

# Aquatic Intactness: Utah and the Colorado Plateau (v20), 12-Digit HUC (HUC6) Resolution

## Description

This dataset provides an estimate of current aquatic intactness (i.e. condition) based on the extent to which human impacts such as water demand, agriculture, urban development, natural resource extraction, dams, diversions, and alterations have disrupted the hydrology, water quality, and habitat quality of aquatic systems across the state of Utah and the Colorado Plateau. Aquatic intactness values will be high in areas where these impacts are low.

This HUC6 (12-Digit NHD Hydrologic Unit Code) resolution dataset was created for the Utah-Colorado Plateau REA Stepdown (UCS) analysis using the open-source logic modeling framework Environmental Evaluation Modeling System (EEMS). Spatially-explicit logic modeling hierarchically integrates numerous and diverse datasets into composite layers, quantifying information in a continuous rather than binary fashion. This technique yields accessible decision-support products that state and federal agencies can use to craft scientifically-rigorous management strategies.

The input data, intermediate layers, and final results of this analysis can be explored via the EEMS Explorer on Data Basin (<http://databasin.org/>), where they are accessible as online interactive maps showing the signature of human impact across the aquatic landscape. A diagram of the fuzzy logic model is also available on Data Basin in PDF format.

## Thresholds

Table 1-2. Aquatic intactness fuzzy logic data inputs for the State of Utah and the Colorado Plateau (v19). Data type, range of values, and true and false modeling thresholds shown for each item at HUC6 resolution.

Input	Range	Data Type	True Threshold	False Threshold
Total Water Demand (Gallons per day/km <sup>2</sup> )	0 – 83,631,875	Density	0	50,000 <sup>2</sup>
Urban/Impervious Development	0 - 100	Percent Cover	0	10 <sup>2</sup>
Roads and Railroads Near Streams (Coverage within 500m buffer)	0 – 22.8	Percent Cover	0	5 <sup>2</sup>
Surface Diversions (pts/km <sup>2</sup> )	0 – 3.5	Count	0	0.4 <sup>2</sup>
Linear Alteration Development (Km/km <sup>2</sup> )	0 – 2.5	Density	0	0.3 <sup>2</sup>
Reservoir Development (Surface area coverage)	0 - 100	Percent Cover	0	5 <sup>2</sup>
Dam Development (Pts/km <sup>2</sup> )	0 – 0.28	Density	0	0.02 <sup>2</sup>
Downstream Dam Impact Score	No impact, Low, Med, High	Score (Categorical)	0	High = -1 Med = -0.75 Low = -0.5

Input	Range	Data Type	True Threshold	False Threshold
EPA Impaired Waters (Streams and lakes with 303d or TMDL designations)	0 – 92.2	Percent Cover	0	0.3 <sup>2</sup>
UT Draft IR Impaired Perennial Streams (% Impaired Perennial Streams; Assessment Unit-level data assigned to HUCs)	0 - 100	Percent Perennial Streams	0	0.3 <sup>2</sup>
UT Draft IR Impaired Lakes & Reservoirs (% Impaired lakes of total surveyed; Assessment Unit-level data assigned to HUCs)	0 - 100	Percent of Lakes Surveyed	0	0.3 <sup>2</sup>
EPA NPDES Discharge Sites (Pts/km <sup>2</sup> )	0 – 2.3	Count	0	0.1 <sup>2</sup>
Polluted EPA Sites (Pts/km <sup>2</sup> ) Superfund and Brownfield Designations	0 – 2.5	Count	0	0.01 <sup>2</sup>
Mine Density (Pts/km <sup>2</sup> )	0 – 2.2	Count	0	0.2 <sup>2</sup>
Oil and Gas Well Density (Pts/km <sup>2</sup> )	0 – 19.6	Count	0	2 <sup>2</sup>
Treatment Pond Polygons (Surface area coverage)	0 - 100	Percent Cover	0	10 <sup>2</sup>
Agricultural Development	0 - 100	Percent Cover	0	10 <sup>2,3</sup>
Manure Deposition (Mean kg N/ha/yr)	18.7	Density	0	2 <sup>2</sup>
Synthetic Nitrogen Deposition (Mean kg N/ha/yr)	46.1	Density	0	3 <sup>2</sup>
Road/Railroad-Stream Crossings (Pts/km <sup>2</sup> )	0 – 2.0	Count	0	0.6 <sup>2</sup>
Road/Railroad Development (Km/km <sup>2</sup> )	0 – 15.9	Density	0	2 <sup>2</sup>
Invasive Riparian Vegetation	0 – 21.1	Percent Cover	0	6 <sup>2</sup>
Invasive Upland Vegetation	0 – 92.2	Percent Cover	0	30 <sup>2</sup>
Biotic Index, NAMC O/E Macroinvertebrate Score	0 – 1.22	Average Score	1.22	0.15 <sup>2</sup>
Area Burned, 2000-2014	0 - 100	Percent Cover	0	20 <sup>2</sup>

1. Used full range or full range with outliers ignored; 2. Expert opinion/ Heuristics, guided by statistical distribution of the data; 3. Taken from the literature