

Characteristics of the Mississippi Sound Estuary and Watershed

Mississippi Sound Estuary Program

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Preface

This website is a collection of documents characterizing the Mississippi Sound Watershed, primarily through use of geospatial data. The outputs are compiled as a ‘quarto book’. Each chapter is produced by a separate .qmd file.

The purpose of the book format is to make the outputs readily findable and accessible. It may also serve as an outline for future undertakings like the State of the Sound report.

Part I

Geographic Setting

Some info here about different ways of describing where we are and what comprises the watershed: USGS HUCs, DEQ's division into different basins, and EPA EcoRegions.

Possibly also the definitions from the CCMP of MS Sound, MS Sound Estuary, and MS Sound Watershed.

1 HUCs

Nice explanation of HUCs [this USGS page](#).

The HUCs that make up the Mississippi Sound Watershed are 0317 (Pascagoula) and 0318 (Pearl).

Show some mappy breakdowns.

2 MDEQ Basins

There are several waterways that don't actually end up in either the Pearl or Pascagoula Rivers. So the Mississippi Department of Environmental Quality uses a slightly different division.

NEED TO CONFIRM, but I think: HUC12s are the same between MDEQ's classification and the USGS HUCs. They're just grouped differently, and the streams that empty into bays or straight into the Sound are the 'Coastal Streams Basin'. There is also a 'Coastal Offshore' grouping, that is comprised of the Sound itself, the islands, and the 3-mile zone beyond the islands.

3 EPA Ecoregions

For some geological classification that isn't based on watershed boundaries, we turn to the [EPA's Ecoregions](#).

Intent here is to list which ecoregions are in our watershed, and which are in each basin (using MDEQ's divisions). And maybe how much are of each basin belongs to each ecoregion. Plus show a map.

Part II

Climatology

Pieces of this part will be things like precipitation, temperature, etc.

4 Precipitation

Make the precip maps here.

5 Temperature

Some descriptions and maps of temperature normals

Part III

Hydrology

Freshwater inflows from the different sources, salinity characteristics, etc.

6 Streams and Waterbodies

6.1 Amount of water

e.g. how many miles of streams, how many acres of lakes/ponds/etc. in the watershed

TO-DO: Calculate this by basin (MDEQ definitions, not HUCs)

6.1.1 Stream Lengths

Table 6.1: Length (mi) of stream types in the MSEP watershed

| Type | total_miles |
|----------------------------|-------------|
| Artificial Path | 1,496.8 |
| Canal/Ditch | 145.3 |
| Coastline | 308.7 |
| Connector | 26.6 |
| Stream/River | 5.2 |
| Stream/River: Intermittent | 20,350.3 |
| Stream/River: Perennial | 11,730.7 |

6.1.2 Waterbody Areas

Table 6.2: Total area (acres) of water body types in the MSEP watershed

| Type | total_acres |
|---|-------------|
| Lake/Pond: Intermittent | 70.6 |
| Lake/Pond: Perennial | 67,602.0 |
| Lake/Pond: Perennial; Average Water Elevation | 27,726.5 |
| Lake/Pond: Perennial; Normal Pool | 9.5 |
| Reservoir | 48.2 |
| Reservoir: Aquaculture | 471.6 |
| Reservoir; Treatment | 954.8 |

Table 6.2: Total area (acres) of water body types in the MSEP watershed

| Type | total_acres |
|-------------|-------------|
| Swamp/Marsh | 251,495.2 |

6.2 Designated Uses

The Mississippi Department of Environmental Quality (MDEQ) is responsible for classifying surface waters in Mississippi into ‘designating uses’ (e.g. fish and wildlife, recreation, shellfish harvesting, public water supply) and creating water quality standards to ensure designated uses can be met. More detail on designated uses and water quality standards can be found on [MDEQ’s website](#).

A 305(b) report (the most recent as of this writing is from 2024; [pdf available here](#)) is generated every other year, and quantifies how many and which water bodies are / are not meeting the criteria for their designated use.

Here, we are only summarizing designated uses within the Mississippi Sound Watershed - not assessment of whether criteria are met. See the 305(b) report linked above for more detailed information.

The tables below do not include the general ‘Fish and Wildlife’ designation; that designation applies to most waters of the state.

Table 6.3: Miles of streams with each designated use in the MS Sound Watershed

| Code | Description | Miles |
|---------|-----------------------------------|---------|
| REC | Recreation | 1,011.6 |
| PWS | Public Water Supply | 26.3 |
| SHF-REC | Shellfish Harvesting & Recreation | 25.3 |
| FW1 | Fish and Wildlife | 10.4 |
| EPH | Ephemeral | 1.8 |

Table 6.4: Area of non-linear waterbodies with each designated use in the MS Sound Watershed

| Code | Description | Square Miles | Acres |
|---------|-----------------------------------|--------------|-----------|
| REC | Recreation | 742.2 | 475,019.3 |
| PWS | Public Water Supply | 34.8 | 22,259.2 |
| SHF-REC | Shellfish Harvesting & Recreation | 22.0 | 14,100.5 |
| PWS-REC | Public Water Supply & Recreation | 0.2 | 119.8 |

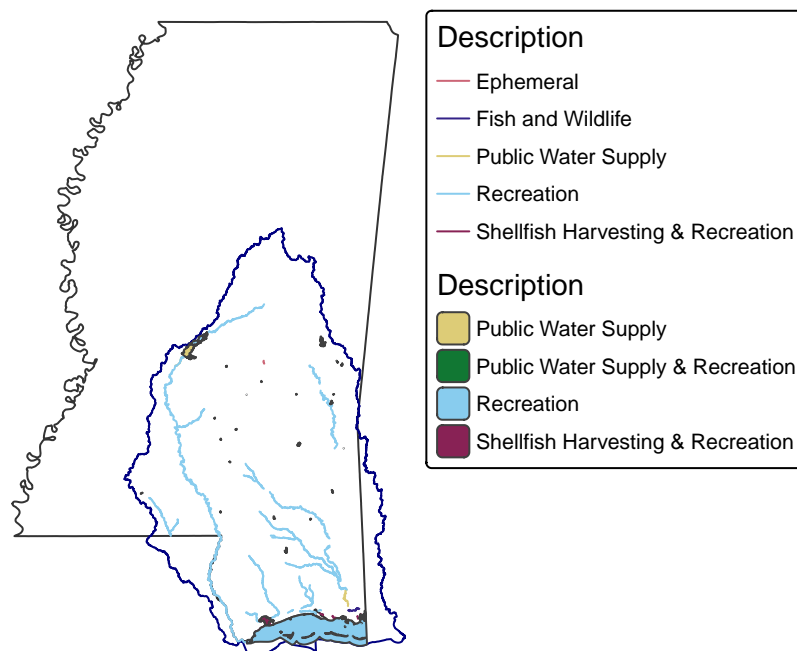


Figure 6.1: Designated uses of streams and waterbodies of the Mississippi Sound Watershed (navy outline on map), within the state of MS, as defined by MDEQ in the 2015 Water Quality Standards dataset. Data provided by MDEQ.

6.3 Impairments

303d, TMDLs - How many, where are they, what are the TMDLs for. What problems are we dealing with in the watershed.

6.4 Data Sources

The .qmd file that generated this section was: `streams_waterbodies.qmd`.

6.4.0.1 Stream Lengths and Waterbody Areas

Stream Lengths and Waterbody Areas were calculated from the [EPA's NHDPlus](#) dataset. Files for the [South Atlantic \(03f\)](#) and [Lower Mississippi River \(03g\)](#) regions were downloaded on 12 June 2025. The original downloaded files are available in the [EPA NHDPlus](#) folder of the [mseCharacterization data files](#) directory.

Those files were read in, combined, and clipped to only the Mississippi Sound Watershed boundaries (using the `outline_full` object from the `{msepBoundaries}` package) using the script `EPANHD_subsetting.R` ([on github](#)) in the `R_preprocessing` folder. The resulting files were saved as geopackages `EPA_NHDplus_flowline_MSEP.gpkg` and `EPA_NHDplus_waterbody_MSEP.gpkg` in the `data/processed` folder. These files are available in the `processed` folder of the `msepCharacterization data files` directory.

6.4.0.2 Designated Uses

Shapefiles of designated uses, already limited to the portion of the Mississippi Sound Watershed that lies within the state of MS, were provided by the Mississippi Department of Environmental Quality (MDEQ) in April 2025. These files provide the designated uses for each waterbody from the 2015 Water Quality Standards dataset. The Mississippi Sound Watershed is made up of MDEQ's Pearl River, Pascagoula River, and Coastal Streams basins. Per MDEQ, "all waters in those 3 basins not specifically listed in the data provided are classified as Fish and Wildlife." See [their website](#) for more information.

The zipped shapefiles are available in **to fill in**.

6.4.0.3 Impairments

7 Freshwater Inflows

Pearl River, Pascagoula River, bays. Do some summarizing based on USGS gage data?

8 Salinity

Summarize the info from the Gulf Data Atlas (e.g. the maps that went into the CCMP). Would be great to summarize the USGS salinity data and DMR's sampling data as well - some seasonal and annual details would be great.

Part IV

People and Land Use

Here's where population calculations and land use/land cover summaries can be generated.

9 Population

Code here that generated population info from Census data

10 Land Use / Land Cover

Summarize LULC info by MDEQ basin here

11 Summary

In summary, this book has no content whatsoever.

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