

RAAF Base Darwin PFAS Investigation

On 7 February 2018, the Australian Department of Defence (Defence) released the Detailed Site Investigation (DSI) for RAAF Base Darwin.

The DSI, an environmental investigation, identified the extent of per- and poly-fluoroalkyl substances (PFAS) contamination emanating from firefighting foams historically used at RAAF Base Darwin.

The DSI involved the testing of ground water, surface water and soil samples and a range of flora and fauna including fish and other aquatic species to determine the potential risks to human health and the environment. As part of the DSI, a Human Health Risk Assessment (HHRA) and an Ecological Risk Assessment (ERA) will be undertaken to assess the potential risks of human and ecological exposure to PFAS.

The HHRA and ERA are expected to be released in May 2018.

There is no consistent evidence of human health effects relating to PFAS exposure, however the possibility cannot be excluded and so a precautionary approach has been adopted.

Currently there are no conclusive results available to provide definitive advice on the consumption fish and other aquatic species surrounding RAAF Base Darwin.

PFAS Investigation RAAF Base Darwin

Defence engaged an independent environmental consultant, Coffey, to conduct the DSI into PFAS on-base and within the surrounding environment of RAAF Base Darwin.

A Preliminary Sampling Program was completed in September 2016 with the DSI commencing in April 2017. The DSI involved the installation of groundwater wells and the sampling of soil, sediment, groundwater and surface water both on-base and within the surrounding environment of RAAF Base Darwin. The findings of the DSI will provide the basis for the Human Health Risk Assessment and Ecological Risk Assessment.

What do we know from the Detailed Site Investigation?

PFAS is soluble within surface water and groundwater and appears to have migrated through the soil profile to the underlying groundwater table. PFAS appears to be migrating across RAAF Base Darwin and to some extent has migrated off-site into the surrounding environment.

PFAS migration pathways off RAAF Base Darwin are:

- To the north into Rapid Creek and surrounding environment;
- To the west into Ludmilla Creek and surrounding environment; and
- To the south into the upper reaches of Sadgroves and Reichardt Creeks and the surrounding environment.

The results also indicate:

- Soil testing has shown that PFAS concentration in the Darwin Investigation Area do not present a high exposure pathway to people off-base through direct dermal contact.
- Elevated surface water concentrations of PFAS in Rapid Creek, during the dry season sampling event, were above recreational guidance values.
- Private bore testing has not indicated contamination above drinking water values.

Previous studies have also indicated elevated concentrations of PFOS have been reported in fish and crustaceans in Rapid and Ludmilla Creeks.

Human Health Risk Assessment (HHRA)

The detailed site investigation findings indicated that a HHRA is warranted based on:

- Some soil results are above screening levels for direct contact on-base; and
- Concentrations in Rapid Creek and potentially Ludmilla Creek, suggest viable exposure pathways during recreation activities like swimming or consumption of fish.

A HHRA assesses the possible exposure risks within the investigation area associated with human exposure to PFAS including PFAS uptake into home-grown foods.

Previous studies indicate that Rapid and Ludmilla Creeks are more impacted by PFAS contamination. The risk to recreational anglers that occasionally access the Ludmilla and Rapid Creek areas is considered very low as it is unlikely that they will exceed the Tolerable Daily Intake on a long term basis. The final HHRA will include further 2017/2018 wet season sampling results on which definitive advice can then be provided.

The Chief Health Officer of the Department of Health has previously advised that water from Rapid Creek and Ludmilla Creek are not suitable for drinking due to fluctuating microbiological levels. Recreational activities should also be limited in creeks during the wet season due to ongoing PFAS testing of water, sediment and aquatic life, as well as fluctuating microbiological activity which poses a more immediate risk to health due to stormwater runoff etc.

What can the HHRA tell us?

The HHRA will be able to detail which activities to avoid in order to minimise cumulative PFAS exposure from undertaking multiple activities, including eating, drinking and swimming. The HHRA can also be used to inform future management actions including remediation of the site, if necessary.

What the HHRA can't tell us.

The HHRA cannot be used to identify potential health effects for individuals or whether existing health effects are associated with any past exposure.

If you have any medical concerns it is important to discuss these with a medical professional.

What next?

Further sampling of plants, fish and animal products from potentially affected areas will continue to March 2018 with a view to completing the HHRA by May 2018.

There is no commercial activity in the Investigation Area therefore the focus will be on home produce and potential exposure pathways for local residents.

Defence have sent out a 'Community Survey' to Darwin residents which will help inform the HHRA.

Ecological Risk Assessment (ERA)

The detailed site investigation has indicated that an ERA is warranted because

- The ERA will assess the possible risks to plants and animals associated with exposure to PFAS within the investigation area and is expected to be completed and published in April 2018.
- Potentially relevant ecological receptors from PFAS contamination are:
 - Terrestrial flora and fauna on-Base
 - Aquatic flora and fauna on-Base
 - Terrestrial flora and fauna in the Rapid Creek, Ludmilla Creek Sadgroves Creek and Reichardt Creek catchments
 - Aquatic flora and fauna in Rapid Creek, Ludmilla Creek, Sadgroves Creek and Reichardt Creek

- Aquatic flora and fauna in marine areas where Rapid Creek, Ludmilla Creek, Sadgroves Creek and Reichardt Creek discharge.

Rapid Creek

What are the concerns from Rapid Creek?

Rapid Creek is a natural water body which has been subject to various studies by Charles Darwin University and the Department of Environment and Natural Resources. The water quality fluctuates between seasons both microbiologically and chemically.

The concern regarding PFAS relates to frequent consumption of aquatic species taken from the creek and frequent swimming all year round in the creek. Occasional historical use of the creek for swimming is considered to be a low risk to health. Drinking water from creeks is also not recommended as it is not a potable water supply. Swimming in the creek during the wet season is also not recommended due to fluctuating microbiological and chemical conditions.

Occasional consumption of fish and aquatic life from Rapid Creek is considered low risk due to results from previous studies. Further wet season sampling results and the release of the final Human Health Risk Assessment by Defence in May 2018, will provide definitive advice on what aquatic foods can be eaten, size of meals and the recommended frequency of consumption.

What about fish in Darwin harbour?

There is limited information available about the impact of PFAS on fish movements in the harbour.

As part of its detailed Ecological Risk Assessment, Defence will ensure sufficient testing is conducted to provide residents with a complete picture of potential impacts on aquatic life downstream from the PFAS contamination from RAAF Base Darwin and the airport.

Further information

<https://ntepa.nt.gov.au/waste-pollution/compliance/pfas-investigation>

<http://www.defence.gov.au/environment/pfas/Darwin/>

<http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-pfas.htm>