

Ecology

Ecology Resource Survey

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OVERVIEW

For all projects requiring an Ecology Resource Survey, the Ecologist must follow GDOT's general procedures for pre-survey, field assessment, and post-field assessment. With these procedures, the Ecologist will be able to complete field assessment activities and documentation. These general survey procedures also include agency coordination requirements and reporting requirements that follow the completion of field assessments. Detailed guidance for Waters of the US (WOTUS) and buffered state waters is provided in the guidebook. Likewise, habitat assessment and survey procedures for federal and state listed species are discussed in the *Protected Species Survey, Avoidance and Minimization* guidebook.

Ecology Environmental Procedures Guidebooks,
GDOT Office of Environmental Services

PRE-SURVEY PROCEDURES

Environmental Survey Boundary

The area surveyed for ecology resources must be the same Environmental Survey Boundary (ESB) provided by Design. In most cases, an ESB should be available to ensure consistency of survey areas between environmental Subject Matter Experts. However, in rare cases where no ESB has been provided by Design, the ESB must be a minimum of 100 feet beyond existing and required right-of-way (ROW), and all temporary and permanent easements. If an ESB hasn't been provided, confirm with Design and the Project Manager (PM) that the ESB (100-foot minimum from ROW/easements) identified will suffice for planned design, ROW, and utility needs prior to initiating fieldwork.

Survey limit requirements for projects in the Low Impact Bridge Program (LIBP) are detailed in the [LIBP Manual](#), available on the GDOT website. For minor projects/activities (e.g., lighting or signage installation) a reduced ESB may suffice for water resource delineation. However, the GDOT Ecologist or Ecology Team Leader must approve a reduced ESB prior to initiating fieldwork.

Early Coordination

Prior to conducting field surveys, early coordination must be initiated per the [Joint Coordination Procedures \(JCP\) Standard Operating Procedure for Early Coordination and Technical Assistance with Agencies for Ecological Assessments and Project Planning](#).

Please note that for consultant projects, the GDOT Ecologist must be copied on all agency coordination. For federal-aid projects, the Federal Highway Administration (FHWA) reviewer should also be copied on direct agency coordination.

Early coordination responses and documentation of technical assistance must be provided with the Ecology Resource Survey Report (ERSR) for the administrative record.

US Fish and Wildlife Service

Early coordination with US Fish and Wildlife Service (USFWS) must be completed by uploading a single Esri shapefile polygon comprising the ESB to the [Information for Planning and Consultation \(IPaC\)](#) website. An early coordination list of federally listed species with consultation ranges occurring in the uploaded polygon will be auto generated in IPaC. Target species for ecology surveys must include all federally listed species included on the IPaC list. The IPaC list for the ESB satisfies USFWS and FHWA early coordination requirements and must be consulted prior to conducting fieldwork. The Ecologist should also check IPaC for programmatic consultation tools/keys that may be available for federally listed species potentially affected by the project. The best practice is to add relevant ecology team members, including the assigned GDOT Ecologist and their Team Leader, as Project Members in IPaC. Project Members are able to access and update, if necessary, the IPaC review which can be helpful in the event of staff turnover or misplaced login information.

National Oceanic and Atmospheric Administration Fisheries

Early coordination with the National Oceanic and Atmospheric Administration (NOAA) Fisheries must be completed to identify federally listed species and designated critical habitat under NOAA Fisheries jurisdiction that may be affected by the project. The NOAA Fisheries Southeast Region's ESA Section 7 Mapper website must be consulted for a list of federally listed species and designated critical habitat in Georgia under NOAA Fisheries jurisdiction. Like the IPaC process, an Esri shapefile polygon on the ESB should be used to obtain the species and habitat list from the system.

Georgia Department of Natural Resources, Wildlife Resources Division

Early coordination with Georgia Department of Natural Resources (GADNR) Wildlife Resources Division (WRD) must be completed through [Georgia's Natural, Archaeological, and Historic Resources GIS \(GNAHRGIS\) Ecology Review and Survey Module](#). A project must be added to GNAHRGIS by entering project specific information and uploading an Esri shapefile of the ESB. Th

The GNAHRGIS Ecology Review and Survey Module then generates a draft WRD list of state and federally listed species using the local Hydrologic Unit Code (HUC) 10 watershed for elements whose range distribution is limited by aquatic systems and within 3 miles for all other elements. An official list must also be requested in GNAHRGIS to receive project specific recommendations from WRD for inclusion in the ERSR. The WRD will provide confirmation and a final list with project specific recommendations for reporting use. However, the draft GNAHRGIS generated list fulfills early coordination requirements for field survey, and it is not necessary to wait for WRD confirmation prior to conducting fieldwork. Federal species that have element occurrence records documented in the GNAHRGIS Ecology Module but are outside of the USFWS consultation range (i.e., not included in IPaC) should not be included as target species for field survey/assessment. However, per the *JCP SOP for Early Coordination and Technical Assistance with Agencies for Ecological Assessments and Project Planning*, these species should be addressed in the Ecology Resource Survey and Assessment of Effects Report (ERS AOE). The official (i.e., final) list should be used for documentation and coordination and comparison to the draft should be made immediately upon receipt of the final to ensure the correct species are assessed in the ecology report, as species are occasionally added or removed upon finalization of the letter.

Georgia Department of Natural Resources, Coastal Resources Division

For projects occurring in Effingham, Long, Wayne, Brantley, Chatham, Glynn, Camden, McIntosh, Bryan, Liberty, and Charlton Counties, early coordination with the GADNR Coastal Resources Division (CRD) should be completed for coastal marshlands and public trust lands water bottoms that may be affected by the project. The CRD is not engaged through the GNAHRGIS system; therefore, early coordination with CRD must be completed prior to field survey. An early coordination request should be submitted to CRD via email requesting information on resources of concern that may be affected by the project. Refer to the *GDOT Document Transmittal Addressees & Carbon Copy List* available on the [Ecology Section SharePoint](#)¹ for the appropriate CRD point of contact.

Fieldwork Preparation

Map Resources

Assess the following map resources for the ESB and load on GPS units and/or other electronic device for field reference, as needed:

- > [USFWS National Wetland Inventory \(NWI\)](#);
- > [US Geological Survey \(USGS\) National Hydrography Dataset \(NHD\)](#);
- > [US Department of Agriculture \(USDA\), Natural Resources Conservation Service \(NRCS\) soil survey data](#), including hydric soil classifications;
- > USGS 7.5-minute topographic quadrangle(s);

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

- > Aerial photography (e.g., USDA National Agriculture Imagery Program, color infrared (CIR) aerial imagery, or Google Earth); and
- > Remote sensing data (e.g., LiDAR) for saturated soils and vegetative communities.

Background Research

Once early coordination species lists have been generated using agency portals, habitat and species survey methodologies for target species should be reviewed in preparation for field assessment of habitat suitability for listed species. These are available in GDOT's [State of Georgia Protected Species Habitat & Presence/Absence Survey Methodologies Manual \(Protected Species Survey Methodology Manual\)](#).

Request species occurrence locations and expertise from WRD regarding known populations, as needed, prior to field assessment. If possible, visit a protected species reference population(s) prior to field survey to observe suitable habitat conditions. This will reduce the potential for incorrect "suitable habitat" determinations or overlooked habitat due to the lack of familiarity with often nuanced habitat requirements for a species. If possible within the GDOT project schedule, general ecology and protected species field surveys should be scheduled concurrently.

Property Access

The Ecologist must obtain a copy of the GDOT property access letter from the PM and bring copies to the field in case it is requested by adjacent/abutting property owners. The GDOT PM is the appropriate point of contact for property owners with questions or concerns regarding the project. The Ecologist should be prepared to distribute contact information for the PM during fieldwork. A copy of the letter must be left on the windshield or dash of the field vehicle along with a business card. Check with the PM for any known property owner concerns or access restrictions prior to fieldwork.

Weather

The USACE recommends that field surveys for WOTUS be completed at least 72 hours after the most recent rainfall or subsiding of a flood event. Guidance from the GADNR Environmental Protection Division (EPD) states that a state waters determination should be made at least 48 hours after the last rain event. The [North Carolina Division of Water Quality \(NCDWQ\) Methodology for Identification of Intermittent and Perennial Streams and Their Origins](#) instructs users not to evaluate a stream within 48 hours of rainfall that results in surface runoff. Professional judgement must be exercised when scheduling fieldwork after a significant rainfall (i.e., 0.2 inch or greater) or flood event. Follow-up field visits may be required if flooding precludes accurate data collection of normal site conditions.

Gear, Equipment, and Data Forms

Gear, equipment, and data forms required to complete an ecology resource field survey are listed below. Additional personal equipment needed may include but is not limited to rubber (waterproof) boots, notebook and pencil, insect repellent, sunscreen, first aid kit, food, and water.

- > Sharpshooter (drain spade) or soil auger;
- > Munsell soil color charts;
- > GPS unit capable of sub-meter accuracy, set to GA State Plane, NAD83 coordinates and US survey feet units—an external antenna and range pole can assist with reception in dense canopy cover;
- > Data forms preferably loaded on a tablet or GPS unit including:
 - USACE Wetland Determination Data Form (Eastern Mountains and Piedmont or Atlantic and Gulf Coastal Plain Region, depending on location) — automated Excel forms are available on the Ecology Section SharePoint, and
 - [NCDWQ Stream Identification Form](#) (current version);
- > Draft GNAHRGIS list, or verified WRD letter, if available;
- > USFWS IPaC early coordination list;
- > NOAA Section 7 Mapper early coordination list;
- > Field guides for applicable flora and/or fauna;
- > Phase 1 survey methodologies and/or GADNR Species Profile Sheets for applicable protected species
- > Digital camera;
- > Property access letter and PM contact information;
- > Binoculars;
- > High-powered flashlight/spotlight for bridge/culvert inspections;
- > Ziploc bags, sharpie, and plant press (optional) for vegetation samples; and
- > Personal Protective Equipment (PPE) necessary to complete project tasks as required by GDOT and/or the consultant employer must be worn in the field.

Other species-specific surveys may require additional or different equipment and preparation that are referenced in the [GDOT Aquatic Survey Protocols for Transportation Projects within the State of Georgia](#), [Protected Species Survey Methodology Manual](#), or other resources/guides.

Delineation Field Guides

Current versions of the following field guides are recommended to assist with field delineation and should be loaded on electronic devices for field reference:

- > [Regional Supplements to the Corps of Engineers Wetland Delineation Manual](#) (Eastern Mountains and Piedmont or Atlantic and Gulf Coastal Plain Region, depending on location);

- > [USACE Regional Wetland Plant List](#);
- > [NRCS Field Indicators of Hydric Soils in the US](#);
- > [NCDWQ Methodology for Identification of Intermittent and Perennial Streams and Their Origins](#);
- > [EPD Field Guide for Determining Presence of State Waters That Require a Buffer](#); and
- > [EPD Field Guide for Identifying and Permitting Coastal Marshlands That Require a Buffer](#).

FIELD ASSESSMENT PROCEDURES

General ecology field surveys (i.e., water resource delineation and habitat assessment) must be completed every five years prior to ROW authorization or a project being let to construction. Refer to the *Water Resource Delineation and Protected Species Survey, Avoidance and Minimization* guidebooks for specific field assessment procedures pertaining to these resources.

Habitat/Land Use Delineation

Habitat/land use types within the ESB must be delineated during the general ecology field survey based on landscape position, dominant vegetation, moisture regime (i.e., mesic or xeric), and human disturbance. Habitat types may also be characterized by land use within the project area and these terms are often used interchangeably. Typical habitats/land use types encountered on GDOT projects include but are not limited to mixed pine/hardwood forest, bottomland hardwood forest, upland hardwood forest, planted pine, early successional/scrub-shrub, maintained ROW/easement, and developed (i.e., high density residential or commercial properties). Waters (i.e., streams, wetlands, and open waters) shall not be described as a separate habitat/land use type unless a contiguous area of water comprises more than 5% of the ESB.

For each delineated habitat/land use, dominant species and approximate age of vegetation must be recorded per *Ecology General Project Report Template and Guidance*. Habitat/land use types throughout the corridor must be recorded in field notes/maps and/or GPS-located for development of a Habitat Map in GIS (See Figure 3 description in the current *Ecology General Project Report Template and Guidance*). Sufficient data must be collected to calculate total acreage and percentage of ESB for each habitat/land use type delineated.

Locations of invasive plant species within each habitat/land use type must be recorded using the [Early Detection and Distribution Mapping System](#) (EDDMapS). Invasive plant colonies comprising an area greater than 1,000 square feet must be delineated on the project Habitat Map(s).

POST-FIELD ASSESSMENT PROCEDURES

Resource Labeling

Aquatic resources delineated during field assessment must be labeled in accordance with guidance for labeling WOTUS and state waters included in the *Ecology General Project Report Template and Guidance*. The Esri shapefile attributes table delivered with GPS data to GDOT must be updated to match final resource labeling, if different.

GPS Data Processing

The appropriate GDOT coordinate system for GPS data is State Plane GA East or West, NAD83. The appropriate units are US Survey Feet. State Plane GA East Zone and GA West Zone are divided based on county boundaries and must be verified for the project area prior to data processing.

Unless all positions were recorded using real-time differential GPS (DGPS), the GPS file must be differentially corrected in Trimble GPS Pathfinder Office or GPS Analyst extension for Esri ArcGIS for Desktop software. The GPS file must then be assessed for errors and corrected, as needed, based on notes and existing site data.

GPS Data Export

A MicroStation DGN file depicting the extent of WOTUS and state waters must be provided to Design for delineation on project plans. The file must be labeled PI#ENVE-ecology.dgn (e.g., 0001783ENVE-ecology.dgn) to distinguish it from the complete project ENVE.dgn file that should include all project Environmentally Sensitive Areas (ESAs). A DGN file may be exported from ArcGIS or created in MicroStation by importing GPS data files. It is recommended that the file be created in MicroStation, as Esri shapefile attribute fields containing labels do not export correctly to MicroStation DGN file format. If resource delineations are to be exported from Esri ArcGIS, the Ecologist must provide figures, in PDF format, depicting resource delineations and labels to Design. Any non-buffered resource segments (e.g., concrete lined channels) that need to be represented on the plans must be noted. The Ecologist must specify to Design, which resources require a state mandated buffer and required buffer width (i.e., 25 or 50 feet).

Ecology ESA delineations should not be submitted to Design until the ERSR has been transmitted. This allows for GDOT Ecologist and Ecology Team Leader review of resource delineations prior to data export in the event that revisions to ESA delineations are required.

ESAs for Plan Sheets

The full resource name, preceded by ESA (e.g., ESA - Perennial Stream #1) must be used for resource labeling on plan sheets. State mandated buffers must be identified as ESA – 25' Buffer #1 or ESA – 50' Buffer #1 for trout waters. Non-jurisdictional and/or non-buffered resource segments must be labeled separately (e.g., Perennial Stream #1 in Concrete Channel). Stream segments must be labeled with separate resource numbers at transition points (e.g., intermittent to perennial). The boundary of coastal marshlands subject to the state mandated 25-foot buffer, delineated or verified by CRD staff, must be clearly labeled as ESA - Coastal Marshlands Protection Act Jurisdictional Determination Line. The proper line and polygon fill/hatching style

must be used to depict delineated resources and associated ESA boundaries in the ENVE.dgn file per standard GDOT Tools available in MicroStation. Consult with Design as needed.

Protected species individuals or populations identified during field survey must be delineated as an ESA on plan sheets. Please note that the species name must be omitted from plan sheets to protect sensitive species locations and these areas must simply be labeled as ESA. Protected plant species populations or terrestrial species burrows, dens, or nesting/roosting (with the exception of forested bat roosting habitat) areas identified in the ESB must be delineated in their entirety on plan sheets.

The Ecologist must complete quality control (QC) review of ESA delineations by comparing GPS data to MicroStation files provided by Design to ensure ecology resources, including buffers, are drawn and labeled correctly and projected in the correct location. The following DGN files, at a minimum, should be requested by the Ecologist and provided by Design to complete ESA delineation QC: existing topography, including structures and edge of pavement (TOPO.dgn); existing contours (ECON.dgn); and existing property information (PROP.dgn). If available, top-of-bank from existing topography or contours should be used for the ESA stream delineation, provided the top-of-bank line is beyond the ordinary high water mark (OHWM) or wrested vegetation line included in the GPS data. Design should be consulted, and GPS data may need to be used for ESA stream delineations if top-of-bank is located inside the GPS-located OHWM or wrested vegetation line. It is critical that stream boundaries be presented clearly on design plans. Problems can arise with agency review in instances where the ENVE does not align with top-of-bank from TOPO or contours from ECON. Discrepancies should be identified early and resolved with design prior to finalizing the Assessment of Effects Report.

ESA delineations should be revised in MicroStation, if possible. If DGN file revision in MicroStation is not feasible then comments and mark-ups should be inserted in PDF plan sheets. Additional plan reviews must be completed, as needed, until plan sheets delineate and label ecology resources accurately. Resource identification for Ecology is complete once the ERSR has been transmitted and Ecology ESA delineations have been submitted to the PM.

Troubleshooting

In some cases, the GPS file will not align properly with GDOT MicroStation files (DGN). This error can occur for several reasons including different coordinate systems or units (feet vs. meters), old or unreferenced design files, and errors exporting an Esri shapefile to MicroStation DGN. The following trouble shooting tips are recommended to correct such errors:

- > Confirm the files are in State Plane GA East or West, NAD83 coordinates and US Survey Feet units, and inform Design of the coordinate system used. Request DGNs to be spatially referenced in State Plane GA East or West, NAD83 coordinates and US Survey Feet units by Design, if needed.
- > Esri shapefiles can be referenced directly into MicroStation V8i if the DGNs are also spatially referenced. Contact Design to confirm which MicroStation version is being used and email the shapefile directly to Design rather than an exported DGN, if feasible. Although V7 may have been used for older existing projects, V8i should be used for all new projects.

- > Verify a GDOT seed file (provided by Design) is referenced when exporting a shapefile to DGN_V8 in ArcGIS.
- > Export the shapefile as an AutoCAD DWG file for Design to import into MicroStation.
- > Import the MAIN.dgn (or PROP.dgn) into ArcGIS. Export a DGN that combines the Mainline (or Property) files and the ecology resources. Design can then use this DGN file to align ecology resources using the Mainline/Property locations as a guide.

For consultant projects, the GDOT Ecologist must be contacted if troubleshooting is unsuccessful in aligning GPS delineations with GDOT MicroStation files. The GDOT Ecologist may need to coordinate with the GDOT Solutions Center for further assistance.

Field Data Processing

All field notes, forms, and photos must be formatted in accordance with the current *Ecology General Project Report Template and Guidance* and reviewed internally for QC. Weather station monthly and historical rainfall data must be downloaded as specified in the current *Ecology General Project Report Template and Guidance*.

AGENCY COORDINATION

Upon completion of ecology resource identification and field data processing, the Ecologist should proceed with verifying the extent of WOTUS with the USACE and buffered state waters with the EPD, as needed.

Aquatic Resource Delineation Verification Request (ARDR)

An ARDR for the ESB should be prepared and submitted to the USACE prior to transmittal of the ERSR and ecology resource delineations to Design. USACE field verification is recommended and should be requested if the Ecologist is unsure of the jurisdictional status of potential wetlands and/or drainage features. USACE field verification is not required for submittal of an ARDR or Section 404 permit application; however, an ARDR would need to be completed in order to request a field verification. An ARDR must include all information listed on the [USACE Savannah District Aquatic Resource Verification Request for GDOT Projects](#) checklist. Refer to the [USACE Coordination Instructions](#) for ARDR agency review timelines. An ARDR must be prepared and submitted to the USACE for all projects containing WOTUS, regardless of funding source and WOTUS impacts or lack thereof.

State Waters Determination

Upon completion of the ecology resource field survey, the Ecologist shall identify all aquatic resources for which state-mandated buffer requirements are unclear. For these resources, EPD should be contacted electronically (See [GDOT Document Transmittal Addresses and Carbon Copy List](#)) to schedule a field determination prior to ERSR transmittal and submitting ecology resource delineations to Design. The intent of a state waters determination is to obtain an EPD determination only for “questionable” state waters, including those with a higher likelihood of intercepting groundwater during construction (i.e., ephemeral drainage features in low lying areas). Verification of the extent of all buffered/non-buffered state waters within an ESB by EPD pe

Personnel is not required for all projects. If the project contains state buffered coastal marshland, then state verification of the delineated Coastal Marshlands Protection Act Jurisdictional Determination Line is required and must be requested from CRD by the Ecologist (See *Water Resource Delineation* guidebook).

ECOLOGY RESOURCE SURVEY REPORT

Upon completion of the general ecology field survey and any required agency field visits, an ERSR must be prepared in accordance with the current *Ecology General/Minor Project Report Template and Guidance*. The ERSR must include all information included in the template with the exception of effects analyses, avoidance and minimization measures, impact calculations, and permit and mitigation information. Receipt of preliminary plans required to complete these sections of the report template typically have not occurred at this stage of project development. If a Phase 2 protected species survey is conducted concurrently with the ecology resources survey, additional reporting requirements are detailed in the *Protected Species Survey Methodology Manual*, including an element occurrence reporting form for positive protected species identifications.

For consultant projects, Version 1 of the Draft ERSR must be submitted in PDF format (.pdf) to Ecology_submittals@dot.ga.gov and the GDOT Ecologist, if one has been assigned, for review. When FHWA is the lead Federal Agency, a transmittal letter must be prepared in accordance with the current transmittal letter template and submitted in an editable Word format (.docx) with the ERSR submitted to GDOT for review. Typically, no coordination is required at this project stage and the ERSR is transmitted for each agencies' information and files. The ERSR must be reviewed, revised, and resubmitted (if necessary) in accordance with the [Office of Environmental Services Consultant Document Submittal Checklist](#).

Upon completion of GDOT review, the ERSR must be transmitted per the current *GDOT Document Transmittal Addressees & Carbon Copy List*. Transmittal procedures differ based on the lead Federal Agency (typically FHWA or USACE); an ERSR is not transmitted to USACE when they are the lead Federal Agency.

If preliminary plans are available and of sufficient detail to calculate impacts, the Ecologist may prepare a combined ERS AOE provided USACE has concurred with the ARDR, an Avoidance and Minimization Measures Meeting (A3M) has been completed, and recommended avoidance and minimization measures have been incorporated in preliminary plans. The GDOT Ecologist or Ecology Team Leader must be consulted prior to preparing an ERS AOE at this project stage.

Guidebook Revision History

Revision Description	Relevant Sections	Revision Date
Initial Publication	All	4/23/2021
Minor editorial revisions & hyperlinks	All	
Update to NOAA early coord. Procedures	Early Coordination	11/7/2023
Removed requirement for bat habitat labeling	Post Field Assessment Procedures – ESAs for Plan Sheets	
Hyperlink update	Pre-survey Procedures – Gear, Equipment, & Data Forms	4/4/2024