EPA VICTORIA | Environment Protection Authority Victoria

Brief
Executive Director/Chief Environmental Scientist

[BRIEF NUMBER]	
PURPOSE:	For decision
ACTION REQUIRED BY:	20/01/2022.

Core message:
In 2018, EPA's Emerging Contaminants in Biota Program identified potential lead contamination in duck samples collected by the Arthur Rylah Institute, on behalf of EPA, from Serpentine Creek and Richardsons Lagoon. The duck samples were re-tested in 2020. Additional environmental (water, sediment and soil) samples were also collected and analysed. The results suggest the potential for duck contamination in the two wetlands, however, the risk for human health from consumption of ducks remains unclear. In 2020 and more recently in November 2021, EPA approached Arthur Rylah Institute to arrange the collection and sampling of additional ducks but were told they were unable to undertake this work. A decision on next steps from the two options presented in this brief is needed. Option 1 is recommended.

Recommendations:

1. Note the content of the brief and make a decision on Option 1 (recommended) or Option 2.

☐ Noted
☐ Please discuss

ED/CES comments:

I have reviewed the documents and the advice and I am of the view it would be prudent to execute Option 2 at the first possible opportunity. This will enable EPA to acquire more suitable data to better understand human health risks and to provide appropriate public advice associated with the consumption of ducks at Serpentine Creek or Richardsons Lagoon.

Chief Environmental Scientist
Professor Mark Patrick Taylor
Environment Protection Authority Victoria

Date: 19/01/ 2022

Signed:
Dr Martine Dennekamp
Deputy Chief Environmental Scientist
Environment Protection Authority Victoria

Date: / / 2022

KEY INFORMATION

1. Elevated lead concentrations were recorded in breast composite samples from ducks collected in Serpentine Creek and Richardsons Lagoon as part of EPA's 2018 Emerging Contaminants in Biota Program.
2. These results triggered further investigation to evaluate potential risks to human health from consumption of ducks. The investigation included:
   a) The re-analysis of the 2018 samples using individual duck samples rather than composite samples previously used.
   b) The collection and analysis of environmental samples (water, sediment and soil) from Serpentine Creek and Richardsons Lagoon.
3. For Serpentine Creek, only four individual liver samples were available for re-analysis. Results showed that one individual liver sample exceeded the Food Standards Australia New Zealand (FSANZ) maximum level (ML) of 0.5 mg/kg for poultry offal (lead concentration in the liver sample was 1.5 mg/kg). Given the consumption scenario of two serves of 20 grams liver per month (consistent with known upper limits of duck taken per season per recreational hunter, this is, 20.8 ducks), children consuming two serves of 20 grams liver per month will only reach approx. 24% of their total daily intake (TDI) for lead (Hazard Quotient (HQ) 0.24). The liver results indicate a low risk to public health and does not require consumption advice to recreational hunters. No breast samples were available for re-analysis. Therefore, the risk from consumption of breast remains unknown.
4. For Richardsons Lagoon, one individual liver sample and three individual breast samples were available for re-testing. Results showed that one individual breast sample exceeded the FSANZ ML of 0.1 mg/kg for poultry meat (lead concentration in the breast sample was 0.69 mg/kg). Lead concentration in the liver sample was 0.11 mg/kg, which is below the FSANZ ML for poultry liver of 0.5 mg/kg. If the concentration of lead in the breast sample was considered a true reflection of concentrations of lead in Richardsons Lagoon, consumption advice would be warranted. However, this result was unusual as the ratio of concentrations of lead in the re-tested breast to liver samples was >1 (0.69/0.11). This is suggestive that the breast samples may have been contaminated, possibly with lead shot (but not through ingestion). A comparison of lead concentrations in duck liver and breast observed from EPA data and published literature supports the observation that the ratio of concentrations of lead in liver to breast samples is expected to be >1 (Appendix 1).
5. The analysis of environmental samples from the two wetlands showed high lead concentrations in water samples from Richardsons Lagoon (Appendix 2). These results further suggest the potential for duck contamination in this wetland.
6. It is not clear from the limited re-analysis of individual duck samples and the results from the environmental samples, if ducks from Serpentine Creek and Richardsons Lagoon are contaminated and therefore, require consumption advice to be issued. For Serpentine Creek, no breast samples were available for re-testing. Therefore, it was not possible to confirm the previous result of lead concentration above FSANZ ML in composite samples. For Richardsons Lagoon, one individual breast sample yielded lead concentrations above FSANZ ML. However, the unusual ratio in breast to liver lead concentrations suggest potential sample contamination.
7. A decision on next steps is required. Two options are presented:
   a) **Option 1 (recommended)**: Conclude the investigation:
      - EPA concludes the investigation based on resource constraints and the fact this is not one of the priority projects for this year. Given EPA is not able to determine whether the elevated concentrations observed in the two composite breast samples from 2018 are due to contamination with lead shot EPA will not be able to determine if consumption advice is required for Serpentine Creek or Richardsons Lagoon.
   b) **Option 2**: continue the investigation.
      - Collect and analyse additional duck samples from Serpentine Creek and Richardsons Lagoon to allow for the determination of human health risk from consumption of ducks.

- The cost and funding for this option is estimated to be $12,000 (please note that this cost is estimated based on the 2018 sampling, which cost $150,000 for a total of 19 wetlands) and the funding source will need to be identified. The Arthur Rylah Institute (ARI) coordinated EPA's 2018 fieldwork for the collection of ducks. The ARI have informed that they are no longer in a position to coordinate the collection of ducks and preparation of samples for EPA. EPA would need to tender out a contract to an external consultant.
- This should be conducted as soon as possible to allow for the collection of ducks during the hunting season in Autumn 2022.

BACKGROUND

8. Lead concentrations in ducks collected as part of EPA's 2018 Emerging Contaminants in Biota Program were revisited in September 2020 following a community member inquiry about EPA's 2017 lead in wetlands study (EPA Publication 1681).
9. Elevated concentrations were found in composite breast samples from ducks collected in Serpentine Creek and Richardsons Lagoon in north-central Victoria. These results were unusual as, opposite to what is expected, the ratio of concentrations of lead in breast to liver was >1 in both locations. This was suggestive that the breast samples may have been contaminated, possibly with lead shot.
10. The concentrations were above FSANZML for lead in poultry and warranted further investigation.
11. Previous briefing was presented to Dr. Andrea Hinwood (Appendix 3). The briefing introduced the problem and included the sampling plan for the collection of samples in December 2020.
12. Dr. Hinwood approved the plan on 25 November 2020 (AS Connect item AST0016393 and Appendix 4).
13. The results from the analysis of samples collected in December 2020 can be found in Appendix 1.
14. Acting Chief Environmental Scientist (Dr Carolyn Brumley) gave approval for EPA to arrange the collection and sampling of additional ducks. EPA approached ARI but were told they were unable to undertake this work (the brief to the Acting CES is attached as Appendix 5).

CONSULTATION

15. Robert Mackenzie (EPHU) and Paula Sardina (WSU) have provided input to the development of this brief.

ATTACHMENTS

No.	Attachment name
1	Appendix 1 -AST0014166 – Lead in ducks
2	Appendix 2 –Lead in wetlands investigation report
3	Appendix 3 – Lead in wetlands investigation – Brief to CES Dr. Andrea Hinwood
4	Appendix 4 – Approval of plan by CES Dr. Andrea Hinwood
5	Appendix 5 – Brief to Acting CES Dr Carolyn Brumley