

# NATIONAL SALTMARSH MOSQUITO SURVEILLANCE PROGRAMME 2012–2013

At present New Zealand is free of human disease transmitted within the country by mosquitoes. The 12 native mosquito species present are not confirmed disease vectors but there are three well-established non-native species. *Aedes (Halaedes) australis* (Erichson) is a minor vector of Ross River virus in Tasmania and has been shown to vector dog heartworm, *Dirofilaria immitis*. *Culex (Culex) quinquefasciatus* (Say) is an important vector of periodic filariasis in some parts of the world and has been shown to be a competent vector of West Nile virus in some populations in the United States, and of several other arboviruses in the laboratory. *Aedes (Finlaya) notoscriptus* (Skuse) is an important vector of *Dirofilaria immitis* in Australia and has been shown to vector Ross River virus in some populations there also. None of these introduced species has demonstrated disease transmission in New Zealand.

There are, however, many exotic mosquito species that present a risk of entry, and they could change New Zealand’s human-disease-free standing if they were to become established.

The National Exotic Saltmarsh Mosquito Surveillance Programme (NSP) aims to minimise the establishment risk of exotic disease-vector mosquitoes that breed in saltmarshes. The NSP had its genesis in the government’s eradication response for the exotic southern saltmarsh mosquito (SSM), *Aedes (Ochlerotatus) camptorhynchus* (Skuse), discovered in Napier in 1998 and finally declared eradicated from numerous locations across both main islands in June 2010.

The Ministry of Health established the NSP in 2005 and administered its operations until July 2010, when responsibility was transferred to the Ministry of Agriculture and Forestry – now the Ministry for Primary Industries (MPI). The NSP is risk-management-guided and uses a saltmarsh-mosquito-specific surveillance protocol that is statistically based to provide confidence in its results. All known saltmarsh habitat in New Zealand has been mapped. Allocation of resources (annual surveillance hours per site) for sampling saltmarsh mosquito immature stages and adults is prioritised using a statistical algorithm accounting for:

- habitat size;
- tidal influences;
- presence of residual surface water;
- habitat quality for mosquito breeding;

- past presence of SSM;
- proximity to ports;
- climate; and
- relevant human activity.

This method provides 95 percent statistical confidence of correctly identifying an exotic mosquito incursion in saltmarsh habitat with 12 months. NSP field surveillance routinely collects mosquitoes in saltmarsh during the course of site sampling, and most mosquitoes found are native. All collected mosquitoes are identified at the NSP laboratory in Gracefield, Lower Hutt, and reported monthly to MPI. The sensitivity of the NSP sampling methodology was confirmed in 2006 by the early detection of a small, apparently new local population of *Ae. camptorhynchus* on Coromandel Peninsula. This enabled a quick response and eradication was achieved much more quickly than at sites where large established populations were found.

In the 2012–2013 year, 9 882 mosquito larvae (**Table 1**) and 6 985 adults (**Table 2**) of seven species were identified from the NSP field collections. No new exotic mosquitoes were found in saltmarsh habitat in New Zealand.

**TABLE 1: LARVAL MOSQUITOES IDENTIFIED, 2012–2013**

<i>Cx. pervigilans</i>	8 059
<i>Ae. antipodeus</i>	1 570
<i>Ae. subalbirostris</i>	85
<i>Ae. notoscriptus</i>	35
<i>Ae. australis</i>	32
<i>Op. fuscus</i>	101

**TABLE 2: ADULT MOSQUITOES IDENTIFIED, 2012–2013**

<i>Cx. pervigilans</i>	2 002
<i>Ae. antipodeus</i>	991
<i>Cq. iracunda</i>	3 762
<i>Ae. notoscriptus</i>	127
<i>Cq. tenuipalpis</i>	41
<i>Cul. tonnoiri</i>	1
<i>Ae. australis</i>	43
<i>Cx. quinquefasciatus</i>	18

The NSP continued surveillance in all areas previously included in the SSM eradication programme and no *Ae. camptorhynchus* larvae or adults were found.

One of the challenges facing on-going surveillance for exotic saltmarsh mosquitoes is detecting them promptly when they are most likely to be initially present in low numbers and in an unpredictable locality.

Sensitivity for exotic species recognition is maintained by providing training for NSP field staff in saltmarsh

habitats in Australia, where two high-risk species, *Ae. camptorhynchus* and *Ae. vigilax* are abundant (**Figure 1**).



Figure 1: Surveillance staff sampling saltmarsh mosquito in southeastern Queensland, 2013.

The NSP currently conducts surveillance in saltmarsh habitat only. Within port boundaries, the Ministry of Health conducts mosquito surveillance aimed at all species, but with particular focus on those that breed in man-made habitats (e.g., tyres, drums, machinery), including *Ae. aegypti* and *Ae. albopictus*. There is, however, potential for a number of high-risk exotic mosquito species with high dispersal capability to bypass port surveillance and become established in freshwater wetlands, particularly adjacent to ports of entry. There is scope for the NSP to review its surveillance model to include high-risk freshwater wetlands in the future and enhance the overall mosquito-borne-disease risk management for the public of New Zealand. The programme will undergo a technical review at the end of the year.

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