Wetland Interception Metadata

Rasters\_Y.zip:

* Contains spatial data for existing wetlands in the National Land Cover Database (NLDC; land cover codes 90 and 95; https://www.mrlc.gov/) and their basins for year Y from study years (1987, 1992, 1997, 2002, 2007, 2012, 2017).
* Wetland\_Rasters:
  + WetlandsRgnGrp\_X.mrf: Rasters containing extent of hydrologically independent wetlands in the medium resolution NHDPlus version 2.1 (NHDPlus; https://www.epa.gov/waterdata/get-nhdplus-national-hydrography-dataset-plus-data) regional processing unit (RPU) “X” stored in meta-raster format (.mrf). Wetlands were extracted from NLCD data (code 90 and 95 combined) within a study year. Wetlands that crossed the hydrologic boundaries of NHDPlus catchments were further split at the divides to represent hydrologically distinct parcels. These hydrologically distinct wetland parcels were given unique IDs within each study year (Y). Raster cell values provide individual wetland IDs (distinct within each study year). Wetland IDs are independent among study years (i.e., the same parcel can have a different IDs across years). Raster cells that do not contain wetland data were given NoData values.
* Basin\_Rasters:
  + BasinCnty\_X.mrf: Rasters containing extent of individual wetland basins intersected with US Census counties in NHD regional processing unit (RPU) “X” stored in meta-raster format (.mrf). Raster cell values provide individual IDs that represent individual areas of basins within separate counties within a RPU (X) for study year (Y). These values can be cross-referenced with the coinciding BasinLC\_X\_Y (where “X” is the RPU and “Y” is the year of interest) tables (.csv) in the Basin\_Tables folder to associate values with wetland IDs (WetID) or counties (FIPS). Raster cells that do not contain wetland data were given NoData values.

WetlandTables\_Y.zip:

* Contains tabular data for NLCD wetland basin land cover, connections, and nutrient allocation for year Y from study years (1987, 1992, 1997, 2002, 2007, 2012, 2017).
* Basin\_Tables:
  + BasinLC\_X\_Y.csv: Tables containing the total area of pixels of each NLCD landcover type within individual wetland basins intersected with US counties in NHD RPU “X” during study year “Y”. Land cover codes can be found here: https://www.mrlc.gov/data/legends/national-land-cover-database-class-legend-and-description.
    - Basin\_Values: IDs of individual wetland basins that fall within different counties within a RPU each year. Values coincide with raster values in BasinCnty\_X.mrf
    - VALUE\_Z: Area (m2) of NLCD land cover code “Z” within each wetland basin (WetID) separated by county (FIPS).
    - LCTotal: total area (m2) of NLCD land cover (sum of VALUE\_Z columns) within each wetland basin (WetID) per county (FIPS).
    - Basin\_Total: Total basin area (m2) of each delineated wetland basin (WetID) within each county (FIPS). Wetland basins were delineated using the hydrologic flow direction rasters of the NHDPlus which can sometimes have a larger extent than NLCD data, (e.g., NLCD cuts off at international borders, but NHDPlus does not).
    - WetID: Wetland ID associated with each basin. These values coincide with raster values from WetlandsRgnGrp\_X.mrf. WetID can be used to group data across Basin\_Value to sum land cover metrics per distinct wetland, independent of county (FIPS) overlay.
    - FIPS: US county ID from US Census data
    - RastDiff: Difference in area (m2) of wetland basin delineated using NHD extent (Basin\_Tot) and summed wetland land cover using NLCD extent (LCTotal). The extent of NHDPlus data extends past US borders and NLCD extent. This column provides an area of each wetland basin where NLCD land cover data is not available. Values should be zero when the full extent of a NHDPlus RPU falls within the extent of NLCD data.
    - PercDiff: Percent difference (%) area of wetland basin delineated using NHD extent (Basin\_Tot) and summed wetland land cover using NLCD extent (LCTotal). Calculated as (RastDiff/Basin\_Total)\*100
* Flow\_Tables:
  + WetlandFrmTo\_X\_Y.csv: Tables containing wetland basin connectivity based on surface hydrology in RPU “X” during study year “Y”. Tables contain wetland IDs that coincide with WetlandsRgnGrp\_X.mrf values. “From” and “To” columns provide upstream (From) wetland IDs connected to downstream (To) IDs. Wetland IDs present in the “To” column but not in the “From” column represent terminal wetlands within wetland chains linked by surface hydrology.
* Nutrient\_Inputs:
  + BsnLoads\_X\_Y.csv: Tables containing nitrogen allocation calculations for different nitrogen inputs to individual wetland basins in RPU “X” during study year “Y”. Nitrogen allocation was performed by applying county-scale per area nitrogen input rates from the US EPA’s National Nutrient Inventory (https://www.epa.gov/water-research/national-nutrient-inventory-portfolio) to area of associated land cover within each wetland basin. Basin land cover is provided in the “Basin\_Tables” folder. All columns containing nitrogen data (N\_source) were multiplied by 104 and truncated to conserve data precision while minimizing file sizes. Values in these columns should be divided by 104 to provide kg of nitrogen allocated to each wetland basin (WetID) before use.
    - WetID: Wetland ID associated with each basin. These values coincide with raster values from WetlandsRgnGrp\_X.mrf.
    - N\_farmfert: landscape nitrogen (kg \* 104) derived from farm fertilizer allocated to agricultural land cover (row crop and pasture/hay, NLCD codes 81 and 82) within a wetland basin.
    - N\_manure: landscape nitrogen (kg \* 104) derived from livestock manure allocated to agricultural land cover (row crop and pasture/hay, NLCD codes 81 and 82) within a wetland basin.
    - N\_croprem: landscape nitrogen (kg \* 104) removed by crops allocated to agricultural land cover (row crop and pasture/hay, NLCD codes 81 and 82) within a wetland basin.
    - N\_cropfix: landscape nitrogen (kg \* 104) derived from nitrogen fixation by crops allocated to agricultural land cover (row crop and pasture/hay, NLCD codes 81 and 82) within a wetland basin.
    - N\_nonfarmfert: landscape nitrogen (kg \* 104) derived from non-farm fertilizer allocated to developed land cover (NLCD codes 21, 22, 23, and 24) within a wetland basin.
    - N\_humanwst: landscape nitrogen (kg \* 104) derived from human waste allocated to developed land cover (NLCD codes 21, 22, 23, and 24) within a wetland basin.
    - N\_dep: landscape nitrogen (kg \* 104) derived from atmospheric deposition. Per area atmospheric nitrogen deposition rates were applied to the full area of wetland basins

Accumulated\_WetlandMetrics.parquet:

* Table contains estimated nitrogen (N) inputs of various sources to wetland basins and wetland basin coverage, number of wetlands, number of wetland chains, and measurements of wetland nestedness within each NHDPlus local catchment (i.e., the area of the landscape draining to a stream segment, excluding upstream contributions) and full accumulative watershed. In the table, local catchment and watershed values are indicated as aoi = “Cat” or aoi = “Ws”, respectively. The year (Y) of estimated N inputs are also included in column names and are available for years 1987, 1992, 1997, 2002, 2007, 2012, 2017. Parquet files can be accessed similar to a table from a .csv file in R statistical software using the *read\_parquet()* function in the *arrow* package or in Python using the *read\_parquet()* function from the *pandas* library.
  + COMID: ID numbers for individual stream catchments from the NHDPlus dataset.
  + CatAreaSqKm: Stream Catchment area (km2) for NHDPlus COMIDs.
  + WsAreaSqKm: Stream Watershed area (km2) for NHDPlus COMIDs.
  + CatPctFull: Percent (%) of catchment that overlaps with landscape layer. Accounts for areas of NoData pixels and international borders.
  + WsPctFull: Percent (%) of watershed that overlaps with landscape layer. Accounts for areas of NoData pixels and international borders.
  + wetNanthro(Y)(aoi): Total anthropogenic landscape nitrogen inputs (kg) within wetland basins accumulated for each COMID’s catchment (aoi = Cat) or watershed (aoi = Ws) for study year Y. Anthropogenic nitrogen input was calculated as the sum or nitrogen inputs from agricultural surplus (wetNagsurp(Y)(aoi)), developed land use (wetNdev(Y)(aoi)), and atmospheric deposition (wetNatdep(Y)(aoi)).
  + wetNagsurp(Y)(aoi): Landscape nitrogen inputs (kg) derived from agricultural surplus for each COMID’s catchment (aoi = Cat) or watershed (aoi = Ws) during study year Y. Agricultural surplus was calculated as the sum of farm fertilizer, livestock manure, and crop fixation minus nitrogen removed by crops. See “Nutrient\_Inputs” files in “WetlandTables\_Y.zip” for allocation rates for individual wetland basins.
  + wetNdev(Y)(aoi): Total landscape nitrogen inputs (kg) derived from developed land use for each COMID’s catchment (aoi = Cat) or watershed (aoi = Ws) during study year Y calculated as the sum of non-farm fertilizer and human waste inputs. See “Nutrient\_Inputs” files in “WetlandTables\_Y.zip” for allocation rates for individual wetland basins.
  + wetNatdep(Y)(aoi): Landscape nitrogen inputs (kg) derived from atmospheric deposition for each COMID’s catchment (aoi = Cat) or watershed (aoi = Ws) during study year Y. See “Nutrient\_Inputs” files in “WetlandTables\_Y.zip” for allocation rates for individual wetland basins.
  + wetbsnsqkm(Y)(aoi): Total area (km2) of a COMID’s catchment (aoi = Cat) or watershed (aoi = Ws) included within wetland basins during a study year (Y).
  + wetbsnperc(Y)(aoi): Total percent (%) of a COMID’s catchment (aoi = Cat) or watershed (aoi = Ws) included within wetland basins during a study year (Y).
  + wetcount(Y)(aoi): Total number of wetlands in a COMID’s catchment (aoi = Cat) or watershed (aoi = Ws) during a study year (Y).
  + wetterm(Y)(aoi): Total number of terminal wetlands that represent number of wetland chains in a COMID’s catchment (aoi = Cat) or watershed (aoi = Ws) during a study year (Y), calculated using the number of terminal wetlands identified in from-to tables (see “Flow\_Tables” description above)
  + wetnest(Y)(aoi): Wetland nestedness calculated as the number of wetlands (wetcount(Y)(aoi)) divided by the number of terminal wetlands (wetterm(Y)(aoi)) in a COMID’s catchment (aoi = Cat) or watershed (aoi = Ws) during a study year (Y). This estimate provides an estimate of average wetland chain length within an aoi.