

Metadata Document to Accompany Hughes et al. "Patterns in and Predictors of Stream and River  
 Macroinvertebrate Genera and Fish Species Richness across the Conterminous USA"

Dataset Title(s)	<p>Alphabeta_ecoboth.txt: Regional taxa richness estimates for stream fish and benthic macroinvertebrates for Omernik level III ecoregions</p> <p>Alphabeta_hucboth.txt: Regional taxa richness estimates for stream fish and benthic macroinvertebrates for 4-digit Hydrologic Unit Codes</p>
Dataset Description(s)	<p>Alphabeta_ecoboth.txt: Tab-delimited text file with 95 records and 54 columns. Includes environmental predictor variables (climate and landcover).</p> <p>Alphabeta_hucboth.txt: Tab-delimited text file with 220 records and 16 columns</p>
Keywords describing the dataset(s)	Biodiversity, residual richness, regional richness, environmental predictors
Definitions of Acronyms and Abbreviations	<p>HUC: Hydrologic Unit Code          NARS: National Aquatic Resource Surveys          NLCD: National Land Cover Database          PC: percent areal cover          NARS aggregated ecoregions:              CPL: Coastal Plain              NAP: Northern Appalachians              NPL: Northern Plains              SAP: Southern Appalachians              SPL: Southern Plains              TPL: Temperate Plains              UMW: Upper Midwest              WMT: Western Mountains              XER: Xeric West</p>

Definitions of Data Variables and Column Headings, Units of Measurements, and Meanings of Variables (data dictionary) for dataset alphabeta\_ecoboth.txt

<b>VARIABLE (COLUMN) NAME</b>	<b>DESCRIPTION (including units of measurement and meanings of variables)</b>
ECONAME	Omernik Level III ecoregion name, or aggregated ecoregion used by the National Aquatic Resource Surveys (NARS)
ECOREGL3	Omernik Level III ecoregion code
GRAIN	Scale at which richness was calculated; COARSE= aggregated Omernik ecoregions used by NARS; FINE=Omernik Level III ecoregion
BENT_RICH	Composite benthic macroinvertebrate genus richness within an ecoregion
BENT_NSITE	Number of sites with benthic macroinvertebrate data in an ecoregion
FISH_RICH	Composite fish species richness within an ecoregion
FISH_NSITE	Number of sites with fish species data in an ecoregion
AREA_KM2	Ecoregion area (in square kilometers)
MEAN_TEMP_C	Mean monthly air temperature (degrees C) within ecoregion
MEAN_PRECIP_MM	Mean annual precipitation (in millimeters) within ecoregion
ICEFIELD_PC	Percent of ecoregion area within the extent of the last glacial maximum.
MEAN_ELEV_M	Mean elevation (in meters) within an ecoregion
NLCD11_PC	% of ecoregion area classified as open water land cover (National Land Cover Database class 11)
NLCD12_PC	% of ecoregion area classified as ice/snow land cover (National Land Cover Database class 12)
NLCD21_PC	% of ecoregion area classified as developed, open space land use (National Land Cover Database class 21)
NLCD22_PC	% of ecoregion area classified as developed, low-intensity land use (National Land Cover Database class 22)
NLCD23_PC	% of ecoregion area classified as developed, medium-intensity land use (National Land Cover Database class 23)
NLCD24_PC	% of ecoregion area classified as developed, high-intensity land use (National Land Cover Database class 24)
NLCD31_PC	% of ecoregion area classified as barren land cover (National Land Cover Database class 31)
NLCD41_PC	% of ecoregion area classified as deciduous forest land cover (National Land Cover Database class 41)
NLCD42_PC	% of ecoregion area classified as evergreen forest land cover (National Land Cover Database class 42)
NLCD43_PC	% of ecoregion area classified as mixed deciduous/evergreen forest land cover (National Land Cover Database class 43)
NLCD52_PC	% of ecoregion area classified as shrub/scrub land cover (National Land Cover Database class 52)
NLCD71_PC	% of ecoregion area classified as grassland/herbaceous land cover (National Land Cover Database class 71)
NLCD81_PC	% of ecoregion area classified as hay land use (National Land Cover Database class 81)

<b>VARIABLE (COLUMN) NAME</b>	<b>DESCRIPTION (including units of measurement and meanings of variables)</b>
NLCD82_PC	% of ecoregion area classified as crop land use (National Land Cover Database class 82)
NLCD90_PC	% of ecoregion area classified as woody wetland land cover (National Land Cover Database class 90)
NLCD95_PC	% of ecoregion area classified as herbaceous wetland land cover (National Land Cover Database class 95)
POP_DENS_KM2	Population density (number of individuals per square kilometer) within an ecoregion
MINE_DENS_KM2	Mine density (number of mines per square kilometer) within an ecoregion
HWY_DENS	Road density (kilometers per square kilometer) within an ecoregion
US_L3CODE	Omermik Level III ecoregion code (should be used as a character variable)
AGR_PCT	Percent of ecoregion area represented by agricultural-related landcover (crop and hay). Calculated as NLCD82_PC+NLCD81_PC.
DEVL_PCT	Percent of ecoregion area represented by development-related landcover (open space, low-intensity, medium intensity, and high-intensity). Calculated as NLCD21_PC+NLCD22_PC + NLCD23_PC + NLCD24_PC.
WETL_PCT	Percent of ecoregion area represented by wetland-related landcover (woody and herbaceous). Calculated as NLCD90_PC + NLCD95_PC.
FOR_PCT	Percent of ecoregion area represented by forest-related landcover (deciduous, evergreen, and mixed). Calculated as NLCD41_PC + NLCD42_PC + NLCD43_PC).
RNG_PCT	Percent of ecoregion area represented by range-related landcover (shrub/scrub and grassland/herbaceous). Calculated as NLCD52_PC + NLCD71_PC.
OPEN_PCT	Percent of ecoregion area represented by open ground-related landcover
BARE_PCT	Percent of ecoregion area represented by barren ground-related landcover
CHK	QA check on sum of landcover percentages (should sum to 100)
NSAMPAlphabent	Number of sites with benthic macroinvertebrate data in an ecoregion
BENTRICH_ALPHAMEAN	Mean site-level genus richness of benthic macroinvertebrates
BENTRICH_ALPHASTD	Standard deviation of site-level richness of benthic macroinvertebrates
NSAMPAlphafish	Number of sites with fish data in an ecoregion
FISHRICH_ALPHAMEAN	Mean site-level species richness of fish
FISHRICH_ALPHASTD	Standard deviation of mean site-level fish species richness
ECOWSA9_2015	Aggregated ecoregions used for reporting in the National Aquatic Resource Surveys. CPL= Coastal Plain; NAP=Northern Appalachians; NPL=Northern Plains; SAP=Southern Appalachians; SPL=Southern Plains; TPL=Temperate Plains; UMW=Upper Midwest; WMT=Western Mountains; XER= Xeric West
ECOWSA9	NARS aggregated ecoregion to which an Omermik Level III ecoregion belongs
FISH_RESIDRICH	Residual species richness (Fish), calculated as the deviation of observed richness from predicted richness given the number of sample sites in the composite

<b>VARIABLE (COLUMN) NAME</b>	<b>DESCRIPTION (including units of measurement and meanings of variables)</b>
BENT_RESIDRICH	Residual genus richness (benthic macroinvertebrates), calculated as the deviation of observed richness from predicted richness given the number of sample sites in the composite
FISH_BG1	National (gamma) fish species richness/Mean alpha species richness. Calculated as $813/FISHRICH\_ALPHAMEAN$
FISH_BG2	Ecoregion (gamma) fish species richness/Mean alpha (site-level) species richness. Calculated as $FISH\_RICH/FISHRICH\_ALPHAMEAN$ .
BENT_BG1	National (gamma) benthic macroinvertebrate genus richness/Mean alpha genus richness. Calculated as $813/BENTRICH\_ALPHAMEAN$
BENT_BG2	Ecoregion (gamma) benthic macroinvertebrate genus richness/Mean alpha (site-level) genus richness. Calculated as $BENT\_RICH/BENTRICH\_ALPHAMEAN$ .

Definitions of Data Variables and Column Headings, Units of Measurements, and Meanings of Variables (data dictionary) for dataset alphabeta\_hucboth.txt

VARIABLE (COLUMN) NAME	DESCRIPTION (including units of measurement and meanings of variables)
GROUP	Hydrologic Unit Code (HUC) group (HUC2NAME or HUC4NAME)
HUC2NAME	2-digit (Region) Hydrologic Unit Code (HUC) name
FISH_RICH	Composite fish species richness within a Hydrologic Unit
FISH_NSITE	Number of sites with fish species data in a Hydrologic Unit
TYPE	Type of classification used to calculate richness (HUC=Hydrologic Unit Code)
GRAIN	Scale at which richness was calculated; LARGE= 2-digit Hydrologic Unit Code (HUC); SMALL=4-digit Hydrologic Unit Code
FISH_RESIDRICH	Residual species richness (Fish), calculated as the deviation of observed richness from predicted richness given the number of sample sites in the composite
BENT_RICH	Composite benthic macroinvertebrate genus richness within a Hydrologic Unit
BENT_NSITE	Number of sites with benthic macroinvertebrate data in a Hydrologic Unit
BENT_RESIDRICH	Residual genus richness (benthic macroinvertebrates), calculated as the deviation of observed richness from predicted richness given the number of sample sites in the composite
HUC2	2-digit Hydrologic Unit code (region)
HUC4NAME	4-digit (Subregion) Hydrologic Unit Code name
HUC4	4-digit Hydrologic Unit Code (subregion)