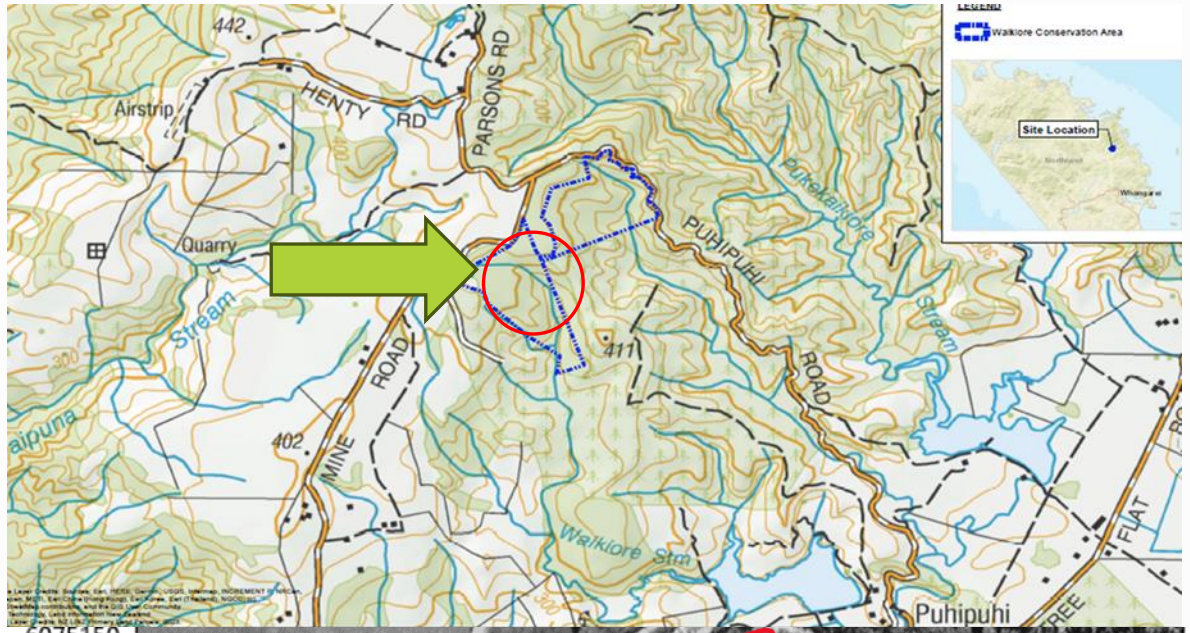
PUHIPUHI MERCURY MINE - DETAILED SITE INVESTIGATION

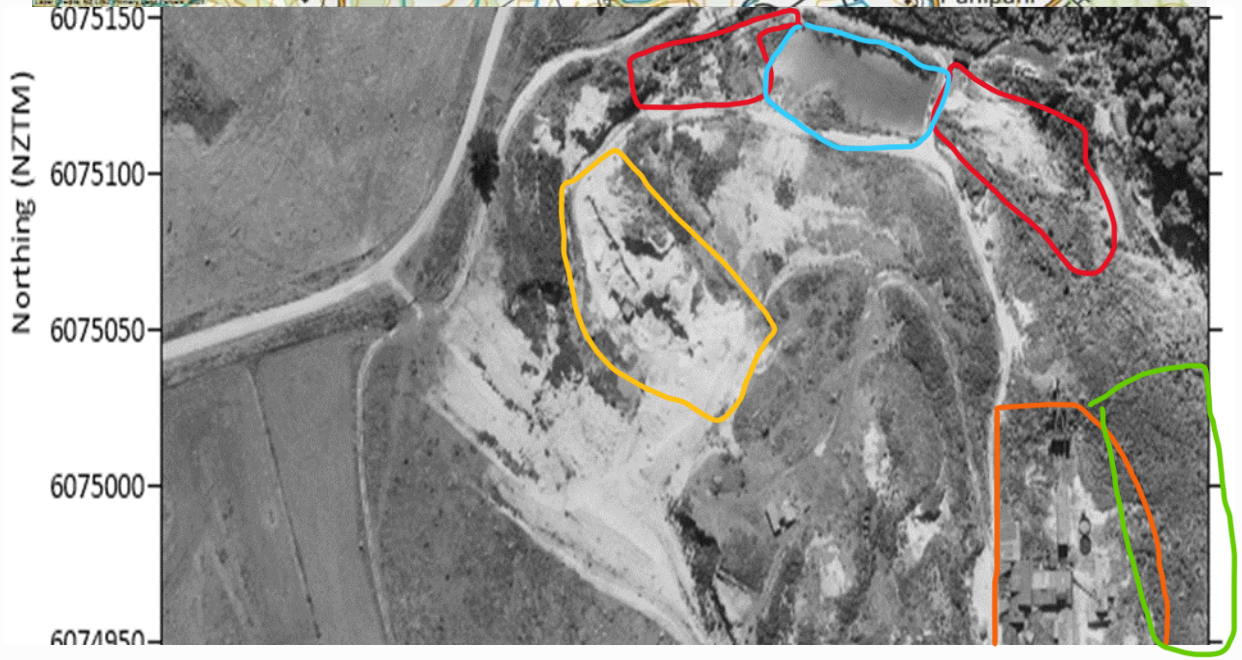
Human Health Risk Assessment

EHS Support

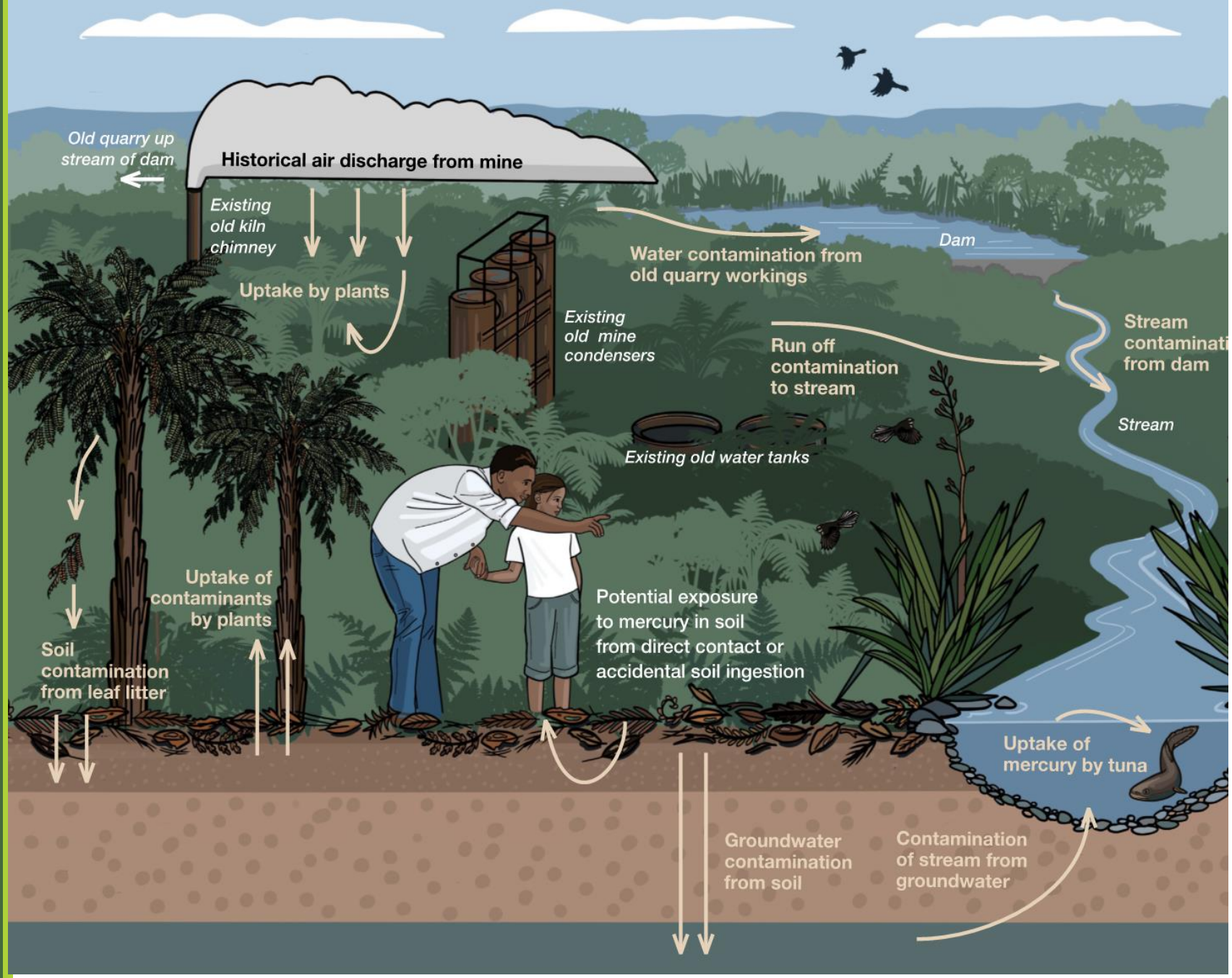
PRIMARY STUDY AREA

- 3 phases of investigation
- 224 soil samples – collected in four main areas
- 18 sediment samples - reservoir
- 40 surface water samples (8 sampling events over 2 years)
- Flow monitoring
- Two rounds of mercury vapour monitoring
- CoC As, Cu, Hg, Sb, Se, Tl, Zn. Limited MeHg





CONCEPTUAL SITE MODEL



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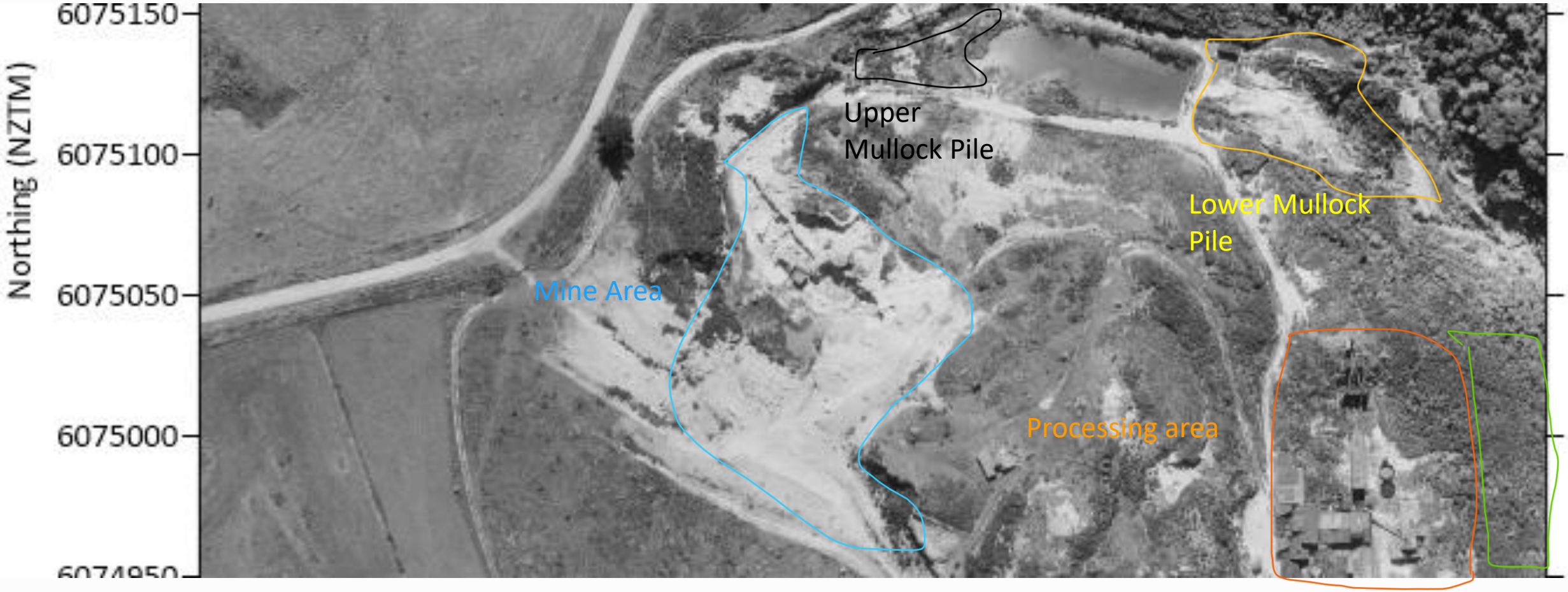
DETAIL SITE INVESTIGATION

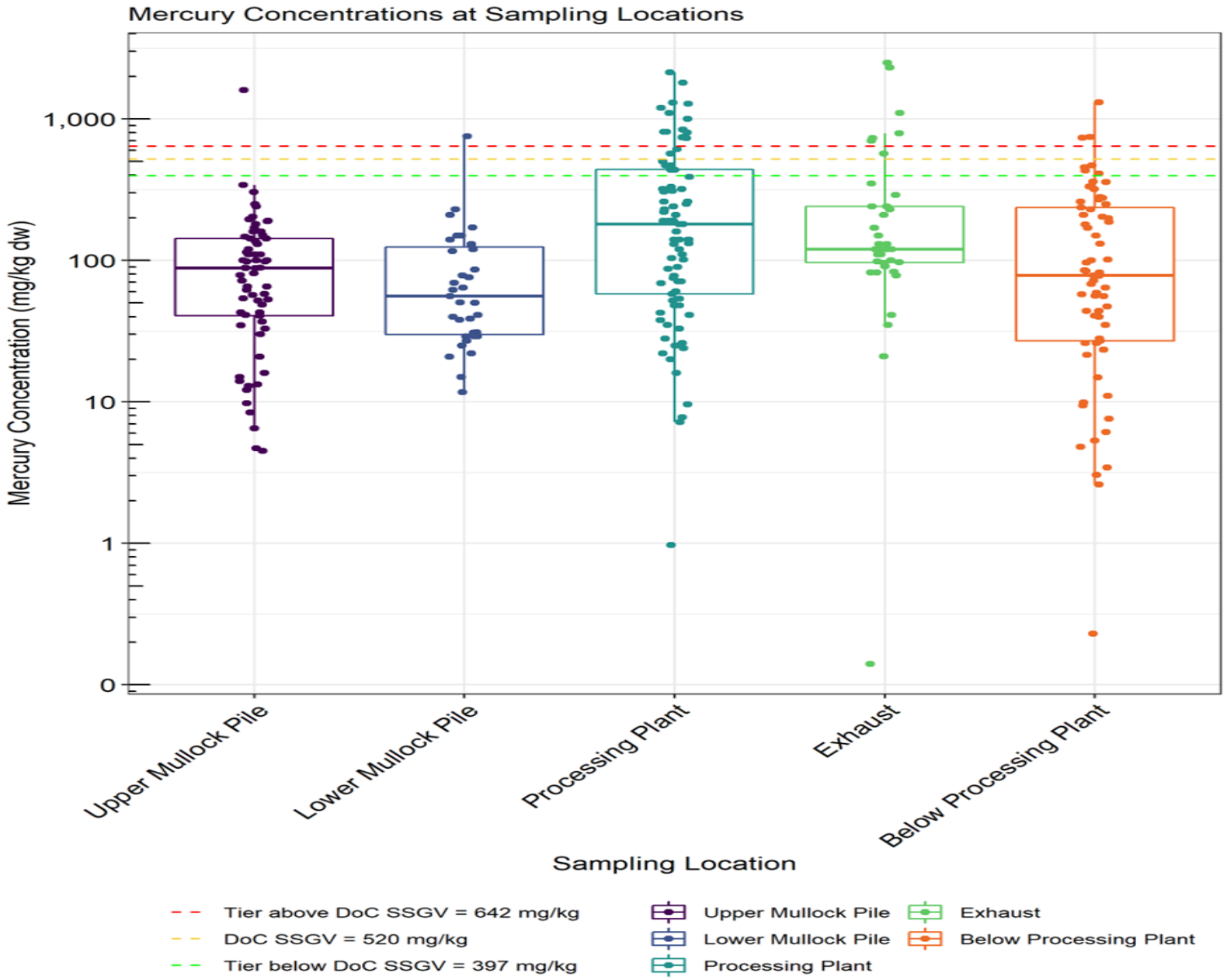
SUMMARY OF PROGRAMME

242 SOIL SAMPLES – 4 MAIN AREAS



SUMMARY

Concentration of mercury in soils is significantly more elevated around the processing plant/exhaust stack and below the plant c.f. mullock piles



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SOIL SAMPLING – MAIN PROCESSING PLANT

185 samples

Processing area

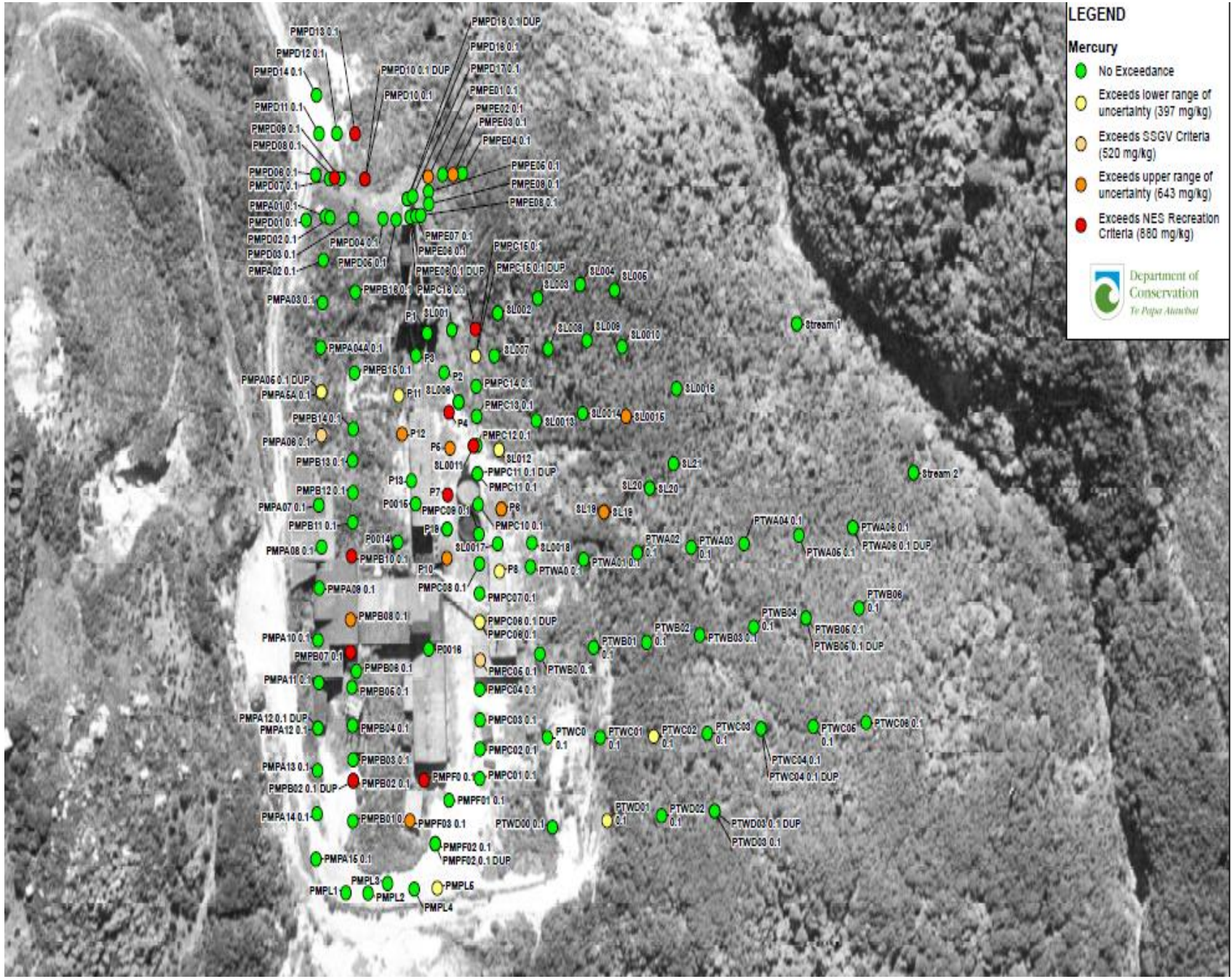
- IQR 58-440 mg/kg
- 18% of samples exceed guidelines

Exhaust Stack

- IQR 97-240 mg/kg
- 13% of samples exceeded guidelines

Below Processing Plant

- IQR 27-220 mg/kg
- 5% of samples exceed guidelines



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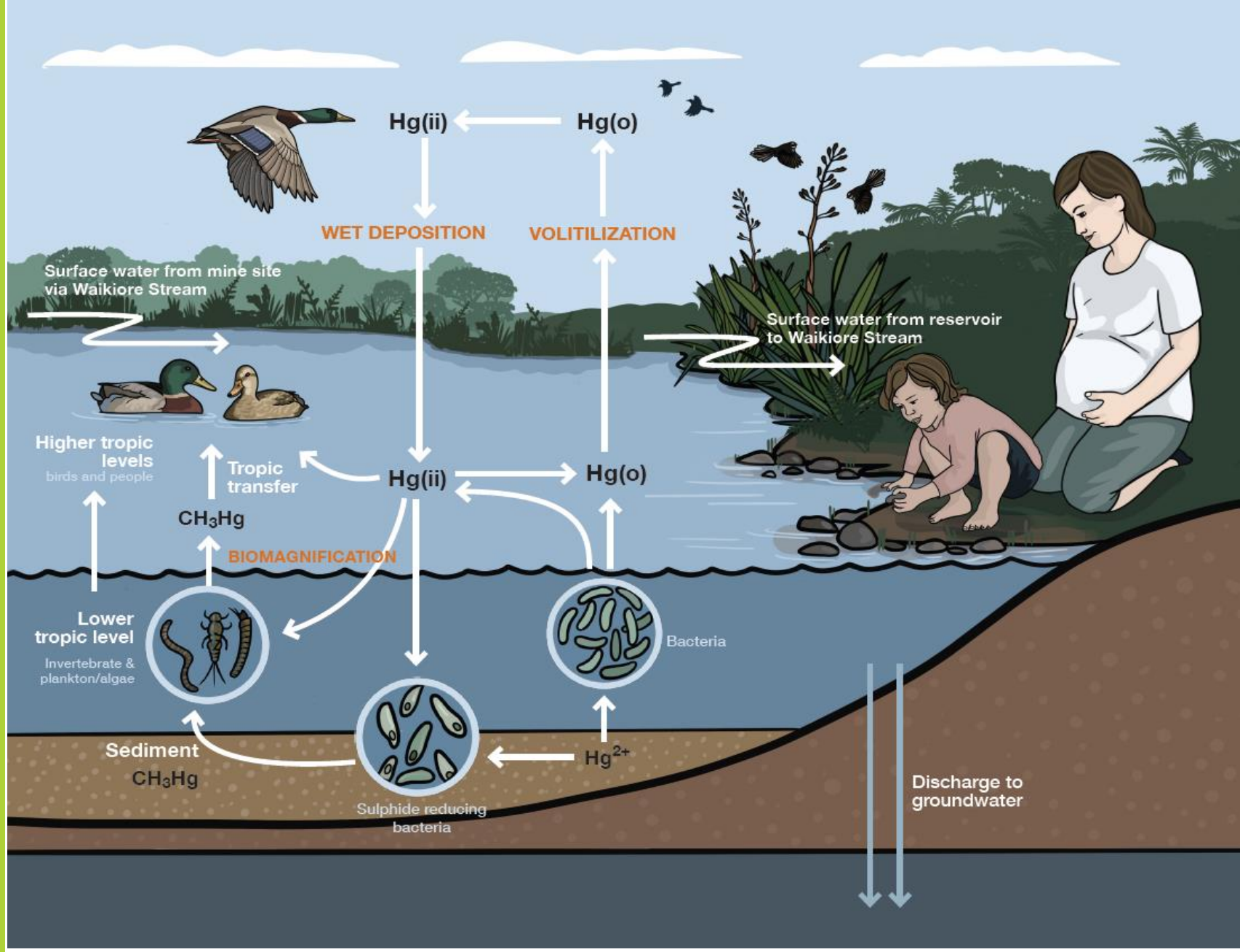
OTHER RESULTS

- Evaluate leaching testing results – showed high potential for mercury to be released from soils
- Mercury vapour monitoring indicated that there is no acute risk to human health for short-term visitors to the site
- The concentration of all inorganic elements in all the water samples is significantly below human health guideline values
- Consumption of wild food is the primary risk driver for human health

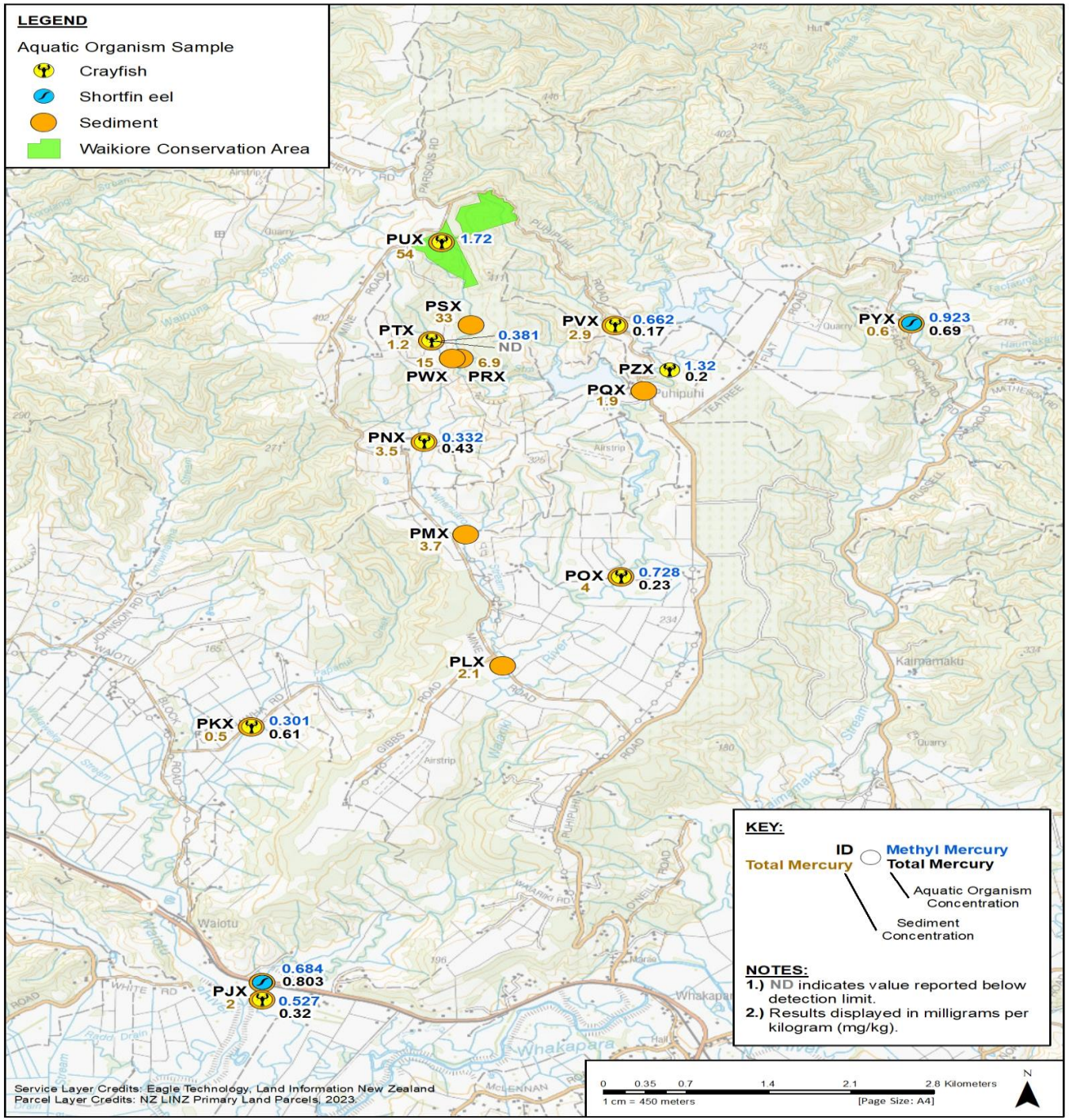
SEDIMENT SAMPLING

- 12 surficial sediment samples
- 10-95 mg/kg Hg (average = 45 mg/kg)
- Sediment GV-high 1 mg/kg

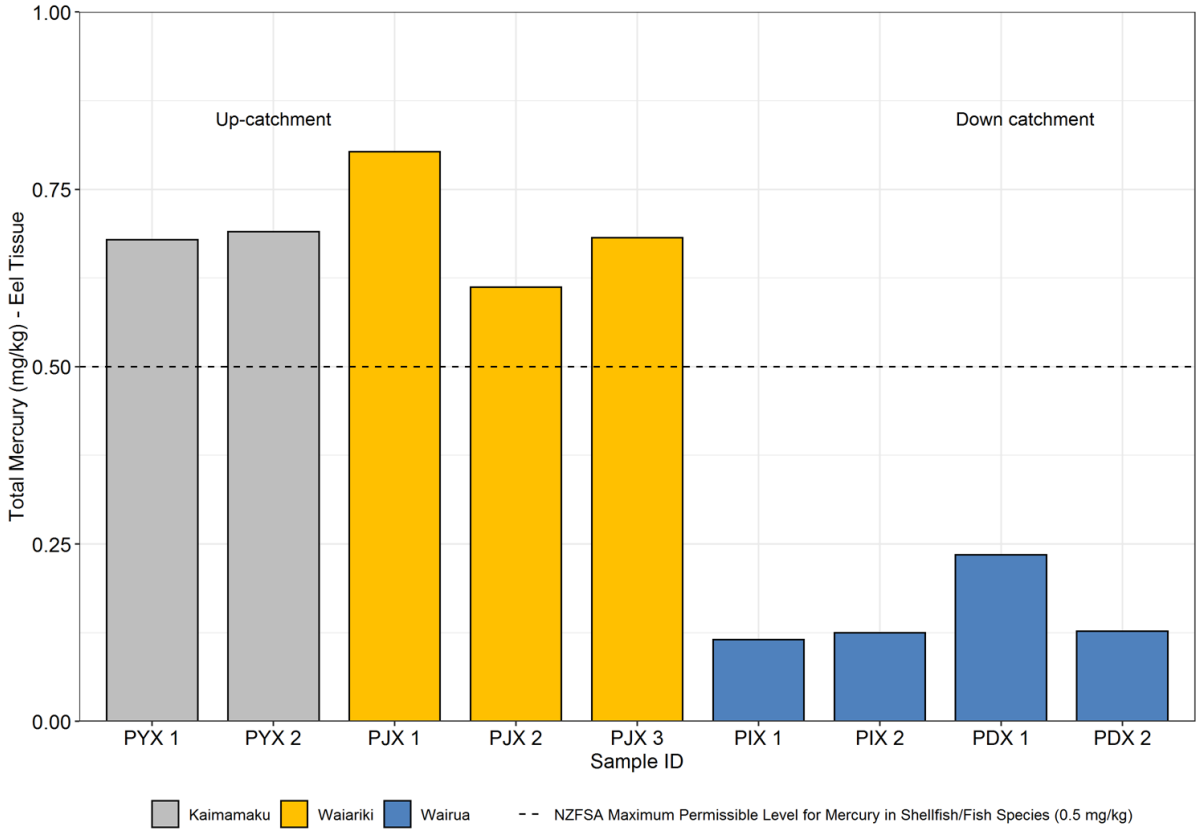


MERCURY IN AQUATIC ORGANISMS

- Decreases with distances from the site
- Higher in the Waikiore Stream compared to the Pukekaikore Stream
- Correlates with stream sediment?

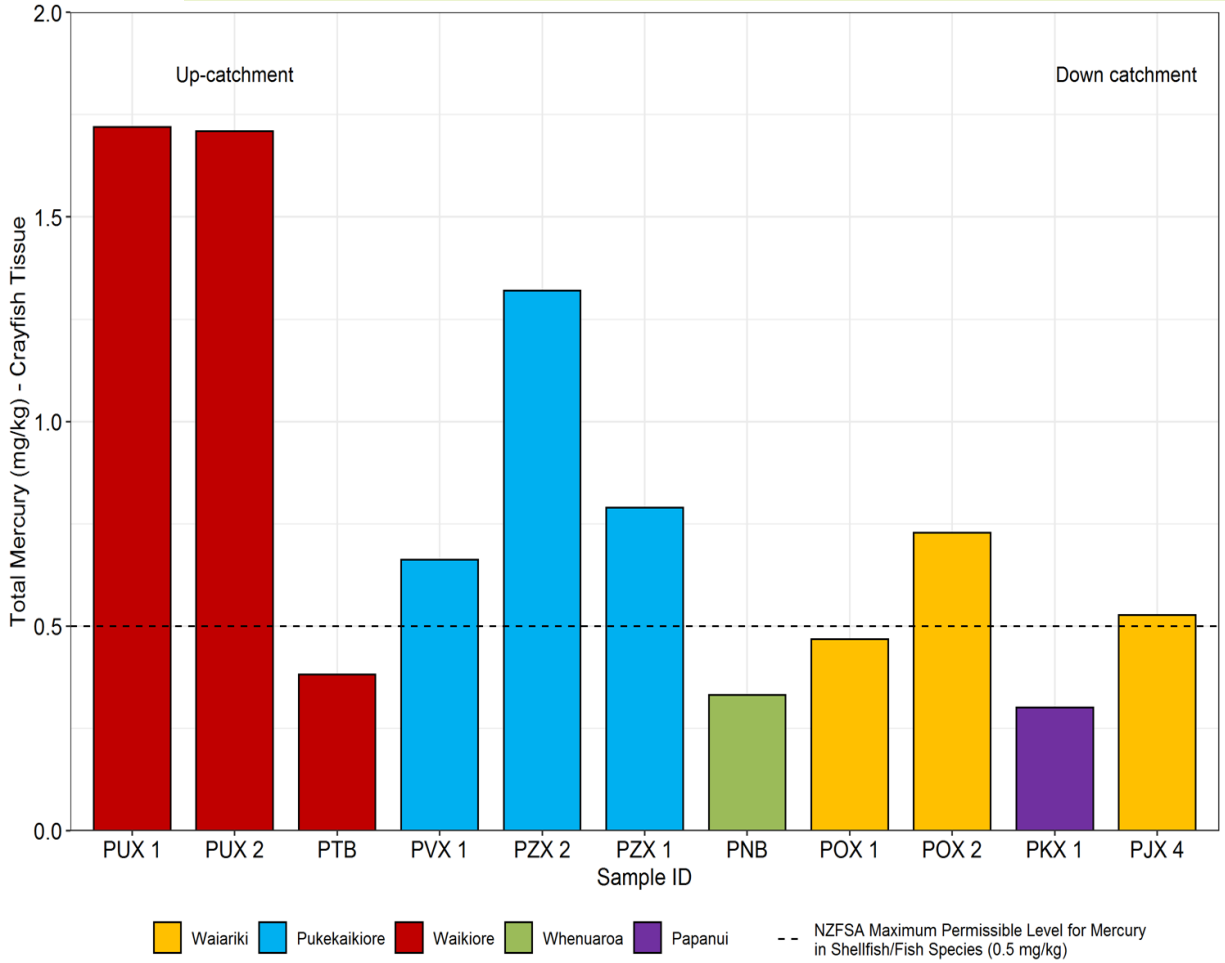


MERCURY IN EELS



- No eels in the investigation area
- Eels downstream in the lower Puhipuhi plateau and Hikirangi have elevated concentrations of mercury in their tissue
- Regular consumption of eels from these areas maybe harmful to human health

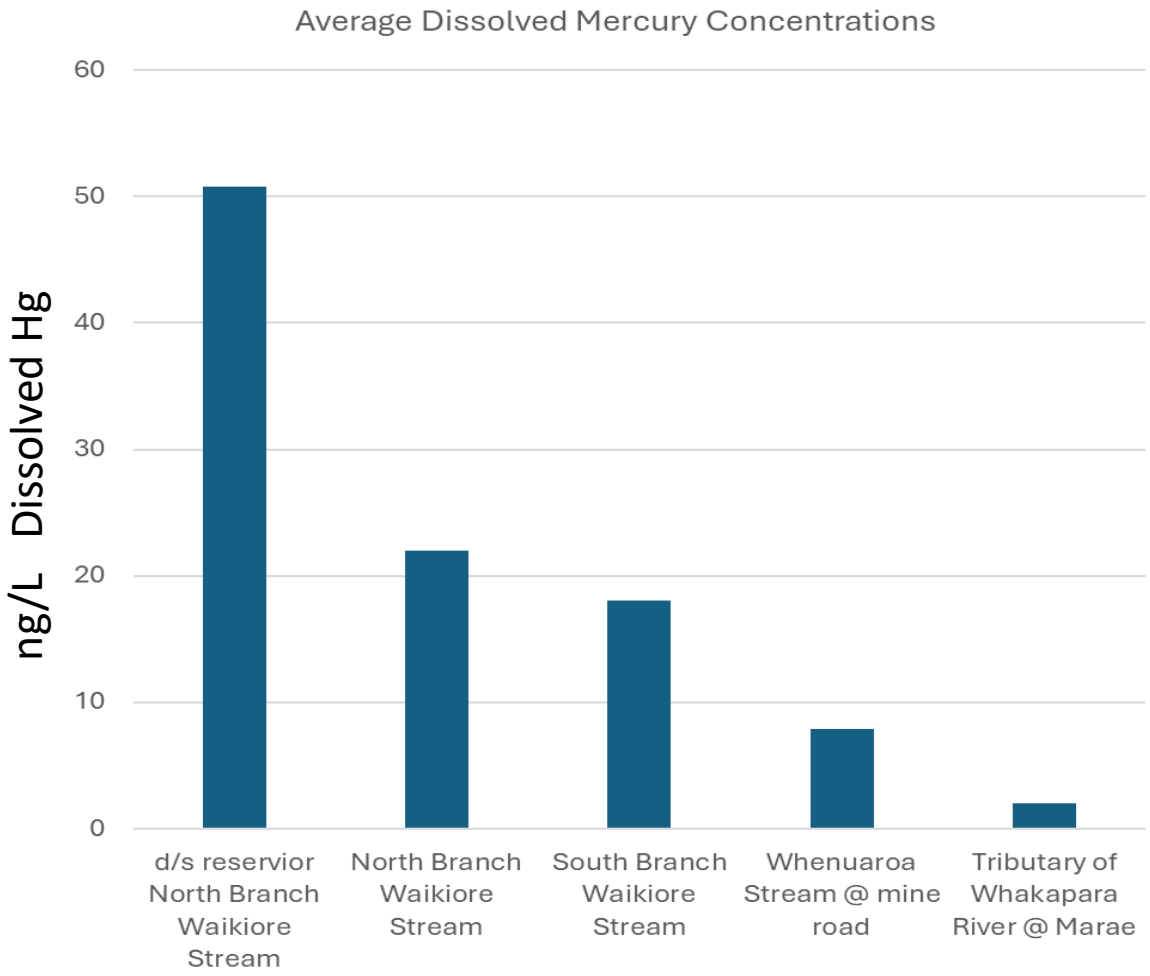
MERCURY IN CRAYFISH



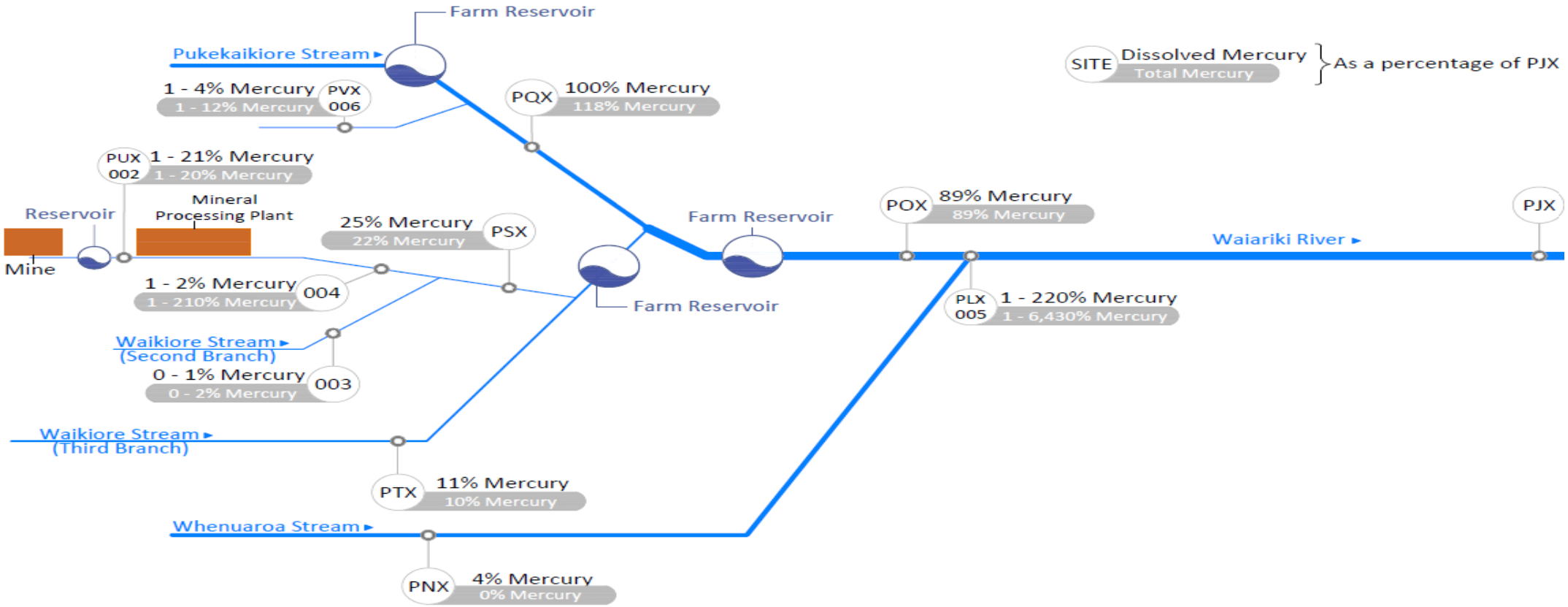
- Crayfish were found immediately downstream of the mine reservoir
- Concentration of mercury in crayfish decreases with increasing distance from the site
- Regular consumption of crayfish from these areas may be harmful to human health
- The concentration of mercury in crayfish does appear to correlate with the concentration of mercury in sediments

SURFACE WATER

- Mercury below 95% ANZG
- Mercury concentration decreased with increasing distance downstream
- Exceeded 99% ANZG
- Cu and Zn exceeded 95% ANZG below the mineral processing plant



MERCURY FLUX



SUMMARY

- Elevated mercury is present in the soils at the site but unlikely to pose a hazard to human health for short-term exposure (current site use).
- Indication that soils may be leaching mercury into the shallow groundwater system, which together with overland flow are likely to be the major source of mercury
- Surface water quality does not present a health hazard to on-site or off-site users
- Up to 10% mercury flux from the Puhipuhi plateau may be coming from the site. Pukekaikiore Stream may be a more significant source of mercury flux.
- Biota and Sediment quality off-site impacted by a number of different sources