SAT

Research Question

**How does water pollution in reservoirs affect fish population in local ponds?**

(too vague)

**Does water pollution levels in upstream reservoirs negatively affect local fish populations?**

(still can use something)

**Does the population of fish in local ponds get negatively affected because of direct toxicity and habitat degradation?**

Information problem

Clarity

Measurability of data requirements

Feasibility

Originality

**How does pollution in upstream reservoirs impact fish population density downstream?**

**Does the presence of heavy metals in bodies of freshwater correlate with decreased fish biodiversity?**

**Does increased microplastic concentration in fresh water affect fish health indicators?**

**Does chemical runoff into reservoirs alter water conditions critical for fish reproduction?**

**Does the accumulation of industrial pollutants in reservoirs affect fish population trends?**

**Does reservoir pollution affect the availability of aquatic invertebrates as fish food sources?**

**Does upstream human waste pollution contribute to long-term declines in freshwater fish?**

**Remember:**Audience is Yr9 Humanities class

Research question

Locked in for:

**Does the concentration of heavy metals in bodies of freshwater correlate with decreased fish biodiversity?**

*Independent variable*: Concentration of heavy metals (e.g. mercury, lead, cadmium)

*Dependent variable*: Measures of fish biodiversity (species richness, abundance, Shannon index)

Underlying assumption: Elevated metal concentrations disrupt aquatic ecosystems through toxicity or bioaccumulation.

Clarification: This problem is not purely about pollution or fish numbers—it's about whether ecotoxicological data can predict or explain changes in ecosystem biodiversity.

Water quality data: Concentration levels of specific heavy metals in freshwater systems (mg/L), ideally longitudinal data.

**Data required (primary):**

**(Observational)**

Species counts and richness across different sites and times

Presence/absence records of indicator species (e.g. native vs invasive)

**(Experimental)**

**Control variables (optional but insightful):**

pH, dissolved oxygen, temperature, turbidity, as these also affect biodiversity

**(Survey)**

Local professional fishermen/gamekeeper outcomes with fishing.

**Data required (secondary) (local):**

**EPA Victoria – Water Quality Monitoring Data**

The Environment Protection Authority (EPA) Victoria provides comprehensive water quality data, including information on heavy metal concentrations in freshwater systems.

<https://www.epa.vic.gov.au/for-community/monitoring-your-environment/monitoring-victorias-water-quality/data-and-resources>

**Victorian Biodiversity Atlas (VBA)**

The VBA is a curated database of species observations across Victoria. It offers detailed records of fish species distributions, which can help assess biodiversity levels in specific regions.

<https://www.environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas>

**Data required (secondary) (foreign):**

**CSIRO – Water quality**

<https://www.csiro.au/en/research/natural-environment/water/Water-Book/Water-quality?utm_source=chatgpt.com>

**Determination of Heavy Metals (Cd, Pb) and Trace Elements (Cu, Zn) in Sediments and Fish of the Southeastern Aegean Sea (Turkey) by Atomic Absorption Spectrometry**

<https://www.publish.csiro.au/MF/MF17293?utm_source=chatgpt.com>

**Heavy Metals: Confounding Factors in the Response of New Zealand Freshwater Fish Assemblages to Natural and Anthropogenic Acidity**

<https://www.publish.csiro.au/mf/MF13285?utm_source=chatgpt.com>