Jozsef Szilagyi
Conservation and Survey Division
School of Natural Resources, University of Nebraska-Lincoln
Department of Hydraulic and Water Resources Engineering, Budapest University of Technology and Economics, Budapest, Hungary

MODIS AIDED WATER-BALANCE INVESTIGATIONS IN THE REPUBLICAN RIVER BASIN, USA

Declining streamflow (R0) and groundwater, steady precipitation (P)

Location of the Republican River basin

Precipitation stations (circles):
1. Bonny Dam
2. Burlington
3. Atwood
5. Oberlin
6. Cambridge
7. Guide Rock
8. Imperial

Gaging stations (squares):
1. Lower Sappa, near Beaver City
2. South-Fork Republican, near Bismarck
3. Beaver near Cedar Bluffs
4. Arkansas at Langar
5. Republican near Hardy
7. North-Fork Republican at the CO-NE border
8. Courtland Canal near Superior

300 Kilometers

B-digit USGS subcatchments

Large east-to-west environmental gradients

Declining streamflow (R0) and groundwater, steady precipitation (P)

Consequences

Deviation of the current ET/P ratios from an “undisturbed” value may be indicative of the extent of accumulated (not climate-related) changes in the hydrologic cycle of the Republican River basin. The largest change (3.95%) can be inferred to have taken place in Colorado, followed by Kansas (2.76%), upstream of Hardy, NE, with almost the same extent of change in Nebraska (2.67%). This is in accordance with the study of Szilagyi (1999) showing that streamflow declined faster outside of Nebraska than within.

References


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