Northwest Florida Water Management District

Hydrologic Monitoring

Location Visit Logical Model

Location Visit

Asset Management

Enumerations

Location
- Shape: Point
- NWFID: Text
- Name: Text
- Project: Integer
- FLUWID: Text
- HasDataLogger: Yes/No
- HasRainfall: Yes/No
- HasStage: Yes/No
- HasGroundwater: Yes/No
- HasConductivity: Yes/No
- HasADVM: Yes/No
- HasADVMBattery: Yes/No
- HasDischarge: Yes/No
- HasTemperature: Yes/No
- HasWaterQuality: Yes/No
- Comments: Text
- Photos: Attachment

Consider Attribute Rules to enforce valid combinations of Has* properties (see location_types.xlsx)

User needs to know project to bill time correctly (e.g. District vs. contract location)

Only used for Stage or Groundwater without Conductivity or ADVM

This is a flag to capture temperature from Stage/Groundwater sensor

LocationVisit
- VisitDate: Timestamp
- Staff: Hydro Staff
- InventoryVerified: Yes/No
- BatteryDOA: Yes/No
- BatteryCondition: Battery Condition
- BatteryVoltage: Decimal
- BatteryCondition2: Battery Condition
- BatteryVoltage2: Decimal
- BatteryReplaced: Yes/No
- BatteryReplacementDate: Timestamp
- BatteryReplacementException: Battery Replacement Exception
- BatteryReplacementComments: Text
- DesiccantEnclosure: Desiccant Maintenance
- DesiccantStage: Desiccant Maintenance
- DesiccantGroundwater: Desiccant Maintenance
- DesiccantComments: Text
- DataLoggerRecordStart: Timestamp
- DataLoggerRecordEnd: Timestamp
- DataLoggerTime: Timestamp
- DataLoggerTimeActual: Timestamp
- DataLoggerTimeAdjAmount: Integer
- DataLoggerTimeAdjusted: Yes/No
- DataLoggerTimeAdjDate: Date
- DataLoggerTimeAdjException: Time Adjustment Exception
- DataLoggerTimeAdjComments: Text
- DataLoggerTime2: Timestamp
- DataLoggerTimeActual2: Timestamp
- DataLoggerTimeAdjAmount2: Integer
- DataLoggerTimeAdjusted2: Yes/No
- DataLoggerTimeAdjDate2: Date
- DataLoggerTimeAdjException2: Time Adjustment Exception
- DataLoggerTimeAdjComments2: Text
- DataLoggerTimeSeries: Attachment
- RainfallBucketCleaned: Yes/No
- RainfallBucketException: Rainfall Exception
- RainfallBucketComments: Text
- RainfallMechanismChecked: Yes/No
- RainfallMechanismException: Rainfall Exception
- RainfallMechanismComments: Text
- ADVMBatteryDOA: Yes/No
- ADVMBatteryCondition: Battery Condition
- ADVMBatteryVoltage: Decimal
- ADVMBatteryReplaced: Yes/No
- ADVMBatteryReplacementDate: Timestamp
- ADVMBatteryReplacementException: Battery Replacement Exception
- ADVMBatteryReplacementComments: Text
- ADVMRecordStart: Timestamp
- ADVMRecordEnd: Timestamp
- ADVMDischargeRecordStart: Timestamp
- ADVMDischargeRecordEnd: Timestamp
- ADVMBeamCheckedInitial: Yes/No
- ADVMBeamCheckInitialException: ADVM Beam Check Initial Exception
- ADVMBeamCheckInitialComments: Text
- ADVMBeamCheckedSecondary: Yes/No
- ADVMBeamCheckSecondaryExeception: ADVM Beam Check Secondary Exception
- ADVMBeamCheckSecondaryComments: Text
- ADVMCleaned: Yes/No
- ADVMCleanedException: ADVM Cleaned Exception
- ADVMCleanedComments: Text
- ADVMMaintenance: ADVM Maintenance
- ADVMTimeSeries: Attachment
- DischargeRecordStart: Timestamp
- DischargeRecordEnd: Timestamp
- DischargeStageStart: Decimal
- DischargeStageEnd: Decimal
- DischargeVolume: Decimal
- DischargeUncertainty: Decimal
- DischargeDataFiles: Attachment
- WaterQualitySensorPulled: Yes/No
- WaterQualitySensorPullDate: Timestamp
- WaterQualityPurgeStart: Timestamp
- WaterQualitySamplingEnd: Timestamp
- WaterQualitySensorReinstallDate: Timestamp

Set automatically when starting survey

Store as delimited text instead of related table to facilitate survey UI

If battery is replaced, only store final voltage

Includes transect photos

If multiple files, start time of earliest file

If multiple files, end time of latest file

Minutes, as signed integer
Positive: Adjusted to later time
Negative: Adjusted to earlier time

Hydro Staff
- NAME

ADVM Beam Check Initial Exception
- ?

ADVM Beam Check Secondary Exception
- ?

ADVM Cleaned Exception
- ?

ADVM Maintenance
- ?

LocationIssue
- Type: Location Issue Type
- Comments: Text
- Photo: Attachment

Location Issue Type
- Conduit
- Update inventory
- Invalid punch
- Missing measuring point
- Solar panel
- Vandalism
- Other

Data logger captured reading after replacing battery, but before adjusting time

RainfallTips
- FalseTipCount: Decimal
- FalseTipDate: Timestamp
- FalseTipRemoved: Yes/No

In **inches**, not count

StageMeasurement
- MeasureDate: Timestamp
- ManualLevel: Decimal
- WaterLevel: Decimal
- SensorLevel: Decimal
- SensorAdjustmentAmount: Decimal
- SensorAdjusted: Yes/No
- SensorAdjustmentDate: Timestamp
- SensorAdjustmentException: Stage Adjustment Exception
- SensorAdjustmentComments: Text

Computed: MeasuringPoint.Elevation + ManualLevel

Computed: WaterLevel - SensorLevel

GroundwaterMeasurement
- MeasureDate: Timestamp
- ReadingType: Reading Type
- ManualLevel: Decimal
- WaterLevel: Decimal
- SensorLevel: Decimal
- SensorAdjustmentAmount: Decimal
- SensorAdjusted: Yes/No
- SensorAdjustmentDate: Timestamp
- SensorAdjustmentException: Groundwater Adjustment Exception
- SensorAdjustmentComments: Text

Computed: MeasuringPoint.Elevation + ManualLevel

Computed: WaterLevel - SensorLevel

ConductivityMeasurement
- MeasureDate: Timestamp
- ReadingType: Reading Type
- SerialNumber: Conductivity Serial Number
- ManualLevel: Integer
- SensorLevel: Integer
- SensorAdjustmentAmount: Integer
- SensorAdjusted: Yes/No
- SensorAdjustmentDate: Timestamp
- SensorAdjustmentException: Conductivity Adjustment Exception
- SensorAdjustmentComments: Text
- CalibrationStandard: Conductivity Standard
- VerificationStandard: Conductivity Standard
- VerificationLevel: Integer
- VerificationDate: Timestamp

Computed: ManualLevel - SensorLevel

TemperatureMeasurement
- MeasureDate: Timestamp
- ReadingType: Reading Type
- SerialNumber: Temperature Serial Number
- ManualLevel: Decimal
- SensorLevel: Decimal
- SensorSource: Temperature Source
- SensorFailed: Yes/No

May have multiple measurements:
1) Long visit, tide changing
2) Conductivity and ADVM at same site
Aquarius only stores temperature value/time, not why, what sensor, etc.

Using specific domain instead of generic Yes/No to allow for more detailed conditions in the future, if necessary

Battery Condition
- Good
- Poor

Battery Replacement Exception
- No materials
- Has solar panel
- Other

Low now, but has solar panel so will charge on its own

Desiccant Maintenance
- Verified
- Replaced
- Needs replacement - No materials
- Other

Rainfall Exception
- No ladder
- Raining
- Other

Stage Adjustment Exception
- Environmental
- Safety
- Time
- Weather
- Wind
- Other

Groundwater Adjustment Exception
- Before water quality sample
- Low conductivity
- Time
- Weather
- Other

Will adjust after taking water quality sample

Conductivity Adjustment Exception
- Missing standard
- Sensor failed
- Time
- Unable to pull sensor
- Other

Set on failure after calibration attempt

Conductivity Serial Number
- SERIAL NUMBERS

Conductivity Standard
- NUMBER

Temperature Serial Number
- SERIAL NUMBERS

Temperature Source
- ADVM
- Conductivity
- Transducer

MeasuringPoint
- Name: Text
- AquariusID: GUID
- Description: Text
- Elevation: Decimal
- IsActive: Yes/No
- DisplayOrder: Integer
- Comments: Text
- Photo: Attachment

Must match Aquarius name
Not unique

Human-assigned sort order for display in survey

DataLogger
- Type: Data Logger Type
- SerialNumber: Text
- LowVoltage: Decimal
- Comments: Text

Make/model

Volts or percent, depending on model

Not modeled yet
Need to document
Why we need this

Data Logger Type
- ?

Sensor
- Type: Sensor Type
- SerialNumber: Text
- Comments: Text

Sensor Type
- ?

Built in to Aquarius
Try to get survey to pick this value for user automatically

Reading Type
- Routine
- Routine before
- Routine after
- After calibration
- Reset before
- Reset after
- Cleaning before
- Cleaning after

Yes/No
- Yes
- No

ORGANIZATION
Northwest Florida Water Management District

DESIGNED BY
MANNION GEOSYSTEMS

STATUS
DRAFT

REVISED
2023-04-18

ABSTRACT

This diagram depicts objects pertaining to NWFWMD hydrologic monitoring field activities. This data model is logical in nature, seeking to illustrate the conceptual objects, their properties, and relationships, with limited consideration for the specific information technology platform(s) on which the model may be implemented.

The graphic syntax is based on UML Class Diagram notation, with some adaptations to 1) simplify presentation for a general audience, and 2) incorporate elements of ArcGIS, the District's enterprise geospatial software platform, that are important to downstream physical modeling efforts and that are not otherwise well-represented in the UML standard.

The modeling effort is ongoing. Please contact the NWFWMD GIS team with comments or corrections.