FOR INFORMATION AND DECISION

NAMP Steering Committee Annual Meeting
27 November 2020
Agenda Item #
Prepared by I Langstaff, E Sears and M Nye

NAMP MANAGEMENT REPORT 2020 (DRAFT)

RECOMMENDATION

That the NAMP Steering Committee:

1. NOTES the performance of the program for 2019-20
2. NOTES the activity plan of the program for 2020-21
3. SUPPORTS the forecast budget for 2021-22
4. PROVIDES STRATEGIC DIRECTION on any changes required to the program.

BACKGROUND

1. The NAMP Technical Committee met from the 25-26th August 2020:
    a. Technical reporting was concluded for the 2019-20 arbovirus season
    b. Monitoring plans were finalized for the 2020-21 arbovirus season
    c. Monitoring plans were discussed for the 2021-22 arbovirus season to guide the development of the budget.
    d. Prospective monitoring strategy was reviewed

DISCUSSION

2. The activity status of virology and entomology sites in the 2019-20 arbovirus transmission season (September 2019 to August 2020) is shown graphically in Figure 1 and Figure 2 (Appendix A).
3. Virology and entomology results by virus and significant vector, for the 2019-20 arbovirus transmission season, are shown graphically in Figure 3, Figure 4, Figure 5, Figure 6 and Figure 7 (Appendix A).
4. Virology and entomology plans for the 2020-21 arbovirus transmission season are shown graphically in Figure 8 and Figure 9 (Appendix A). Plans are mostly unchanged from the 2019-20 season.
5. Virology and entomology undertaken in 2019-20 is shown numerically in the Activity Summary (Appendix B). The summary shows the proportion of planned virology visits and entomology collections completed for the period.
6. NAMP coordinators' commentary on activities undertaken in 2019-20 is provided in annual reports (Appendix C).
7. Performance of the NAMP, measured by reference to target outcomes, is shown at Appendix D.
8. Details of bluetongue virus transmission zone changes undertaken in 2019-20 are shown in Appendix E.

FINANCIAL IMPLICATIONS

9. The balance of expenditure for 2019-20 is shown in Table 2, Appendix E. Total expenditure is within budget (5% or $70K under budget).
10. With consideration to individual cost centres: management costs were over-budget 5% ($10K) due to unbudgeted consultant fees for the review, monitoring costs (virology and entomology) were under-expended 7% ($78K) due to some uncompleted monitoring plans resulting from COVID restrictions; and database and application support costs (NAMP-info) were over-budget 22% ($7k) due to unexpected additional work on the zone map system following the review.
11. The budgeted expenditure for 2020-21 is shown Table 2, Appendix F. Total budgeted expenditure is as per agreed in the NAMP Business Plan 2020-21 and AHA AOP 2020-21 ($1,442,541).
12. The draft budget for 2021-22 is shown in shown Table 2, Appendix F. Budget items are expected to increase by a CPI adjustment (1%).

CONSULTAITON/COMMUNICATION

13. The NAMP Technical Committee was consulted on this paper at the annual Technical Committee meeting from the 25th to 26th of August 2020.

NEXT STEPS/ACTIONS

14. The supported budget for 2021-22 and any changes required to the program will be incorporated into a final Business Plan for 2021-22 for agreement with members by email in March 2021.

Appendix A: *Maps showing NAMP activity for 2019-20 and proposed activity for 2020-21*
Appendix B: *Activity summary*
Appendix C: *Annual coordinator reports of NAMP monitoring*
Appendix D: *Measures of performance*
Appendix E: *Bluetongue virus transmission zone boundary changes*
Appendix F: *Budget and expenditure summary*

APPENDIX A: Maps showing NAMP activity for 2019-20 and proposed activity for 2020-21

Figure not available - to be inserted

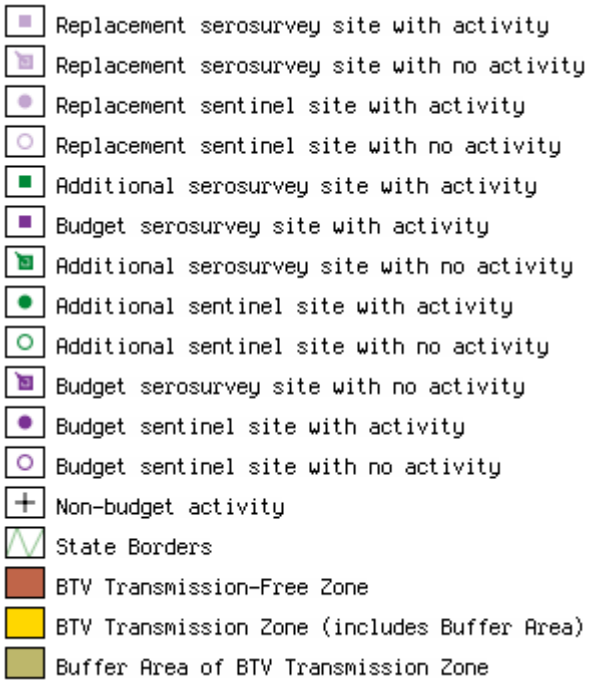

Figure 1 Map of proposed and actual virology activities conducted at budget, replacement and additional sites in the 2018-19 arbovirus transmission season

Figure not available - to be inserted

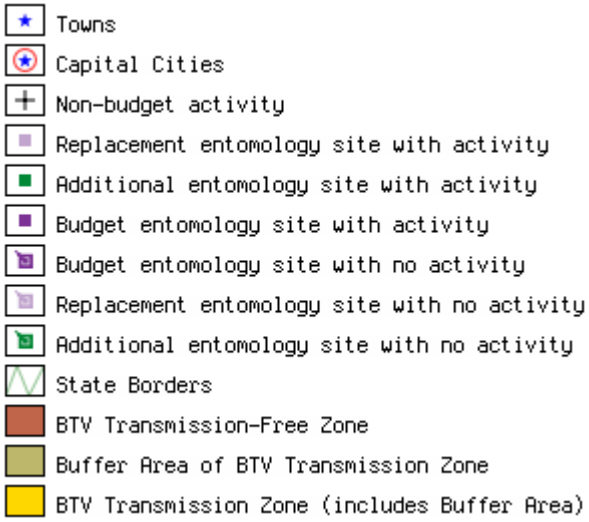

Figure 2 Map of proposed and actual entomology activities conducted at budget, replacement and additional sites in 2019-20 arbovirus transmission season

Figure not available - to be inserted

Serology (SIM)
- Negative SERO
- Positive SERO
- Negative SNTL
- Positive SNTL

Bluetongue Zoning Map
- Bluetongue Virus Transmission Zone (includes Buffer Area)
- Buffer Area of Transmission Zone
- Bluetongue Virus Transmission-Free Zone

Figure 3 Distribution of NAMP cattle herds tested for bluetongue virus (sentinel and serosurvey), showing serological test results by colour, 2019-20 arbovirus transmission season

Figure not available - to be inserted

Current Map Endorsed: 29/8/2019

Serology (SIM)
- Negative SERO
- Positive SERO
- Negative SNTL
- Positive SNTL

Bluetongue Zoning Map
- Bluetongue Virus Transmission Zone (includes Buffer Area)
- Buffer Area of Transmission Zone
- Bluetongue Virus Transmission-Free Zone

Figure 4 Distribution of NAMP cattle herds tested for Akabane virus (sentinel and serosurvey), showing serological test results by colour, 2019-20 arbovirus transmission season

Figure not available - to be inserted

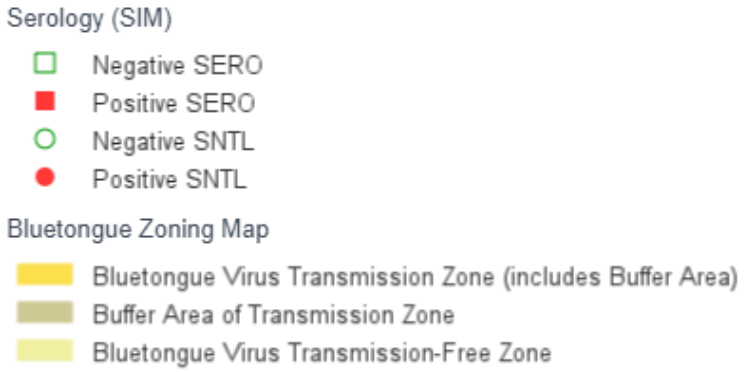

Figure 5 Distribution of NAMP cattle herds tested for bovine ephemeral fever virus (sentinel and serosurvey), showing serological test results by, 2019-20 arbovirus transmission season. Note: Not all NAMP herds are tested for BEF and the map only shows results from those herds tested within the NAMP.

Figure not available - to be inserted

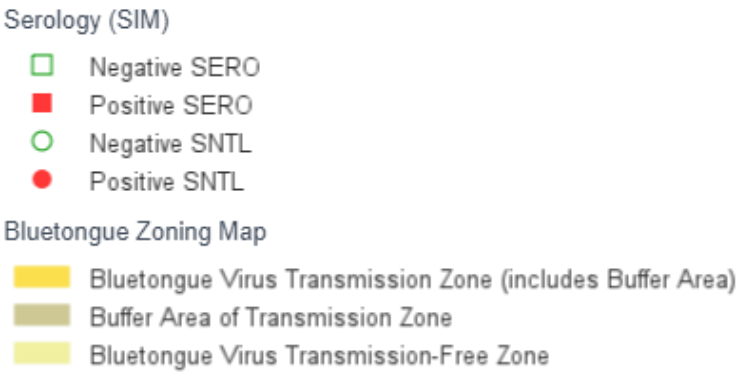

Figure 6 Distribution of NAMP cattle herds tested for Simbu virus (sentinel and serosurvey), showing serological test results by colour, 2019-20 arbovirus transmission season

Figure not available - to be inserted

Figure 7 Distribution of NAMP entomology sampling sites, showing significant vectors detected by colour, 2019-20 arbovirus transmission season

Figure not available - to be inserted

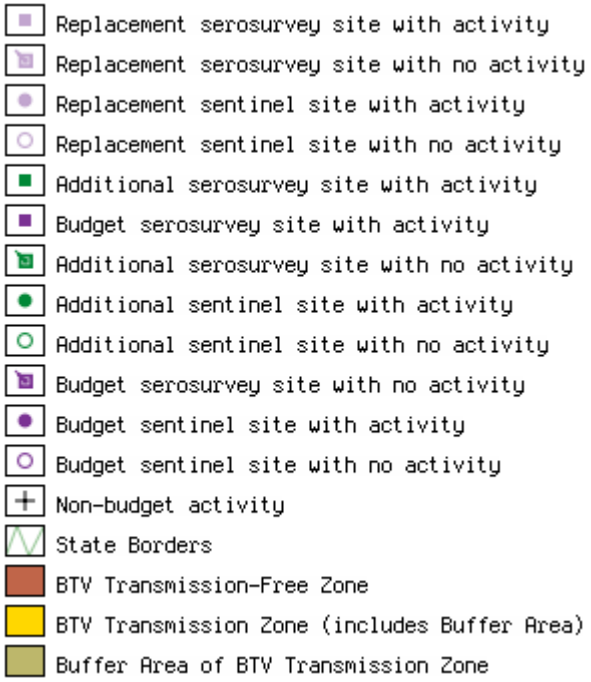

Figure 8 Map of proposed and actual NAMP virology (sentinel and serosurvey herds) for the 2020-21 arbovirus transmission season (as at xx-xx-xxxx)

Figure not available - to be inserted

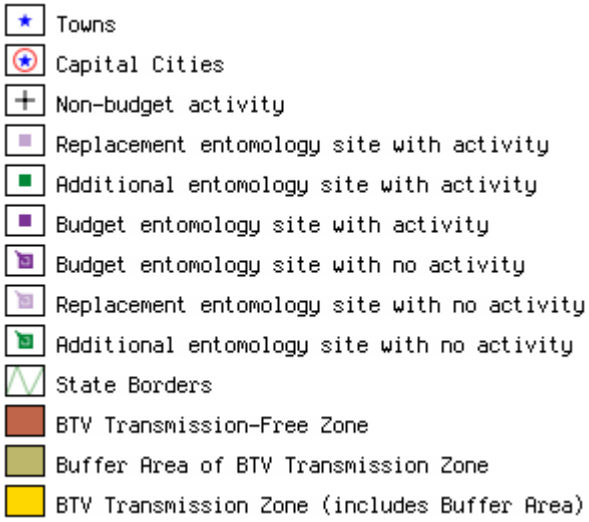

Figure 9 Map of proposed and actual NAMP entomology for the 2020-21 arbovirus transmission season (as at xx-xx-xxxx)

APPENDIX B: Activity summary by AGENCY: 2019-20

These summaries are dynamically generated from NAMPInfo and provide a summary of activities conducted in the 2019 – 20 arbovirus transmission season.

Date of page generation	Percentage of sampling year completed
xx/xx/20xx	100%

Percentage of activity reported may exceed 100% when activities undertaken at budget or replacement sites exceed those budgeted for at the beginning of the sampling year, or when data on activities for supplementary sites are included.

SEROLOGY: SENTINEL AND SEROSURVEY ACTIVITIES

Table 1 Numbers of sampling visits (listed against the agency recorded as 'collector')

Agency	Budgeted visits to budget sites	Visits made to official budget or replacement sites	Visits made to official additional sites	Visits made to B+R+A sites/(budgeted visits + A visits) (%)
NAQS				
NSW GOV				
NT GOV				
QLD GOV				
SA GOV				
TAS GOV				
VIC GOV				
WA GOV				

ENTOMOLOGY

Table 2 Numbers of collections

Agency	Budgeted visits to budget sites	Visits made to official budget or replacement sites	Visits made to official additional sites	Visits made to B+R+A sites/(budgeted visits + A visits) (%)
NAQS				
NSW GOV				
NT GOV				
QLD GOV				
SA GOV				
TAS GOV				
VIC GOV				
WA GOV				

APPENDIX C: Annual coordinator reports of NAMP monitoring 2019-20

New South Wales (Deb Finlaison and Adrian Nicholas)

1. Epidemiological features and significance on key findings (E.g. rainfall, temperature)

Forty sentinel herds (33 budget/7 non-budget sites) were monitored by serology across NSW during 2019-20. Two herds were replaced mid-season.

For the period July to December, NSW experienced ongoing drought conditions with generally "very much below average" rainfall recorded across the state with "lowest on record" falls across the northern tablelands, north-west slopes and southern tablelands. Additionally, catastrophic bushfires occurred in NSW, principally on the Great Dividing Range and coastal plain from the Queensland to Victorian borders from October through to January. Conditions improved from mid-late January as rainfall was recorded across the northern and central tablelands and coastal plain. From January to June rainfall was "above average" or better across the eastern two-thirds of the state with significant rainfall (and flooding) recorded in February along the coastal plain, northern tablelands and north-west-slopes. Inland, "above average" or better rainfall was also recorded in March and April.

At the end of June 83% of the state was drought affected, although areas in drought or intense drought were limited to 11% of the state. Maximum temperature deciles were "very much above average" or higher across the state from July to February. From February the maximum temperature deciles were generally "average" to "below average" till May, increasing to "above average" in June. First frosts were recorded on the northern tablelands in early May. Minimum temperature deciles were "above average" along the coastal plain (to the Shoalhaven) and eastern ranges during June.

The rainfall received in February was sufficient to support BEF virus transmission in coastal and inland NSW. The dry start to the season does not appear to have impacted BTV or Simbu virus group transmission.

2. Key findings and relevance to NAMP objectives and planned actions

a. Bluetongue

BTV transmission was first detected on the north coast at Lismore in February (with seroconversions first detected at Lismore, Casino and Bowraville in March). Additionally, activity was also detected in the lower Hunter Valley at Paterson in March. BTV seroconversions were subsequently first detected on the north coast at Kempsey in April and Taree in May; in the Hunter Valley at Singleton in May. Interestingly, transmission was detected at Nowra in late April (PCR) and preceded detection of activity at Richmond (early May - PCR) and Camden (mid-June - seroconversion). Transmission extended as far south as Milton on the south coast (detected at end of season bleed in mid-July). On the Northern Tablelands transmission was detected at Tenterfield (June) and Inverell (July); on the North-West Slopes activity was detected at Coolatai (May), east of Moree (June) and Warialda (July).

The incidence of seroconversions was high on the north coast from Lismore to Kempsey, and at Paterson and Singleton in the Hunter Valley, moderate at Nowra on the south coast and low at all other sites where transmission was detected. BTV 1 was detected at all sites, with BTV 16 detected in a single animal at Lismore (far north coast) and 5 animals at Paterson (lower Hunter Valley). Serotypes 2, 3, 4, 5, 7, 9, 12, 15, 20, 21 & 23 were not detected. (Serotype was determined by type-specific real-time PCR).

b. Akabane

During the monitoring season Simbu virus group serology was performed on all collections, with Akabane virus serology performed strategically after Simbu virus seroconversions were detected at a site and then again on the end of season samples from those sites.

Simbu group seroconversions were first detected in December on the far north coast (Lismore, Casino, Bowraville), extending to Milton on the south coast by May, and on the southern tablelands near Goulburn (July). Seroconversions were detected in the Hunter Valley at Paterson and Singleton from January and March respectively; on the northern tablelands/eastern ranges near Tenterfield (June), Inverell (July), Tamworth (May), Armidale (April) and Walcha (April); and on the north-west slopes Coolatai (May), Warialda (July), east of Moree (June).

The incidence of Simbu group seroconversions was generally high along the coastal plain south to Milton, and on the northern tablelands at Tamworth, moderate at Coolatai and Warialda (North West slopes); and low at all other locations.

Due to the limited Akabane virus serology it is not clear in which months Akabane virus seroconversions first occurred. Akabane seroconversions were detected at all sites on the north coast south to Richmond in the Sydney Basin and then further south to Milton (with the exception of Camden), extending up into the Hunter Valley to Singleton, and on the northern tablelands near Tenterfield, Armidale and Tamworth. The first seroconversions were detected in February on the Far North Coast.

The incidence of Akabane virus seroconversions was generally moderate to low in the herds in which Simbu group virus seroconversions were detected (high at Kempsey and Nowra) suggesting that at least one other Simbu group virus was circulating this season in addition to Akabane virus. Cases of Akabane disease are possible in areas close to the margins of the endemic zone.

c. Bovine Ephemeral Fever

Bovine ephemeral fever virus serology is undertaken at selected NAMP sites in NSW (inland NSW and South Coast). Seroconversions were detected in herds in the north-west slopes region (Coolatai - May; Warialda - April; Pilliga - April) and the coastal herds at Camden (June) and Nowra (May). Seroconversions were detected at a low to moderate prevalence at these sites. Cases of BEF were confirmed through diagnostic submissions tested by real-time PCR at EMAI from late February to early June. First cases were recorded in the north-west slopes region extending to Bourke in the west onto the northern tablelands near Tamworth in the east. Inland cases reached as far south as Young and West Wyalong in the northern Riverina by mid-March. Cases were recorded on the south coast near Berry from mid-March, extending to Milton by early April. First cases were recorded on the north coast and Hunter Valley from late-March.

d. Summary of virus isolation, neutralisation and PCR tests performed

As of 10/8/2020: 79 x BTV virus isolations were underway or had been completed and 226 pan-BTVs had been performed. BTV VI is undertaken ideally on the first blood sample where each serotype of BTV is detected. The pan-BTV PCR is performed on a sample from an individual animal when seroconversion is detected and the month before. For simplicity the results for the whole herd are reported for the months that serconversions are detected. A final pan-BTV PCR is completed on blood collected from seropositive animals at the end of season bleed. Where BTV is detected by the pan-BTV PCR a serotype specific (BTV 1, 2, 16 and 21) is performed.

e. Entomology

In alignment with week of the new moon, vector trapping for the 2019-20 season commenced on 23 December 2019 and continued until May 2020. *Culicoides brevitarsis*, the principal vector of BTV in NSW, was detected in the coastal region at all sites from Casino in the north to Camden in the south throughout the December to May period. It was also detected at Berry from December to April and at Moruya from February to April. In the Hunter Valley *C. brevitarsis* was detected at Singleton from December 2019, Denman and Scone from January and at Paterson from February. Singleton and Denman remained positive for *C brevitarsis* until May. Paterson and Scone until April.

Inland and the Dividing Range *C. brevitarsis* was detected intermittently at Wallangra (January, April) Tenterfield (January to April), Armidale (January), Wollomombi (January to March), Tamworth (April) and Yarrowitch (January). *Culicoides brevitarsis* was detected further inland and close to the NSW Queensland border, at Boomi, Lightning Ridge and Moree in April and further south at Mudgee in January. *Culicoides wadai* was detected at Bellingen (February and March) Grafton (April) and Casino and Kempsey in April and May. Except for Taree, vector numbers were generally lower than in recent seasons.

3. Activities completed and significance to NAMP objectives

a. Under-activity

The ongoing drought at the start of the season affected our ability to recruit sentinel herds at some locations on the northern tablelands (Inverell and Glen Innes), north-west slopes (Coonamble) and Hunter Valley (Scone). In another case a herd was recruited, although the first bleed was delayed (Tenterfield). With much appreciation and admiration of LLS staff involved in the bushfire response and producers impacted by the summer bushfires and or drought, while there were some delays to NAMP bleeds this had less impact than expected. Serosurveys were undertaken at Bourke and Inverell at the end of the monitoring season to provide monitoring data for these regions. COVID-19 responses did not affect NAMP sampling this season.

At the start of August only one end of season bleed from recruited herds remained outstanding.

b. Over-activity

NSW DPI maintains 7 non-budget sentinel herds and they are generally in locations near the boundary of the BTV free zone or in regions that activity occurs irregularly: these herds provide extra support for the BTV zones in NSW. We have also chosen to maintain the sentinel herd near Lismore that is within the BTV endemic region but no longer a budgeted site. BTV transmission was detected at three non-budget sites (Lismore, Coolatai and Milton). Critically, activity was detected at the Milton site (N195) that resulted in an expansion of the BTV transmission zone on the south coast of NSW.

NSW has completed more BTV PCR and VI than is included in the budget.

NSW DPI maintains an additional vector trapping site at Ballina.

4. Recommendations to Management

That the number of sites and samplings at each site remains unchanged. Given the increased scrutiny of the zone of possible BTV transmission in NSW with regard to international trade it is critical that we have enough monitoring sites to support the zoning applied.

That as a minimum BEFV serology (ELISA) continues to be performed on selected NAMP sentinel herds in NSW located west of the Great Dividing Range and south of Sydney along the coast. Sampling frequency as per the 2019-20 season would be adequate.

Northern Territory (Lorna Melville)

1. Epidemiological features and significance on key findings (E.g. rainfall, temperature)

Daytime and night time temperatures were above average during the dry season of 2019, although overall the departures from average were less than one degree celsius. Rainfall was about half of the long-term average for the Northern Territory during the 5-month period. While the Top End had above average rainfall, it was mostly well below average across southern parts of the NT.

Nearly the entire Northern Territory saw below average rainfall totals during the 2019-20 wet season. Both daytime and overnight temperatures both ranked as the second-highest on record as nearly all locations had temperatures in the highest 10% of their long-term record. The Northern Territory had a second season of below average rainfall, immediately following a dry 2018-19 wet season. Territory-wide, rainfall was 20% below the long-term average. Only a few parts of the eastern NT saw average or above average rainfall for the wet season. The north-western, the far north, and the south-western NT, had seasonal rainfall totals in the lowest 10% of historical records since 1900.The primary climate driver responsible for the low rainfall was the near-record strong positive Indian Ocean Dipole (IOD) which dominated Australia during the second half of 2019

The positive IOD contributed to the late monsoon onset of 18 January, 3 weeks later than average. Following this initial monsoon activity, two other relatively weak and short-lived monsoon bursts were observed, contributing to moderate widespread rainfall over the NT. Below average tropical low/cyclone activity during 2019-20 also contributed to the relatively dry conditions.

Northern Territory was affected by two tropical cyclones during wet season 2019-20. A tropical low moved across the Top End before moving over the Timor Sea and became TC Claudia in the first half of January, and while no significant wind impacts were observed, the low generated very heavy rain across parts of the northwest Top End. TC Esther made landfall near the NT/Qld border in the southern Gulf of Carpentaria, late in February, generating heavy rainfall across parts of the Carpentaria, Daly and southern Arnhem districts. As an ex-TC, Esther subsequently tracked westwards through northern Western Australia and then through much of the central NT, in early March, generating locally heavy rainfall.

2. Key findings and relevance to NAMP objectives and planned actions

a. Bluetongue

This has been a relatively quiet year with respect to virus activity. Only 103 viruses were isolated. 67 have been identified to date as BTV. The initial BTV isolations occurred at Beatrice Hill, Douglas Daly, Katherine and Garrithiya in July. Following this activity only Douglas Daly was positive in August and September. All these early detections were BTV1. In October, BTV16 isolations began at Douglas Daly and Beatrice Hill. This was the dominant serotype for 2020. In January, BTV7 was isolated at Beatrice Hill.

17 BTV isolates were sent to AAHL for genotyping. The BTV1 isolates from Douglas Daly and Beatrice Hill were Australia A and all the BTV16 isolates were Malaysia A. The BTV7 was untyped.

b. Akabane

No Akabane testing was performed in the northern endemic herds. There was no activity at Alice Springs.

c. Bovine Ephemeral Fever

BEF activity was very limited with seroconversions only at Beatrice Hill, Douglas Daly, Katherine, Coomalie and Gunbalanya. Most activity occurred between January and March.

d. Summary of virus isolation, neutralisation and PCR tests performed

155 pan PCR tests were performed and 17 BTV8 serotype specific tests. All BTV8 PCRs were negative.

Virus isolations were performed weekly at Beatrice Hill and on seroconversion at Douglas Daly, Gunbalanya, Garrithiya and Katherine. BTV1,7 and 16 were identified, with BTV16 predominating.

e. Entomology

See separate report from Glenn Bellis

3. Activities completed and significance to NAMP objectives

a. Under-activity

The loss of land at Berrimah resulted in the sentinel herd being terminated after the last bleed in May 2018. An alternate site at Finniss River was tried. After three successful bleeds a new herd was established in February 2018 but subsequent attempts to follow up were unsuccessful. Recently a new site at Coomalie was found and three bleeds have now been conducted.

b. Over-activity

No impact

4. Recommendations to Management

No recommendations

Queensland (Bruce Hill and Natalie Leo)

1. Epidemiological features and significance on key findings (E.g. rainfall, temperature)

During spring (2019) most of the State reported below average rainfall. On a State average, the 2019 spring was the fourth-driest on record, affecting especially the Darling Downs and Granite Belt; southern Burnett; and South-east Coast districts. The mean maximum temperatures were warmer than average for most of the State.

Summer 2019-20 provided above average rainfall in parts of the Gulf Country, the central and southern interior, and the southeast coast of Queensland. Raised water levels were reported in the upper Georgina River due to late January rain in the north-west. The Georgina-Eyre, Logan-Albert, Condamine-Balonne and Warrego catchments recorded significant flood levels during February. Mean maximum and mean minimum temperatures were above average across the whole State.

Autumn 2020 brought heavy rain to western Queensland in March as a result of tropical cyclone Ester; this resulted in flooding in the Georgina, Diamantina, and Bulloo, Paroo and Warrego rivers and the Cooper Creek catchment. Heavy rainfall in February over the Balonne and Maranoa rivers resulted in flooding in early March. A below average mean temperature was recorded for the State as a whole.

During winter in June 2020 rainfall was mostly confined to the eastern half of the State. Mean maximum temperatures were warmer than average across most of the State.

Source: Climate summaries were derived from the Australian Bureau of Meteorology (http://www.bom.gov.au/climate/current/month/qld/archive/)

Drought Declarations:
As reviewed on 1st May 2020, there were a total of 41 fully drought-declared and 4 partly drought-declared Local Government Areas. These declarations represented 67.4% of the land area of Queensland. There were also 28 individually drought-declared properties in a further 11 Local Government Areas. Source: https://www.longpaddock.qld.gov.au/drought/drought-declarations/

2. Key findings and relevance to NAMP objectives and planned actions

For descriptive purposes, NAMP within Queensland is divided into northern, central and southern horizontally placed biosecurity regions. Their approximate dividing latitudes are at -21.6 degrees (Cape Palmerston) and -25.8 degrees (Inskip point).

a. Bluetongue

In the north, the Cooktown sentinel site showed evidence of active infection at recruitment in August 2019 associated with BTV-15 (Aust B2). Further seroconversion was discovered in November in association with both BTV-15 and BTV-16. There was a late recruitment at the Normanton sentinel site in February and a second sampling in July did not reveal any evidence of seroconversion. The Innisfail sentinel site showed evidence of active infection at recruitment in October 2019 associated with BTV-16. Further seroconversions were recorded in January and March in association with both BTV-1 and BTV-16. The sentinel site at Hervey Range near Townsville was recruited in September 2019. Seroconversions were subsequently recorded in October and November, and again during April, May and June 2020. BTV-16 was the associated serotype in both monthly groupings.

In Central areas, the Springsure sentinel site showed evidence of active infection on recruitment in December 2019 associated with BTV-16. Further seroconversion was recorded in June 2020, where associated serotyping was not available at the time of writing. Difficulties in acquiring suitable sentinel animals in the Tambo region necessitated continued monitoring of the substantially BTV negative mob from the 2018-19 season; this

resulted in detecting seroconversion in November 2019 but no further seroconversion was demonstrated from a sampling taken in June. From recruitment in October 2019 at the Capella site, seroconversion was subsequently detected in March (associated with BTV-1) and again in July. The sentinel site at Maryborough showed evidence of active infection between February and April; this was associated with BTV-1. The additional (volunteer) sentinel herd at Milman showed evidence of active infection at recruitment in October 2019; this was associated with both BTV-1 and BTV-16. The sentinel site near Mackay showed evidence of active infection at recruitment in September. Serotyping by VNT and BTV RT PCR VP2 methods showed exposure to BTV-1, 4, 15 and 16. One animal was negative on BTV Elisa, positive on PCR testing and showed seroconversion on the following sampling in December.

Seropositive animals were recorded at the following survey sites: Springsure (July 2019); Windorah (Q369-June 2020; the subject of a zone-change notification); Boulia (May 2020). No seropositive animals were detected at a further survey site near Windorah in September 2019 and at a survey site located near Bedourie in September 2019.

In southern areas, the Chinchilla sentinel herd showed evidence of active infection at recruitment in October 2019 associated with BTV-16. Further seroconversion in June 2020 was associated with BTV-1. Seroconversion was recorded at the Kenilworth sentinel herd with evidence of exposure to BTV-1 and BTV-4 in February 2020. Seropositive animals were detected at the Cunnamulla and Charleville survey herds in December and June respectively.

b. Akabane

Seroconversion at sentinel sites and seropositive animals recorded at survey sites were broadly distributed across all regions.

c. Bovine Ephemeral Fever

In the north, the following sentinel sites recorded seroconversions: Cooktown (November 2019); Hervey Range (October 2019, February and March 2020); Innisfail (March and June).

In central areas, the following sentinel sites recorded seroconversions: Springsure (March and June); Tambo (June); Capella (March); Maryborough (October, November, January and February); Mackay (December and June). Seropositive animals were recorded at the following survey sites: Springsure (July 2019); Windorah (September 2019 and June 2020).

In southern areas, the following sentinel sites recorded seroconversions: Chinchilla (June 2020); Kenilworth (December 2019 and February 2020) Cunnamulla (June); Seropositive animals were recorded at the following survey sites: Cunnamulla (December 2019); Windorah (September 2019); Charleville (June 2020).

d. Summary of virus isolation, neutralisation and PCR tests performed

The above reports for the Northern, Central and Southern management regions within Queensland provide summarised results for BTV serotyping.

e. Entomology

Annual NAMP Entomology Report 2019/2020
Site Summary:

- We managed 16 entomology sites, not including the NAQS-managed sites
- 13 of the 16 sites submitted samples in the 2019-2020 financial year, with no samples from Q288, Q366 and Q390.
- Of approximately 96 scheduled collections we received 61 (approximately 64%). This is an increase from last financial year (less than 50% received).

Vector Summary:

- Vectors were found further inland than last financial year, with *C. brevitarsis* identified from Emerald, Springsure and Cunnamulla sites.
- *C. brevitarsis* was widespread, absent only from the inland sites of Bollon, Moonie and Longreach (Q397, Q403, and Q407 respectively).
- The vector species *C. actoni* and *C. fulvus* remained confined to the north of the state.
- Like last year, *C. wadai* was found in sites along the coast.
- Flies from vector species represented 73% of the total flies collected (20230 of 27384)

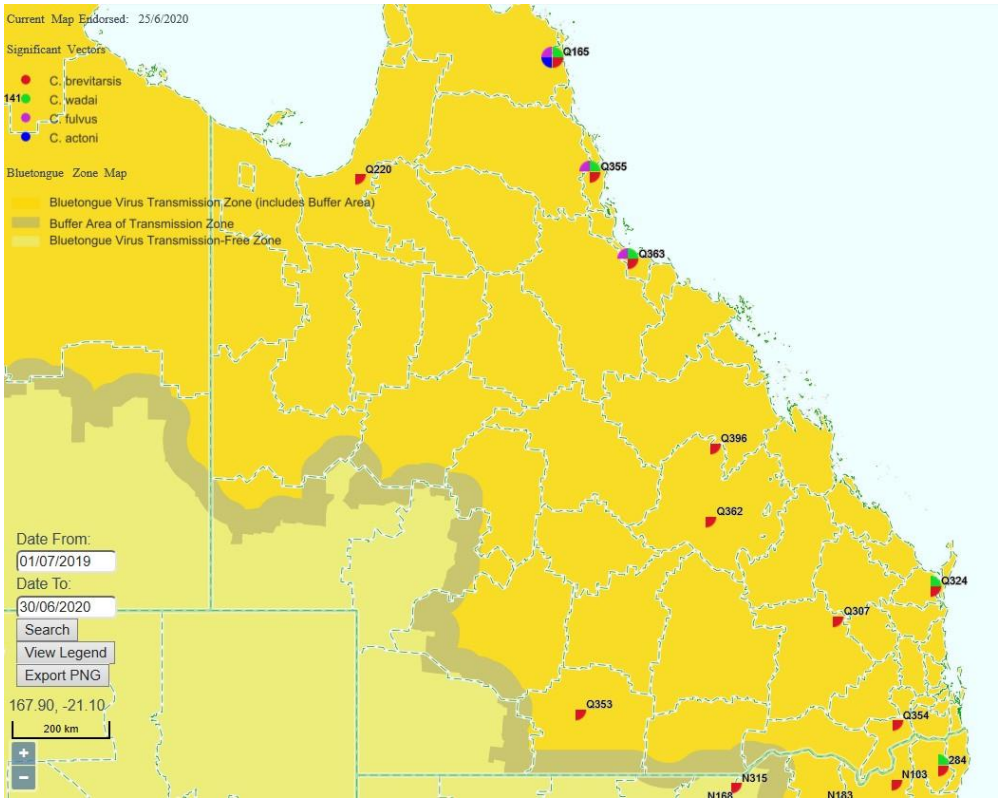

Figure 1. Distribution of *Culicoides* vector species found from Queensland sites in 2019/2020.

Yield Summary:

- In 2019/2020, 27384 flies were collected from 61 collections. C. brevitarsis was the predominant vector species in distribution and numbers, followed by C. wadai (Table 1).
- At each site, yields of *Culicoides* spp. varied greatly during the year (Table 2). This is likely due to seasonal weather conditions.
- The northern sites of Cooktown and Innisfail (Q165, Q355) often recorded large numbers, with multiple collections of over 1000 flies. These sites also had three or more vector species reported. This may have implications for disease transmission.

Table 1. Numbers of *Culicoides* vector species collected from Queensland sites in 2019/2020.

	2019		2020		Total
Species	**Qtr3**	**Qtr4**	**Qtr1**	**Qtr2**	
C. brevitarsis	1579	5913	10291	147	17930
C. wadai	664	616	690	80	2050
C. actoni	37		54	55	146
C. fulvus	3	7	74	5	89
C. oxystoma		1	13	1	15
Total	**2283**	**6537**	**11122**	**288**	**20230**

Table 2. Numbers of *Culicoides* collected from Queensland sites during 2019/2020.

Site No.	2019						2020						Total
	Qtr3			Qtr4			Qtr1			Qtr2			
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
Q165		1024		1712	32			430	1266	301			4765
Q220			898	0	89		61	651	1092		9		2800
Q307		0		15	49		168	1597	149	1	0		1979
Q324	447		3		497			134			5		1086
Q353			17						120			1	138
Q354	0				999		0		0	303	0		1302
Q355	347				3450	1179		237	1833				7046
Q362				39									39
Q363	37			4	169		7216	591		53	73		8143
Q396	0			22	75			127			1	0	225
Q397			78										78
Q403		1		19									20
Q407					0			8	205				213
Total	831	1025	996	1811	5360	1179	7445	3775	4665	658	88	1	27834

Species diversity:

- 35 species were identified from the submissions we received in 2019/2020. This is likely an underestimate of the true number of species, with many flies identified to group only following examination by the senior entomologist.
- The greatest species diversity was found at Cooktown (Q165) with 23 species identified. All other sites had 12 species or fewer.

A new trap site has been established near Camooweal, on the Qld-NT border, in response to the finding of *C. nudipalpis* in the Northern Territory. The trap currently has funding for the 2020-21 season.

3. Activities completed and significance to NAMP objectives

a. Under-activity

Apparent under activity is generally attributable to property and breeder management operations in northern herds:

- Samples from the last quarter (August to October) of the NAMP sentinel recruitment cycle are yet to be received, tested and entered into the data base. During this quarter both the final sampling of the old mob and recruitment of a new mob for the coming year take place. For management reasons this is usually done on the same property visit.
- Substantial areas of the State were influenced either by lingering flood waters or drought. These events limited access to sites and resulted in reduced sampling activity. In addition, routine collections under the NAMP were suspended under COVID-induced restrictions, which resulted in reduced sampling activity.

b. Over-activity

No impact.

4. Recommendations to Management

No recommendations.

South Australia (Trent Scholz)

1. Epidemiological features and significance on key findings (E.g. rainfall, temperature)

South Australia experienced very dry and warm conditions for the first 6 months of this period which are unlikely to be conducive to arboviral activity. Areas of northern South Australia had significant rainfall in the third quarter of the period, providing ideal conditions for arboviral activity. This was supported by anecdotal reports of bovine ephemeral fever on a number of northern properties during this time.

2. Key findings and relevance to NAMP objectives and planned actions

a. Bluetongue

No activity detected

b. Akabane

No activity detected

c. Bovine Ephemeral Fever

A sentinel serology sampling site in the north of South Australia had 11/14 animals sero-convert for bovine ephemeral activity at the second sampling.

d. Summary of virus isolation, neutralisation and PCR tests performed

n/a

e. Entomology

No *Culicoides* species considered important to NAMP were detected in South Australia this season.

3. Activities completed and significance to NAMP objectives

a. Under-activity

No entomology samples were submitted from one remote collection site due to reduced opportunity to get the samples to the appropriate postal service during a period of covid-19 restrictions. This meant no entomology samples from the far north of South Australia

2/7 sentinel serology sites were not sampled, meaning a reduced picture of arboviral activity in South Australia. Dry conditions in the north of the state made it difficult to recruit one of these herds.

b. Over-activity

None

4. Recommendations to Management

No recommendations

Tasmania (Debbie Grull)

1. Epidemiological features and significance on key findings (E.g. rainfall, temperature)

Overall, for Tasmania, 2019 was warmer than average but not as warm as 2018. October were very dry for most of the State, and rainfall totals for the year were below average in the east, but westerly winds and cold fronts gave the west a wetter than average year.

Tasmania saw plenty of hot weather during December and January, but in February days were mostly cooler than average. Rainfall was below average for most of the State, despite a wet December in the west and some wet days in the northeast during February.

Rainfall in Tasmania during autumn and winter was above to very much above average in most areas, except for parts of the Central Plateau and Upper Derwent Valley districts where totals were closer to average. Overall, it was Tasmania's wettest autumn since 1975. Daytime temperatures were generally cooler than average, particularly in the east, but nights tended to be warmer than average.

2. Key findings and relevance to NAMP objectives and planned actions

a. Bluetongue

Bluetongue was not detected at the sentinel site in Northern Tasmania.

b. Akabane

Akabane was not detected at the sentinel site in Northern Tasmania.

c. Bovine Ephemeral Fever

Bovine ephemeral Fever was not detected at the sentinel site in Northern Tasmania.

d. Summary of virus isolation, neutralisation and PCR tests performed

Nil virus isolation, neutralisation and PCR tests performed.

e. Entomology

No *Culicoides* species of interest were recorded at the sentinel site in Northern Tasmania.

3. Activities completed and significance to NAMP objectives

a. Under-activity

No impact

b. Over-activity

No impact

4. Recommendations to Management

No recommendations

Victoria (Karen Moore)

1. Epidemiological features and significance on key findings (E.g. rainfall, temperature)

Winter 2019 rainfall in Victoria was below average across much of the north and east of the State, while in parts of the south it was above average. Daytime temperatures were warmer than average in most of the eastern and south-central Victoria, with very much above average daytime temperatures in most of East Gippsland. Night-time temperatures were warmer than average across much of southern Victoria and only the elevated regions of the Victorian Alps had cooler than average nights.

Victoria in spring 2019 was drier than average, with areas of very much below average rainfall totals across the State's north. Daytime temperatures were warmer than average across most of Victoria, except for the southwest, and very much warmer than average in East Gippsland. Night-time temperatures were below to very much below average in most of Victoria's west and north, with an area of lowest on record night-time temperatures in the State's west.

Daytime and night-time temperatures for summer were above average across much of Victoria. The mean maximum temperature for Victoria over summer 2019-2020 was 1.04°C above average. Rainfall was below average in parts of the north and the far east, but above average in the southeast of the State. Victoria was impacted by fire and storms. Significant new fires commenced in East Gippsland during December. There were widespread areas of smoke from fires burning in southern New South Wales and East Gippsland which extended across eastern and southern Victoria on 23 December and again on 13 January, persisting over several days. Strong storms in parts of Gippsland resulted in flash flooding.

Autumn was wetter than average for large parts of the State, with some areas in the northern and central districts in Victoria much wetter than average. Many sites, some of which have more than 100 years of data, had their highest autumn daily rainfall on record. Days were cooler than average for most of the State away from East Gippsland and parts of the coast, while night-time temperatures were generally close to average. Some sites had their lowest autumn mean daily maximum temperature on record.

2. Key findings and relevance to NAMP objectives and planned actions

a. Bluetongue

Eight sentinel herds had recruitment bleeds in late Spring 2019 with follow-up bleeds in June (Winter 2020). Management practices on four herds resulted in only less than 10 cattle being available for. No seroconversions were detected in any of the herds.

b. Akabane

Simbu: Eight sentinel herds had recruitment bleeds in late Spring 2019 with follow-up bleeds in June (Winter 2020). Management practices on four herds resulted in only less than 10 cattle being available for. No seroconversions were detected in any of the herds.

c. Bovine Ephemeral Fever

Eight sentinel herds had recruitment bleeds in late Spring 2019 with follow-up bleeds in June (Winter 2020). Management practices on four herds resulted in only less than 10 cattle being available for. No seroconversions were detected in any of the herds.

d. Summary of virus isolation, neutralisation and PCR tests performed

N/A

e. Entomology

Victoria had six monitoring sites, this season. The Gippsland fires resulted in no insect trapping from the Cann River site. No *Culicoides* sp. known to be vectors were detected at any of the other sites.

3. Activities completed and significance to NAMP objectives

a. Under-activity

Four herds had less than ten cattle bled at the follow up bleed due to management practices.

Due to severe fire activity in Gippsland no insect trapping was done at the Cann River site.

b. Over-activity

None

4. Recommendations to Management

No recommendations

WESTERN AUSTRALIA (Marion Seymour) - Report not available - to be inserted

1. Epidemiological features and significance on key findings (E.g. rainfall, temperature)

2. Key findings and relevance to NAMP objectives and planned actions

a. Bluetongue

b. Akabane

c. Bovine Ephemeral Fever

d. Entomology

3. Activities completed and significance to NAMP objectives

a. Under-activity

b. Over-activity

4. Recommendations to Management

NAQS (Skye Fruean) – See separate report from Skye Fruean

1. Epidemiological features and significance on key findings (E.g. rainfall, temperature)

2. Key findings and relevance to NAMP objectives and planned actions

a. Bluetongue

b. Akabane

c. Bovine Ephemeral Fever

d. Entomology

3. Activities completed and significance to NAMP objectives

a. Under-activity

b. Over-activity

4. Recommendations to Management

APPENDIX D: Measures of performance

Table 3 Measures of performance of NAMP during 2018-19 by reference to agreed target outcomes and performance indicators (Business Plan 2018-19)

Target outcome *The measurable benefits that are sought from undertaking a project.*	**Performance indicator** *The measure that will be used to indicate the level of achievement of the target outcome(s).*	**Measure in 2019-20** *The outputs for measuring the level of performance.*
Australian Government Department of Agriculture (DoA)		
• Provides a technical basis for export certification for Australian livestock and germplasm to meet importing country arbovirus conditions. • Provides a technical basis for negotiation of import health protocols for countries requiring import conditions for arboviruses. • Provides information in support of Australia's animal health status enabling accurate reporting to the World Organization for Animal Health (OIE). • Support exotic disease preparedness by implementing effective surveillance systems for arboviruses.	• Bluetongue free zone accurately predicts areas where viral transmission does not occur. • NAMP program accepted by importing countries as an effective arbovirus surveillance system. • Records bluetongue virus types circulating in Australia, records changes in the epidemiology of bluetongue viruses observed in Australia. • Understanding of the epidemiology of arboviruses in Australia.	• The BTV Transmission Zone boundary updated in a timely manner. Three changes was made to the BTV zone in the 2019-20 arbovirus season in response to serological evidence of BTV transmission: Balonne Shire (Qld), Moree and Milton (NSW), and Boulia (Qld) (Appendix E). • The NAMP review was concluded in 2019-20 to ensure good management and technical practice and to enhance an ongoing collaborative approach to livestock arbovirus monitoring in Australia. • The NAMP continued additional monitoring at 3 sites in Victoria (initiated in 2017-18) to understand whether the epidemiology of bluetongue in the BTV transmission-free zone has changed. • Bluetongue virus typing occurred to determine BTV types circulating in Australia – types 1, 16 and 21.
Livestock exporters		
Satisfied information needs of livestock exporters (buyers and agents) on the distribution of bluetongue, bovine ephemeral fever and Akabane disease.	The confidence exporters have in Australian regions, reported by NAMP to be free of bluetongue, Akabane or bovine ephemeral fever i.e. the confidence exporters have to market livestock to countries concerned about Australia's arbovirus status. NB: some of the countries concerned about	• An online interactive BTV zoning map was maintained throughout 2019-20 and was made publically available to allow exporters to review buying areas. Depiction of the buffer zone has been removed from the map and is scheduled for adding as a selectable map layer.

Target outcome *The measurable benefits that are sought from undertaking a project.*	**Performance indicator** *The measure that will be used to indicate the level of achievement of the target outcome(s).*	**Measure in 2019-20** *The outputs for measuring the level of performance.*
	bluetongue are not actually free of this virus e.g. Israel).	• The measures listed for the DoA also indirectly supported the needs of livestock exporters.
Livestock producers		
Satisfied information needs of livestock producers on the distribution of bluetongue, bovine ephemeral fever and Akabane disease.	• The confidence livestock producers have in the zone map: temporal and spatial data points. • The confidence livestock producers have in early detection of changes to the distribution. • Market access to bluetongue sensitive markets maintained.	• An annual report was published to enable promotion of the Australian livestock industry. • A BTV transmission zone map was maintained throughout 2019-20 and made publically available to allow producers to make management decisions and inform them on the distribution of arboviruses. • The measures listed for the DoA also indirectly supported the needs of livestock producers including through maintaining market access.
State and territory governments		
Satisfied information needs of state and territory governments to assess the risk of bluetongue, bovine ephemeral fever and Akabane disease occurrence and advise their stakeholders. To enable accurate property of origin certification.	• Governments have details of geographical distribution of viruses and vectors and their temporal variation. • Governments received updates of new incursions of exotic strains of virus or exotic species of *Culicoides* and notification of any extraordinary epidemiological events. • Governments have up-to-date vector map (e.g. quarterly) and incursions of new species are reported.	The measures listed above for the DoA also supported the needs of state and territory governments in determining areas eligible for export and testing protocols required. In addition: • A database of BEF and AKA virus occurrence was maintained throughout 2019-20 to provide information on their distribution. • Timely notification changes to BTV status in Australia supported the needs of state and territory governments. Timely notification of changes to status.

APPENDIX E: Bluetongue virus transmission zone boundary changes 2018-19

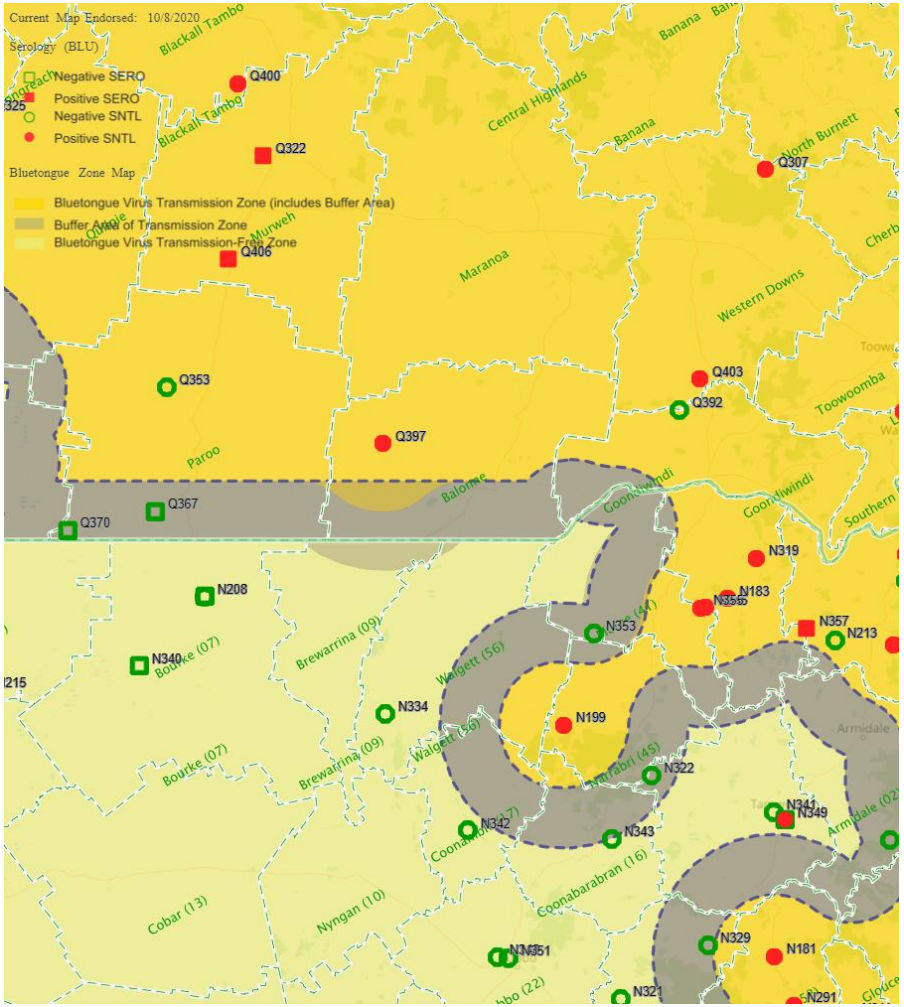

Figure 10 Map showing the prior (dotted line around buffer area) and new bluetongue virus transmission zone boundary in response to transmission detected in the Balonne Shire of southern Queensland, November 2019

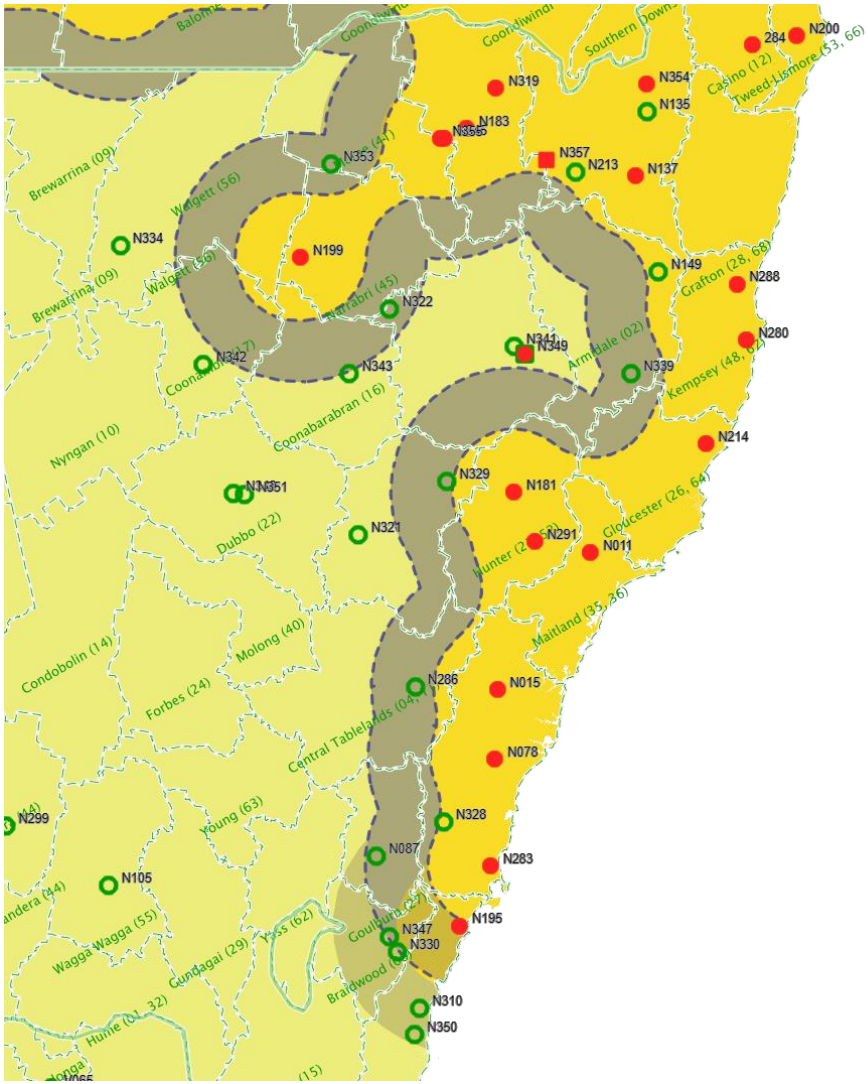

Figure 11 Map showing the prior (dotted line around buffer area) and new bluetongue virus transmission zone boundary in response to transmission detected in sentinel herds near Moree (north-west slopes) and Milton (south coast), June 2020

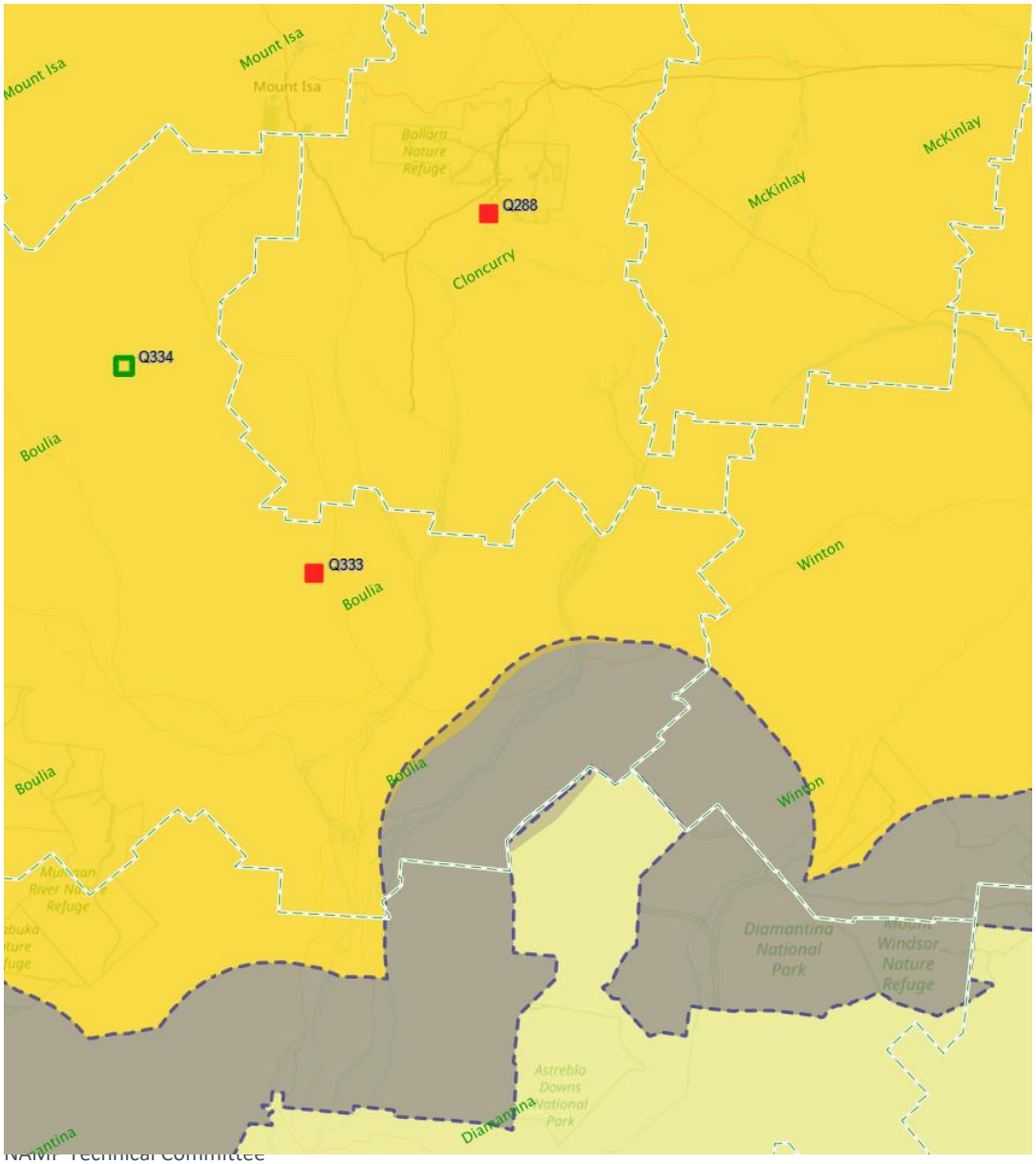
Mount Isa
Mount Isa
Mount Isa
Ballara Nature Refuge
Q288
Cloncurry
McKinlay
McKinlay
Q334
Boulia
Q333
Boulia
Winton
Boulia
Boulia
Winton
Diamantina National Park
Mount Windsor Nature Refuge
Astrebla Downs National Park
Diamantina

Figure 12 Map showing the prior (dotted line around buffer area) and new bluetongue virus transmission zone boundary in response to transmission detected in in a survey herd located 70 km to the north-west of Boulia, Queensland, June 2020.

APPENDIX F: Budget and expenditure summary

Table 4 Budget and expenditure of NAMP

Expenditure Item	Actual 2017-18	Budget 2018-19 (Business Plan)	Actual 2018-19[d]	Budget 2019-20 (Business Plan)	Actual 2019-20	Budget 2020-21 (Business Plan)	Proposed Budget 2021-22 (1% CPI)
Program management and administration	$223,271[a]	$191,296	$226,459[a]	$211,766	$221,940	$195,082	$195,000
NAMP-Info Management (database)	$40,013	$32,640	$39,547	$32,640	$39,953	$33,162	$33,494
Entomology and virology monitoring subtotal	$1,056,575	$1,120,974[b]	$1,079,593	$1,103,431	$1,036,483	$1,121,085	$1,132,296
Contingency for Additional Monitoring (5%)	$8	$394	$0	$11,367	0	$56,054	$56,615
Entomology and virology monitoring total	**$1,056,583[a]**	**$1,121,368**	**$1,079,593**	**$1,114,798**	**$1,036,483**	**$1,177,139**	**$1,188,910**
Annual Report	$2,388	$3,000	$1,314	$3,054	$1,882	$3,012	$3,042
Meeting Expenses	$8,642	$19,966	$19,524	$20,344	$16,376	$20,670	$20,877
Reference Entomology[c]	$9,627	$13,024	$4,470	$13,264	$9,170	$13,476	$13,611
Total / Balance of Expenditure	**$1,340,524**	**$1,381,294**	**$1,370,907**	**$1,395,866**	**$1,325,804**	**$1,442,541**	**$1,454,933**

Notes to budget and expenditure table – all figures are exclusive of GST.

a. Includes consultant fees.

b. Includes 4 Victorian sites initiated in 2017-18.

c. Reference entomology is a contracted service for preparation of material for the NAMP reference collection (specimen slide mounting).

d. Figures include accruals for 2018-19.