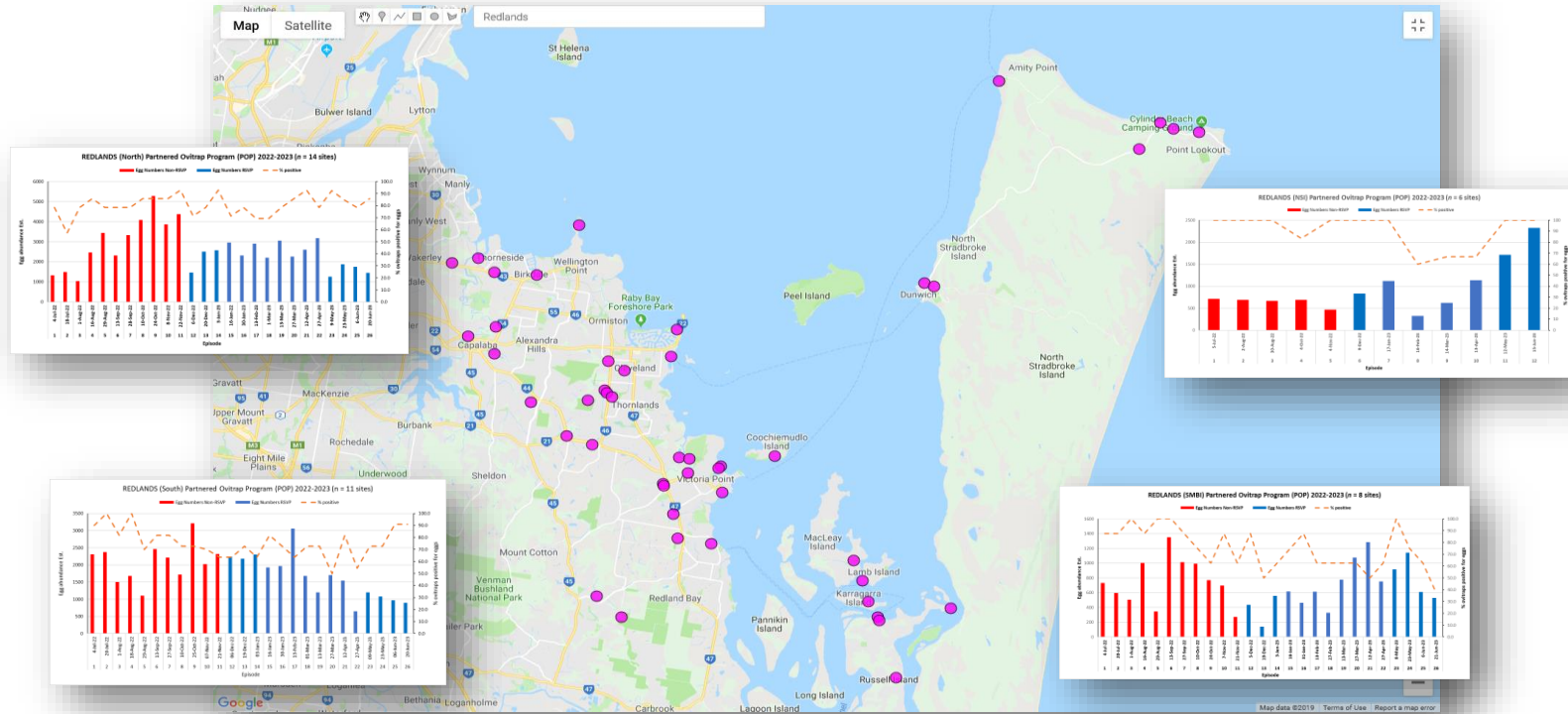


Ian Mohamad (RSVP Support Officer) in action



'PCR cohort' (max. 5,000 eggs) is the RSVP base unit

Can represent a trap, part-run, run (10 traps), town or city



Redland City Council 2023 (39 sites in four runs)

COVID-19 spatial impacts: contraction *Outside MSH*

2018-21

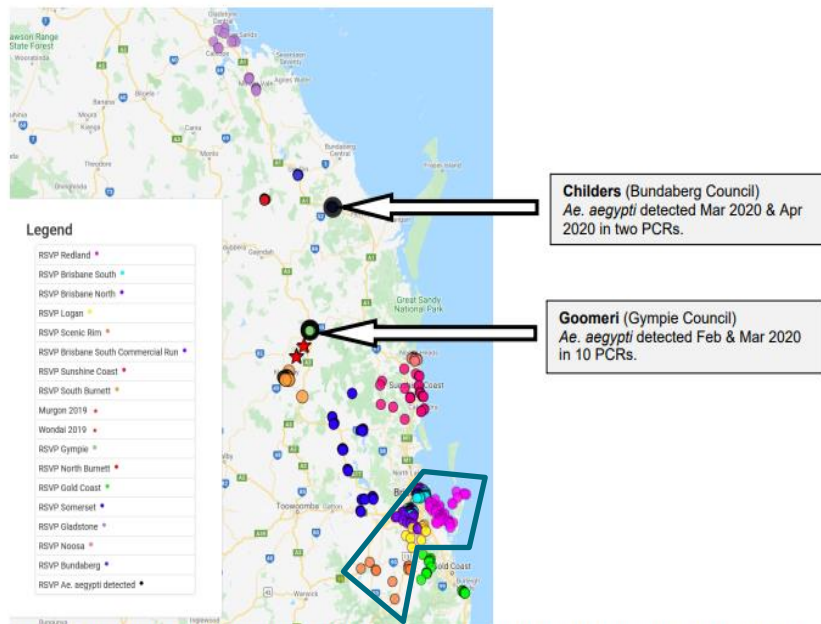


Fig. 6. Map showing the spatial scope of the RSVP Regional Program (SEQ and Near SEQ). Ovitrapping Runs by respective Local Government areas are indicated by different coloured dots. Childrens and Goomeri (large black dots) tested positive for Ae. aegypti. Wondal and Murgon (red stars) indicate the closest towns to SEQ for recent Ae. aegypti detections independent of RSVP programs.

2022

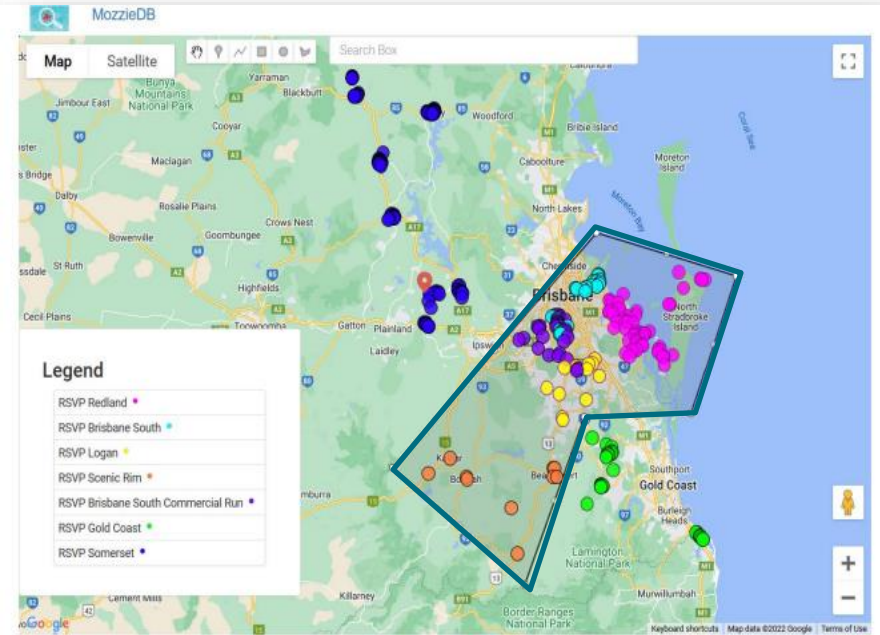


Fig. 6. Map of POP ovitrap sites in SEQ subregions 2021-22; 'SEQ Outside MSH' (Gold Coast, Somerset) and 'SEQ Inside MSH' (Brisbane South, Brisbane Commercial, Logan, Redland, and Scenic Rim).

Recovery: *Regional RSVP Program 2022-23*

($n = 369$ ovitrap sites; 412,361 eggs processed by 164 PCR)

Nine of 12 SEQ councils and two councils near-SEQ (25 townships, 6 cities)

Metro South Health

Regional 'Rapid Surveillance for Vector Presence (RSVP)' Program

Annual Report (1 July 2022 - 30 June 2023)

Medical Entomology
Metro South Public Health Unit
Aug 2023


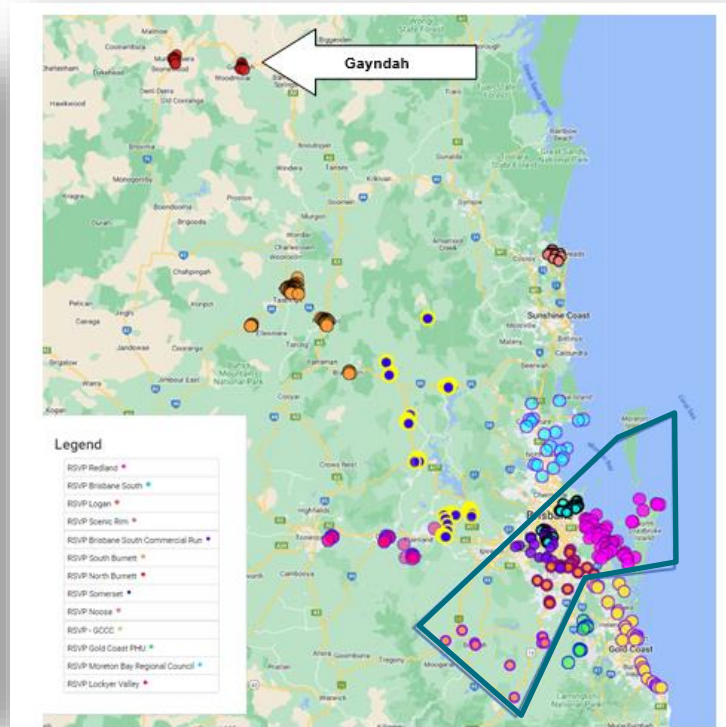



Fig. 6. Map of POP ovitrap sites in SEQ subregions 2022-23. Polygon indicates 'SEQ Inside MSH' sites (Brisbane South, Brisbane Commercial, Logan, Redland, and Scenic Rim). All other sites are 'SEQ Outside MSH' (Gold Coast, Lockyer Valley, Moreton Bay, Somerset). A single detection of *Ae. aegypti* in Gayndah (North Burnett)

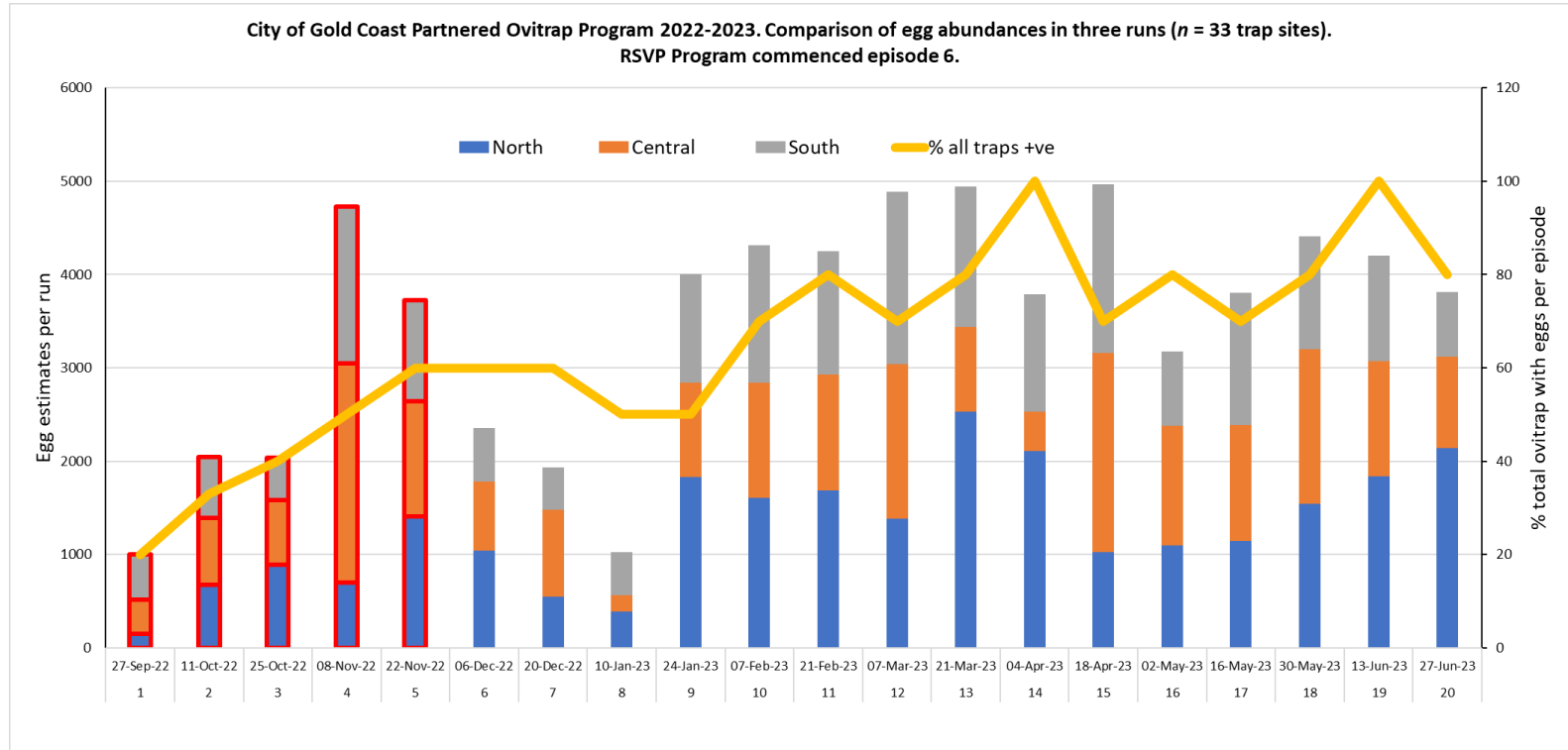
Table 2. Summary of Partnered Ovitrap Programs (POP) in and near SEQ. Contributions are divided into non-RSVP and RSVP Regional Program (1 Jul 2022 - 30 Jun 23) to quantify the proportion of eggs identified for target species (*Ae. aegypti* and *Ae. albopictus*) in the RSVP season. *Ae. aegypti* was detected in Gayndah (South Burnett).

Local Government Area	No. ovitrap sites	Non-RSVP egg est. (No. episodes)	RSVP egg est. (No. episodes)	Total eggs p.a. (% RSVP)	Mean eggs/RSVP ovitrap	No. PCRs Auslab	Target spp. detected?
Brisbane (North)	2	0	106 (5)	106 (100)	10.6	1	No
Brisbane (South)	41	77,633 (9)	133,023 (14)	210,656 (63.1)	233	40	No
Gold Coast (Council)	33	13,533 (5)	55,859 (15)	69,392 (80.5)	113.7	14	No
Gold Coast (PHU)	10	0	21,401 (9)	24,401 (100)	240.5	8	No
Lockyer Valley	27	0	11,930 (7)	11,930 (100)	265.1	8	No
Logan	15	27,432 (11)	35,507 (14)	62,939 (56.4)	176.7	12	No
Moreton Bay	20	0	20,420 (6)	20,420 (100)	243.1	8	No
Noosa	10	0	2,420 (1)	2,420 (100)	242	1	No
North Burnett	20	0	3,504 (1)	3,504 (100)	17.1	11	Yes
Redland	39	67,389 (5.11) ^a	77,254 (7.15) ^a	144,643 (53.4)	145.8	39	No
Scenic Rim	10	6,624 (4)	21,834 (8)	28,458 (76.7)	272.9	8	No
Somerset	63	0	23,346 (4)	23,346 (98.4)	370.6	10	No
South Burnett	79	0	5,747 (1)	5,747 (100)	72.7	4	No
TOTAL	369	192,611 (45)	412,351 (117)	607,962 (67.8)	165.1	164	

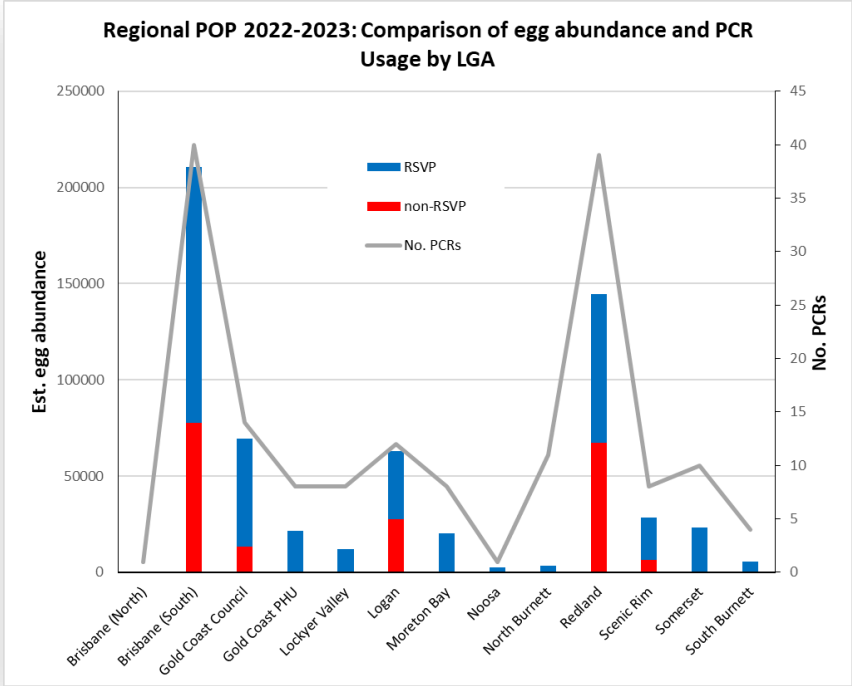
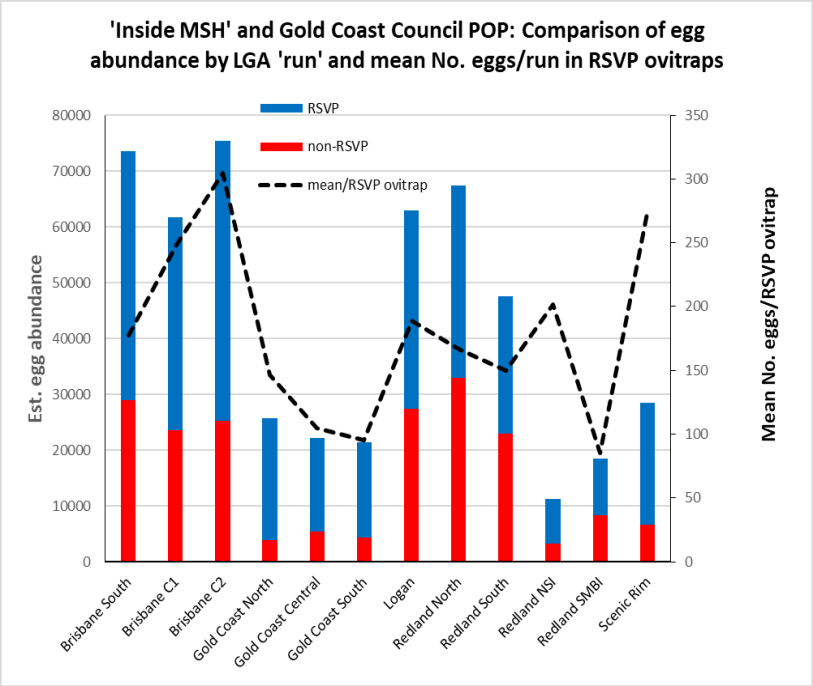
^a 5 episodes in NSI run, 11 episodes in North, South and SMBI runs

2023 expansions in SEQ

City of Gold Coast Council, Moreton Bay City Council, and Lockyer Valley Regional Council

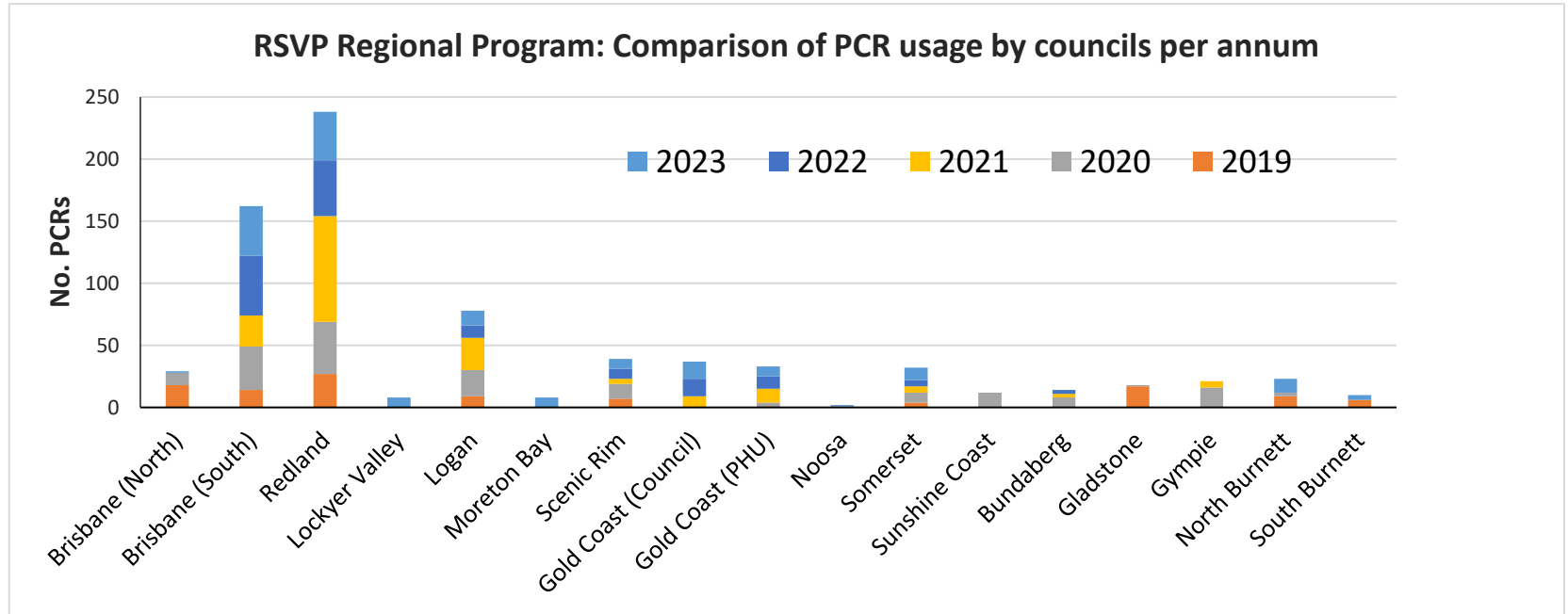


Largest programs in Brisbane (South), Gold Coast, Redland, Logan, and Scenic Rim



PCR usage 2019-2023

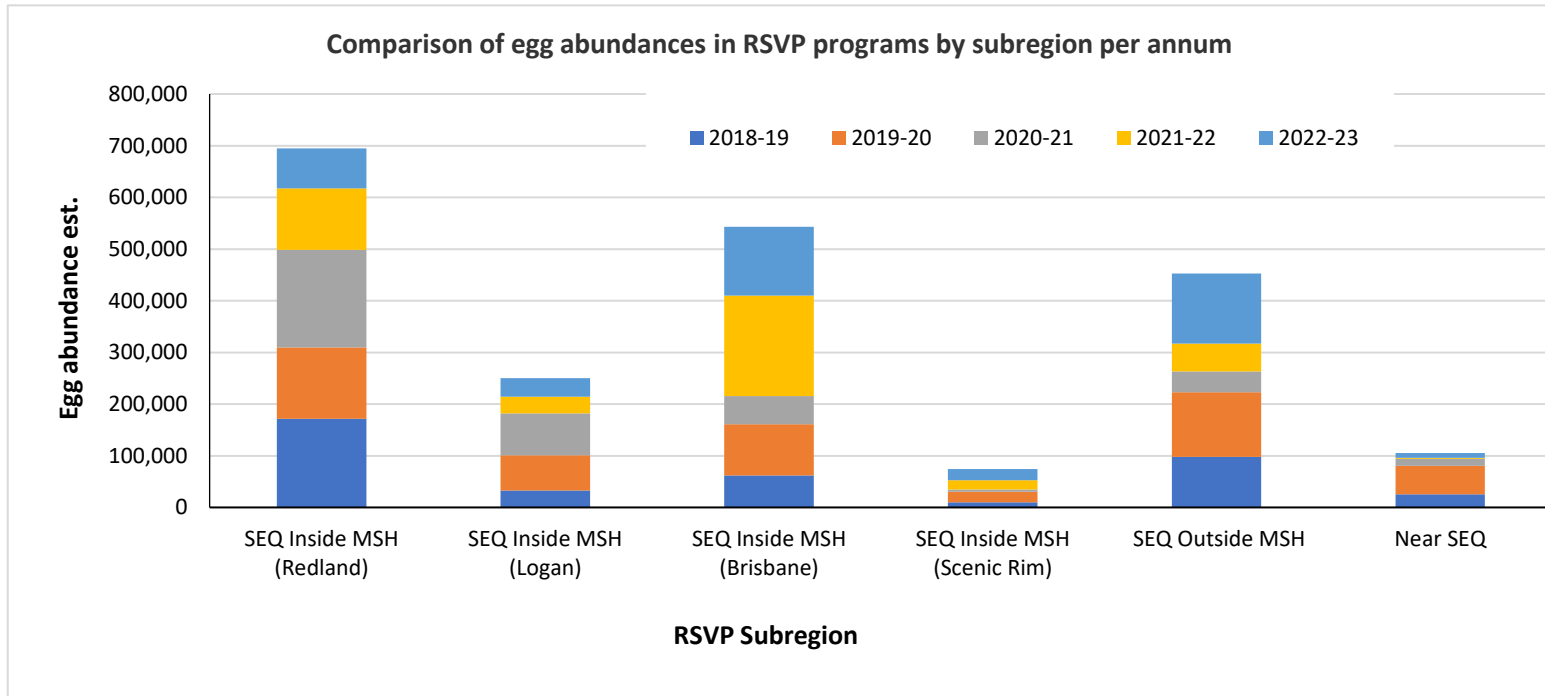
Unused PCRs from deviations on roster are shunted to councils *Inside MSH*



During COVID-19 (2021) most PCRs were shunted to Redland City Council

Egg abundances: COVID-19 impact is not obvious

SEQ Outside MSH and Near-SEQ council subscribers differ each year



Brisbane South and Redland extended program in 2020-21

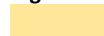
RSVP 2023 best SEQ coverage to date: 9 of 12 councils

Number of subscribers, ovttrap sites and episodes p.a. informs robustness of surveillance

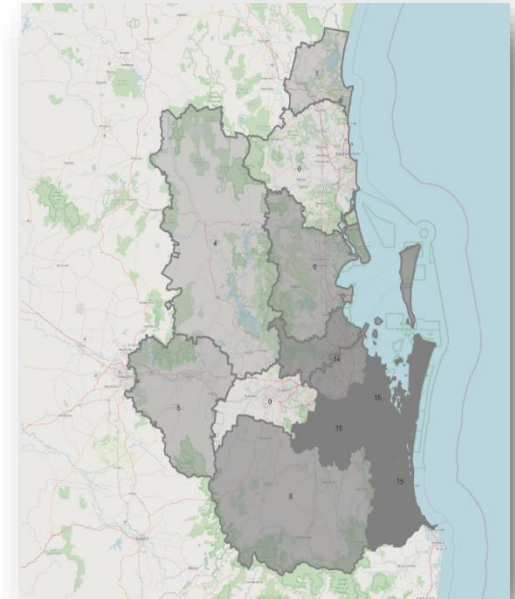
Number	Council	No. sites	2020	2021	2022	2023
			No. RSVP Episodes	No. RSVP Episodes	No. RSVP Episodes	No. RSVP Episodes
1	Brisbane (North)	2-17	6	0	0	5
	Brisbane (South)	41-51	30	22	17	14
2	Gold Coast Council	10-33	0	11	18	15
	GC PHU	19	4	8	9	9
3	Ipswich					
4	Lockyer Valley	27	0	0	0	5
5	Logan	12	19	26	11	14
6	Moreton Bay	20				6
7	Noosa	10	2	0	0	1
8	Redland	41-54	42	26	17	15
9	Scenic Rim	10	12	4	8	8
10	Somerset	149	3	0	3	4
11	Sunshine Coast*	30	17	0		
12	Toowoomba	0				
Total episodes			135	97	83	96
Total councils			8	5	6	9

* moved to LAMP diagnostic

RSVP stall



RSVP stop

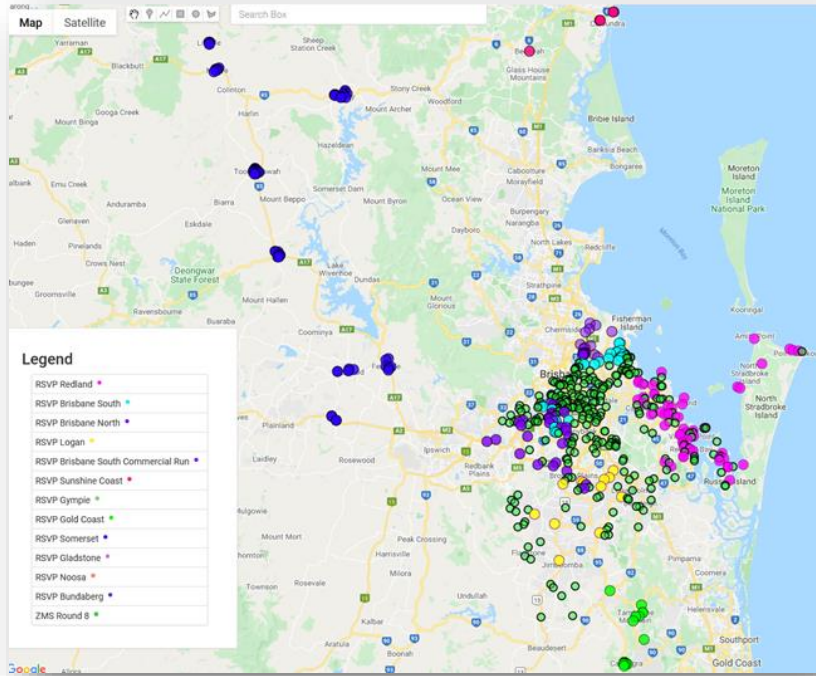


2023 RSVP

described by number of episodes per council

Toward integrated urban mosquito monitoring...

Commercial sites can be complemented by new sites and citizen science in residential areas



Sentinel sites provide biased data: Beware emerging and ephemeral sites, (e.g. yards that store tyres)!

Acknowledgements

- Participating councils and Public Health Units
- Department of Health (Communicable Disease Branch)
- Participating businesses and property owners