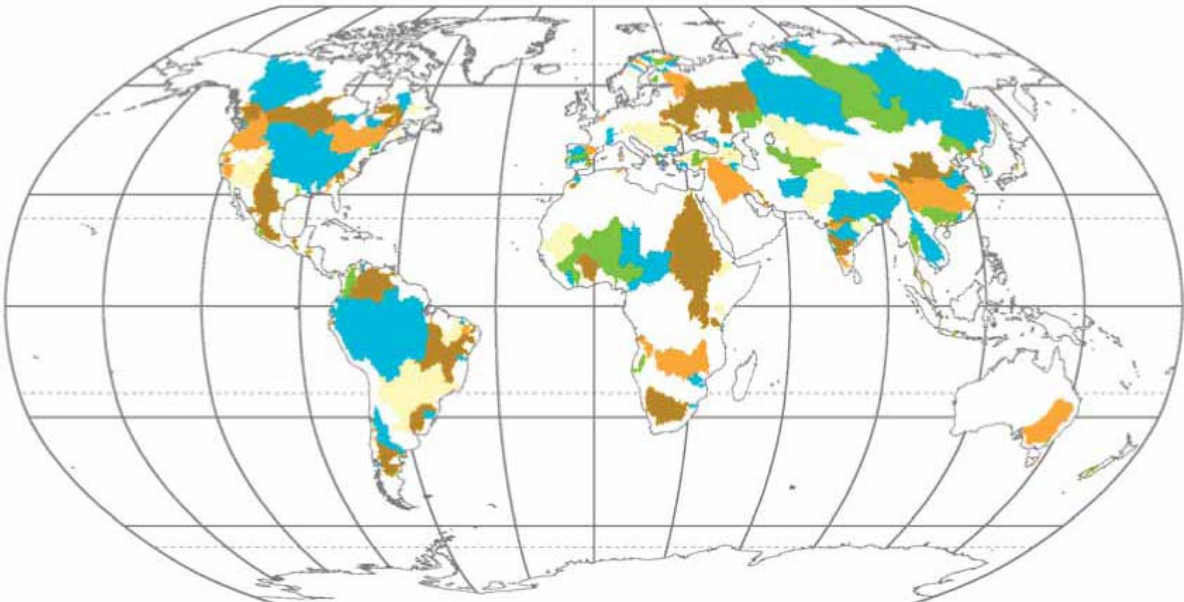
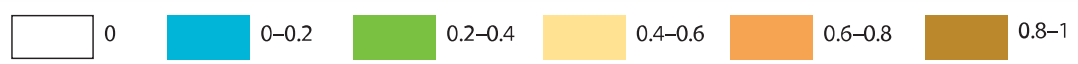


Indicator name	
<b>Impact of sediment trapping by large lams and reservoirs</b>	
	
	
Prepared by	Water Systems Analysis Group, University of New Hampshire (UNH)
Example	<b>WWDR2, Section 3, Global Map 6</b>
Rationale	The impacts of reservoirs and water diversions can manifest downstream in the form of altered stream flow and reduced sediment and nutrient fluxes affecting downstream water resources and ecosystem health and productivity.
Position in DPSIR chain	Pressure
Definition of indicator	Residence time of water held in large reservoirs; sediment trapping efficiency of large reservoirs.
Underlying definitions and concepts	The indicator is based on the following definitions: <ul style="list-style-type: none"> <li>• Volume capacity in world's largest reservoirs</li> <li>• Pre and Post-Impounded discharge at reservoirs</li> </ul>
Specification of determinants needed	Reservoir database containing ~677 of the world's largest reservoirs (having maximum storage capacities greater than or equal to 0.5 km <sup>3</sup> ) Gridded discharge fields (annual and monthly discharge per grid cell) Digitized, topological river network
Computation	The indicator can be computed as: $\tau_R = 0.67 * \text{Max Capacity} / Q$ $TE = 1 - (0.05 / \Delta\tau_R^{0.5})$ <p>Where:</p> <p><math>\tau_R</math> = residence time of water in reservoir; TE = trapping efficiency of reservoir; MaxCapacity = maximum reservoir capacity, Q = local mean annual discharge (pre-impoundment).</p>
Units of measurements	$\tau_R$ has units of time (i.e., days, years); TE is unitless.
Data sources, availability and quality	All data for this indicator is available from the Water Systems Analysis Group at University of New Hampshire: <a href="http://wwdrii.sr.unh.edu/download.html">http://wwdrii.sr.unh.edu/download.html</a> (Accessed 3 March 2009)
Scale of application	Local for basins exceeding 25, 000 km <sup>2</sup> (within a city or community); regional (within a sub-national region); national (for a country); international (across several

	countries or globally).
Geographical coverage	Global, gridded dataset at 30-minute grid cell resolution Africa, gridded dataset at 6-minute grid cell resolution
Interpretation	The residence time of water in large reservoirs and subsequent sediment trapping efficiencies is calculated as a measure of the impact of these man-made structures on the characteristics of river flow and sediment discharge to the ocean. Estimations of water removed from basins as diversions (i.e., interbasin transfers and consumptive use) also provide information on the impacts of diversions on river flow and sediment transport.
Linkage with other indicators	None reported
Alternative methods and definitions	The reservoir database is being expanded from ~677 of the largest reservoirs to over 1,000.
Related indicator sets	None reported
Sources of further information	Charles J. Vörösmarty, Michel Meybeck, Balázs Fekete, Keshav Sharma, Pamela Green, and James Syvitski. Anthropogenic Sediment Retention: Major Global Impact From Registered River Impoundments. <i>Global and Planetary change</i> , 39 (2003) 169-190. Syvitski, J.P.M., C.J. Vörösmarty, A.J. Kettner, and P. Green. 2005. Impact of humans on the flux of terrestrial sediment to the global coastal ocean. <i>Science</i> 308: 376-380.
Involved agencies	Water Systems Analysis Group, University of New Hampshire ( <a href="http://www.wsag.unh.edu/">http://www.wsag.unh.edu/</a> ) Institute for Arctic & Alpine Research, University of Colorado <a href="http://instaar.colorado.edu/">http://instaar.colorado.edu/</a> (Accessed 3 March 2009)