# Metadata for remote sensing potential maps shapefile “huc12\_allMaps”

## Description

These files have been created by joining the HUC-12 layer in the National Hydrography Dataset’s watersheds geodatabase database with the analyses layers from the following paper:

Sridharan, V.K., Kumar, S.K., and Madhur Kumar, S. In rev. Can remote sensing fill the United States’ monitoring gap for watershed management?

There are two options for downloading the data layers in the project:

1. A shapefile containing all the layers used in the analysis and the results of the remote sensing potential model already attributed to each HUC-12 subwatershed.
2. A CSV containing all the layers used in the analysis and the results of the remote sensing potential model which must be joined with the HUC-12 subwatershed shapefile layer.

## Shapefile has been downloaded

If the shapefile **huc12\_Final.shp** from this project is directly available to you, it will contain all the attributes listed in the table below. The bolded attributes, when visualized, can be used for decision support.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S.No.** | **Name** | **Description** | **Source** | **Comments** | **Units** |
| 1 | objected |  | NDHPlus |  |  |
| 2 | tnmid |  | NDHPlus |  |  |
| 3 | metasource |  | NDHPlus |  |  |
| 4 | sourcedata |  | NDHPlus |  |  |
| 5 | sourceorig |  | NDHPlus |  |  |
| 6 | sourcefeat |  | NDHPlus |  |  |
| 7 | loaddate |  | NDHPlus |  |  |
| 8 | reference |  | NDHPlus |  |  |
| 9 | areaacres |  | NDHPlus |  |  |
| 10 | areasqm |  | NDHPlus |  |  |
| 11 | states |  | NDHPlus |  |  |
| 12 | huc12 | Primary key | NDHPlus |  |  |
| 13 | name |  | NDHPlus |  |  |
| 14 | hutype |  | NDHPlus |  |  |
| 15 | humod |  | NDHPlus |  |  |
| 16 | tohuc |  | NDHPlus |  |  |
| 17 | noncontrib |  | NDHPlus |  |  |
| 18 | noncontr\_1 |  | NDHPlus |  |  |
| 19 | globalid |  | NDHPlus |  |  |
| 20 | shape\_leng |  | NDHPlus |  |  |
| 21 | shape\_Area |  | NDHPlus |  |  |
| 22 | Pop | Population | EnviroAtlas |  |  |
| 23 | PopL | Population levels | Synthesis | 0 to 6 in decades from <10 to >1,000,000 |  |
| 24 | AWD\_MGAL | Agricultural water demand | EnviroAtlas |  | MGD |
| 25 | DWD\_MGAL | Domestic water demand | EnviroAtlas |  | MGD |
| 26 | IWD\_MGAL | Industrial water demand | EnviroAtlas |  | MGD |
| 27 | TWW\_MGAL | Thermoelectric water demand | EnviroAtlas |  | MGD |
| 28 | Water\_MGAL | Total water demand | Synthesis |  | MGD |
| 29 | WaterL | Water demand levels | Synthesis | 0 to 6 in decades from <10 to >1,000,000 people served with per capital consumption of 1,200 MGD |  |
| 30 | TotProtFra | Total fraction of land protected | Synthesis | Total % of land cover protected by IUCN and US government |  |
| 31 | Outdoors\_D | Outdoor activities demand | Synthesis | Total days in year for big game hunting, bird hunting, migratory bird watching and fishing | Days/yr |
| 32 | NativeVulI | Aquatic species vulnerability index | EnviroAtlas |  |  |
| 33 | wESI | Weights for each index | Synthesis | See Section 2.2 of paper |  |
| 34 | ESI | Ecosystem vulnerability index | Synthesis | See Section 2.2 of paper |  |
| 35 | ESIL | Ecosystem vulnerability levels | Synthesis | 0 to 4 for no ESI, 25th, 50th, 75th and 100th quantile levels |  |
| 36 | Wastewater | Wastewater discharge | EnviroAtlas |  | MGD |
| 37 | Permit\_LbP | Permitted pollution load | EnviroAtlas |  | lb/yr |
| 38 | AgTileSSF\_ | Tile agricultural subsurface runoff | EnviroAtlas |  | mm |
| 39 | AgNonTileS | Non-tile agricultural subsurface runoff | EnviroAtlas |  | mm |
| 40 | AgSF\_MM | Agricultural surface runoff | EnviroAtlas |  | mm |
| 41 | AgRunoff\_M | Total agricultural runoff | Synthesis | Sum of rows 37, 38 and 39 | mm |
| 42 | Area\_sqKM | Total water surface area | Synthesis | Sum of areal watersurface and area of floodplains designated as streams | km2 |
| 43 | PIL | Pollution index | Synthesis | Levels 0 to 1, but see Section 2.2 of paper |  |
| 44 | imp | Impairment status | Synthesis | 0 or 1 depending on whether watershed has any assessments reported in ATTAINS |  |
| 45 | huc\_12T | HUC index | Synthesis | Ignore this |  |
| 46 | maxTravelT | Maximum shortest travel time | Malarial Atlas Project | See Section 2.1 of paper | minutes |
| 47 | cloudCover | Mean cloudy days per year | EarthEnv | See Section 2.1 of paper | days per year |
| 48 | **rsPotOACC** | Remote sensing potential for accessibility and acquisition cost-payoff levels | Synthesis | Name syntax: rsPot[L]A[L]C  [L]: O – optimistic in Table 2  N – Normal in Table 2  C – Conservative in Table 2  A – access, C – cloud  Levels: 0 (unsuitable), 1-3 (low), 4-6 (good), and 9 (excellent) |  |
| 49 | **rsPotOANC** | Remote sensing potential for accessibility and acquisition cost-payoff levels | Synthesis |  |
| 50 | **rsPotOAOC** | Remote sensing potential for accessibility and acquisition cost-payoff levels | Synthesis |  |
| 51 | **rsPotNACC** | Remote sensing potential for accessibility and acquisition cost-payoff levels | Synthesis |  |
| 52 | **rsPotNANC** | Remote sensing potential for accessibility and acquisition cost-payoff levels | Synthesis |  |
| 53 | **rsPotNAOC** | Remote sensing potential for accessibility and acquisition cost-payoff levels | Synthesis |  |
| 54 | **rsPotCACC** | Remote sensing potential for accessibility and acquisition cost-payoff levels | Synthesis |  |
| 55 | **rsPotCANC** | Remote sensing potential for accessibility and acquisition cost-payoff levels | Synthesis |  |
| 56 | **rsPotCAOC** | Remote sensing potential for accessibility and acquisition cost-payoff levels | Synthesis |  |
| 57 | popPot | Intersection of potential > 4 and PopL >3 | Synthesis | For normal cost-payoff scenario |  |
| 58 | watPot | Intersection of potential > 4 and WaterL >3 | Synthesis | For normal cost-payoff scenario |  |
| 59 | esiPot | Intersection of potential > 4 and ESIL >1 | Synthesis | For normal cost-payoff scenario |  |
| 60 | pollPot | Intersection of potential > 4 and PIL >1 | Synthesis | For normal cost-payoff scenario |  |
| 61 | accessPot | Intersection of potential > 4 and access >2 | Synthesis | For normal cost-payoff scenario |  |
| 62 | coveragePot | Intersection of potential > 4 and imp=0 | Synthesis | For normal cost-payoff scenario |  |
| 63 | **allPot** | Intersection of potential > 4 and all layer conditions | Synthesis | For normal cost-payoff scenario |  |

## CSV has been downloaded

If you downloaded the **huc12\_Final.csv** and its sidecar **huc12\_Final.csvt** from the GitHub repo, then the shapefile would be unavailable. The following attributes from the table above will be available in the CSV: attributes numbered 12 and 22 to 63.

Please first download the Watershed Boundary Dataset (WBD) from here:

<https://www.usgs.gov/national-hydrography/access-national-hydrography-products>

Click on the “Download the WBD by the Entire Nation” link:

<https://prd-tnm.s3.amazonaws.com/index.html?prefix=StagedProducts/Hydrography/WBD/National/GDB/>

and download the WBD\_National\_GDB.zip file which is 2.3 GB. Then, in ArcGIS or QGIS, open the geodatabase and load only the WBDHU12 layer. Then, perform a table join with the CSV, with the **huc12** field as the primary key. All the attributes pertain to each HUC-12 unit.