

MICROBIAL STUDIES OF A HIGH ALPINE WATER SUPPLY USED FOR RECREATION

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Objectives of the Research

- A. To determine the bacterial flora of a high alpine water supply seldom visited by man.
- B. To evaluate the impact of various recreational activities on the bacterial flora of the high alpine water supply.
- C. To provide a basis, relative to water quality, for decision making on use of high alpine areas in Grand Teton National Park.
- D. To study the types and occurrence of coliform bacteria and streptococci found in the alpine ecology.
- E. To relate the findings from the alpine ecosystem to data obtained at lower elevations.

Research Plan

Water samples were obtained from specific sites within Grand Teton National Park at regular intervals and their bacterial microflora determined. These samples were collected along Leigh Creek and Glacier Gulch (areas seldom visited by man), along Cascade Creek and Garnet Creek (heavily used by man) and the lakes in the valley into which they flow. The bacterial microflora of public health significance (coliforms and fecal streptococci) were determined by standard methods. Colonies of both types of bacteria were transferred to storage media and further characterized at a later time.

Results

The results of this year's study revealed no evidence of gross water contamination in any part of the Park that is remote. This finding indicated that hiking, back-packing and mountain climbing, as managed in Grand Teton National Park, do not lead to detectable degradation of water quality. However, water samples that were taken below the outflow of Jenny Lake demonstrated a dramatic adverse impact. In the 600 yards below the boat dock the number of indicator bacteria in the water increased by a factor of 10 to 20. Detailed microbiological examination of the situation revealed that the pattern of indicator bacteria was typical of water contaminated by domestic animals and further, that the increase in bacterial content of

the water increased at a point where an old drain connected the horse corral and the river.

The water samples that were analyzed from Garnet Canyon also reflected a similar pattern as observed in Cascade Canyon. Little evidence of contamination was found in spite of intense use and virtual absence of sanitary facilities or topsoil to bury human waste. On the other hand, consistently high counts of indicator bacteria were isolated from the creek that drains Surprise Lake and Glacier Gulch. These results were unexpected and are still under investigation. However, it appears that the chemical make-up in those streams promotes the growth of algal communities on the rocks in the water that provides a suitable environment for the growth of certain types of the indicator bacteria. Further studies are being carried out to define this symbiotic relation and the influence of environmental variables on it.

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