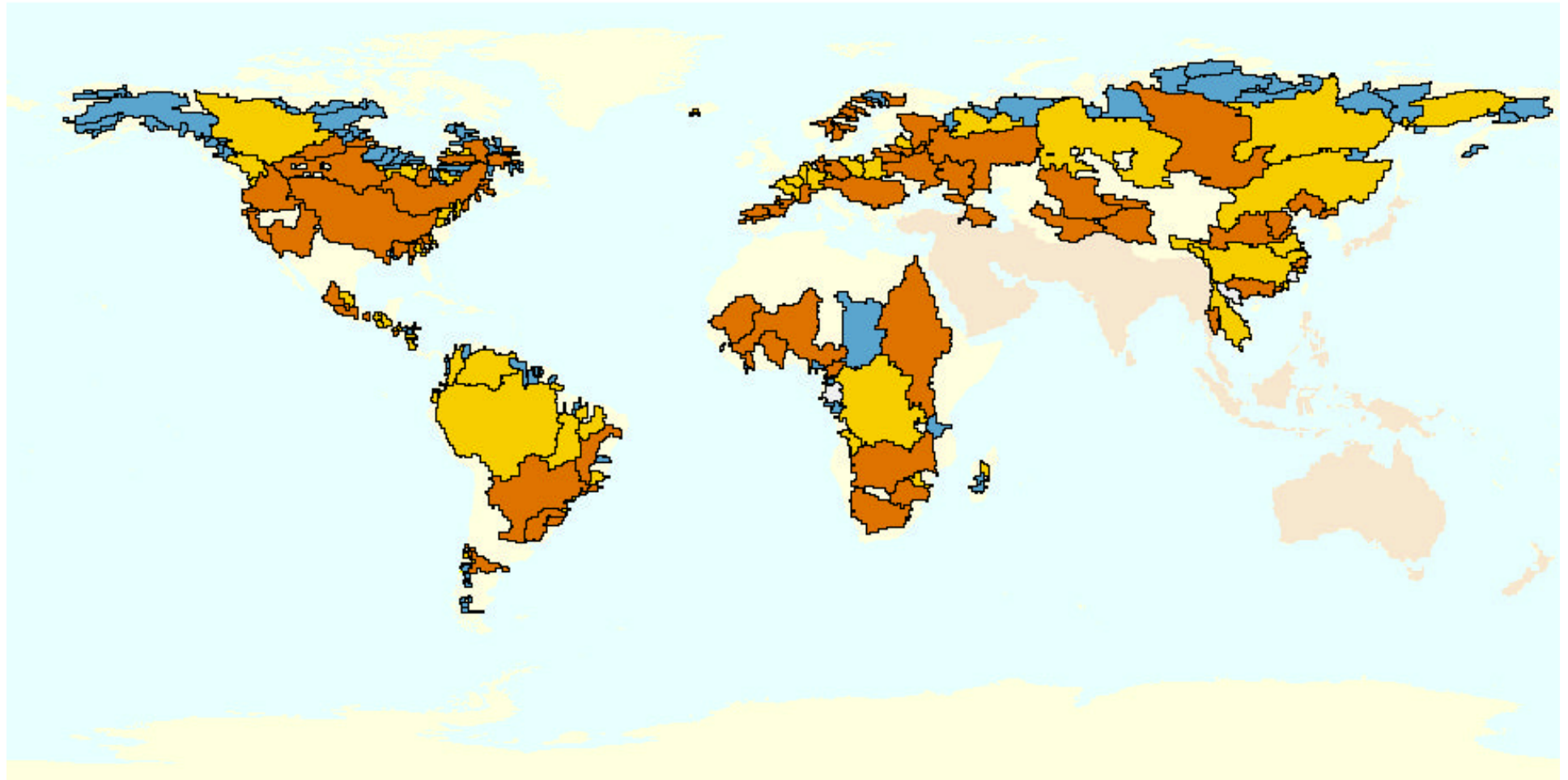


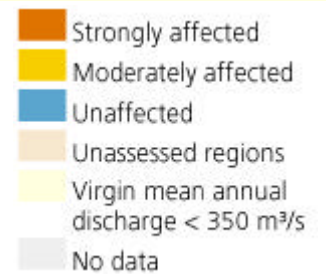
River Channel Fragmentation and Flow Regulation



Map Projection: Geographic

Citation: World Resources Institute - PAGE, 2000

Notes:



Map Description:

This map shows the results of a river fragmentation analysis carried out by Dynesius and Nilsson (1994) and Nilsson et al. (2000). Of the 227 large river basins assessed, 37 percent are strongly affected by fragmentation and altered flows, 23 percent are moderately affected, and 40 percent are unaffected. Large river systems (LRS) are defined as rivers with a virgin mean annual discharge (VMAD) equal to or above 350 m³ per second. Strongly affected systems include those with less than one quarter of their main channel left without dams, where the largest tributary has at least one dam, as well as rivers whose annual flow patterns have changed substantially. Unaffected rivers are those without dams in the main channel of the river and, if tributaries have been dammed, river discharge has declined or been contained in reservoirs by no more than 2 percent. The only remaining large free-flowing rivers in the world are found in the tundra regions of North America and Russia, and in smaller coastal basins in Africa and Latin America. It should be noted, however, that considerable parts of some of the large rivers in the tropics, such as the Amazon, the Orinoco, and the Congo, would be classified as unaffected rivers if an analysis at the subbasin level were done. The Yangtze River in China, which currently is classified as moderately affected, will become strongly affected once the Three Gorges dam is completed.

Analytical Overview:

For the regions analyzed in this study, rivers with a historical virgin mean annual discharge equal to or above 350 m³ per second were selected. Once selected, the number of dams and the degree of flow regulation in these river systems were analyzed and combined into a fragmentation index (strongly affected, moderately affected and unaffected). The results of the analysis were combined with a basin GIS coverage to make the final map.

Source:

1. Nilsson, C., M. Svedmark, P. Hansson, S. Xiong and K. Berggren. 2000, River Fragmentation and flow regulation analysis. Umeå, Sweden: Landscape Ecology, Umeå University.
2. Dynesius, M and C. Nilsson. 1994. "Fragmentation and Flow Regulation of River Systems in the Northern Third of the World". Science 266: 753-762.
3. Fekete, B., C.J. Vörösmarty, and W. Grabs. 1999, Global, Composite Runoff Fields Based on Observed River Discharge and Simulated Water Balance. Koblenz, Germany: WMO-GRDC. . .