

Ecology

Water Resource Delineation

Objective
Water Resources
Waters of the US Field Procedures
State Waters Field Procedures

OBJECTIVE

By following GDOT's processes for delineating water resources, the Ecologist will accomplish the following:

- > Delineate US Army Corps of Engineers (USACE)-regulated Waters of the US (WOTUS) on transportation projects; and
- > Delineate Georgia Department of Natural Resources (GADNR) Environmental Protection Division (EPD)-regulated buffered state waters on transportation projects.

WATER RESOURCES

Waters of the US

[40 Code of Federal Regulation 230.3](#) defines WOTUS as including, but not limited to, the following:

- > Traditional navigable waters (as defined in the Rivers and Harbors Act of 1899);
- > Interstate waters, including interstate wetlands;
- > Other waters, including intrastate, non-navigable waters with interstate/foreign commerce connections;
- > Impoundments of water otherwise defined as WOTUS;
- > Tributaries of any of the above;
- > Territorial seas; and
- > Wetlands adjacent to these waters.

Two federal statutes mandate USACE jurisdiction over navigable waterways and adjacent wetlands. These are [Section 10 of the Rivers and Harbors Act of 1899 \(33 USC § 403\)](#) and [Section 404 of the Clean Water Act \(CWA\) \(33 USC § 1344\)](#). Section 10 of the Rivers and Harbors Act of 1899 applies to all navigable WOTUS and Section 404 of the CWA applies to all waters, including wetlands that have significant nexus to traditional navigable waters.

State Waters

State Waters are defined by the [Georgia Erosion and Sedimentation Act of 1975 \[Official Code of Georgia \(OCGA\) § 12-7-1\]](#) and protected by the. There is an established 25-foot buffer along the banks of all state waters from which vegetation has been wrested by normal stream flow or wave action [OCGA § 12-7-6(b)(15)]. There is an established 50-foot buffer along the banks of all state waters classified as "trout streams" from which vegetation has been wrested by normal stream flow or wave action [OCGA § 12-7-6(b)(16)]. There is an established 25-foot buffer along coastal marshlands, as measured horizontally from the coastal marshland-upland interface [OCGA § 12-7-6(b)(17)]. In compliance with the National Pollutants Discharge Elimination System permit under [Section 402 of the CWA](#), any land disturbance within the designated 25-foot or 50-foot buffer of a state water will be described, and the need for a variance will be indicated.

WATERS OF THE US FIELD PROCEDURES

In addition to the applicable [Regional Supplements to the Corps of Engineers Wetland Delineation Manual](#) (Atlantic and Gulf Coastal Plain [AGCP] Region or Eastern Mountains and Piedmont [EMP] Region) available on the USACE Savannah District website and USACE [Regulatory Guidance Letter No. 05-05: Ordinary High Water Mark Identification](#), refer to the Jurisdictional WOTUS Guidance included in the [GDOT Waters Flowchart](#), available on the [GDOT Ecology Section SharePoint](#)¹, as needed during delineation of WOTUS. While in the field, the Ecologist must record all relevant and required data for each resource determined to be WOTUS per the [Ecology General Project Report Template and Guidance](#)².

Streams

For each stream delineated, as applicable, the Ecologist must complete the current USACE Savannah District Standard Operating Procedure (SOP) for Compensatory Mitigation [Qualitative Stream Assessment](#) form for the appropriate physiographic region (Piedmont/Ridge & Valley/Blue Ridge or Coastal Plain) in the field. The Hydrology and Chemistry sections of the form may be completed via desktop review using available information.

¹ See instructions for accessing SharePoint on [Office of Environmental Services Guidebooks website](#).

² All Ecology templates are available on the Ecology Section SharePoint.

With the exception of named rivers and creeks, the Ecologist must complete the [*North Carolina Division of Water Quality \(NCDWQ\) Stream Identification Form*](#) for each stream delineated. The stream segment to which the form applies must be noted and a GPS location must be recorded. Multiple forms are completed for a single stream if the Ecologist observes transitions in flow regime (i.e., perennial, intermittent, or ephemeral) within survey limits. Each flow regime segment of a single stream must be identified by a separate resource number beginning/ending at the transition point(s). The Ecologist must assess and sketch the stream reach on the form. Additional data is required on the form in accordance with the *NCDWQ Methodology for Identification of Intermittent and Perennial Streams and Their Origins*. It includes, but is not limited to, aquatic and larval terrestrial species observed within the stream reach and water quality observations (turbidity, odor, trash/debris, etc.).

The Ecologist must locate via GPS the ordinary high-water mark (OHWM) on both sides of each stream in the survey area, with recorded point/vertex frequency adjusted for accuracy, as needed. The delineator shall collect sufficient GPS locations to accurately depict stream sinuosity.

For stream channels with an average width of 8 feet or less, the OHWM on one side of each stream or stream centerline may be located via GPS and offset appropriately during GPS data processing to accurately delineate both banks and capture any significant variability in stream width throughout the surveyed reach. *The Ecologist must provide delineations of both banks of all streams to Design.*

The Ecologist must collect photographs of representative reaches of each stream in the survey area depicting OHWM and any drainage structures (bridges, culverts, concrete channels, stormwater outfalls, etc.) within each stream. Additionally, the Ecologist must collect photographs of culvert outfalls to document perched or non-perched condition. The beginning and end point of culverts and concrete channels conveying delineated streams must also be GPS located.

Wetlands

For each wetland delineated (see further guidance below regarding separation of wetlands by vegetative community), the Ecologist must complete the appropriate *USACE Wetland Determination Data Form* (Eastern Mountains and Piedmont or Atlantic and Gulf Coastal Plain Region) for the physiographic region in which the resource is located. Fillable, automated versions of these data forms are available on the GDOT Ecology Section SharePoint site. USACE wetland data forms are completed for both the wetland and adjacent uplands, while the specific locations where these data forms are completed are referred to as the wetland data point and upland data point, respectively. Typically, a separate, distinct upland data point is utilized in correspondence with each wetland data point. Wetland and upland data points must be located as close to the delineated wetland boundary as possible. However, in some cases, it may be appropriate to use a single upland data point in connection with multiple wetland data points, provided the upland data

point is located no further than 300 feet away from any of the associated wetland data points.

The Ecologist must collect GPS coordinates and at least one representative photo for each wetland and upland data point. The soil profile and any drainage structures present within the wetland must also be photographed. The Ecologist must collect sufficient GPS positions to accurately depict irregularities in the wetland boundary.

For each delineated freshwater wetland, the Ecologist must complete the current USACE Savannah District SOP for Compensatory Mitigation [*Freshwater Wetland Qualitative Assessment*](#) form for the appropriate wetland classification (Riverine, Lacustrine Fringe, Freshwater Tidal, or Non-Riverine in the field). The *Saltwater Tidal Wetland Qualitative Assessment* SOP worksheet must be completed for each delineated saltwater wetland. The Ecologist must assess brackish waters per the definitions for freshwater tidal and saltwater tidal wetlands in the current SOP and complete the appropriate form. Saltwater tidal wetlands are limited to six Georgia counties (Bryan, Camden, Chatham, Glynn, Liberty, and McIntosh) and are typically dominated by one or more salt tolerant vegetative species (as codified in [OCGA § 12-5-282](#)).

If a contiguous wetland area contains two or more distinct vegetative communities, such as forested wetlands abutting herbaceous wetlands in maintained right-of-way (ROW), then each vegetative community must be GPS located, photographed, and identified as a distinct wetland. Further, a separate data form and SOP assessment worksheet must be completed for each such distinct vegetative community of the larger, contiguous wetland system. This distinction is necessary because vegetative community affects the Wetland Qualitative Function Capacity Score (WQFC) and subsequent wetland credits owed for proposed impacts. For example, if a contiguous wetland was delineated and scored as a single forested wetland due the presence of a forested vegetative community within the Environmental Survey Boundary (ESB), but impacts would occur in a maintained ROW portion of the wetland, GDOT would be purchasing more credits than necessary at a higher WQFC Score.

Wetland Data Form Guidance

The following guidance corrects common issues/mistakes observed on *Wetland Determination Data Forms* submitted for GDOT projects. However, this is not an all-inclusive list of indicators that may be applicable to wetland resources on GDOT projects.

Wetland Hydrology

Indicator A2: High water table is a commonly observed Primary Hydrology Indicator in wetlands. Both the EMP and AGCP Regional Supplements require that the water table be observed **12 in. (30 cm) or less** below the surface for this indicator to be met. Adequate time must be allowed for the water table to stabilize in the soil pit for use of A2 per the Regional Supplements.

Indicator A3: Saturation is another commonly observed Primary Hydrology Indicator in wetlands. Both the EMP and the AGCP Regional Supplements require visual observation of saturated soil conditions **12 in. (30 cm) or less** from the soil surface for this indicator to be met. This indicator must be associated with an existing water table, the depth of which must be recorded on the wetland data form; however, this requirement may be waived if a restrictive soil layer or bedrock is present within 12 in. (30 cm) of the surface. Presence of the restrictive soil layer or bedrock must also be recorded on the data form.

Indicator D5: FAC-neutral test is a commonly overlooked Secondary Hydrology Indicator that should be evaluated for all wetland and upland data points. The procedure for completing the FAC-neutral test is identical for both the EMP and AGCP and described in both Regional Supplements.

Hydrophytic Vegetation

Every effort must be made to identify all dominant plants observed to the species level during vegetation sampling and analysis. If a plant species cannot be identified in the field, then the Ecologist must collect a sample and consult a botanist or plant professional for assistance. The Ecologist only records vegetation on a wetland data form that has been identified to the species level. The plant genus alone is not sufficient for the form, though it can be recorded in other field notes to aid with general vegetative community descriptions. Species not included on the current [*National Wetland Plant List*](#) for the appropriate region are assumed to be upland (UPL) species.

Unless otherwise noted in the applicable Regional Supplement, a vegetation stratum for sampling purposes is defined as having 5 percent or more total plant cover. For the EMP Region, if a stratum has less than 5 percent cover during the growing season, then those species and their cover values should be recorded on the data form but must not be included in calculations for the dominance test, unless it is the only stratum present. However, percent cover of these species must be included in the prevalence index in the EMP Region. For the AGCP Region, if a stratum has less than 5 percent cover during the peak of the growing season, then those species and their cover values can be combined into other similar woody or non-woody strata for sampling purposes. For example, a sparse tree stratum would be incorporated into the sapling stratum, and a sparse herb stratum would be combined with the shrub stratum. Procedures for determining the growing season are described in the Glossary (Appendix A) of the AGCP Regional Supplement.

Hydric Soils

Indicator F3: Depleted Matrix is a commonly observed hydric soil indicator in wetlands. However, a depleted matrix requires a value of 4 or more and chroma of two or less. Further, distinct and prominent (See the applicable Regional Supplement Glossary for definitions) redox concentrations are required in soils with matrix colors of 4/1, 4/2, and 5/2 to meet depleted matrix criteria. Depleted matrix is used in other hydric soil indicators (A11: Depleted Below Dark Surface and A12: Thick Dark Surface) and it is important to note the specific matrix and redox requirements for use of F3.

Indicator F19: Piedmont Flood Plain Soils is for use in active floodplains in Major Land Resource Areas (MLRAs) 148 and 149A of Land Resource Region (LRR) S. This area includes portions of Maryland, New Jersey, Pennsylvania, and Virginia. This indicator can also be used as an indicator for problematic hydric soils on floodplains in MLRA 136 of LRR P, which includes portions of Georgia, and MLRA 147 of LRR S (See Figure 1 of the EMP Regional Supplement). Therefore, Indicator F19 should be selected as an indicator only for problematic hydric soils in Georgia. Per the US Department of Agriculture, Natural Resources Conservation Service [*Field Indicators of Hydric Soil in the US*](#), this indicator does not apply to stream terraces. Also, although found on floodplains, flooding may be rare, and groundwater is often the source of hydrology for these soils.

Open Water

The Ecologist must collect at least one representative photo of each delineated open water. Any constructed drainage features within the open water must also be photographed. Sufficient GPS locations must be collected along the OHWM to capture any irregular shapes of the delineated open water. Open water locations within the study area should not be delineated based on aerial imagery or topographic survey data.

Compensation is generally not required for impacts to aquatic resources whose only function is to move water from one point to another or retain/detain water, such as open waters, ditches, and canals, provided that function is not adversely impacted.³ However, the aforementioned resources may be considered wetlands or streams, on a case-by-case basis, in consultation with the USACE Savannah District. Refer to the current USACE SOP for additional guidance.

*SOP Qualitative Assessment worksheets may be required in the rare event the USACE requires compensatory mitigation for impacts to open waters, ditches, or canals. For example, a beaver impoundment may be considered a wetland, not an open water, thus requiring completion of a *Wetland Qualitative Assessment* SOP worksheet. Because of this possibility, the Ecologist should collect the necessary data to complete SOP worksheets for these resources in the field.*

STATE WATERS FIELD PROCEDURES

In addition to the current [*EPD Field Guide for Determining the Presence of State Waters That Require a Buffer and Field Guide for Identifying and Permitting Coastal Marshlands That Require a Buffer*](#), the Ecologist should consult the State Waters Determination Guidance included in the *GDOT Waters Flowchart* as needed during delineation of state waters. [“Trout Stream Designations By County”](#), available on the EPD website, should be

³ Savannah District’s 2018 Standard Operating Procedure for Compensatory Mitigation (Version 1), Section 5.4. Open Waters, Ditches, and Canals

consulted for a listing of trout streams and watersheds potentially occurring in the ESB, as state waters in a designated trout watershed are subject to additional buffer requirements.

The definition of “state waters” specifies waters *“not entirely confined and retained completely upon the property of a single individual, partnership, or corporation.”* Therefore, even a feature with no discernable surface or piped connection to other waters would typically be considered a state water (and, potentially, require a state-mandated buffer), if it extends beyond the boundary of a single property.

While in the field, the Ecologist must record all relevant and required data for each resource determined to be state waters per the current *Ecology General Project Report Template and Guidance*.

Buffered State Waters

Many WOTUS, including all perennial and intermittent streams, ephemeral trout streams, and open waters, that exhibit evidence of wretched vegetation are considered buffered state waters and are delineated per the procedures discussed above. Buffered state waters (BSWs) also can include features exhibiting wretched vegetation that are not confined to a single property, yet have no connection to aquatic resources. For example, a detention basin or farm pond constructed in uplands that spans two separate properties (i.e., GDOT ROW and adjacent private property) may be considered a BSW if it exhibits wretched vegetation. Consult the *GDOT Waters Flowchart* for additional examples of BSWs.

For each linear BSW identified within the survey area, both sides of the BSW in the survey area should be located via GPS, with recorded point/vertex frequency adjusted for accuracy, as needed. The Ecologist must collect sufficient GPS locations to accurately depict BSW sinuosity.

For linear BSWs with an average width of 8 feet or less, the wretched vegetation line on one side of each resource or resource centerline may be located via GPS and offset appropriately during GPS data processing to accurately delineate both banks and capture any significant variability in stream width throughout the surveyed reach. The Ecologist must provide delineations of both banks of all linear BSWs to Design.

Additionally, the Ecologist must complete a NCDWQ stream form and a representative segment must be photographed. For basins and impoundments considered to be BSWs, the Ecologist must collect adequate GPS locations to accurately depict the feature shape. Furthermore, vegetation wretched by normal stream flow or wave action within the BSW, if present, shall be photographed.

Ephemeral streams exhibiting wretched vegetation in an EPD-designated trout stream watershed shall be delineated as BSWs and are subject to a state-mandated 50-foot buffer. However, a general variance is provided for reducing the buffer to 25 feet or piping of trout streams with an average annual flow of 25 gpm or less [[GADNR Rule 391-3-7-.05\(9\)](#)].

Coastal Marshlands

The Coastal Marshlands Protection Act [(CMPA) [OCGA § 12-5-282](#)] defines coastal marshlands and vegetated marshlands as "any marshland intertidal area, mud flat, tidal water bottom or salt marsh." The CMPA specifically lists 14 plant species (See Table 1 below) as indicative of "vegetated marshlands", the presence of which is used to determine the CMPA Jurisdictional Determination (JD) Line for establishing the state-mandated 25-foot buffer. Other tidal indicators include fiddler crab (*Uca spp.*) holes, wrack lines, escarpment, and presence of salt marsh peat.

Table 1 – Coastal Marshlands Protection Act – Marsh Plants

Common Name (<i>Scientific name</i>)	
Salt marsh grass (<i>Spartina alterniflora</i>)	Woody glasswort (<i>Salicornia virginica</i>)
Black needlerush (<i>Juncus roemerianus</i>)	Saltwort (<i>Batis maritima</i>)
Saltmeadow cordgrass (<i>Spartina patens</i>)	Sea lavender (<i>Limonium nashii</i>)
Big cordgrass (<i>Spartina cynosuroides</i>)	Sea oxeye (<i>Borrichia frutescens</i>)
Saltgrass (<i>Distichlis spicata</i>)	Silverling (<i>Baccharis halimifolia</i>)
Coast dropseed (<i>Sporobolus virginicus</i>)	False willow (<i>Baccharis angustifolia</i>)
Bigelow glasswort (<i>Salicornia bigelovii</i>)	High-tide bush (<i>Iva frutescens</i>)

The CMPA JD Line subject to state-mandated buffer requirements must be verified in the field by the GADNR Coastal Resources Division (CRD). Field visits to identify state buffered coastal marshlands and tidal streams must be completed during low tide conditions to allow for identification of marsh plants and shellfish beds that may be submerged during high tide conditions. Low tide conditions may also assist in identification of the wretched vegetation and/or scour line on tidal streams that may not be clearly discernible during high tide conditions.

In some cases, the delineated boundary of WOTUS for tidal wetlands may differ from the CMPA JD Line, as federally jurisdictional wetlands require three parameters (wetland hydrology, hydrophytic vegetation, and hydric soils), while state buffered coastal marshlands require only marsh vegetation. In such cases, the CMPA JD Line shall be GPS located with sufficient positions recorded to adequately capture the extent of state jurisdiction. The Ecologist must record and photograph all marsh plant species present.

CRD verification of the CMPA JD Line expires one year after issuance, except for projects that have let for construction, in which case the verification is good for 3 years or the duration of the project. Therefore, CRD verification will typically need to be completed twice during the preconstruction phase of a given project: initially, during resource identification, prior to submittal of an ARDVRq to the USACE; and, subsequently, within one year prior to the construction let date.

Non-Buffered State Waters

Features typically considered to be non-buffered state waters (NBSWs) include upland drainage features, including anthropogenic features constructed in uplands for stormwater management/conveyance and erosional features, such as gullies. Consult the *GDOT Waters Flowchart* for additional examples of NBSWs.

For each linear NBSW identified within the survey area, the Ecologist must GPS locate the centerline or a single bank, photograph a representative segment, and complete a NCDWQ stream form. If a single bank is GPS located, it must be offset by the average NBSW width to delineate the opposite bank. For basins and impoundments considered to be NBSWs, the Ecologist must collect adequate GPS locations to accurately depict the resource shape.

Guidebook Revision History

Revision Description	Relevant Sections	Revision Date
Initial Publication	All	5/22/2019
Minor editorial revisions & hyperlinks	All	11/7/2023
Moved ephemeral trout stream discussion	Buffered State Waters & Non-Buffered State Waters	
Hyperlink update	Waters of the US Field Procedures – Wetlands	4/4/2024
Font update & content review (no changes)	All	1/27/2025