

Excerpted from Chapter 5
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Empty Promises:
The Elusive Benefits of Large Dams

For every claim to virtue made by the proponents of big dams there is a clear-cut, factual and demonstrable refutation.

Elmer T. Peterson
Big Dam Foolishness, 1954

STATIC DAMS, CHANGING CLIMATE

Dam designers work on the assumption that historic hydrological variables such as average annual flow, annual variability of flow, and seasonal distribution of flow are a reliable guide to the future. As global warming takes hold, however, there are likely to be significant changes in seasonal and annual rainfall patterns and other factors affecting streamflow such as the rate and timing of snowpack melting, and the nature of watershed vegetation. Historical and geological evidence for floods in past millennia indicate that even small changes in climate can cause major changes in the size of floods. Reservoir sedimentation will also likely be significantly affected: in arid areas, an increase in average annual precipitation of only 10 per cent can double the volume of sediment washed into rivers.¹

Calculations of the amounts of water available to turn turbines, the maximum flood which spillways will have to discharge, and the rate at which reservoirs fill with sediment, will thus become increasingly unreliable as global warming takes hold and as, inexorably, year by year, decade by decade, the earth's climate changes. Insurers are increasingly convinced that global warming is to blame for the increased frequency and severity of violent and expensive storms, floods and droughts since the late 1980s, weather events which have already resulted in burst dams, increased sedimentation and reduced hydropower capacity. A 1991 report from the UN Intergovernmental Panel on Climate Change noted that: 'Increased run-off due to climate change could potentially pose a severe threat to the safety of existing dams with design deficiencies. Design criteria for dams may require re-evaluation to incorporate the effects of climate change'. Thus, not only is global warming

¹ Williams, P. (1989) 'Adapting Water Resources Management to Global Climate Change', Villach Conference on Developing Policies for Managing the Effects of Climate Change, special issue of *Climate Change*; Knox, C. (1993) 'Large increase in flood magnitude in response to modest changes in climate', and, Baker, V. (1993) 'Learning from the past', both in *Nature*, Vol. 361, 4 February.

not the godsend to save an ailing industry which many hydro backers hope, but it is going to render dams less safe and less likely to perform as their builders' claim.²

² Leggett, J. (1995) 'Insurance Industry at UN Climate Conference', Greenpeace International, March 27; Intergovernmental Panel on Climate Change (1991) *Climate Change: The IPCC Response Strategies*. Island Press, Washington, DC, 181.