
Mountains as Water Towers E-Discussion:
The Quantity and Quality of Water in - and from -
Mountain Areas

TOPIC 1: DISCUSSION SUMMARY
Mountain Water Ecosystems

Thank you to everyone who contributed to the first topic of discussion. The messages shared over the first two weeks addressed river systems in the Wrangell/Saint Elias and Mackenzie Ranges, the Canadian Rockies, the Sierra Nevada, and Indian Himalaya.

The following summary is categorized by discussion thread. Where discussion participants have recommended resources, these are noted at the end of each section. Common opinions are noted at the end.

MOUNTAIN WATER ECOSYSTEMS

Discussion Threads:

- *** Minimum Streamflows
- *** Cumulative Impacts
- *** The Indian Himalaya
- *** Kluane National Park
- *** The Bow River Basin
- *** The Sierra Nevada
- *** Sharing Mountain Water
- *** Common Opinions

*** Minimum Streamflows

Hans Schreier began this discussion by noting the trend toward allocating minimum streamflows to maintain basic aquatic ecosystem functions.

Kyle White noted that studies were undertaken in Alberta to identify "instream flow needs" for both aquatic ecosystems and recreation. While in Oregon, Chris Winter noted that "in-stream water rights" were legislated to protect steelhead trout and salmon. These are recent events, but according to Rick K., river-basin assessments for water-

supply purposes were conducted in China centuries ago and for the big cities of California in the early 1900s.

In maintaining minimum streamflows, Rick also cautioned that active management of the water itself will affect annual water balance, temporal distribution, flood hydrology and water quality, in addition to minimum streamflows.

Resources Recommended:

Oregon Water Resources Department

<http://www.wrd.state.or.us/>

Alberta Environment: Background Studies Section

<http://www3.gov.ab.ca/env/water/regions/ssrb/index.asp>

According to Rick K., detailed manuals for watershed assessments have been published by:

Oregon State

Washington State

British Columbia Ministry of Forests

USDA-Forest Service

USDI-Bureau of Land Management

For a General Overview:

Messerli, B., and J. D. Ives (eds.). 1997. Mountains of the World: A Global Priority. The Parthenon Publishing Group. New York, NY, USA and United Kingdom. 495 pp.

*** Cumulative Impacts

Hans Schreier and Chris Winter also drew attention to the fact that assessing the health of any water ecosystem requires taking into account the cumulative impacts of all the different land uses occurring there, including how different land uses impact one another.

Resources:

US Forest Service Documents

(Analysis Methodology for Cumulative Impacts Assessments)

<http://www.fs.fed.us>

*** The Indian Himalaya

Vimal Khawas described mountain water ecosystems in the

Indian Himalaya - including the Indus, the Ganges, and the Brahmaputra - noting that many of the "sub-rivers" in these systems are antecedent, meaning they existed before the mountains began to rise. A large portion of South Asia - including Pakistan, India, Nepal, Bhutan and Bangladesh - relies on these three river systems to support agriculture, industry and power generation.

Vimal Khawas, DeVon Nelson, Merv Stevens and Iqrar Haroon all noted that the Himalaya is unusually prone to erosion and must be managed carefully. DeVon Nelson suggested that natural erosion is so common, it likely far outstrips that caused by human activity. Merv Stevens noted that if a landscape is prone to natural erosion, then it will be even more prone to human activity. He expressed frustration that seemingly few people fully appreciate that the "built-in natural erosion factor" of all mountain places inevitably amplifies the impacts of human-use.

*** Kluane National Park

Brent Liddle briefly described large-scale hydrological processes in Kluane National Park. He explained that Kluane shares a large central Icefield with neighboring parks in Alaska and British Columbia. This icefield is fed by moist Pacific storms from the turbulent Gulf of Alaska which pass over the western edge of the St Elias Mountains, causing precipitation. The central icefield in turn feeds large valley glaciers that melt and return the water to the ocean through major glacial watersheds.

*** The Bow River Basin

Shortly before the opening of this discussion, several conservation organizations in Canada launched a national campaign to protect the "10 Most Endangered Rivers in Canada" placing 6 of the 10 rivers in mountain regions. Mark Bennett wrote to express his concern that the campaign ignored the work already underway to conserve these rivers, particularly the Bow River, and in this way sensationalized the issue by implying that disaster was imminent and no action was being taken to address the problem. Rachelle Haddock, a participant of the Endangered Rivers Initiative, argued that this campaign is an opportunity to rally

support for existing conservation efforts and catalyze action on an issue where it is believed that polite negotiation has been unsuccessful.

Endangered Rivers

<http://www.endangeredrivers.net/>

Bow River Basin Council

<http://www.brbc.ab.ca/>

*** The Sierra Nevada

Rick K. and Joan Clayburgh provided a thorough description of watersheds in the Sierra Nevada, including a history of human impacts.

Joan Clayburgh described how the Sierra Nevada Alliance created the Sierra Water campaign in 2003, partly in response to the findings of the US Congress funded "Sierra Nevada Ecosystem Project study" completed in 1993. At the heart of the Sierra Water campaign are collaborative, multi-stakeholder watershed groups created to protect all 24 major watersheds in the Sierra. The aim is maintain healthy fisheries, aquatic ecosystems, and wildlife habitat, prime recreation, and high quality drinking water to Sierran's, California and Nevada.

According to Joan, this consensus-driven, collaborative approach is unusual in the Sierra, where most water protection efforts in the past have been focused on regulation, litigation, and legislation. The process has resulted in some outstanding successes, and some deeply divisive battles.

*** Sharing Mountain Water

Dilnawaz Gerdezi and Drona Rasali brought up the issue addressed by topic 3 of this discussion, ownership of mountain water resources. Both Dilnawaz and Drona pointed out that access to water, like many other resources, is often dictated by socio-economic factors.

Drona explained that in her homeland of Nepal, certain castes were considered "untouchable" by the statutory provisions until recently, yet still have no access to most

natural resources (including water). According to Drona, there is a belief in Himalayan foothills and mountains that the resourcefulness of a mountain family can be judged by the distance they live from water.

*** Common Opinions

- When assessing the health of a water ecosystem, one must take into account the cumulative impacts of all land uses.
- The "built-in natural erosion factor" along mountain watersheds inevitably amplifies the impacts of human-use.
- The active management of river systems will affect more than stream flow, but the hydrology of the entire aquatic ecosystem.
- Mountain residents must sometimes compete, with each other and with flatland residents downstream, for dwindling water resources.