

**Invasive Carp eDNA Program Data Management  
Standard Operating Procedure**  
IC eDNA Monitoring Program



U.S. Fish and Wildlife Service, Midwest and Northeast Regions

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**Document Information**

IC eDNA Monitoring Program

IC eDNA Program Data Management SOP

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## Application/Purpose

This document describes roles and responsibilities for all data that are collected, documented, reviewed, and stored in the Invasive Carp (IC) eDNA Monitoring Program.

## Data Management Roles and Responsibilities

Each role for the flow of data within the IC eDNA Program is provided in Figure 1. Figure 2 outlines the data flow for WGL generated detection results. Specific details surrounding the data flow, roles and the responsible party are listed in the following sections.

## Data Sharing

All field data and summarized lab detection data from the IC eDNA Monitoring Program can be accessed through Servcat, the U.S. Fish and Wildlife Service's data catalog. The [catalog record](#) (URL) contains program information, points of contact, metadata, and how to access the database of field data and summarized lab detection data. The data is also displayed in a public facing ArcGIS Dashboard for partners and the public to use pre-set widgets and filters to view different pieces of the data.

- All IC eDNA Monitoring Program forms, feature layers, online maps, and applications (ex. ArcGIS) are housed under this ArcGIS Online (AGOL) group: [FWS Midwest and Northeast Regions FAC Invasive Carp eDNA Collection](#). If new forms, feature layers, or online maps are created, they must be stored in this location.
- All IC eDNA Monitoring Program feature layers are connected to an internal SQL database housed in an Azure managed instance
- The public facing feature layer and dashboard for the program are also hosted in a private AGOL editing group (FWS R3 Invasive Carp Data Manager Group) with restricted access to manage edits and changes to the feature layer and dashboard.
- Metadata will be created for each form, feature layer, online map and application for the IC eDNA Monitoring Program.

## FWCO Staff

- FWCOs are responsible for entering (automatic with ArcGIS Field Maps App), proofing, and retaining field data. The ArcGIS Field Maps App Manual No 1 is provided as a separate document.
- The eDNA Station Leads are responsible to properly enter data and facilitate QA/QC of data using the ArcGIS Pro eDNA Editing Manual No 2. If possible, QA/QC and edits of missing or incorrect data should be completed and synced with the database within **10 business days** after the last day of collection for a specific event or before the next sampling event to be conducted at the same location if that is to occur in less than 10 days. This removes the possibility of confusing old and new data points and declutters the online web maps used for data collection. The eDNA Station Leads are responsible to properly enter data and facilitate QA/QC of data using the ArcGIS Pro eDNA Editing Manual No. 2.

In extenuating circumstances, when a designee is assigned, the designee is required to read and understand the ArcGIS Pro eDNA Editing Manual No. 2 before QA/QC of the data.

- eDNA Station Leads will use the eDNA Case Tracking Microsoft Planner application to mark progress of sample collection and when data has been proofed and edited. Once the Samples Collected and Sample Data QA/QC Complete tasks have been completed for the case in Planner, the eDNA Station Leads will move the case to the In Processing bucket and assign the eDNA Database Coordinator. If other field work prevents proofing and QA/QC of data to take place within the required 10 business days, FWCO staff must notify the eDNA Database Coordinator and eDNA Program Coordinator.
- FWCO staff should retain an electronic copy of the completed dataset for each of their eDNA events. A list of data collected, and an explanation of data fields are provided in Table 1.
- Hard copy and electronic data (final QA/QC of field data) should be backed up regularly.
- Survey123 electronic COC forms will be submitted in the field to track sample transfer and then to WGL when samples are shipped. WGL will receive an email via a web hook when the Survey123 COC form is submitted for shipping. The Survey 123 Chain of Custody and Trip Plan Summary SOP No 3 is provided in a separate document. A list of field descriptions for the Survey123 COC form and Trip Plan Summary form is included in Tables 3 through Table 6. WGL will use the eDNA Shipping Alerts channel in Teams to let FWCO offices know when samples are received in the lab. The shipping FWCO may request a hard copy of their Survey123 COC data.
- The Pre-Trip section of the Survey123 electronic Pre-Trip/Post Trip & QA/QC Summary form will be submitted at least one day before sampling and the Post-Trip & QA/QC Summary section of the form will be submitted when samples are shipped. Pre-Trip/Post-Trip & QA/QC Summary form instructions are provided in the Survey123 Chain of Custody and Trip Plan Summary SOP No 3.

### **WGL Staff**

- WGL staff are responsible for keeping an internal Case Log for all samples. The Case Log tracks cases and samples through the lab workflow.
- WGL staff will keep a record of sample location storage through Microsoft Power Apps.
- WGL will keep records of cycling logs, sample location, and sample movement electronically for one year. Once all samples have been analyzed, records for cycling logs, sample location and movement will be documented and destroyed.
- WGL will maintain a OneNote electronic logbook for extraction and PCR.
- Raw data files from the real-time instruments will be processed with standardized R-code, a QC Report generated, and all result files will be kept in a folder labeled with the case number. These files will be backed up on the WGL and MFC Azure

cloud server. All R-code scripts will be stored in an internal GitHub repository record.

- WGL staff are responsible for recording and archiving fridge and freezer temperatures on the WGL and MFC Azure cloud server. When sampling season concludes, fridge and freezer data can be deleted.
- WGL will scan any non-electronic data collection into PDFs by case and these will be saved on the WGL Azure cloud server and backed up on the MFC Azure cloud server.
- The eDNA Processing Lead will be responsible for reporting results with the eDNA Program Coordinator and eDNA Data Steward within 48 hours of QC review.
- The Survey123 COC and Pre-Trip/Post-Trip & QA/QC Summary data and all laboratory generated data files will be maintained on the WGL and MFC Azure cloud server and are connected to an internal SQL database in an Azure managed instance.
- WGL staff will upload detection data to SQL server after each eDNA sampling season has completed.

#### **eDNA Data Steward**

- eDNA Data Steward Reports will be generated as each case is completed. Each report will be sent to the eDNA Program Coordinator and saved electronically in the WGL and MFC servers.
- The eDNA Data Steward will backup and maintain the eDNA sample data in at least three backup locations. The eDNA Data Steward will also routinely back up eDNA sample data from the ArcGIS Online eDNA Fisheries Group once a week. Field offices should still download and maintain the data collected by their office (per 2. above). A list of field descriptions that contain data descriptions for reported results is listed in Table 5.
- The eDNA Data Steward will update metadata annual through ArcGIS and ServCat records.
- The Data Custodian will maintain an electronic folder under the Service's Enterprise Data Warehouse that contains the field geodatabase complete with field and lab data, backup of working geospatial files, the eDNA result maps, and data summary tables.

#### **Quality Assurance/Quality Control Specialist**

- Survey123 COC data will be stored in an ArcGIS database and will be maintained by the eDNA Processing QA/QC Specialist.
- All Pre-Trip/Post-Trip & QA/QC Summary data will be stored in an ArcGIS database and will be maintained by the eDNA Processing QA/QC Specialist. A list of field descriptions that contain data descriptions for the Pre-Trip/Post-Trip & QA/QC Summary data is listed in Table 5 and Table 6.

- Review, validate and certify eDNA detection data before eDNA Processing Lead reports results.

## Data Tables

Table 1. Data dictionary for the Invasive carp eDNA field sample point feature layer.

Field Name	Alias	Type	Length	Description
caseNumber	Case Number	Text	5	Composite number that has 2-digits representing the year (YY), a 3-digit case (CCC) number; a series of unique numbers assigned by the Whitney Genetics Lab (WGL) to each Fish and Wildlife Conservation Office (FWCO) at the start of the sampling year and provided for each individual planned sampling event to track cases
projectid	Sampling Protocol	Integer	2	The sampling protocol being used to collect the samples
gearTypeCode	Gear Used	Integer	3	The gear used to collect/process the samples
sampleID	Regional Unique ID	Text	8	Composite number that has 2-digits representing the year (YY), a 3-digit case (CCC) number; a series of unique numbers assigned by the Whitney Genetics Lab (WGL) to each Fish and Wildlife Conservation Office (FWCO) at the start of the sampling year and provided for each individual planned sampling event, followed by a 3 digit sample ID number (SSS) assigned by the FWCO numerically as they take samples in the field (no punctuation, YYCCSSS). Used as the primary key to join to the eDNA Data Steward Report table.

Field Name	Alias	Type	Length	Description
officeCode	Sampling Station ID Code	Text	10	Alpena FWCO – ALPFWCO; Ashland FWCO – ASHFWCO; Carterville FWCO – CARFWCO; Columbia FWCO – COLFWCO; Green Bay FWCO – GRBFWCO; La Crosse FWCO - LAXFWCO; Lower Great Lakes FWCO – LGLFWCO The office who lead the collection of samples and collected the eDNA sample field data
State	State	Text	2	Full U.S. state name in which samples were collected based on the U.S. Census Bureau Tigerlines U.S. state boundaries from 2021
Basin	Basin	Integer	4	LH = Lake Huron (3); LM = Lake Michigan (4); LE = Lake Erie (2); LS = Lake Superior (6); LO = Lake Ontario (5); CAWS = Chicago Area Waterway System (1); UMR=Upper Mississippi River (9); OHR=Ohio River (8); MOR=Missouri River (7); OTHR=Other (0) (applicable to older eDNA field data) -Other designations to be added as needed by Fisheries Data Steward; River basin where samples were collected
locationID	Waterbody	Integer	7	Waterbody name of where sample was collected. A set domain list is used to standardize waterbody name by locationID code for each sampling site based on Universal ID of geographic name ( <a href="https://www.geonames.org/v3/">https://www.geonames.org/v3/</a> )
altLocationName	Site Name	Text	255	The specific name of the location of sampling for reference
HUC2	HUC2	Text	255	The HUC2 watershed the sample was collected in based on the USGS Watershed Boundary Dataset
HUC4	HUC4	Text	255	The HUC4 watershed the sample was collected in based on the USGS Watershed Boundary Dataset
HUC8	HUC8	Text	255	The HUC8 watershed the sample was collected in based on the USGS Watershed Boundary Dataset
eventDate	Date Collected	Datetime	255	Date and time of collection (MM/DD/YYYY)
decimalLatitude	Latitude	Double	n/a	WGS 84 Decimal Degrees, 5 decimals

Field Name	Alias	Type	Length	Description
decimalLongitude	Longitude	Double	n/a	WGS 84 Decimal Degrees, 5 decimals
waterTemperature	Temperature (F)	Double	n/a	Temperature of the water in degrees Fahrenheit (1 decimal) at the first sample and when changing sites (optional). Temperature could be in Fahrenheit or Celsius. Fahrenheit became standard measure in 2016. A -999999 means no data.
blank	Blank	Text	5	Yes/No (Field Control: Tube filled with distilled water)
ProcessTime	Processing Date	Datetime	n/a	Date and time of processing of sample in trailer (MM/DD/YYYY)
volumeSampled	Volume (Liters)	Decimal	n/a	The volume of water filtered in liters (for non-traditional eDNA sampling only).
poreSize	Size of Filter (um)	Decimal	n/a	Size of filter ( $\mu\text{m}$ ) that determines the smallest particle a filter will trap.
turbidity	Turbidity (NTU)	Decimal	n/a	A measure of the amount of light that can pass through the water in NTU.
meterLogNumber	Smith Root Sample ID	String	50	Unique sample ID for Smith Root filter.
eventNotes	Comments	Text	500	General notes, issues, or observations while sampling or processing
QCcomments	QC Comments	Text	500	Notes or comments on changes made to the data as part of the quality control review
CreationDate	CreationDate	Date	n/a	The date and time the sample data was created
Creator	Creator	Text	128	The ArcGIS Online username of the person who entered in the sample collection data. This field is linked to recordedBy in SQL database
EditDate	EditDate	Date	n/a	The date and time the sample data was last edited

<b>Field Name</b>	<b>Alias</b>	<b>Type</b>	<b>Length</b>	<b>Description</b>
Editor	Editor	Text	128	The ArcGIS Online username of the person who last edited the sample collection data

Table 2. Data dictionary for the eDNA result data steward report table generated by the Whitney Genetics Lab.

Field Name	Alias	Type	Length	Description
caseNumber	Case Number	Long Integer	5	Composite number that has 2-digits representing a year (YY) and a 3-digit case number (CCC); a series of unique numbers assigned by the Whitney Genetics Lab (WGL) to each Fish and Wildlife Conservation Office (FWCO) at the start of the sampling year and provided for each individual planned sampling event.
sampleNumber	Sample Number	Integer	3	A 3-digit sample ID number assigned by the FWCO numerically as they take samples in the field (no punctuation, #####)
sampleID	Unique ID	Long Integer	8	Composite number that has 2-digits representing the year (YY), a 3-digit case (CCC) number; a series of unique numbers assigned by the Whitney Genetics Lab (WGL) to each Fish and Wildlife Conservation Office (FWCO) at the start of the sampling year and provided for each individual planned sampling event, followed by a 3 digit sample ID number (SSS) assigned by the FWCO numerically as they take samples in the field (no punctuation, YYCCSSS). Used as the foreign key to join the field data to eDNA sample field data (Primary key: RUID)

Field Name	Alias	Type	Length	Description
Any_Detections	Any Detection	Integer	1	1= detection of at least 1 of the 3 assays (Bighead, Silver, or Invasive Carp), 0= no detection of any assay, null= no detection data
ACTM_Assay	ACTM Assay	Integer	1	1= detection of at least 1 Invasive Carp qPCR replicate, 0= no detection, corresponds to one of three assays running in multiplex, null= no detection data
BHTM_Assay	BHTM Assay	Integer	1	1= detection of at least 1 Bighead carp qPCR replicate, 0= no detection, corresponds to one of three assays running in multiplex, null= no detection data
SCTM_Assay	SCTM Assay	Integer	1	1= detection of at least 1 Silver carp qPCR replicate, 0= no detection, corresponds to one of three assays running in multiplex, null=no detection data
eDNA_Detection_Summary	eDNA Detection Summary	Integer	1	Summary results from the ACTM_Assay, BHTM_Assay, and SCTM_Assay. 0= no detections, 1= detection ACTM only, 2= Bighead or BHTM and ACTM only, 3= Silver or SCTM and ACTM only, 4= Both Bighead (BHTM) and Silver (SCTM) with or without ACTM detection. null= no detection data
eDNA_Detection_Status	eDNA Detection Status	Text	255	Summary results from the ACTM Assay, BHTM Assay, and SCTM Assay in text for symbolizing on detection maps. No eDNA detected= no detections, IC carp eDNA only detected= detection of ACTM only, Bighead carp eDNA only detected= Bighead (BHTM) and ACTM only, Silver carp eDNA only detected= Silver (SCTM) and ACTM only, No eDNA detected= no detections, Bighead carp and Silver carp eDNA detected= Both Bighead (BHTM) and

<b>Field Name</b>	<b>Alias</b>	<b>Type</b>	<b>Length</b>	<b>Description</b>
				Silver (SCTM) with or without ACTM detection. No detection data= detection data not available
labNotes	Notes	Text	255	Any relevant lab notes pertaining to the eDNA detection data.

Table 3. Field descriptions for the Invasive carp eDNA Chain of Custody Form

Field Name	Alias	Type	Length	Description
projectID	Project	Integer	1	Unique codes to identify the protocol collection: eDNA Monitoring of Bighead and Silver Carps (5), Non-Traditional eDNA Monitoring of Bighead and Silver Carps (6), Research (7)
caseNumber	Case Number	Integer	5	Composite number that has a 5-digit “case” number, a series of unique numbers assigned by the Whitney Genetics Lab (WGL) to each Fish and Wildlife Conservation Office (FWCO) at the start of the sampling year and provided for each individual planned sampling event.
numberSamples	Number of Samples	String	255	Sample number range being transferred.
Sample_Type	Sample Type	String	255	The type of sample being collected based on gear type: Centrifuge, Smith Root Filter Packs, Glass Fiber Filter, Other
Collection_Office	Collection Office	String	255	FWCO office who is transferring the samples: Ashland FWCO (ASHFWCO), Alpena FWCO (ALPFWCO), Green Bay FWCO (GRBFWCO), Lower Great Lakes FWCO (LGLFWCO), La Crosse FWCO (LAXFWCO), Columbia FWCO (COLFWCO), Carterville FWCO (CARFWCO), and Wilmington Substation (WILSS)
Collected_by	Collected By	String	255	First and last names of all crew members who are part of sample collection.
Date_of_Collection	Date of Collection	Date	n/a	date of collection of samples (M/DD/YYYY)
shipDate	Last Shipped Date	Date	n/a	Date when samples are shipped to the lab (M/DD/YYYY)
Notes	Notes	String	255	General notes, issues, or observations about samples.

<b>Field Name</b>	<b>Alias</b>	<b>Type</b>	<b>Length</b>	<b>Description</b>
Editing_Notes	Editing Notes	String	255	Any changes to the form denoted with the initials of the individual making the change and the date when the change was made
Reviewed_by	Reviewer Name	String	255	The individual reviewing the form for completeness and accuracy.
Review_status	Review Status	String	255	The status of the data review check.
Review_Notes	Review Notes	String	255	Notes by the reviewer on the data check.
CreationDate	CreationDate	Date	n/a	The date and time the sample data was created
Creator	Creator	Text	128	The ArcGIS Online username of the person who entered in the sample collection data.
EditDate	EditDate	Date	n/a	The date and time the sample data was last edited
Editor	Editor	Text	128	The ArcGIS Online username of the person who last edited the sample collection data

Table 4. Field descriptions for the related table to the Invasive carp eDNA Chain of Custody Form feature layer detailing the transfer log for samples.

Field Name	Alias	Type	Length	Description
caseNumber_Sender	Case Number	String	5	Composite number that has a 5-digit “case” number, a series of unique numbers assigned by the Whitney Genetics Lab (WGL) to each Fish and Wildlife Conservation Office (FWCO) at the start of the sampling year and provided for each individual planned sampling event.
minSampleNumber	Minimum Sample Number	Integer	3	Minimum sample number being transferred.
maxSampleNumber	Maximum Sample Number	Integer	3	Maximum sample number being transferred.
Shipping_Notes	Shipping Notes	String	255	Note of how many boxes are being shipped and which boxes contain which samples.
Release_Signature	Release Signature	String	255	Digital signature of who is releasing samples.
Release_Signature_Certified	I certify the digital release signature above represents my signature for Chain of Custody purposes.	String	255	A yes check box to certify the digital signature represents the individual signature for the chain of custody purposes.
Release_Agency	Release Agency	String	255	The agency who is releasing the samples.

Field Name	Alias	Type	Length	Description
Release_Date	Release Date	Date	255	The release date of the samples (M/DD/YYYY).
Delivered_by	Delivered via	String	255	How were samples transferred: options included FedEx, In Person, and Other.
Delivered_by_Other	Delivered via Other	String	255	How were samples transferred by other. Only filled in if the user selects the other option for the Delivered_by field.
deliv_repeat_pos	delivered_position	String	255	The repeat number for the transfer record for the case.
Receipt_Signature	Receipt Signature	String	255	Digital signature of who is receiving the samples.
Receipt_Signature_Certified	I certify the digital receipt signature above represents my signature for Chain of Custody purposes.	String	255	A yes check box to certify the digital signature represents the individual signature for the chain of custody purposes.
Receipt_Agency	Receipt Agency	String	255	The agency who is receiving the samples.
Receipt_Date	Receipt Date	Date	255	The receipt date of the samples (M/DD/YYYY).
CreationDate	CreationDate	Date	n/a	The date and time the sample data was created
Creator	Creator	Text	128	The ArcGIS Online username of the person who entered in the sample collection data.

<b>Field Name</b>	<b>Alias</b>	<b>Type</b>	<b>Length</b>	<b>Description</b>
EditDate	EditDate	Date	n/a	The date and time the sample data was last edited
Editor	Editor	Text	128	The ArcGIS Online username of the person who last edited the sample collection data

Table 5. Field descriptions for Pre-Trip and Post-Trip & QA/QC Summary Survey123 form feature layer

Field Name	Alias	Type	Length	Description
Case Number	caseNumber	Integer	5	Composite number that has a 5-digit “case” number, a series of unique numbers assigned by the Whitney Genetics Lab (WGL) to each Fish and Wildlife Conservation Office (FWCO) at the start of the sampling year and provided for each individual planned sampling event.
fieldOperationsManager	Field Operations Manager	String	255	The first and last name of the individual who leads the planning and implementation of a trip for sampling.
fieldOperationsManagerPhone	Field Operations Manager Phone	String	255	The phone number of the field operations manager.
postTripSummary	Post Trip Summary	String	255	Sampling plan was completed as described in Pre-Trip form section OR Sampling plan was NOT completed as described in Pre-Trip form section: conformed, deviated
postTripDev	Post Trip Dev	String	255	List and describe any deviations from the QAPP, include reasoning. Only available if any “No” answer is selected in Sampling Quality
boatDecon	Boat Decontamination if the Field	String	3	Yes or No, boat was decontaminated.
samplingCollection	Sampling Collection Procedures	String	3	Yes or No, sampling collection procedures were followed.

Field Name	Alias	Type	Length	Description
navigation	Navigation to Sample Sites	String	3	Yer or No, navigation to sample sites was followed.
samplingDev	Sampling Deviations	String	255	List and describe any deviations from the QAPP, include reasoning. Only available if any "No" answer is selected in Sample Quality section of form.
processingDecon	Decontamination of Processing Equipment	String	3	Yes or No to decontamination of processing equipment.
processing	Sample Processing Procedure	String	3	Yes or No, sample processing procedure was followed.
processingDev	Processing Deviations	String	255	List and describe any deviations from the QAPP, include reasoning. Only available if any "No" answer is selected in Processing Quality section of form.
dataQAQCSpecialist	Data QAQC Specialist	String	255	First and last name of individual who was the Data QA/QC Specialist
Sampling_Quality	Sampling Quality	String	255	The Sampling QA/QC Specialist observed and witnessed adherence to the QAPP in the following criteria. A "Yes" or "No" check box is selected for each criteria "Boat decontaminated in the field", "Sample collection procedure", "Navigation to sample sites"
Sampling_QAQC_Specialist	Sampling QA/QC Specialist (first and last name)	Text	255	Individual who was the Sampling QA/QC Specialist

<b>Field Name</b>	<b>Alias</b>	<b>Type</b>	<b>Length</b>	<b>Description</b>
Processing_QAQC_Specialist	Processing QA/QC Specialist (first and last name)	Text	255	Individual who was the Processing QA/QC Specialist
dataconfirmation	Data Confirmation	String	3	The Data QA/QC Specialist confirms that data are accurate and represent the locations and conditions in which samples were collected. A "Yes" or "No" check box is selected.
dataDev	Data Deviations	String	255	List and describe any deviations, include reasoning. Only available if "No" is selected in Data Confirmation
Data_QAQC_Specialist	Data QA/QC Specialist (first and last name)	Text	255	Individual who was the Data QA/QC Specialist
tripNotes	Trip Notes	String	255	General notes, issues, or observations about sample collection and processing
eDNALeadSig	Signature	Text	255	First and last name of individual who was the eDNA Lead, certifying that the information input is correct and accurate and that they communicated with the field staff for the information that is entered.
eDNALeadCert	eDNA Lead Certification	String	3	A yes check box to certify the digital signature represents the individual signature for Exhibit 2 purposes.
eDNALeadDate	eDNA Date	Date	n/a	Date the eDNA Lead submits Post Trip form information (M/DD/YYYY).

<b>Field Name</b>	<b>Alias</b>	<b>Type</b>	<b>Length</b>	<b>Description</b>
qualitySpecialist	Quality Specialist	String	255	Individual who is the eDNA Processing QA/QC Specialist and has reviewed all trip form information for accuracy and completeness.
qualityStatus	Quality Status	String	16	Status of the quality check for all trip information conducted by the eDNA Processing QA/QC Specialist: Approved, Needs Correction, Pending
reviewDate	Review Date	Date	n/a	Date of the quality check by the eDNA Processing QA/QC Specialist for all trip information.
tripReviewNotes	Trip Review Notes	String	255	Any notes from the eDNA Processing QA/QC Specialist for corrections.
CreationDate	CreationDate	Date	n/a	The date and time the sample data was created
Creator	Creator	Text	128	The ArcGIS Online username of the person who entered in the sample collection data.
EditDate	EditDate	Date	n/a	The date and time the sample data was last edited
Editor	Editor	Text	128	The ArcGIS Online username of the person who last edited the sample collection data

Table 6. Field descriptions for Pre-Trip Daily Plan related table to the Pre-Trip and Post-Trip & QA/QC Summary Survey123 form feature layer

<b>Field Name</b>	<b>Alias</b>	<b>Type</b>	<b>Length</b>	<b>Description</b>
dailyPlanDate	Date	Date	n/a	The date of sampling.
dailySamples	Number of Samples	Integer	3	The number of samples being collected for the sampling date.
dailyBlanks	Number of Blanks	Integer	3	The number of blank samples being collected for the sampling date.
boatOperator	Boat Operator	String	255	The first and last name of the boat operator for the sampling date.
sampleCollector	Sample Collector	String	255	The first and last name of the sample collector for the sampling date.
sampleAssistant	Sample Assistant	String	255	The first and last name of the sample assistant for the sampling date.
dataRecorder	Data Recorder	String	255	The first and last name of the data recorder for the sampling date.
samplingQAQCSpecialist	Sampling QAQC Specialist	String	255	The first and last name of the sampling QAQC

Field Name	Alias	Type	Length	Description
				specialist for the sampling date.
processingQAQCSpecialist	Processing QAQC Specialist	String	255	The first and last name of the processing QAQC specialist for the sampling date.
sampleProcessor	Sample Processor	String	255	The first and last name of the sample processor for the sampling date.
boatRampCoordinates	Boat Ramp Coordinates	String	255	The latitude and longitude of the first boat ramp launch for the sampling date.
planDescription	Plan Description	String	1000	The description of the sampling plan for the date of sampling.
CreationDate	CreationDate	Date	n/a	The date and time the sample data was created
Creator	Creator	Text	128	The ArcGIS Online username of the person who entered in the sample collection data.
EditDate	EditDate	Date	n/a	The date and time the sample data was last edited
Editor	Editor	Text	128	The ArcGIS Online username of the person who last

<b>Field Name</b>	<b>Alias</b>	<b>Type</b>	<b>Length</b>	<b>Description</b>
				edited the sample collection data

## Data Workflows

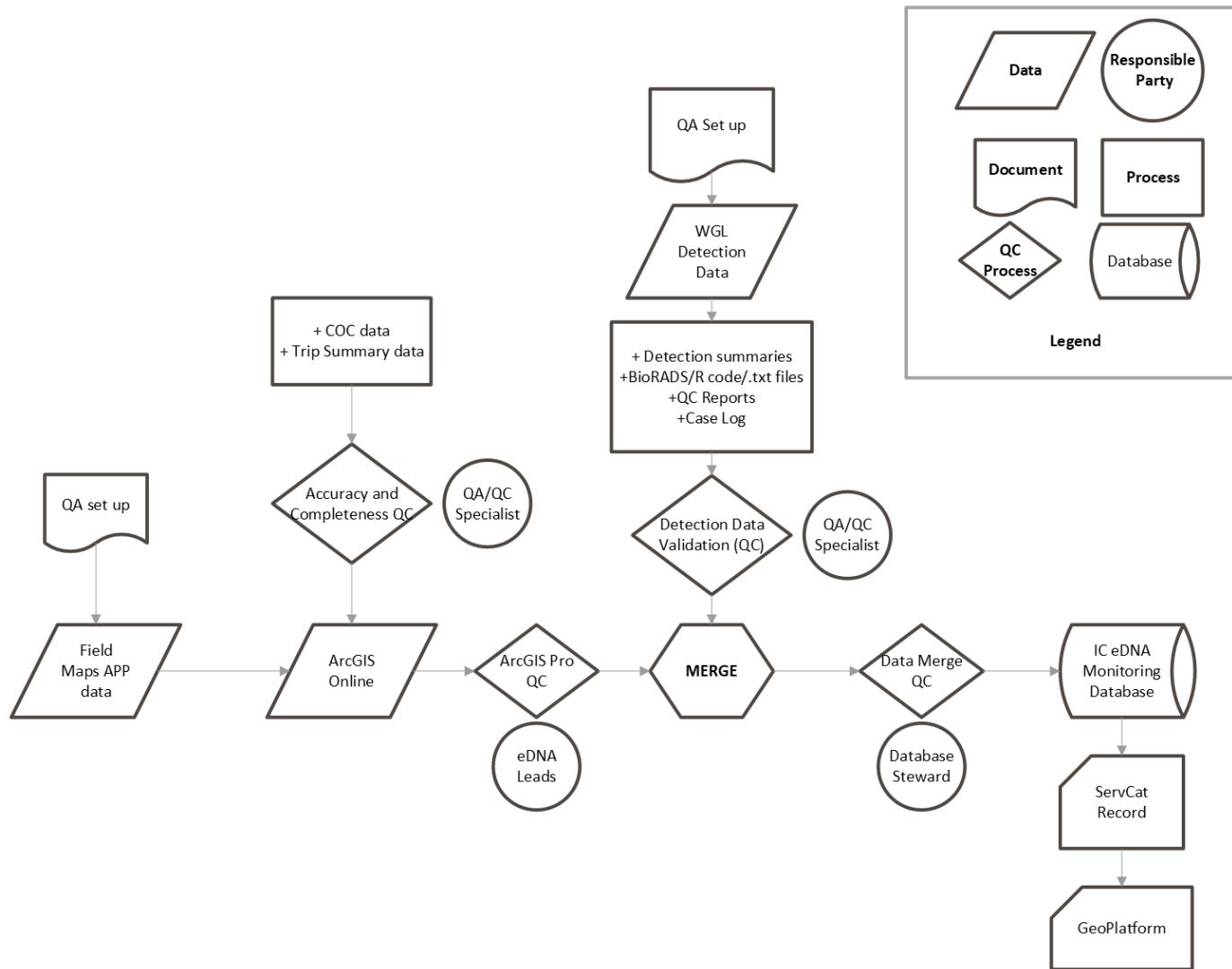


Figure 1. Invasive Carp eDNA Monitoring Program overall data flow from FWCO field collection, incorporating WGL sample processing and the resulting Invasive Carp eDNA Monitoring Enterprise Database.

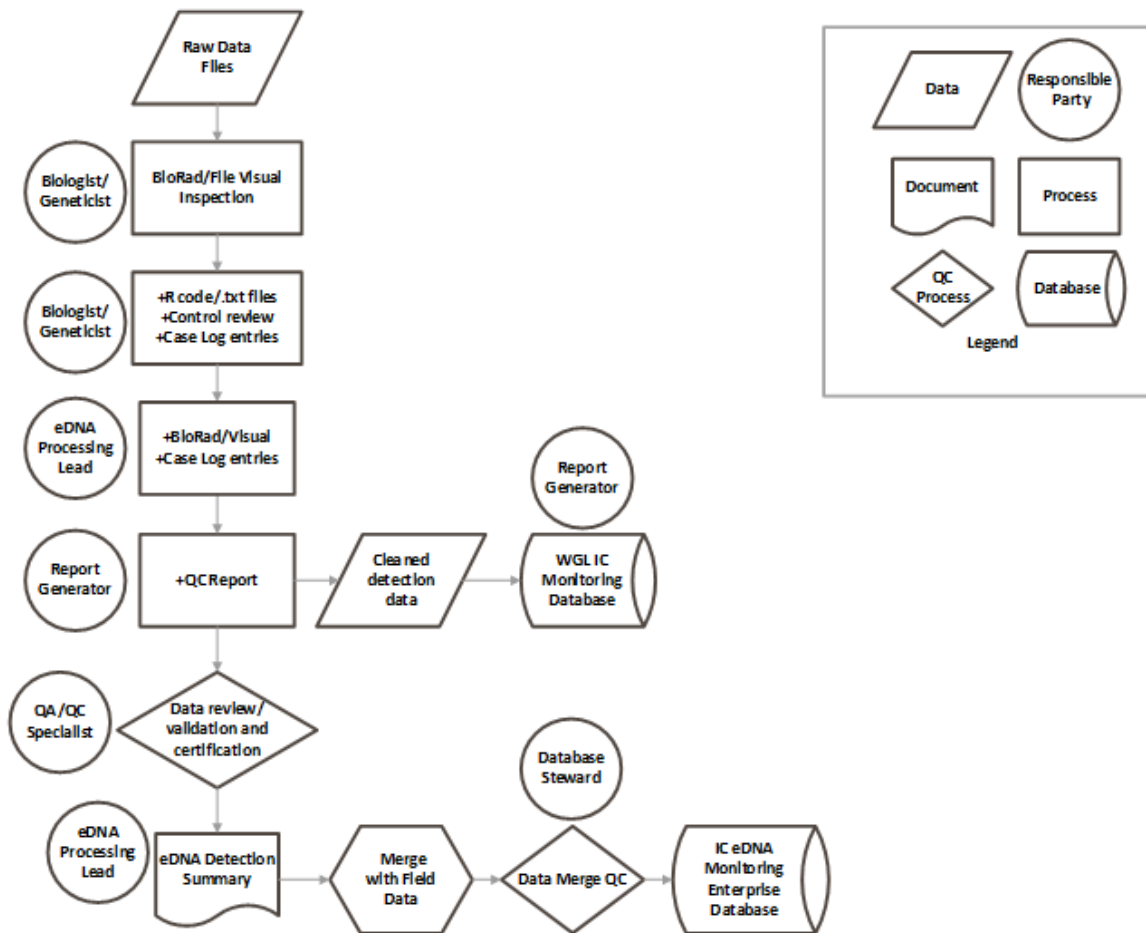


Figure 2. Data flow for detection results generated in WGL for the Invasive Carp eDNA Monitoring Program.