



WATER QUALITY

Environmental Protection

State of Water Quality of Alsek River Above Bates River 1992 - 1994

Canada - British Columbia Water Quality Monitoring Agreement

**Water Quality Branch
Environmental Protection Department
Ministry of Environment, Lands and Parks
(now called Ministry of Water, Land and Air Protection)**

**Monitoring and Systems Branch
Pacific and Yukon Region
Environment Canada**

November 1996

Executive Summary

The Alsek River originates in the Yukon Territory and flows through the northwest corner of British Columbia. From here, the Alsek River flows southwest through the Alaskan panhandle into the Pacific Ocean. Activities in the Alsek watershed are minimal as much of the watershed lies within Kluane National Park.

This report assesses the water quality data collected by Environment Canada at the monitoring station just upstream from the Bates River. Water quality samples were collected bi-monthly during 1992 to 1994 by Environment Canada. Flow was measured at a Water Survey of Canada flow gauge at the same location.

We concluded that:

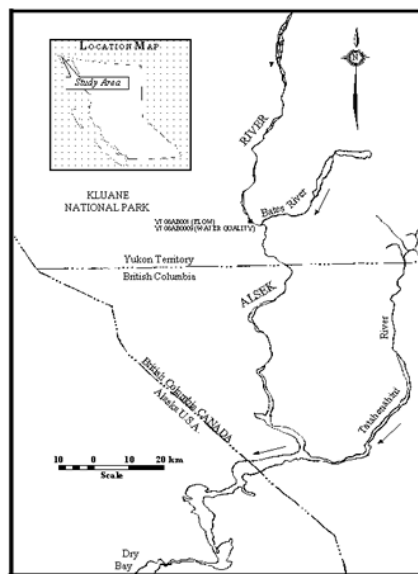
- Not enough data were available to comment on trends in water quality.
- Peak non-filterable residue and turbidity values occurred during peak flows and turbidity removal would be necessary before use as drinking water.

- High metals levels that exceeded water quality criteria corresponded with high suspended sediments, suggesting that the metals were in a particulate form and probably not biologically available and would be removed by the turbidity removal process needed before drinking.
- The river had a low sensitivity to acid inputs.
- Hardness levels were within the optimum range for drinking water most of the time, with highest values in the spring and lowest values in the autumn.

Water quality monitoring is continuing for the Alsek River above Bates River at present, and its future will depend on federal obligations under the Heritage Rivers Act and the needs of Kluane National Park. British Columbia has no interest in further monitoring of the Alsek at this time because:

- There were no apparent problems in Alsek River water quality and none are expected in the foreseeable future.
- The data obtained to date would suffice as baseline information for general planning purposes.

Figure 1: Map of Alsek River (scale 1:900 000)



Author

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Introduction

The Alsek River originates in the Yukon Territory, and flows south through the northwest corner of BC, crossing the BC and Alaska international border before flowing southwest through the Alaskan panhandle and into the Pacific Ocean at Dry Bay. The Alsek River is under ice for 5 to 6 months of the year.

The water quality monitoring station and the flow station are located in the Yukon about 20 km north from the Yukon/BC border, and a short distance upstream from the Bates River. We are not able to obtain drainage area information for this watershed.

Data for this report were obtained from samples collected primarily by Environment Canada during 1992 to 1994. The data are stored under ENVIRODAT station number YT08AB0009. The water quality indicators are plotted in [Figures 3 to 45](#). Water Survey of Canada operates a flow gauge at the water quality monitoring station (site number YT08AB001). Flow data are plotted in [Figure 2](#).

Quality Assurance

The water quality graphs were inspected and erroneous values were removed. Mercury data were not plotted because all detectable values were likely due to contamination (Pommen, 1994).

Conclusions — State of Water Quality

The state of the water quality for certain variables was judged by comparing values to the Ministry of Environment, Lands and Parks' Approved and Working Criteria for Water Quality (Nagpal et al., 1995). There are no site-specific water quality objectives for the Alsek River. With only three years of bi-monthly samples, the record was too short and sparse to comment on any trends. Since the record was short and sparse and there were no apparent water quality concerns, a detailed assessment of the data was not written. Our overall conclusions about the state of water quality are presented below.

- Not enough data were available to comment on trends in water quality.
- Peak non-filterable residue and turbidity values occurred during peak flows and turbidity removal would be necessary before use as drinking water.
- High metals levels that exceeded water quality criteria corresponded with high suspended sediments, suggesting that the metals were in a particulate form and probably not biologically available and would be removed by the turbidity removal needed before drinking.
- Hardness levels were usually within the optimum range for drinking water most of the time, with highest values in the spring and lowest values in the autumn.
- The river had a low sensitivity to acid inputs.
- The river was cool enough for drinking, but too cold for water-contact recreation at all times of the year.

Recommendations for Water Quality Management

Remediation

No remedial activities appear to be necessary at this time.

Monitoring

Water quality monitoring is continuing for the Alsek River above Bates River at present, and its future will depend on federal obligations under the Heritage Rivers Act and the needs of Kluane National Park. British Columbia has no interest in further monitoring of the Alsek at this time because:

- There were no apparent problems in Alsek River water quality and none are expected in the foreseeable future.
- The data obtained to date would suffice as baseline information for general planning purposes.

References

CCME (Canadian Council of Ministers of Environment). 1996. Proposed Aquatic Life Criterion for Arsenic.

EC-Info for Pacific and Yukon Region. Surface Water Quality Monitoring Data in British Columbia. Environment Canada, Ottawa, Ontario.

Nagpal, N.K., L.W. Pommen, and L.G. Swain. 1995. Approved and Working Criteria for Water Quality - 1995. Water Quality Branch, Environmental Protection Department, Ministry of Environment, Lands and Parks, Victoria, B.C.

Pommen, L.W. 1994. Mercury Monitoring Issues (Mark II). Presented at the Environmental Protection Impact Biologists' Meeting, February 21-22, 1994, Water Quality Branch, Ministry of Environment, Lands and Parks, Victoria, B.C.

Water Survey of Canada. Surface Water and Sediment Data to 1993. Environment Canada, Ottawa, Ontario.

Figures

Figure 1. Map of Alsek River (Scale 1:900 000)

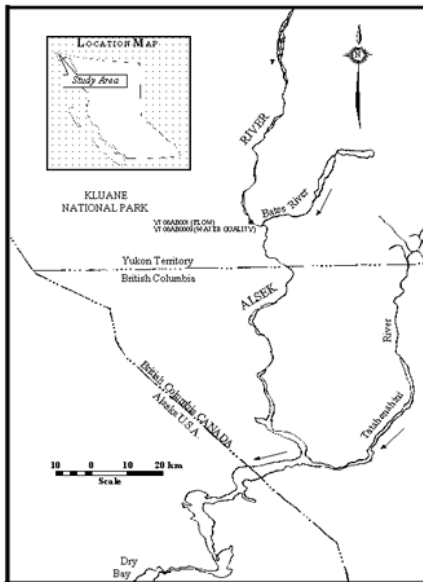


Figure 2. Flow (click on figure to see larger image)

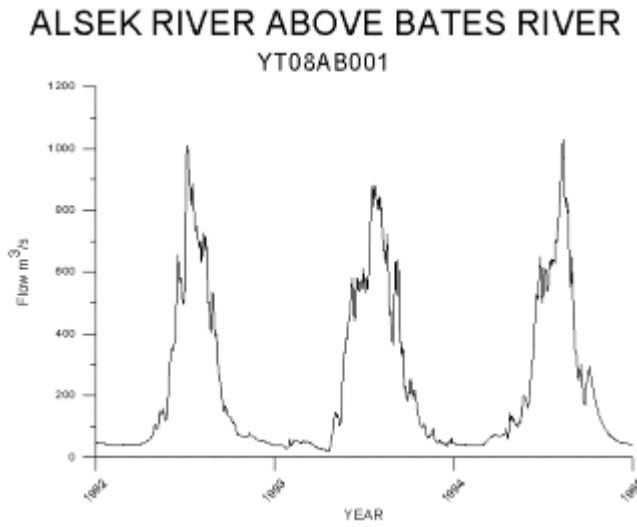


Figure 3. Total Alkalinity (click on figure to see larger image)

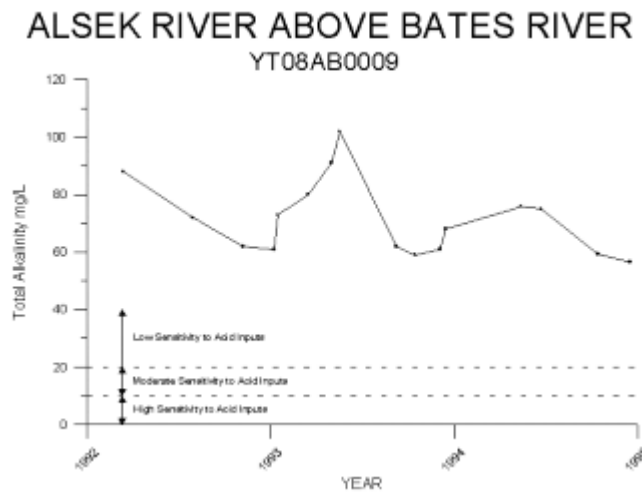


Figure 4. Total Aluminum (click on figure to see larger image)

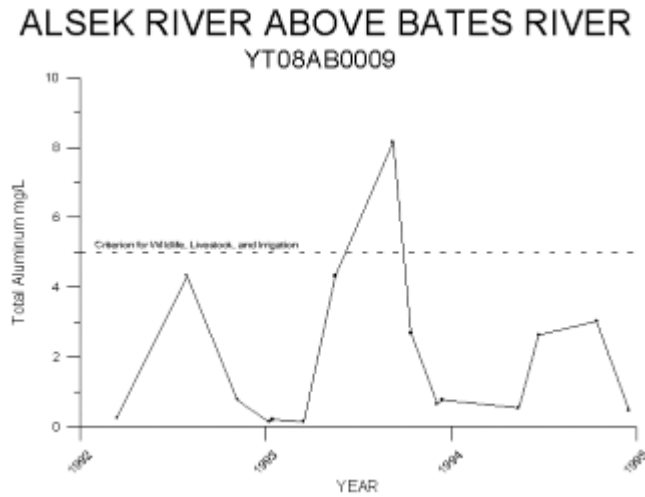


Figure 5. Total Arsenic (click on figure to see larger image)

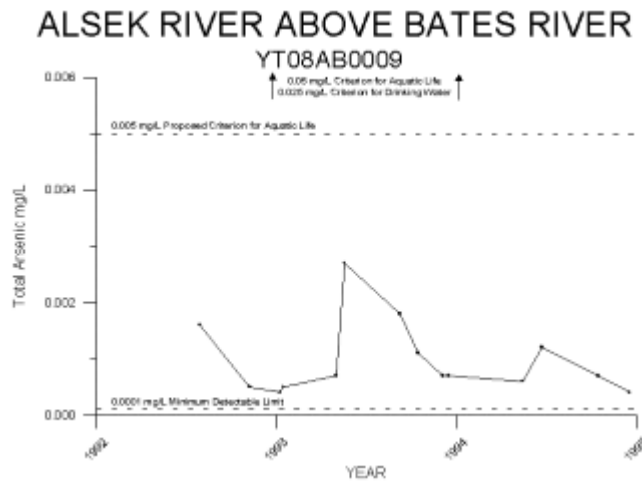


Figure 6. Total Barium (click on figure to see larger image)

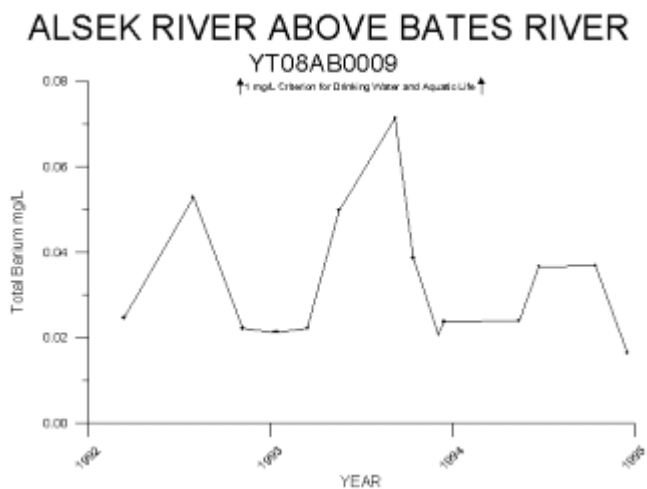


Figure 7. Total Beryllium (click on figure to see larger image)

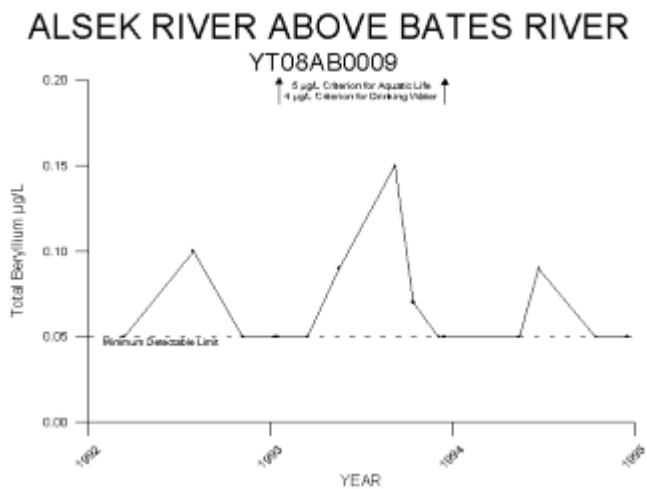


Figure 8. Total Cadmium (click on figure to see larger image)

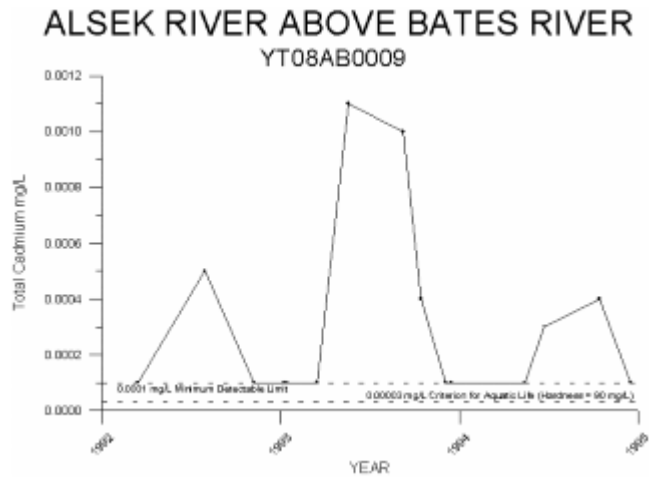


Figure 9. Calcium (click on figure to see larger image)

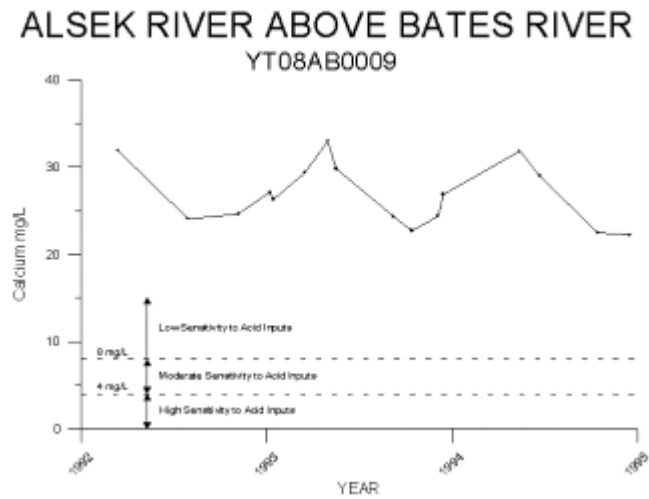


Figure 10. Total Inorganic Carbon (click on figure to see larger image)

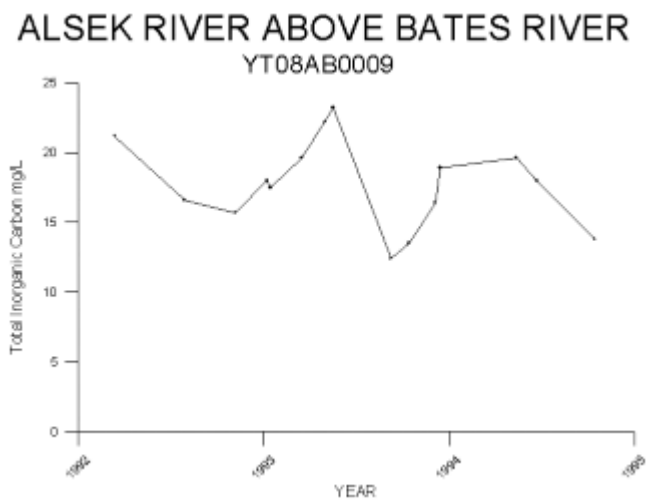


Figure 11. Total Organic Carbon (click on figure to see larger image)

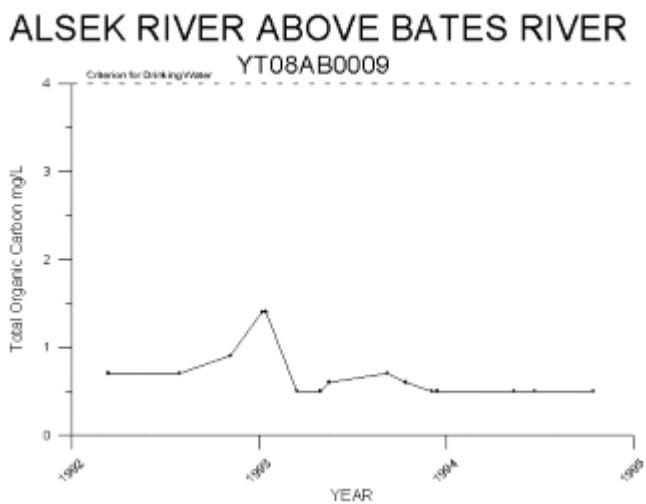


Figure 12. Dissolved Chloride (click on figure to see larger image)

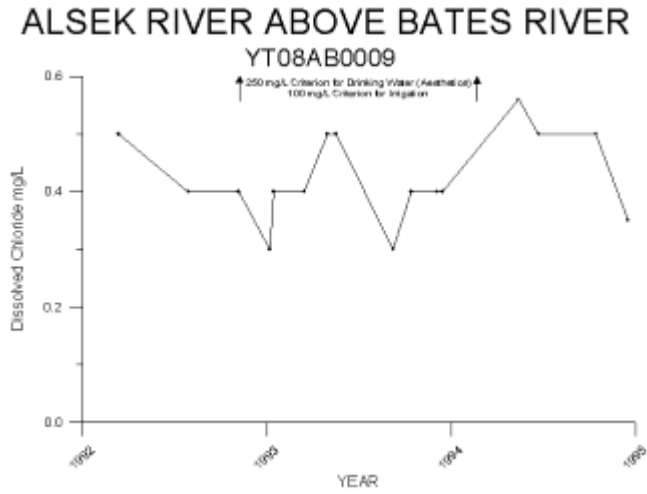


Figure 13. Total Chromium (click on figure to see larger image)

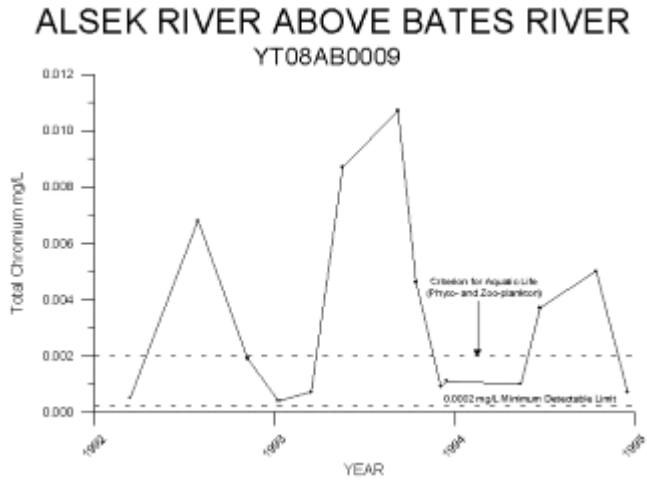


Figure 14. Total Cobalt (click on figure to see larger image)

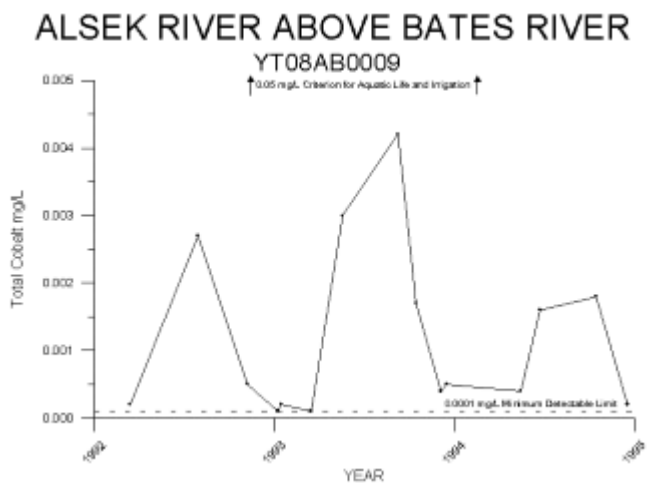


Figure 15. Apparent Colour (click on figure to see larger image)

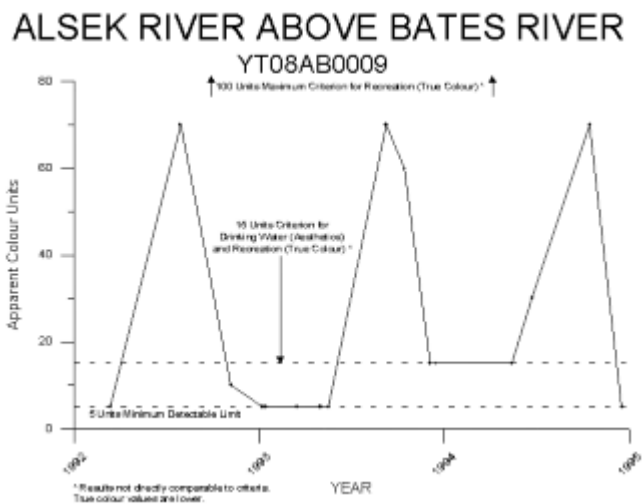


Figure 16. Total Copper (click on figure to see larger image)

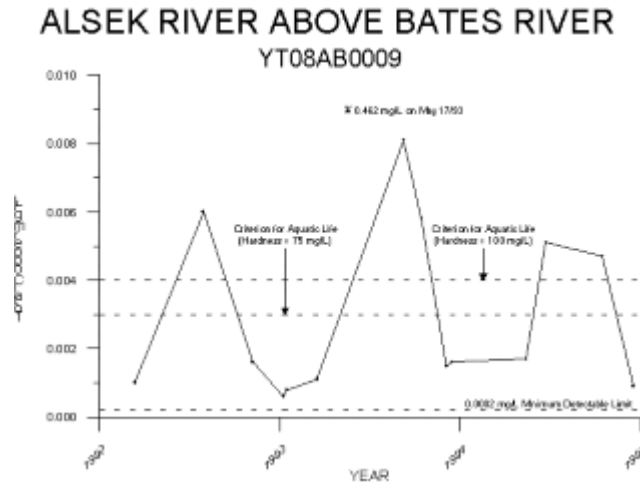


Figure 17. Dissolved Fluoride (click on figure to see larger image)

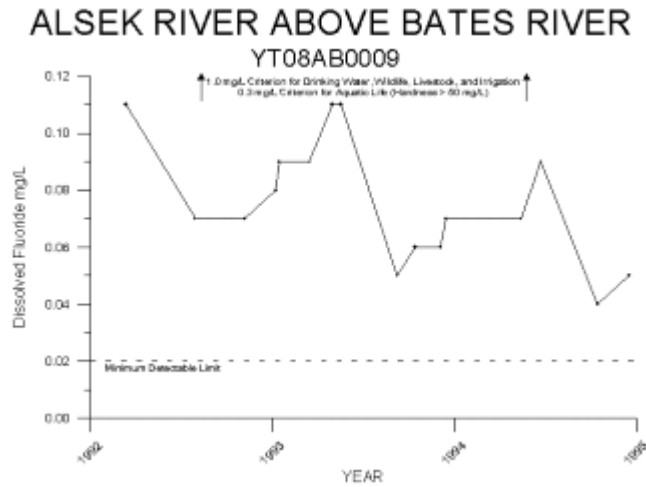


Figure 18. Hardness (click on figure to see larger image)

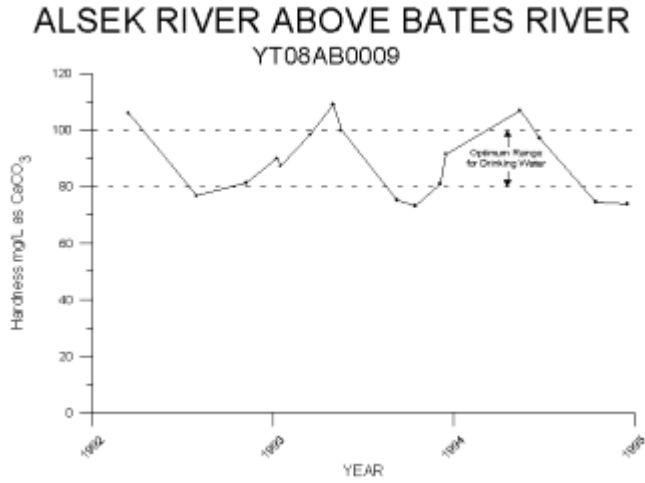


Figure 19. Total Iron (click on figure to see larger image)

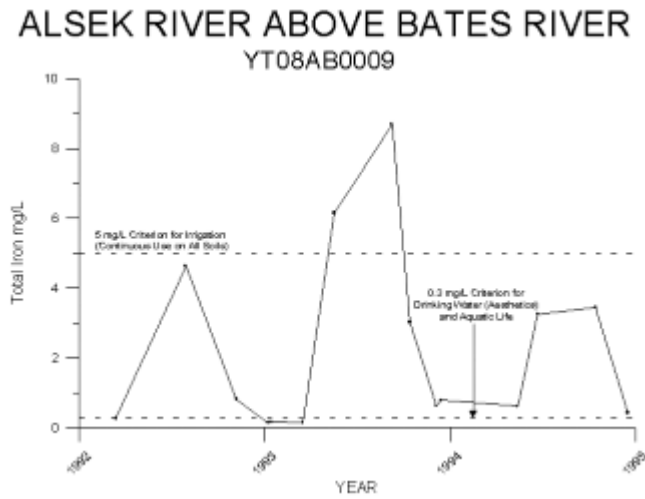


Figure 20. Total Lead (click on figure to see larger image)

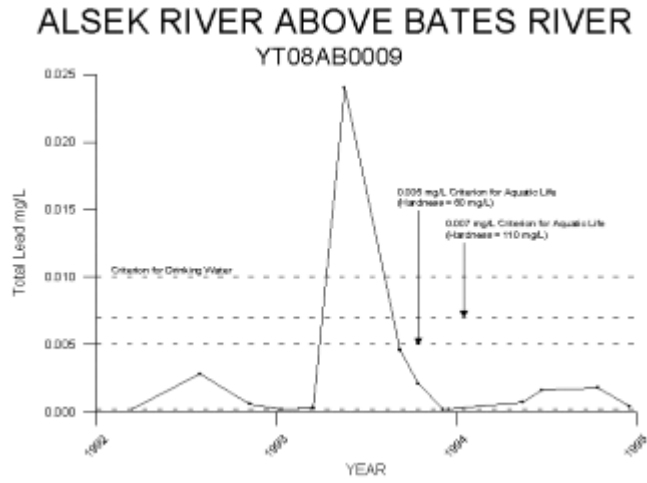


Figure 21. Total Lithium (click on figure to see larger image)

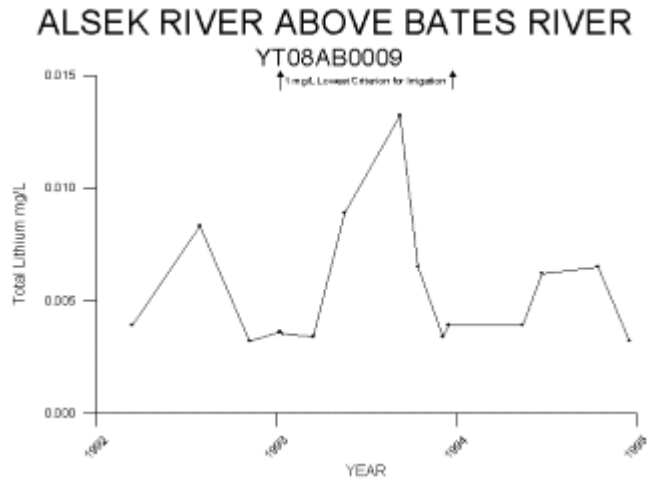


Figure 22. Magnesium (click on figure to see larger image)

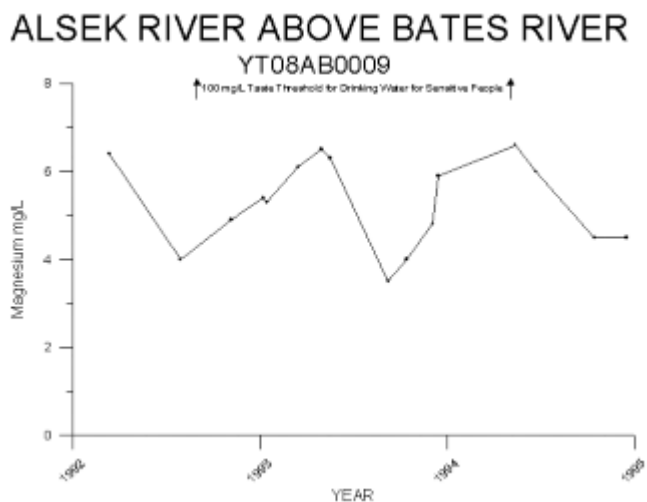


Figure 23. Total Manganese (click on figure to see larger image)

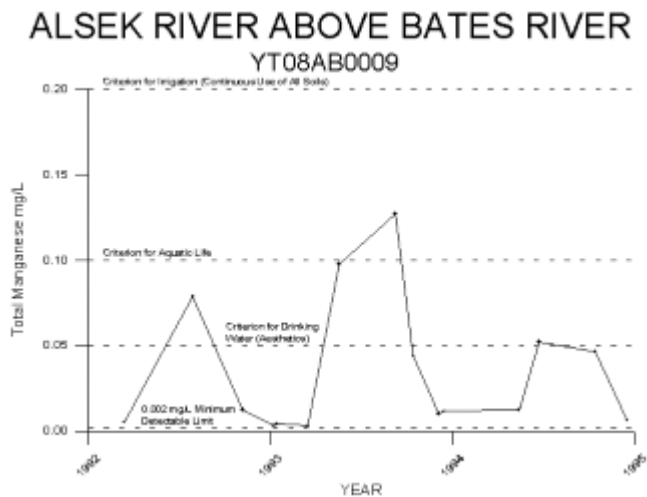


Figure 24. Total Molybdenum (click on figure to see larger image)

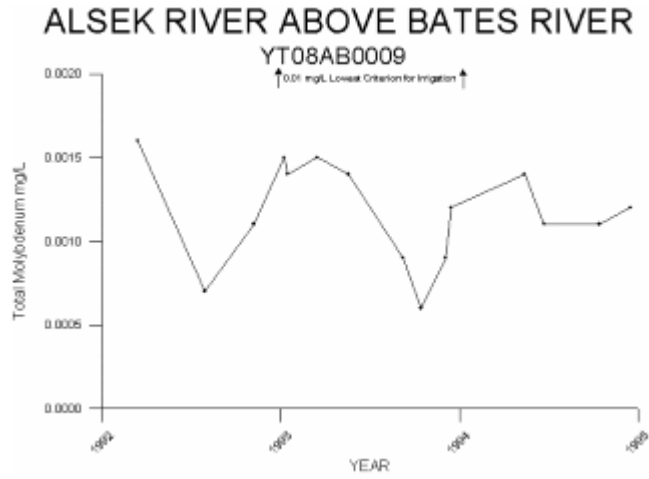


Figure 25. Total Nickel (click on figure to see larger image)

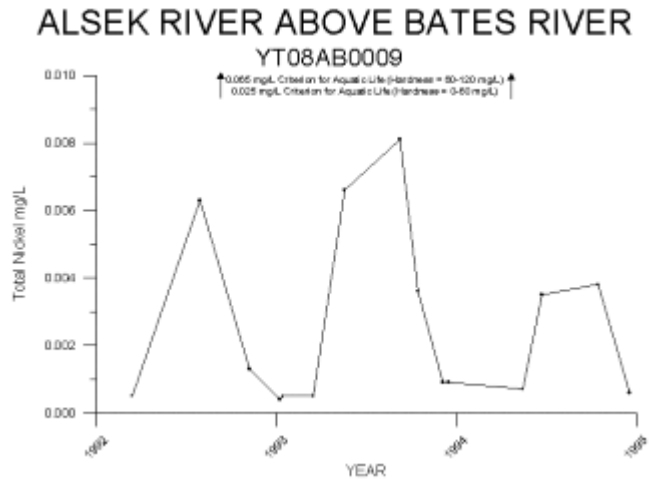


Figure 26. Nitrogen (Nitrate / Nitrite) (click on figure to see larger image)

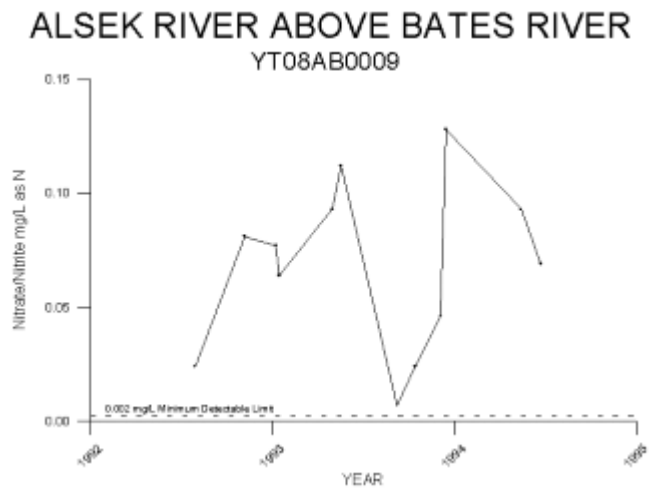


Figure 27. Total Dissolved Nitrogen (click on figure to see larger image)

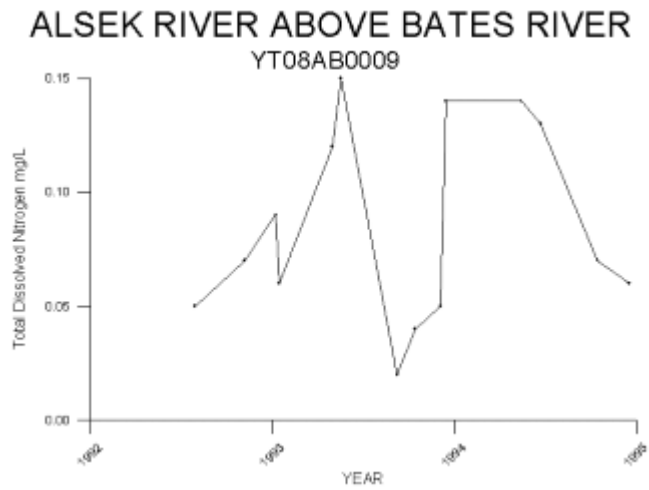


Figure 28. pH (click on figure to see larger image)

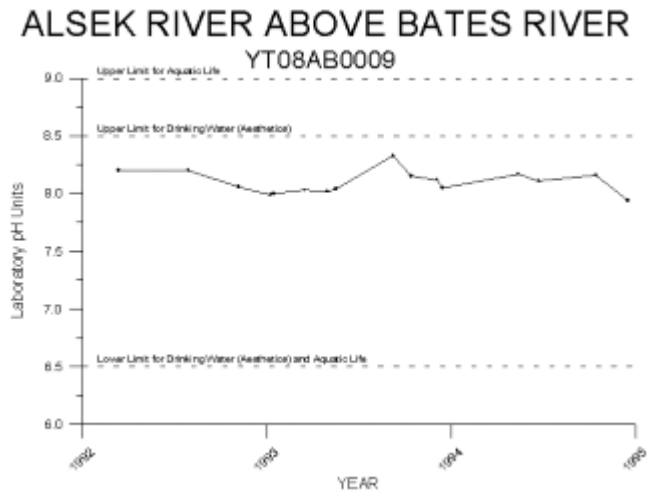


Figure 29. Total Phosphorus (click on figure to see larger image)

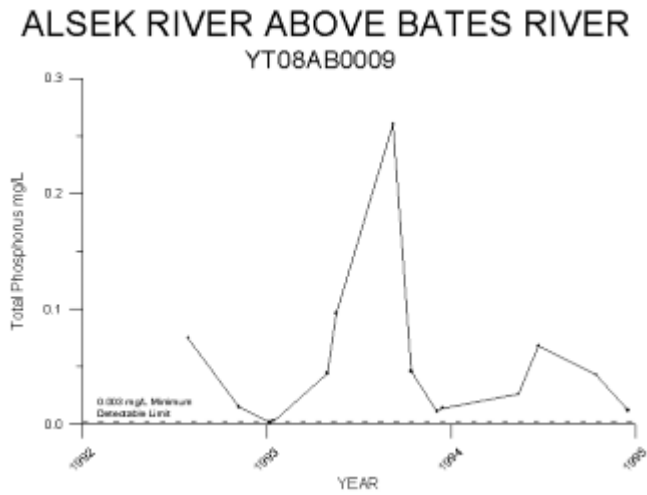


Figure 30. Potassium (click on figure to see larger image)

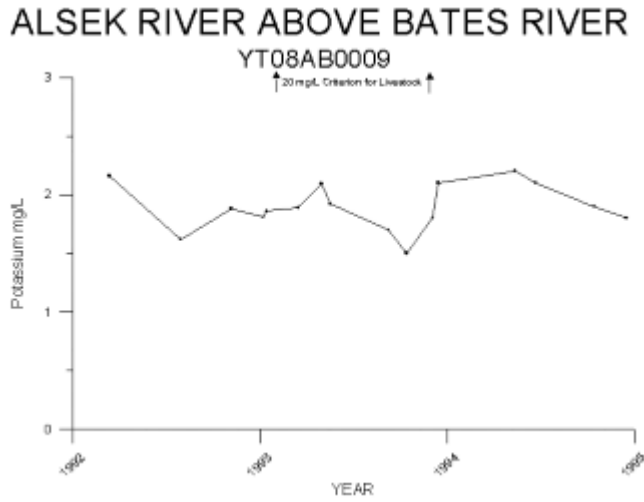


Figure 31. Filterable Residue (click on figure to see larger image)

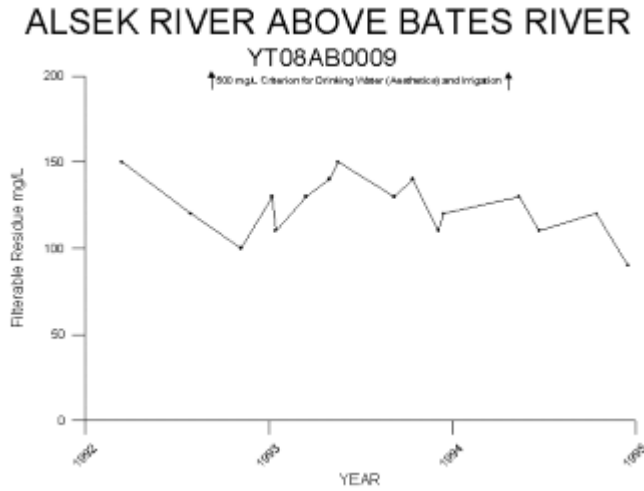


Figure 32. Non-Filterable Residue (click on figure to see larger image)

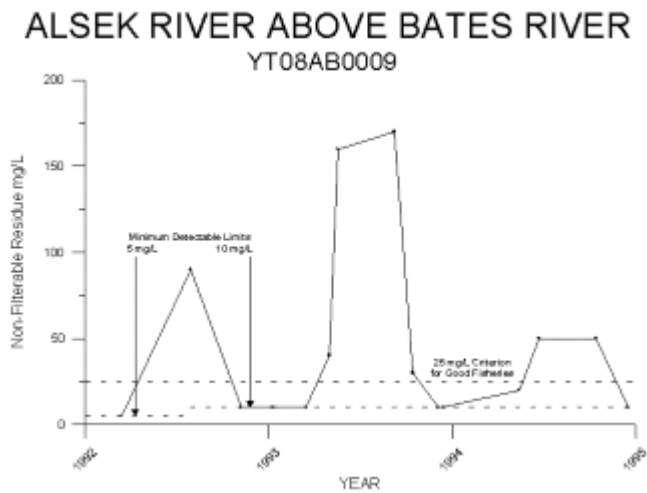


Figure 33. Fixed Filterable Residue (click on figure to see larger image)

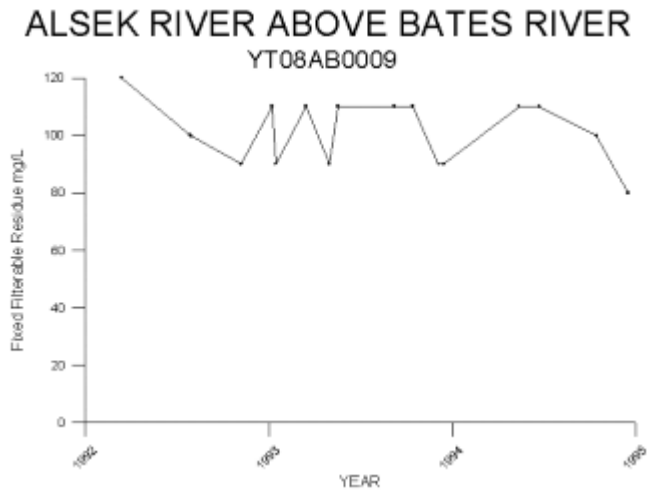


Figure 34. Fixed Non-Filterable Residue (click on figure to see larger image)

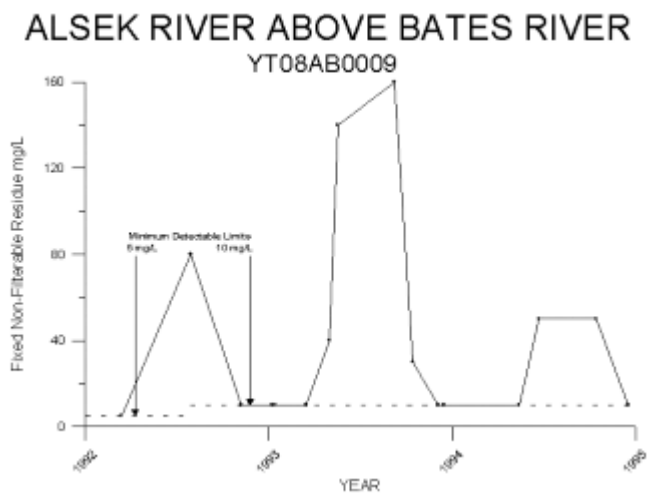


Figure 35. Total Selenium (click on figure to see larger image)

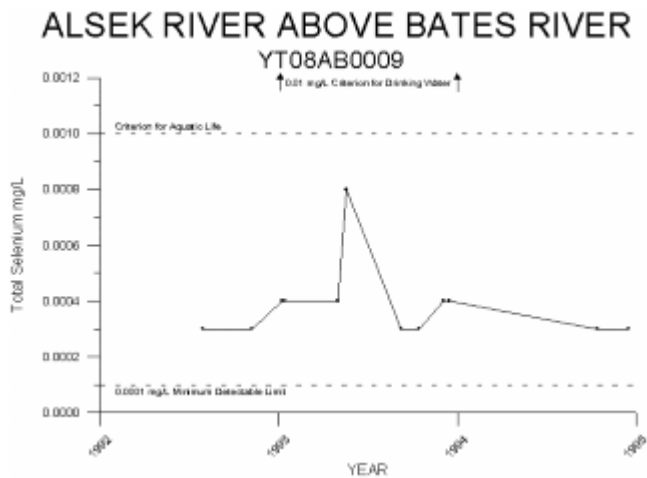


Figure 36. Silica (click on figure to see larger image)

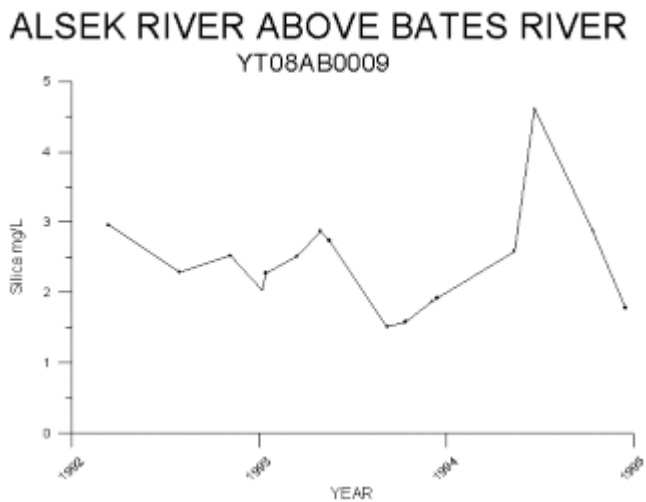


Figure 37. Sodium (click on figure to see larger image)

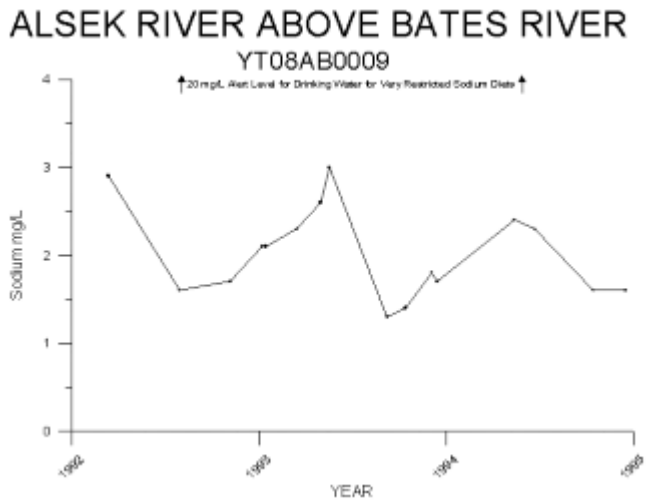


Figure 38. Specific Conductivity (click on figure to see larger image)

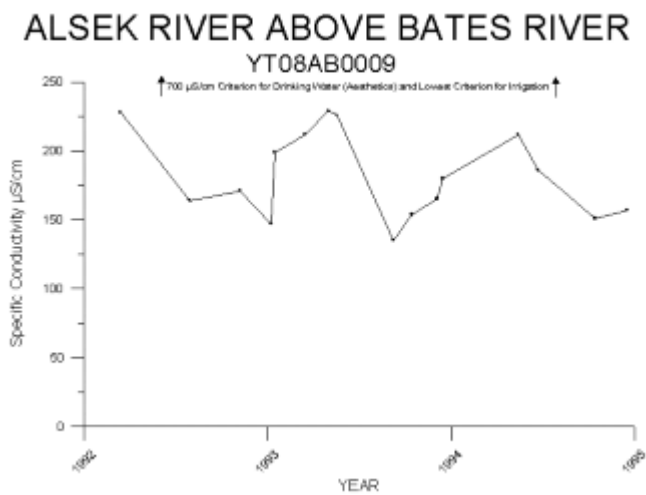


Figure 39. Total Strontium (click on figure to see larger image)

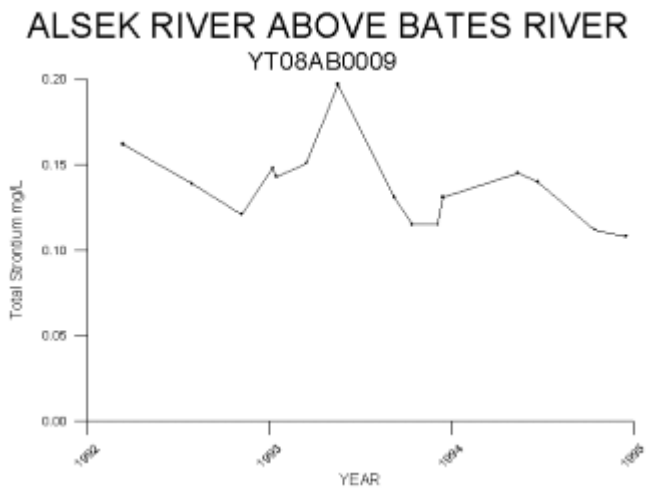


Figure 40. Dissolved Sulphate (click on figure to see larger image)

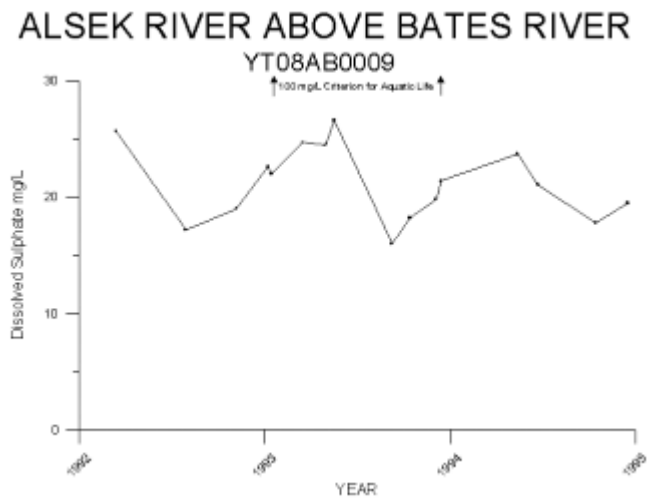


Figure 41. Air Temperature (click on figure to see larger image)

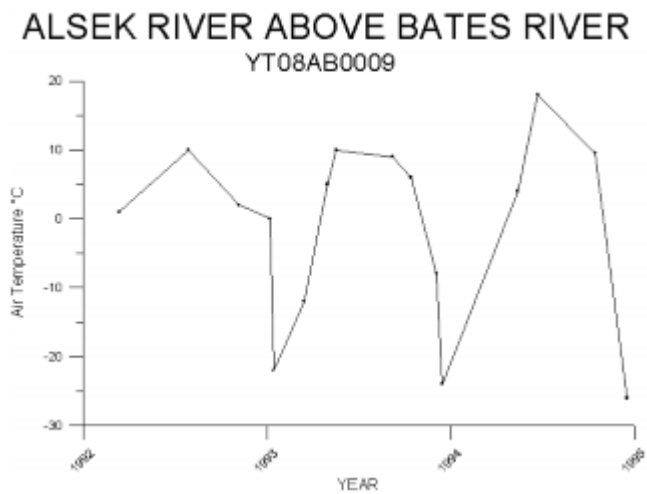


Figure 42. Water Temperature (click on figure to see larger image)

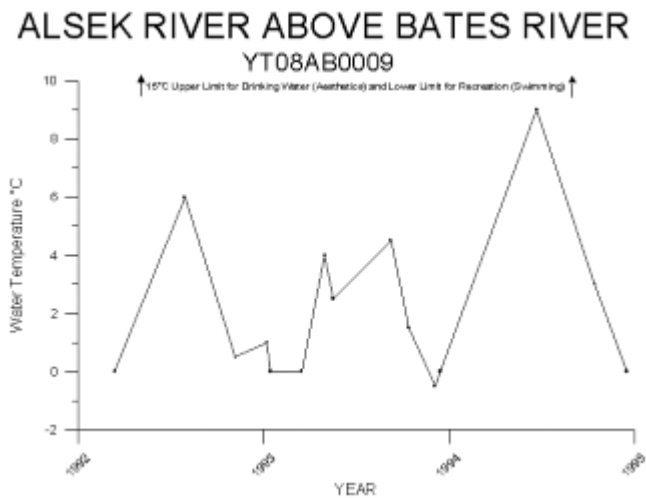


Figure 43. Turbidity (click on figure to see larger image)

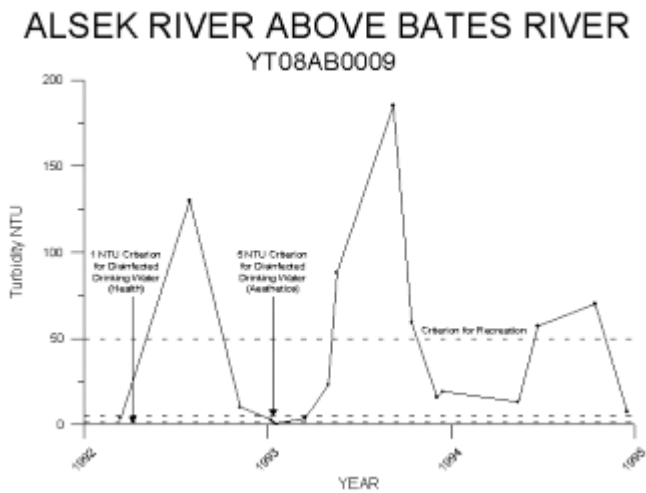


Figure 44. Total Vanadium (click on figure to see larger image)

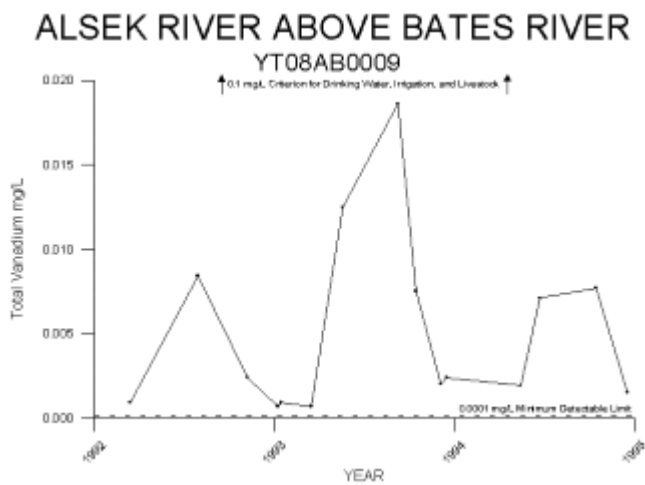


Figure 45. Total Zinc (click on figure to see larger image)

