Moose Monitoring Database Application

Table of contents

Overview

NPS Moose Monitoring Database Application

Overview

Moose population structure and abundance are monitored the National Park Service in Alaska. Methods follow the protocols developed by the Arctic and Central Alaska Inventory and Monitoring Networks and rely on the GeoSpatial Estimator toolset described in Kellie and Delong, 2006.

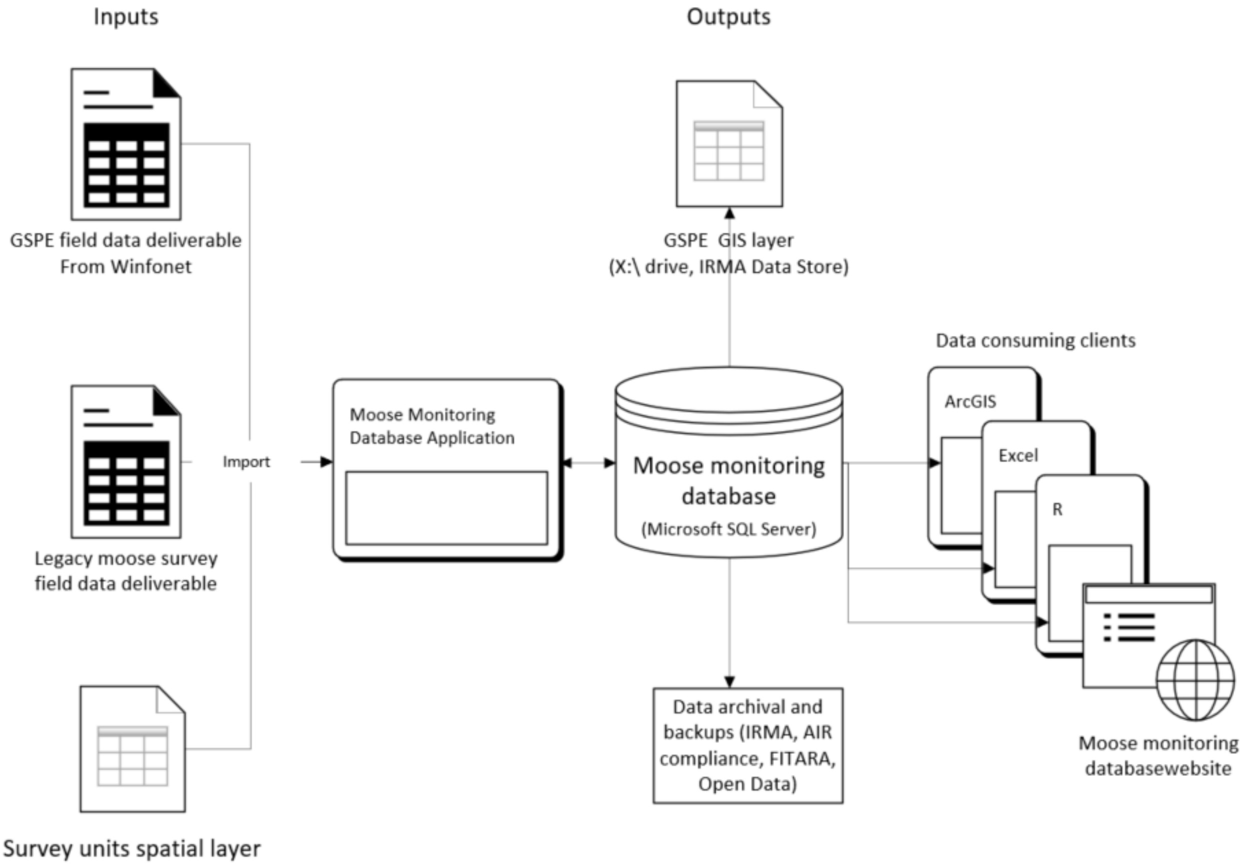
From 2006 until 2016 moose monitoring data was stored in ADF&G's Winfonet system. NPS policy now requires that the data reside in an authorized Department of the Interior data store. Development of a database began in 2015, data migration started in 2016 and was substantially finished in 2022, at which time a front-end application was developed. This document describes the moose monitoring data management system, database and front-end application.

Sensitivity statement

The Moose Monitoring Database Application contains information about a species of commercial interest, some or all of which may be subject to data sharing agreements with partner agencies. Please read and follow the directives of each participating Park superintendent as outlined in memorandums available in the IRMA Data Store regarding protected data (search on *'Handling of Protected Natural Resource Data'* for each Park in question. Obtain permission of the Park moose biologist and Park superintendent before sharing data beyond the NPS.

Conceptual diagram

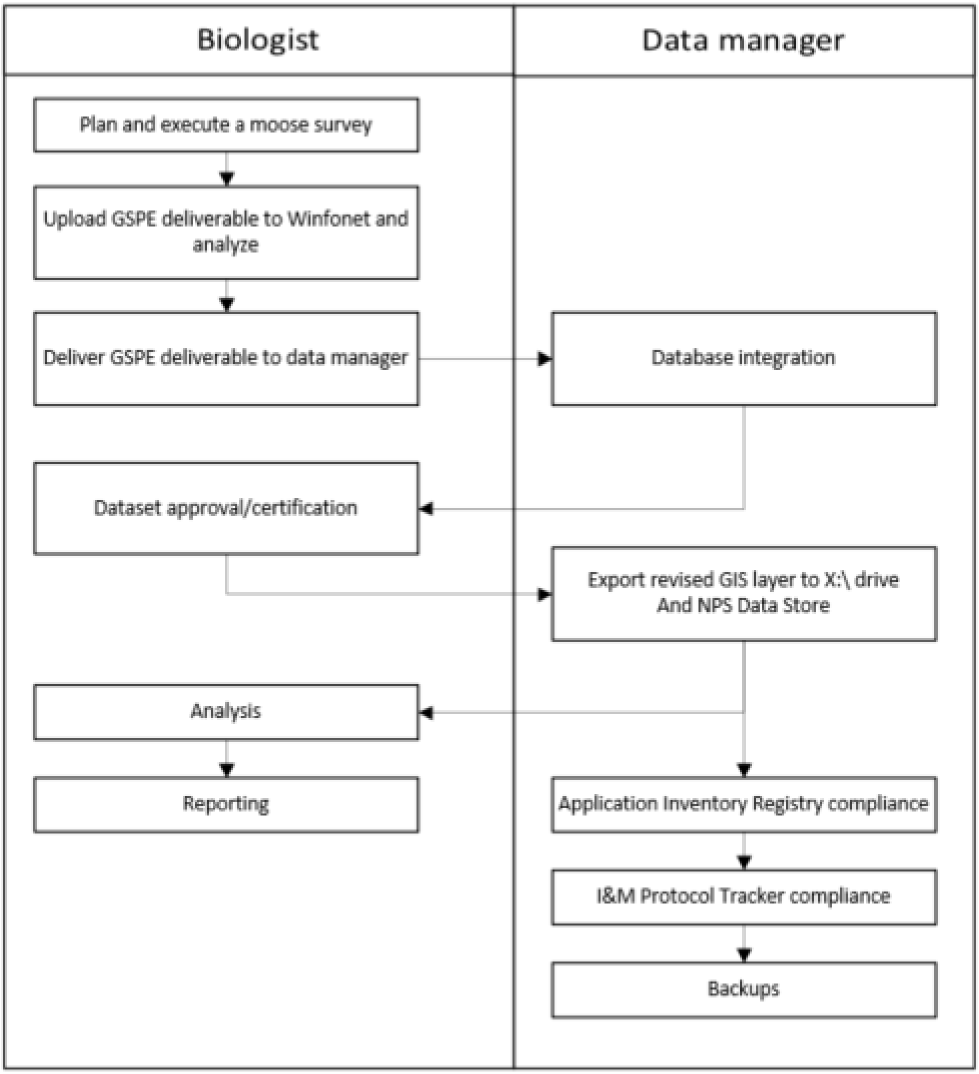
The heart of the moose monitoring system is the Moose database hosted on an SQL Server at the NPS Fairbanks Administrative Center.



Work flow

The moose monitoring work flow can be summarized simply in the steps below

1. Collect data according to ARCN/CAKN protocol
2. Process GSPE deliverable in Winfonet
3. Integrate GSPE deliverable to ARCN/CAKN moose monitoring database
4. Analyze
5. Report


Biologist
Data manager
Plan and execute a moose survey
Upload GSPE deliverable to Winfonet and analyze
Deliver GSPE deliverable to data manager
Database integration
Dataset approval/certification
Export revised GIS layer to X:\ drive And NPS Data Store
Analysis
Reporting
Application Inventory Registry compliance
I&M Protocol Tracker compliance
Backups

Resources

Resources available to moose monitoring personnel include:\

Resource	Location
Data deliverable files	ARCN O:\Monitoring\Vital Signs\Moose\Data CAKN J:\Monitoring\Moose\Data
Moose monitoring master Project reference in the IRMA Data Store	ARCN: DataStore - Project - (Code: 2222140) (nps.gov) CAKN: DataStore - Project - (Code: 2220369) (nps.gov)
Moose monitoring database	See Database documentation
Moose monitoring database application	NPS-ARCN-CAKN/Moose3 (github.com)
Alaska Department of Fish and Game's Winfonet database	Home (alaska.gov)

System administration

ARCN/CAKN FAC IT

Obtaining/installing the Moose Monitoring Database Application

Obtaining/installing the Moose Monitoring Database Application

The NPS ARCN/CAKN Moose Monitoring Database Application is available to authorized NPS wildlife biologists through the IRMA Data Store (https://irma.nps.gov/DataStore/Reference/Profile/2295016).

Database permissions

Contact either of the Arctic or Central Alaska Network data managers for database permissions.

Installation

Installation is simple: just download the zipped file archive to your computer and unzip it. Double click Moose.exe to start the application. A help file is included.

Contact either of the Arctic or Central Alaska Network data managers if you have any problems.

Adding a new moose survey and GSPE data deliverable to the moose monitoring database

Adding a new moose survey and GSPE data deliverable to the moose monitoring database

Adding a new survey to the Moose Monitoring Database Application involves two (or possibly three) steps that must be performed in order:

1. Add a Survey record to the GSPE_Surveys database table
2. Add related GSPE records to the GSPE database table
3. If you are trying to add legacy moose survey data rather than standard GSPE data then it's possible the survey units do not exist in the database. In this case add the data as above but leave the SurveyUnitSet fields blank or NULL. You will have to get your data manager to add the survey unit polygons to the database and relate them to the survey data. There is currently no within-application functionality to accomplish this task.

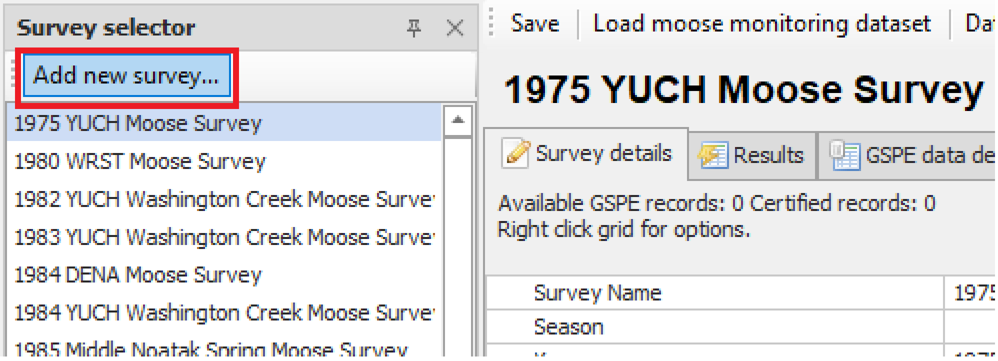
Prerequisites

- At minimum, datawriter privileges on the database. Contact your data manager.
- SQL Server Management Studio software.

Procedure

Adding a new Survey record

1. If the survey does not exist then add a new survey record to the database by clicking the Add new survey... button.


Survey selector
Add new survey...
1975 YUCH Moose Survey
1980 WRST Moose Survey
1982 YUCH Washington Creek Moose Surve
1983 YUCH Washington Creek Moose Surve
1984 DENA Moose Survey
1984 YUCH Washington Creek Moose Surve
1985 Middle Noatak Spring Moose Survey
Save
Load moose monitoring dataset
Da
1975 YUCH Moose Survey
Survey details
Results
GSPE data de
Survey Name
197
Season

Available GSPE records: 0 Certified records: 0
Right click grid for options.

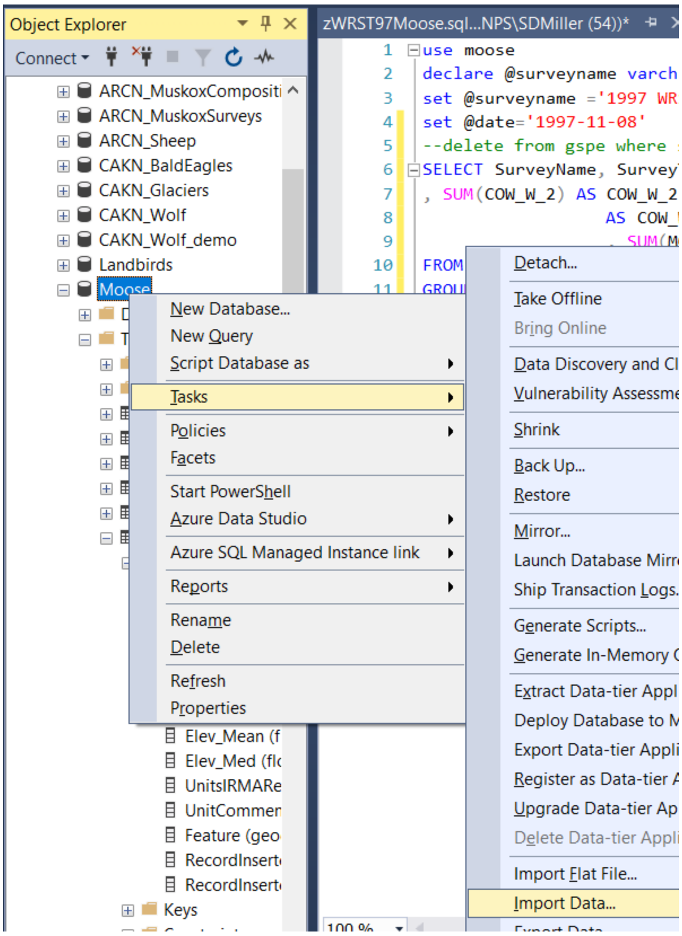
2.
3. Answer the wizard questions and save your work after the new survey appears in the surveys inventory.

Importing GSPE records for the new Survey

As of 2022 there is no tool in the Moose Monitoring Database Application to directly import GSPE data for a new Survey. You can use Microsoft SQL Server Management Studio to import the records, or other data manipulation software, but really, the easiest way is to give the deliverable to the ARCN data manager for import. The method using SSMS is shown below.

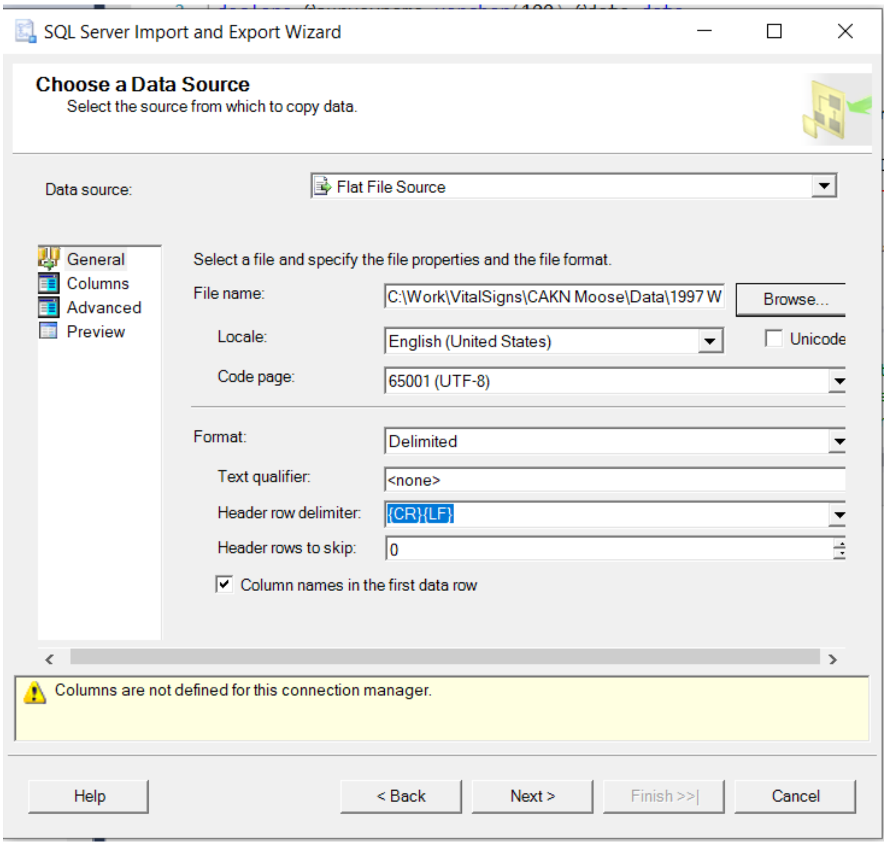
Procedure

1. Start SSMS
2. Navigate to the Moose database and then locate the Sql Server Import/Export Tool: Moose -> Tasks -> Import Data...
3. *TIP: Befor you import the data in the GSPE spreadsheet, make sure the source dataset does not have commas in any of the fields, or, if commas exist, that the text fields are surrounded by quotes.*
4. *TIP: To ensure that the data you import gets associated with the standard GSPE survey unit polygons, make sure your input table has a column titled **SurveyUnitSet** and each cell in this column reads **'ADFG GSPE'**.*
5. Start the Import Data... tool in Sql Server Management Studio by right clicking the database and selecting Tasks -> Import Data...

6. 

```
use moose
declare @surveyname varch
set @surveyname ='1997 WR
set @date='1997-11-08'
--delete from gspe where
SELECT SurveyName, Survey
, SUM(COW_W_2) AS COW_W_2
                         AS COW_
                        , SUM(M
FROM
GROU
```

7. Choose the GSPE deliverable as a data source



SQL Server Import and Export Wizard

Choose a Data Source

Select the source from which to copy data.

Data source: Flat File Source

Select a file and specify the file properties and the file format.

File name: C:\Work\VitalSigns\CAKN Moose\Data\1997 W

Locale: English (United States)

□ Unicode

Code page: 65001 (UTF-8)

Format: Delimited

Text qualifier: <none>

Header row delimiter: {CR}{LF}

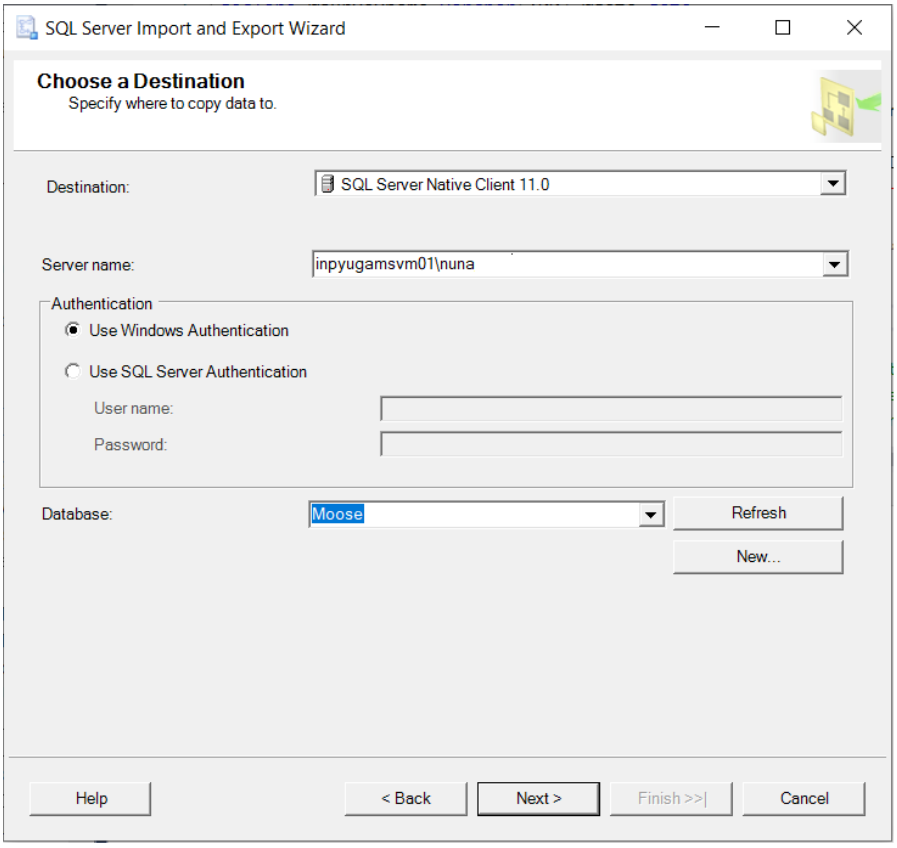
Header rows to skip: 0

☑ Column names in the first data row

Columns are not defined for this connection manager.

8.

9. Choose the Moose database on the nuna SQL Server (the. Contact the ARCN/CAKN data manager for database details and/or permissions. You must have datawriter privileges at minimum).



SQL Server Import and Export Wizard

Choose a Destination

Specify where to copy data to.

Destination: SQL Server Native Client 11.0

Server name: inpyugamsvm01\nuna

Authentication

● Use Windows Authentication

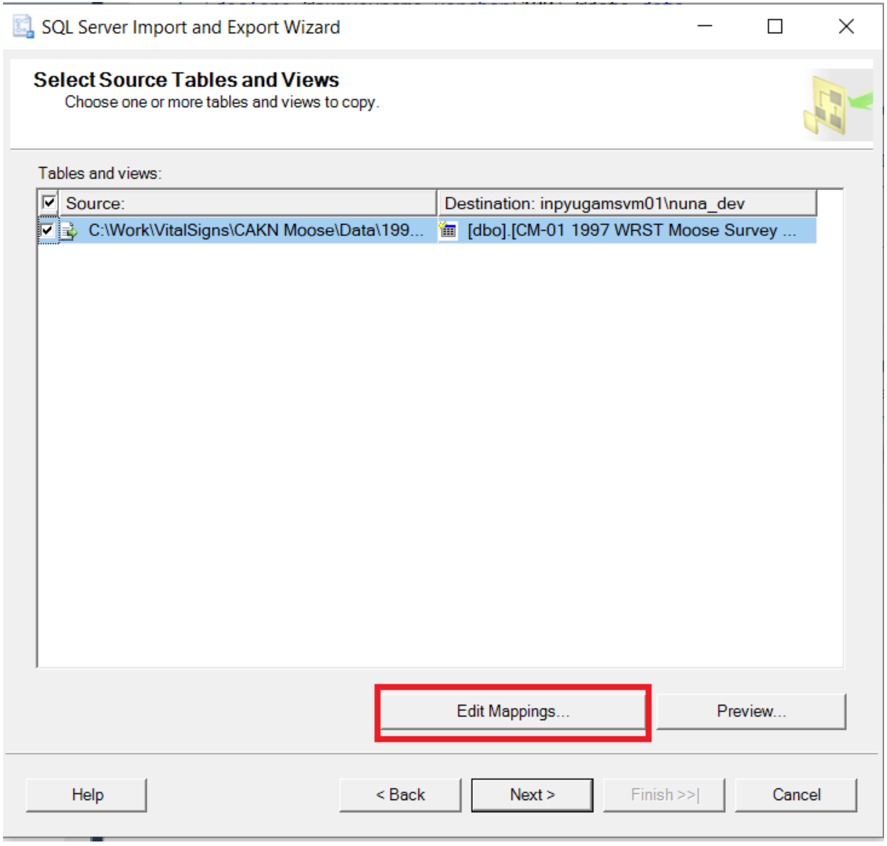
○ Use SQL Server Authentication

User name:

Password:

Database: Moose

10.
11. Click Next
12. Map the source columns to the database columns. Choose Edit Mappings...



SQL Server Import and Export Wizard

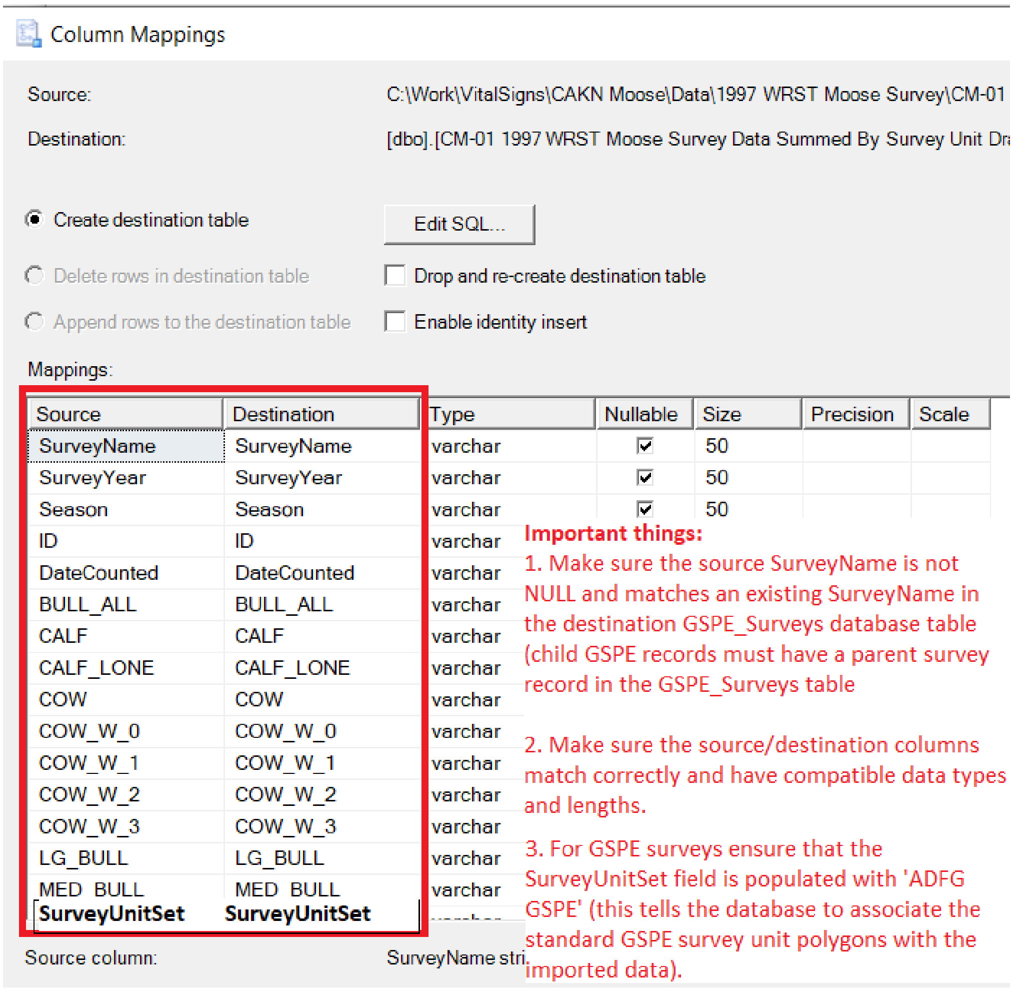
Select Source Tables and Views

Choose one or more tables and views to copy.

Tables and views:

☑ Source:	Destination: inpyugamsvm01\nuna_dev
☑ C:\Work\VitalSigns\CAKN Moose\Data\199...	[dbo].[CM-01 1997 WRST Moose Survey ...

13.
14. Map the columns ensuring the source/destination columns and data types are compatible



Column Mappings

Source: C:\Work\VitalSigns\CAKN Moose\Data\1997 WRST Moose Survey\CM-01

Destination: [dbo].[CM-01 1997 WRST Moose Survey Data Summed By Survey Unit Dr

● Create destination table

○ Delete rows in destination table

○ Append rows to the destination table

□ Drop and re-create destination table

□ Enable identity insert

Mappings:

Source	Destination	Type	Nullable	Size	Precision	Scale
SurveyName	SurveyName	varchar	☑	50		
SurveyYear	SurveyYear	varchar	☑	50		
Season	Season	varchar	☑	50		
ID	ID	varchar				
DateCounted	DateCounted	varchar				
BULL_ALL	BULL_ALL	varchar				
CALF	CALF	varchar				
CALF_LONE	CALF_LONE	varchar				
COW	COW	varchar				
COW_W_0	COW_W_0	varchar				
COW_W_1	COW_W_1	varchar				
COW_W_2	COW_W_2	varchar				
COW_W_3	COW_W_3	varchar				
LG_BULL	LG_BULL	varchar				
MED_BULL	MED_BULL	varchar				
SurveyUnitSet	SurveyUnitSet					

Source column: SurveyName stri

Important things:

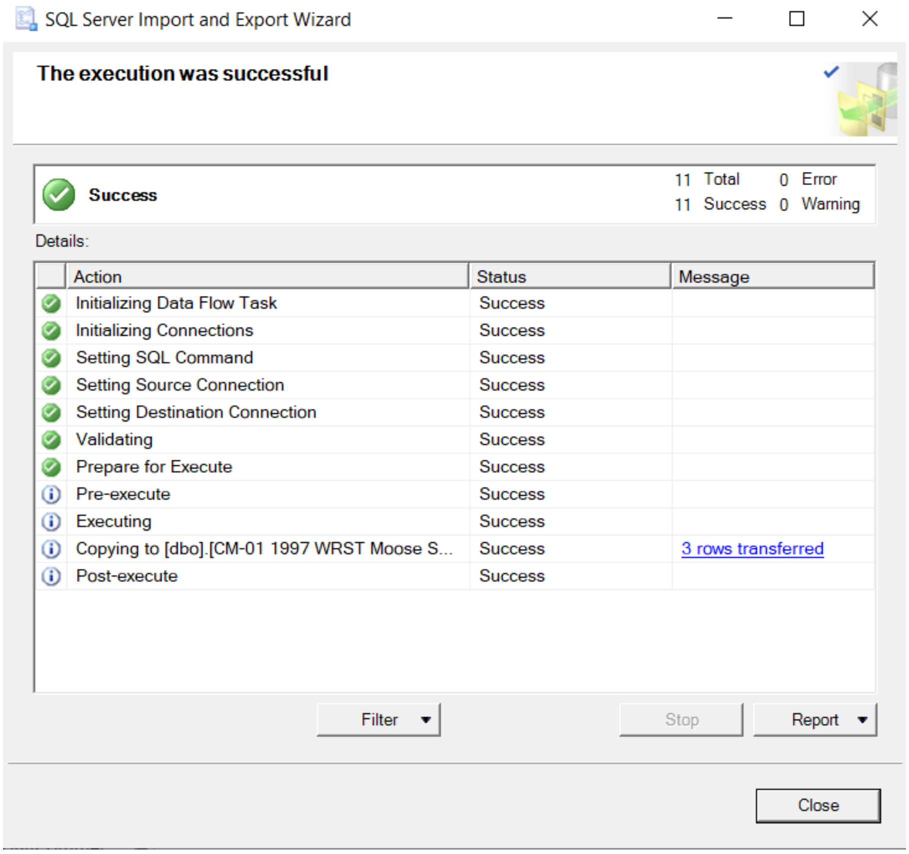
1. Make sure the source SurveyName is not NULL and matches an existing SurveyName in the destination GSPE_Surveys database table (child GSPE records must have a parent survey record in the GSPE_Surveys table

2. Make sure the source/destination columns match correctly and have compatible data types and lengths.

3. For GSPE surveys ensure that the SurveyUnitSet field is populated with 'ADFG GSPE' (this tells the database to associate the standard GSPE survey unit polygons with the imported data).

15.

16. Double check all settings are correct and execute. If all goes well you should see something like this:



SQL Server Import and Export Wizard

The execution was successful

Success

11 Total 0 Error
11 Success 0 Warning

Details:

Action	Status	Message
Initializing Data Flow Task	Success	
Initializing Connections	Success	
Setting SQL Command	Success	
Setting Source Connection	Success	
Setting Destination Connection	Success	
Validating	Success	
Prepare for Execute	Success	
Pre-execute	Success	
Executing	Success	
Copying to [dbo].[CM-01 1997 WRST Moose S...	Success	3 rows transferred
Post-execute	Success	

17.

18. Check your work to be sure the data imported correctly.
19. Validate that the destination data exactly matches the source data. This is most easily done by cross-summing the source numeric values in a pivot table in Excel and comparing them to a similar SQL query or by using the Moose Monitoring Database Application's pivot tool. Scan the comments and text fields visually.
20. Certify the dataset, if warranted. Compare the record counts, summed values, etc., against the GSPE Winfonet report. If a formal report for the dataset exists, then attempt to regenerate any summary tables. If all looks good and the biologist approves, then certify the survey dataset.

Adding a new set of survey units

Adding a new set of survey units

You shouldn't normally need to add new survey units to the moose database. Adding new survey units is a rare event exclusively associated with importing older moose surveys that did not use the standard GSPE survey units. If you are importing a standard GSPE deliverable then you should not have to add the GSPE units because they already exist in the database. Just make sure the records for your survey in the GSPE table have the field SurveyUnitSet set to *'ADFG GSPE'*.

If you are importing an older moose survey that did not use the standard GSPE units, then you may have to import survey units from a GIS layer into the database. This is a task requiring advanced database skills and should only be done by an experienced database administrator.

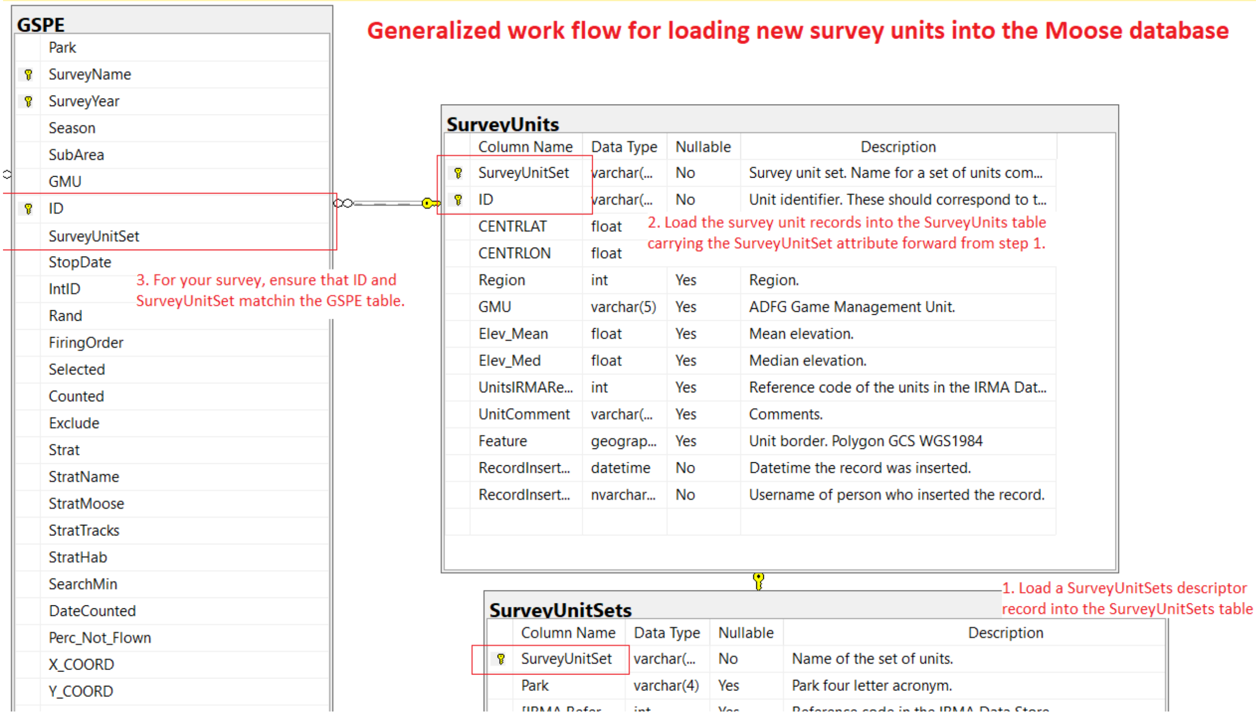
Survey units were often re-used over many years so eliminate the possibility that the survey units don't already exist in the database. The 1978 DENA moose survey re-used the 1974 units, for example.

There is currently (Nov. 2022) no functionality within the Moose Monitoring Database Application to add a new set of moose survey unit polygons. You will have to do this task using Python and SQL. You can modify the arcpy script in this section to produce a script of SQL INSERT queries that can be executed in SQL Server Management Studio to insert the units.

How survey units are related to survey records

An understanding of how survey units are related to survey data records is important for success when importing new survey records. To import survey units your objective is to:

1. Create a new SurveyUnitSet record in the SurveyUnitSets table to describe the set of units.
2. Load the new survey units into the SurveyUnits table, matching the new records to the SurveyUnitSet you chose in step 1. The survey unit polygons should be in Geographic Coordinate System, World Geodetic Survey 1984 spheroid. These polygons should be loaded into the Feature field of the SurveyUnits table.
3. Matching the SurveyUnitSet fields in the GSPE table for SurveyName and ID.
    1. If importing data from a spreadsheet simply make a column called SurveyUnitSet and fill it in with the SurveyUnitSet you chose in step 1.
    2. If retrofitting existing GSPE records then write an UPDATE query that isolates the change in SurveyUnitSet to the correct SurveyName. use extraordinary care to isolate the changes to the SurveyName in question so that you do not contaminate other records in the GSPE table. This is a job best left to an experience database admin.



Generalized work flow for loading new survey units into the Moose database

GSPE

	Park
🔑	SurveyName
🔑	SurveyYear
	Season
	SubArea
	GMU
🔑	ID
	SurveyUnitSet
	StopDate
	IntID
	Rand
	FiringOrder
	Selected
	Counted
	Exclude
	Strat
	StratName
	StratMoose
	StratTracks
	StratHab
	SearchMin
	DateCounted
	Perc_Not_Flown
	X_COORD
	Y_COORD

3. For your survey, ensure that ID and SurveyUnitSet matchin the GSPE table.

SurveyUnits

	Column Name	Data Type	Nullable	Description
🔑	SurveyUnitSet	varchar(...	No	Survey unit set. Name for a set of units com...
🔑	ID	varchar(...	No	Unit identifier. These should correspond to t...
	CENTRLAT	float		
	CENTRLON	float		
	Region	int	Yes	Region.
	GMU	varchar(5)	Yes	ADFG Game Management Unit.
	Elev_Mean	float	Yes	Mean elevation.
	Elev_Med	float	Yes	Median elevation.
	UnitsIRMARe...	int	Yes	Reference code of the units in the IRMA Dat...
	UnitComment	varchar(...	Yes	Comments.
	Feature	geograp...	Yes	Unit border. Polygon GCS WGS1984
	RecordInsert...	datetime	No	Datetime the record was inserted.
	RecordInsert...	nvarchar...	No	Username of person who inserted the record.

2. Load the survey unit records into the SurveyUnits table carrying the SurveyUnitSet attribute forward from step 1.

SurveyUnitSets

	Column Name	Data Type	Nullable	Description
🔑	SurveyUnitSet	varchar(...	No	Name of the set of units.
	Park	varchar(4)	Yes	Park four letter acronym.
	IRMA Refer...	int	Yes	Reference code in the IRMA Data Store

1. Load a SurveyUnitSets descriptor record into the SurveyUnitSets table

Importing survey units into the Moose database from a shapefile

Prerequisites

SQL Server Management Studio
ArcMap/ArcGIS Pro
datawriter privileges on the moose monitoring database

Procedure

There are many ways to import survey units into the Moose database. Using Python inside ArcGIS is the way all the units were imported into the database from 2016 on. Below is an example ArcPy script that can be modified. The script interrogates a shapefile of survey units and cycles through the rows one by one and converts the unit polygons into an SQL script of INSERT queries that can be executed through SQL Server Management Studio. Each polygon is converted to its Well Known Text representation and from there to an SQL Geography entity.

```
#Written by Scott D. Miller
#National Park Service, Arctic and Central Alaska Inventory and Monitoring programs
#2021-08-24

# Description: This script was written to convert NPS moose monitoring survey units in shapefile format to SQL INSERT queries suitable for executing against
# the ARCN/CAKN Moose database. The goal is to reproduce the survey polygons in the shapefile in the database's SurveyUnitSets and SurveyUnits tables.
# For assistance, contact the Network data manager.

# How to use:
# Point the Shp variable (see Start here below) to your shapefile of survey units
# In the 'for row in arcpy.da.SearchCursor(FeatureClass,['FID','UNIT','Shape@WKT']):' line below, in the second item in the columns list,
# change the name of the column holding your survey unit identifier. It may be SU, or UNIT or ID or some other name.
# Run the script in the Python window of ArcGIS
# The output SQL insert queries script will be in the same directory as the input shapefile and will have the same name but with '.sql' appended.
# Open the output .sql script in SQL Server Management Studio
# Modify the .sql script as needed and execute to insert the survey units.
# IMPORTANT: The insert queries are wrapped in a transaction. The transaction must be
closed out by executing COMMIT if all the queries insert successfully, or ROLLBACK if
anything fails.
# Failure to close out the transaction will cause the database to hang, rendering it
useless until administrative action is taken to fix the problem.

# Imports
import arcpy
import getpass
import re
import os

# Function to export a featureclass as a comma separated values text file.
def ExportSQLScript(FeatureClass,SurveyUnitSetName):
    try:

        # The output SQL script file.
        OutputFile = FeatureClass + ".sql"

        # if the output file exists already then delete it.
        if os.path.exists(OutputFile):
            print("File exists: " + OutputFile + '. Deleted')
            os.remove(OutputFile)
        OutputFile = open(OutputFile,'a')

        # loop through the data rows, create Sql insert queries and add them to the
output file.
        OutputFile.write("-- Moose survey units import script.\n")
        OutputFile.write("-- Source FeatureClass: " + FeatureClass + "\n")
        OutputFile.write("-- Generated by " + getpass.getuser() + " on " +
str(datetime.datetime.now()) + "\n")
        OutputFile.write("\n")
        OutputFile.write("USE Moose\n")
        OutputFile.write("Declare @SurveyUnitSet Varchar(100),@UnitsIRMARefCode
Int\n")
        OutputFile.write("Set @SurveyUnitSet = '" + SurveyUnitSetName + "'\n")
        OutputFile.write("\n-- Utility queries. Uncomment and use as needed\n")
        OutputFile.write("-- Insert the parent SurveyUnitSet record for the survey
units, if it does not exist already\n")
        OutputFile.write("-- INSERT INTO SurveyUnitSets(SurveyUnitSet)
VALUES(@SurveyUnitSet)\n")
        OutputFile.write("-- SELECT * FROM SurveyUnits WHERE SurveyUnitSet =
@SurveyUnitSet ORDER BY ID\n")
        OutputFile.write("-- DELETE FROM SurveyUnits WHERE SurveyUnitSet =
@SurveyUnitSet\n\n")
        OutputFile.write("BEGIN TRANSACTION -- ROLLBACK COMMIT -- You must rollback or
commit the insert queries in this transaction or the database will be left hanging.
\n\n")


        # Loop through the feature class's rows and convert the units to WKT and
create an insert query.
        # Make sure the column names below match those in the source shapefile.
        RowCounter = 0

        # Make sure FID or OBJECTID is the zeroeth columnname, the unit identifier is
the first column and the second column is Shape@WKT.
        # Example: for row in arcpy.da.SearchCursor(FeatureClass,
['FID','UNIT','Shape@WKT']):
        for row in arcpy.da.SearchCursor(FeatureClass,['FID','UNIT','Shape@WKT']):

            # Get the row items into variables to substitute into the SQL queries
below.
```

```
            ID = str(row[1]).strip()
            WKT = str(row[2])

            # Build up a Geography for the polygon using Well Known Text
representation of the Feature.
            Geog = "geography::STGeomFromText('" + WKT + "', 4326)"
            InsertQuery = "INSERT INTO SurveyUnits(SurveyUnitSet,ID,Feature)
VALUES(@SurveyUnitSet,'" + ID + "'," + Geog + ");"

            # Write the INSERT query to the output script file.
            OutputFile.write(InsertQuery +'\n')

            # Increment the row counter.
            RowCounter = RowCounter + 1
        del row

        # Output some more information for the user.
        OutputFile.write("-- " + str(RowCounter) + " rows.\n")
        OutputFile.write("-- Execute the output SQL script in SQL Server Management
Studio to insert the survey unit polygons.\n")
        OutputFile.close

    except Exception as e:
        ExMessage = '---------------------------------------------------\n--  ERROR:
Export failed for FeatureClass: ' + FeatureClass + ' ' + str(e) +
"----------------------------------------------------\n"
        print(ExMessage)
        OutputFile.write(ExMessage)

# Start here
try:
    # Shp is the input shapefile whose polygons should be converted to an SQL INSERT
query
    Shp = "C:/Work/VitalSigns/CAKN Moose/Units/1978-1996  DENA Moose Survey
Units/DENA1978.shp"
    print('Processing: ' + str(Shp))

    # This will be the unique identifier in the Moose database's SurveyUnitSets table
    SurveyUnitsetName = '1978 DENA Winter Moose Survey Units'

    # Convert the shapefile's features to a script of INSERT queries
     ExportSQLScript(Shp,SurveyUnitsetName)

except Exception as e:
    ErrorMessage = str(e)
    print(ErrorMessage)
```

Quality control

Quality control

Quality control (QC) procedures ensure that data in the database meet expectations. Defects should be repaired or documented.

Primary QC methods involve visual record scanning, database interrogation via scripts, QC queries, and stored procedures. The primary tools for ensuring data quality are the *RunQCOnASurvey* and *DataQualityReport* stored procedures (described in the sections below).

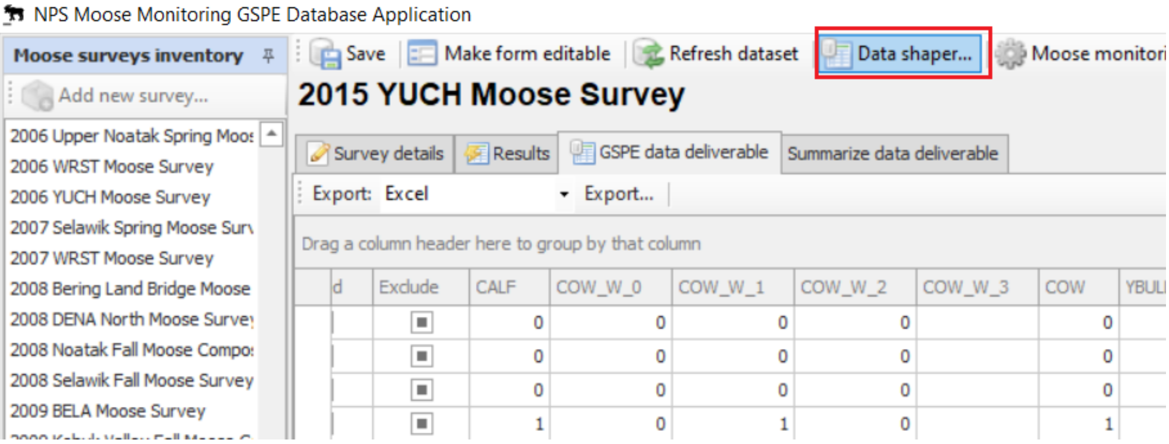
Dashboard

Dashboard query

The Dashboard query provides a good summary of the database contents and quality. Run the Dashboard query through (SSMS) or the Moose Monitoring Database Application's Data Shaper tool.

Procedure

1. Open the Moose Monitoring Database Application
2. Click Data shaper in the toolbar

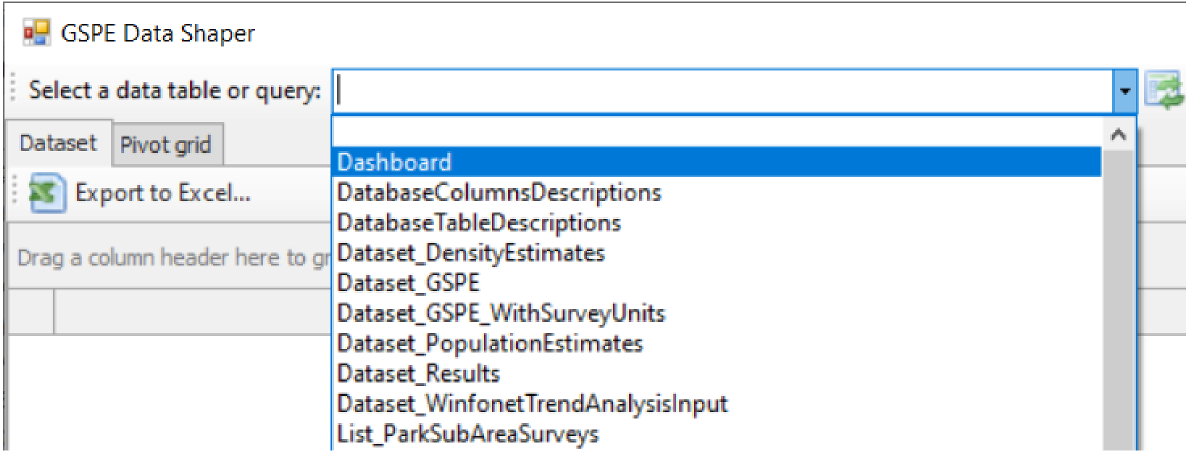


2015 YUCH Moose Survey

2006 Upper Noatak Spring Moos
2006 WRST Moose Survey
2006 YUCH Moose Survey
2007 Selawik Spring Moose Surv
2007 WRST Moose Survey
2008 Bering Land Bridge Moose
2008 DENA North Moose Survey
2008 Noatak Fall Moose Compo:
2008 Selawik Fall Moose Survey
2009 BELA Moose Survey

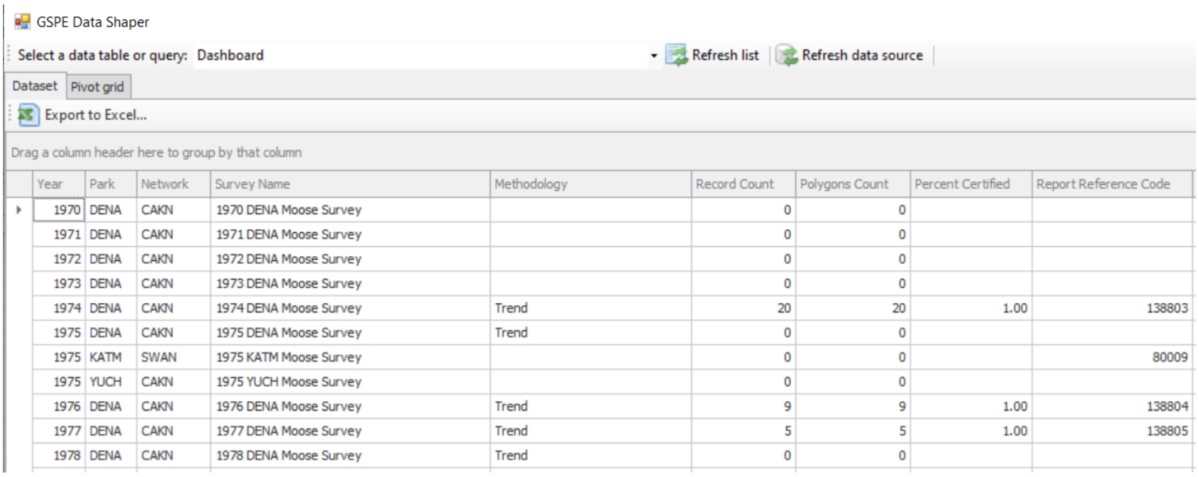
d	Exclude	CALF	COW_W_0	COW_W_1	COW_W_2	COW_W_3	COW	YBULL
	■	0	0	0	0		0	
	■	0	0	0	0		0	
	■	0	0	0	0		0	
	■	1	0	1	0		1	

3.
4. Select Dashboard from the list of available database queries:


GSPE Data Shaper
Select a data table or query:
Dataset
Pivot grid
Export to Excel...
Drag a column header here to gr

Dashboard
DatabaseColumnsDescriptions
DatabaseTableDescriptions
Dataset_DensityEstimates
Dataset_GSPE
Dataset_GSPE_WithSurveyUnits
Dataset_PopulationEstimates
Dataset_Results
Dataset_WinfonetTrendAnalysisInput
List_ParkSubAreaSurveys

5.
6. The results of the Dashboard query appear:

7. 

Select a data table or query: Dashboard

Year	Park	Network	Survey Name	Methodology	Record Count	Polygons Count	Percent Certified	Report Reference Code
1970	DENA	CAKN	1970 DENA Moose Survey		0	0		
1971	DENA	CAKN	1971 DENA Moose Survey		0	0		
1972	DENA	CAKN	1972 DENA Moose Survey		0	0		
1973	DENA	CAKN	1973 DENA Moose Survey		0	0		
1974	DENA	CAKN	1974 DENA Moose Survey	Trend	20	20	1.00	138803
1975	DENA	CAKN	1975 DENA Moose Survey	Trend	0	0		
1975	KATM	SWAN	1975 KATM Moose Survey		0	0		80009
1975	YUCH	CAKN	1975 YUCH Moose Survey		0	0		
1976	DENA	CAKN	1976 DENA Moose Survey	Trend	9	9	1.00	138804
1977	DENA	CAKN	1977 DENA Moose Survey	Trend	5	5	1.00	138805
1978	DENA	CAKN	1978 DENA Moose Survey	Trend	0	0		

Sort, group, filter and/or summarize the information as needed.

Run quality control checks on data from a single survey

Run quality control checks on data from a single survey

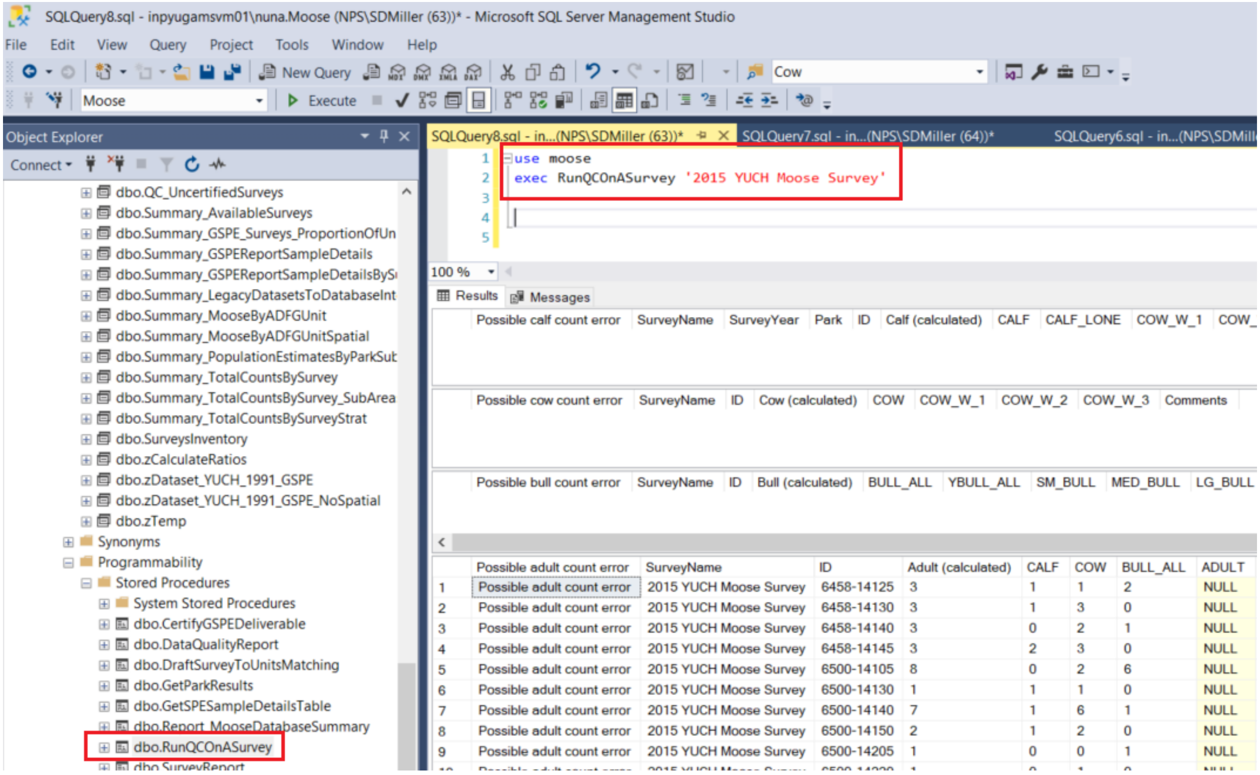
It may be useful to import data into the moose monitoring database and then perform automated quality control checks. This can be done using the *RunQCOnASurvey* stored procedure. The example below shows a QC run on the 2015 YUCH Moose Survey dataset.

IMPORTANT NOTE: The automated QC checks described below are a *starting point* and the results should be interpreted based on knowledge of the survey before making any corrective edits. Surveys are conducted in different ways and using calculation rules that may be different from the automated database checks. Some surveys collect more or less detailed information about sex and age composition which may throw off QC checks. Project biologists or may include or exclude animals tagged UNKNOWN, for summing total ADULT or MOOSE values, for example. Use your judgement before editing the data.

Procedure

1. Open SSMS
2. Connect to the moose monitoring database
3. Click New Query
4. Type or copy the following into the new query file substituting your SurveyName attribute for 'Your survey name goes here':
5. `use moose`
6. `exec RunQCOnASurvey 'Your survey name goes here'`
7. Execute the procedure

Example QC run showing that the [Adult] attributes have not been calculated in the 2015 YUCH Moose Survey. Other QC checks returned no problems (you should still verify the data visually, by summing and comparing to the source data file, and comparing the results to any report generated on the dataset).


SQLQuery8.sql - inpyugamsvm01\nuna.Moose (NPS\SDMiller (63))* - Microsoft SQL Server Management Studio
File
Edit
View
Query
Project
Tools
Window
Help
New Query
Cow
Moose
Execute
Object Explorer
Connect
dbo.QC_UncertifiedSurveys
dbo.Summary_AvailableSurveys
dbo.Summary_GSPE_Surveys_ProportionOfUn
dbo.Summary_GSPEReportSampleDetails
dbo.Summary_GSPEReportSampleDetailsByS
dbo.Summary_LegacyDatasetsToDatabaseInt
dbo.Summary_MooseByADFGUnit
dbo.Summary_MooseByADFGUnitSpatial
dbo.Summary_PopulationEstimatesByParkSub
dbo.Summary_TotalCountsBySurvey
dbo.Summary_TotalCountsBySurvey_SubArea
dbo.Summary_TotalCountsBySurveyStrat
dbo.SurveysInventory
dbo.zCalculateRatios
dbo.zDataset_YUCH_1991_GSPE
dbo.zDataset_YUCH_1991_GSPE_NoSpatial
dbo.zTemp
Synonyms
Programmability
Stored Procedures
System Stored Procedures
dbo.CertifyGSPEDeliverable
dbo.DataQualityReport
dbo.DraftSurveyToUnitsMatching
dbo.GetParkResults
dbo.GetSPESampleDetailsTable
dbo.Report_MooseDatabaseSummary
dbo.RunQCOnASurvey
dbo.SurveyReport
SQLQuery8.sql - in...(NPS\SDMiller (63))*
SQLQuery7.sql - in...(NPS\SDMiller (64))*
SQLQuery6.sql - in...(NPS\SDMill
100 %
Results
Messages

```
use moose
exec RunQCOnASurvey '2015 YUCH Moose Survey'
```

	Possible calf count error	SurveyName	SurveyYear	Park	ID	Calf (calculated)	CALF	CALF_LONE	COW_W_1	COW_

	Possible cow count error	SurveyName	ID	Cow (calculated)	COW	COW_W_1	COW_W_2	COW_W_3	Comments

	Possible bull count error	SurveyName	ID	Bull (calculated)	BULL_ALL	YBULL_ALL	SM_BULL	MED_BULL	LG_BULL

	Possible adult count error	SurveyName	ID	Adult (calculated)	CALF	COW	BULL_ALL	ADULT
1	Possible adult count error	2015 YUCH Moose Survey	6458-14125	3	1	1	2	NULL
2	Possible adult count error	2015 YUCH Moose Survey	6458-14130	3	1	3	0	NULL
3	Possible adult count error	2015 YUCH Moose Survey	6458-14140	3	0	2	1	NULL
4	Possible adult count error	2015 YUCH Moose Survey	6458-14145	3	2	3	0	NULL
5	Possible adult count error	2015 YUCH Moose Survey	6500-14105	8	0	2	6	NULL
6	Possible adult count error	2015 YUCH Moose Survey	6500-14130	1	1	1	0	NULL
7	Possible adult count error	2015 YUCH Moose Survey	6500-14140	7	1	6	1	NULL
8	Possible adult count error	2015 YUCH Moose Survey	6500-14150	2	1	2	0	NULL
9	Possible adult count error	2015 YUCH Moose Survey	6500-14205	1	0	0	1	NULL

Global database QC checks

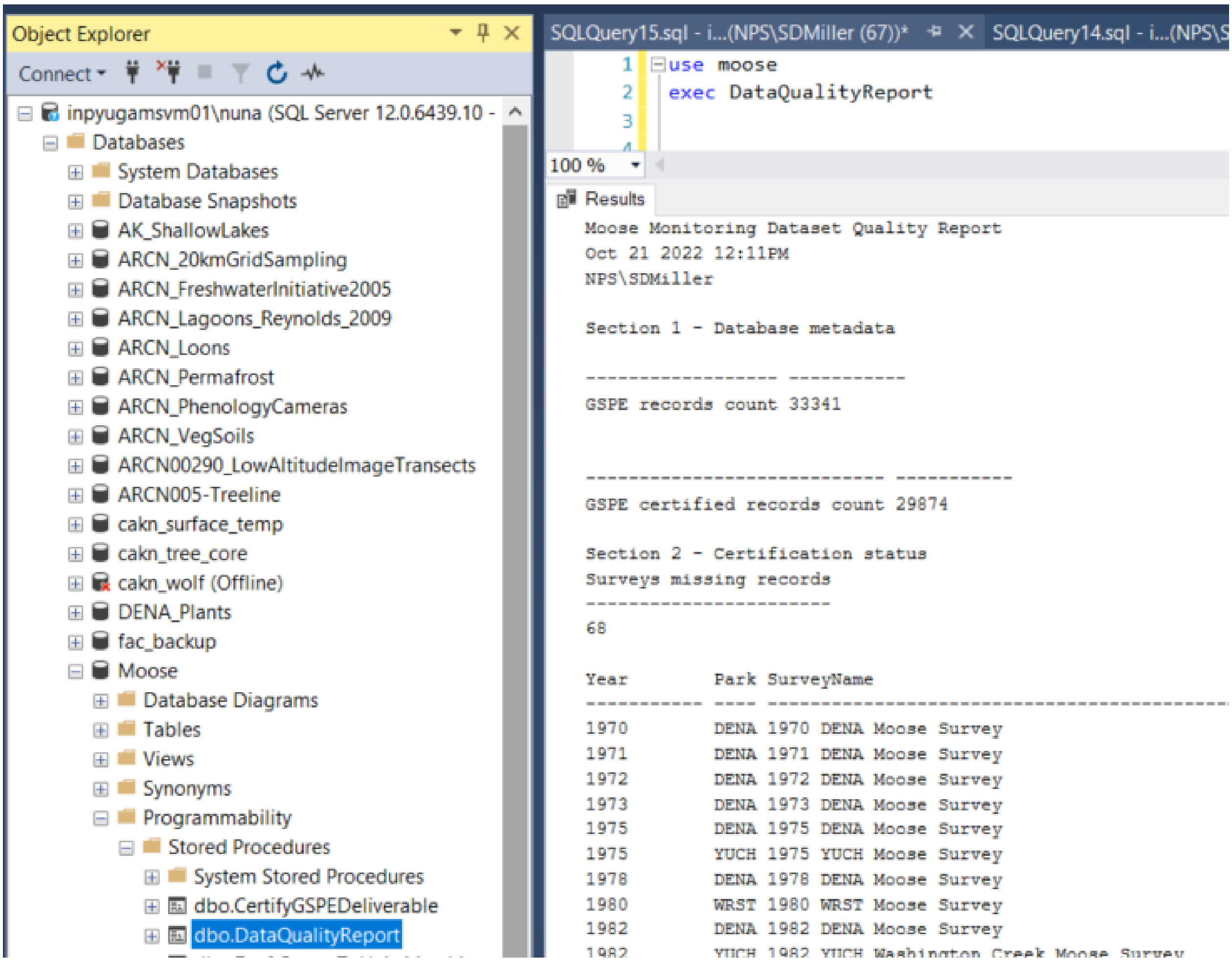
Global database QC checks

The DataQualityReport stored procedure provides a good starting point for checking data quality in the moose database.

IMPORTANT NOTE: The automated QC checks described below are a *starting point* and the results should be interpreted based on knowledge of the survey before making any corrective edits. Surveys are conducted in different ways and using calculation rules that may be different from the automated database checks. Some surveys collect more or less detailed information about sex and age composition which may throw off QC checks. Project biologists or may include or exclude animals tagged UNKNOWN, for summing total ADULT or MOOSE values, for example. Use your judgement before editing the data.

DataQualityReport stored procedure

Note: for best results, right click the query pane and select **Results to -> Results to text**; otherwise the queries will be shown as grids and some context of what QC process is being run will be lost.



```
use moose
exec DataQualityReport
```

```
Moose Monitoring Dataset Quality Report
Oct 21 2022 12:11PM
NPS\SDMiller

Section 1 - Database metadata

------------------ -----------
GSPE records count 33341


---------------------------- -----------
GSPE certified records count 29874

Section 2 - Certification status
Surveys missing records
-----------------------
68

Year        Park SurveyName
----------- ---- ----------------------------------------------
1970        DENA 1970 DENA Moose Survey
1971        DENA 1971 DENA Moose Survey
1972        DENA 1972 DENA Moose Survey
1973        DENA 1973 DENA Moose Survey
1975        DENA 1975 DENA Moose Survey
1975        YUCH 1975 YUCH Moose Survey
1978        DENA 1978 DENA Moose Survey
1980        WRST 1980 WRST Moose Survey
1982        DENA 1982 DENA Moose Survey
1982        YUCH 1982 YUCH Washington Creek Moose Survey
```

Examine the output to help isolate possible errors for repair or documentation.

Some results shown in the output may not be errors.
Some records may be flagged not because there is a problem but because of the way the survey was conducted. An example is a population survey that only counts [Adult] and [Calf] data. The [Adult] column will not equal [BULL_ALL] + [COW] in such cases, and may be flagged.

Another example of confused results is where the biologist counted [UNKNOWN] in the [ADULT] tally, throwing off the QC check calculation where that sort of summing is not allowed.

Use expert judgement and please do not try to fix other people's datasets, but rather communicate such issues with the respective Park biologist.

Dataset certification

Dataset certification

Data certification is an important tool to communicate data quality to data consumers. The moose monitoring dataset consists of data from many surveys done over many parks. In many cases datasets have been recovered many decades after institutional knowledge is gone, often without the benefit of a summary report or other forms of documentation. Three levels of certification are allowed:

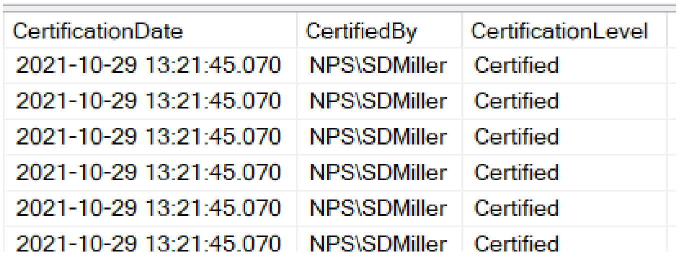
Raw	Records that have not undergone any quality control procedures
Provisional	Records that have undergone rudimentary quality control or have been received directly from a park biologist or the Winfonet system, but have not been fully processed and approved for

analytical purposes.

Certified Data that have been approved for analysis. These records have been processed for quality, validated against a source dataset, a report or other summary, have defects documented, and are of known quality.

Certification process

GSPE records are certified at the record level. This means that each record in the GSPE data table has a column called CertificationLevel (and also CertifiedBy and CertificationDate).



CertificationDate	CertifiedBy	CertificationLevel
2021-10-29 13:21:45.070	NPS\SDMiller	Certified
2021-10-29 13:21:45.070	NPS\SDMiller	Certified
2021-10-29 13:21:45.070	NPS\SDMiller	Certified
2021-10-29 13:21:45.070	NPS\SDMiller	Certified
2021-10-29 13:21:45.070	NPS\SDMiller	Certified
2021-10-29 13:21:45.070	NPS\SDMiller	Certified

During data ingestion and quality control these columns should be null but CertificationLevel should be set to 'Raw' for raw data or 'Provisional' if the data are likely good enough for provisional analysis but not fully processed.

Verify the dataset ingested into the moose monitoring database exactly matches the GSPE deliverable that was submitted and analyzed in Winfonet. An alternative check for old datasets for which a report exists is to attempt to re-generate any summary tables in the report with the ingested data. Any data failing QC checks should have CertificationLevel set to 'Raw'. If the data all check out issue the following query, substituting the name of your survey for `<SurveyName>` exactly as stored in the parent GSPE_Surveys table.

```
USE Moose
Begin Transaction
UPDATE GSPE SET
CertificationLevel='Certified',CertifiedBy=suser_name(),CertificationDate=getdate() WHERE SurveyName = 'Your SurveyName goes here'
-- Execute COMMIT if all goes well, or else ROLLBACK if there are errors.
Warning: you must commit or rollback the query result above or the database
will be left in a hanging, unusable state.
```

ENSURE THE QUERY IS PROPERLY FILTERED to avoid contaminating records from other surveys. If you have any questions contact the ARCN/CAKN data manager.

Data analysis

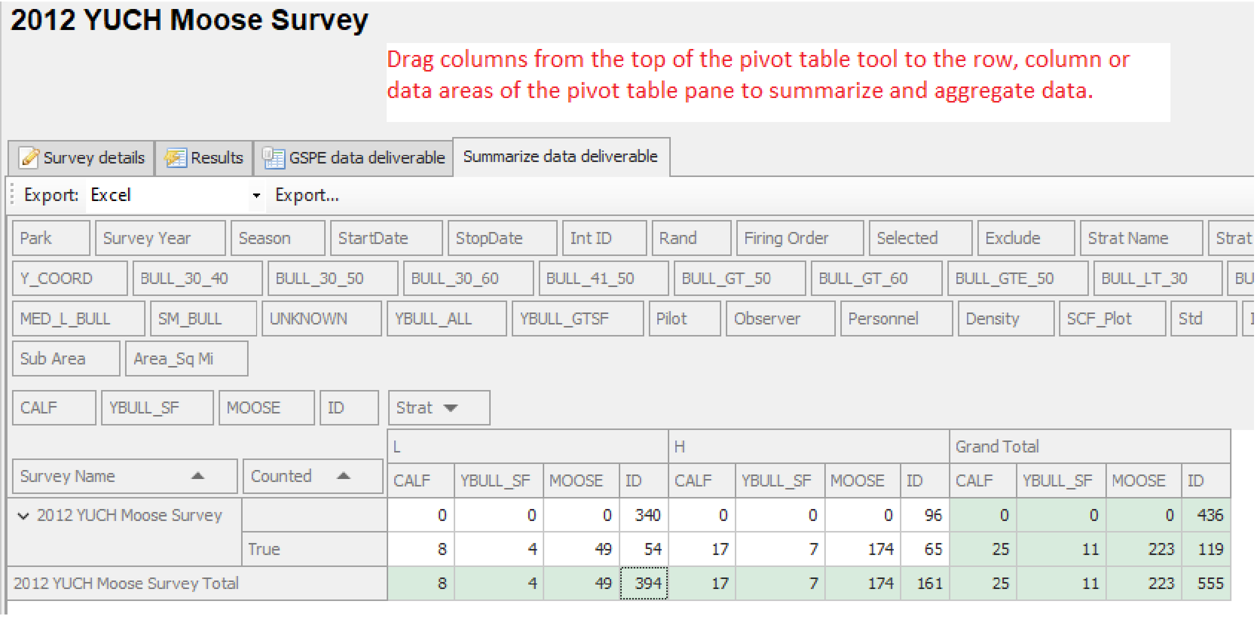
Data analysis

Winfonet is the primary tool for generating moose abundance estimates, calf/bull:cow ratios, etc., but the Moose Monitoring Database application has tools for accessing and summarizing survey data.

Generating pivot tables

Pivot tables are powerful tools for statistically aggregating data over groups. The Moose Monitoring

Database Application offers a tool to quickly generate a pivot table for any survey containing data. Navigate to the survey you would like to summarize, click on the Summarize data deliverable tab and then drag columns from the top of the tool onto the data, rows, or columns area to quickly summarize data. Change the summary type (sum, avg, count, etc.) by right clicking on a column in the data area and selecting a different summary type.


2012 YUCH Moose Survey

Drag columns from the top of the pivot table tool to the row, column or data areas of the pivot table pane to summarize and aggregate data.

		L				H				Grand Total			
Survey Name	Counted	CALF	YBULL_SF	MOOSE	ID	CALF	YBULL_SF	MOOSE	ID	CALF	YBULL_SF	MOOSE	ID
2012 YUCH Moose Survey		0	0	0	340	0	0	0	96	0	0	0	436
	True	8	4	49	54	17	7	174	65	25	11	223	119
2012 YUCH Moose Survey Total		8	4	49	394	17	7	174	161	25	11	223	555

An example of generating summary tables or validating existing summaries

The screenshot below overlays Table 2 of the 2012 YUCH moose survey report with the equivalent summary generated using the Moose Monitoring Database Application's pivot table tool.

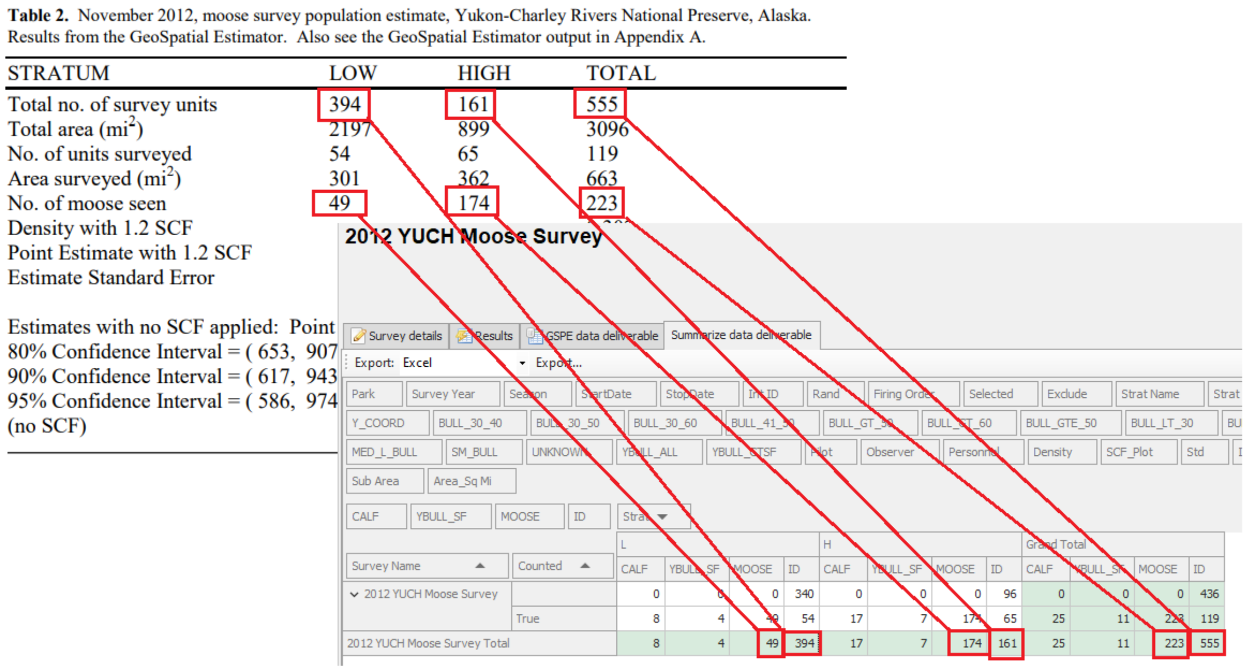


Table 2. November 2012, moose survey population estimate, Yukon-Charley Rivers National Preserve, Alaska. Results from the GeoSpatial Estimator. Also see the GeoSpatial Estimator output in Appendix A.

STRATUM	LOW	HIGH	TOTAL
Total no. of survey units	394	161	555
Total area (mi^2)	2197	899	3096
No. of units surveyed	54	65	119
Area surveyed (mi^2)	301	362	663
No. of moose seen	49	174	223
Density with 1.2 SCF			
Point Estimate with 1.2 SCF			
Estimate Standard Error			

Estimates with no SCF applied: Point
80% Confidence Interval = (653, 907
90% Confidence Interval = (617, 943
95% Confidence Interval = (586, 974
(no SCF)

2012 YUCH Moose Survey

		L				H				Grand Total			
Survey Name	Counted	CALF	YBULL_SF	MOOSE	ID	CALF	YBULL_SF	MOOSE	ID	CALF	YBULL_SF	MOOSE	ID
2012 YUCH Moose Survey		0	0	0	340	0	0	0	96	0	0	0	436
	True	8	4	49	54	17	7	174	65	25	11	223	119
2012 YUCH Moose Survey Total		8	4	49	394	17	7	174	161	25	11	223	555

Dataset publication

Dataset publication

Periodically the moose monitoring dataset should be published so that people can use it. This should be done to the AK Region's GIS X drive and also to the IRMA Data Store.

Considerations for publishing sensitive data

Consider carefully the permissions of any dataset published to Data Store. Moose monitoring data falls under the category of 'species of commercial interest', which is one justification for tagging a reference as 'Internal'. Additionally the NPS and Alaska Department of Fish and Game may have one or more data sharing agreements in place which should not be violated. Generally a moose monitoring dataset should only be available internal to the NPS or to specific individuals within the Service. Consult the Data Store help for more information on permissions.

Generating a dataset for publication

ArcPy

Modify and execute the Python script below in ArcGIS to generate a shapefile of moose monitoring data. Notice that the SQL query is restricted to certified data only.

```
import arcpy

# Point to the database connection file (use Create Database Connection tool in
ArcToolbox)
database_connection_file_path = r"C:\Work\Code\ArcPy Scripts\Moose DB to
GeoDB\MooseDBLocalConnectionFile.sde"

# Get a reference to the main data frame; assumes it's the first and only one
df = arcpy.mapping.ListDataFrames(MXD)[0]

# The spatial query to submit to the QueryLayer
sql = "SELECT TOP 100 Percent SurveyName, Year, Network, Park, SubArea, Season,
Personnel, ReportReferenceCode, ReportLink, DeliverablesDatasetReferenceCode,
Methodology, ID, IntID, Rand, FiringOrder, Selected, Counted, Exclude, Strat,
StratName,                StratMoose, StratTracks, StratHab, SearchMin,
DateCounted, Area_SqMi, CALF, COW, COW_W_0, COW_W_1, COW_W_2, COW_W_3, YBULL_ALL,
SM_BULL, MED_BULL, LG_BULL, BULL_ALL, ADULT, MOOSE,                    UNKNOWN,
BULL_30_40, BULL_30_50, BULL_30_60, BULL_41_50, BULL_ADULT, BULL_GT_50, BULL_GT_60,
BULL_GTE_50, BULL_LT_30, BULL_LT_50, CALF_LONE, MED_L_BULL, YBULL_GTSF, YBULL_SF,
Pilot, Observer, Density, SCF_Plot, Std, Int, Comments, CertificationLevel,
DataResourcesDirectory, DataSource, ValidatedDate, SourceFilename, SurveyUnitSet,
Feature,Convert(varchar(36),NEWID()) as UniqueID        FROM
Dataset_GSPE_WithSurveyUnits  WHERE  CertificationLevel='Certified'"

# Layer name
layer_name = "GSPE"

# Create the QueryLayer
arcpy.MakeQueryLayer_management(database_connection_file_path,  layer_name,  sql,
"[UniqueID]", "POLYGON", "4326")

# Create an MXD to hold the new QueryLayer
MXD = arcpy.mapping.MapDocument(r"C:\Work\Code\ArcPy Scripts\Moose DB to
GeoDB\MooseUnits.mxd")
```

```
# Get a reference to the created QueryLayer
output_layer = arcpy.mapping.Layer(layer_name)

# Add the layer to the main data frame
arcpy.mapping.AddLayer(df, output_layer, "AUTO_ARRANGE")

# Export the layer to a shapefile
try:
    arcpy.analysis.Select(layer_name, "C:/Temp/zMooseUnits/GSPE.shp","")
except:
    print("An exception occurred exporting the dataset " + layer_name)
```

Ogr2Ogr

In 2022 I was unable to get the Python script above to work in ArcGIS Pro/ArcMap. I successfully exported the dataset to a shapefile using ogr2ogr using the following:

```
ogr2ogr -f "ESRI Shapefile" "C:\Temp\MooseSurveys.shp"
"MSSQL:server=inpyugamsvm01\nuna;database=Moose;tables=GSPE;trusted_connection=yes" -
sql "SELECT SurveyName, ID, GEOMETRY::STGeomFromWKB(Feature.STAsBinary(), 4326) AS
Feature, SubArea, Season, Methodology AS Method, DateCounted AS Date, IntID, Selected,
Counted, Exclude, Strat, ADULT, BULL_30_40,                    BULL_30_50, BULL_30_60,
BULL_41_50, BULL_ALL, BULL_ADULT, BULL_GT_50, BULL_GT_60, BULL_GTE_50 AS BULL_GTE50,
BULL_LT_30, BULL_LT_50, CALF, CALF_LONE, COW, COW_W_0, COW_W_1, COW_W_2, COW_W_3,
LG_BULL,                   MED_BULL, MED_L_BULL, SM_BULL, UNKNOWN, YBULL_ALL,
YBULL_GTSF, YBULL_SF, MOOSE, SearchMin, Density, SCF_Plot, Std, Int, SurveyUnitGMU AS
SU_GMU, AreaSqMi AS SqMi_Calc, Area_SqMi, GMU, Rand,                   FiringOrder AS
FiringOrdr, StratName, StratMoose, StratTracks AS StratTrack, StratHab, Perc_Not_Flown
AS PctNotFlwn, X_COORD, Y_COORD, Elev_Mean, Elev_Med, Network, SRID, CENTRLAT,
CENTRLON, Pilot, Observer,                   GSPEComment AS Comment, SurveyUnitComment
AS SUComment, ReportReferenceCode AS RptCode, ReportLink,
DeliverablesDatasetReferenceCode AS DlvrblsCode, CertificationLevel AS CertLevel,
CertifiedBy AS CertBy,                   CONVERT(Date, CertificationDate) AS CertDate,
UniqueID, CONVERT(Date, VersionDate) AS Version FROM     Dataset_GSPE" -overwrite -
a_srs EPSG:4326 -s_srs EPSG:4326
```

Write metadata

Use the tools in ArcCatalog to write metadata for the shapefile generated above. Validate the metadata.

Publish

X drive

Build metadata and ask Kerry Shakarjian to replace the existing

Data Store

Update the existing Spatial Dataset reference with the latest revision of the shapefile generated above [Note 2022 this doesn't exist yet]

Data mining resources

Data mining resources

Mat Sorum put together a summary in 2016 for ARCN Moose Survey Data_3_23_2016.xlsx	N:\Natural\GAAR\Moose\GAAR Moose Surveys
DENA Moose drive	\\inpdenafiles02\teams\ResMgmt\Wildlife\Moose
CAKN Moose shared drive	J:\Monitoring\Moose\Data
ARCUS has old reports	

. He put data at

: \\inpdenafiles02\teams\ResMgmt

Hey Scott! Sounds like a big lift. You have all the YUCH surveys I have information on. I assume the red ones stem from some information you perhaps got from Shults or Lawler, but I don't have additional information on them. I tasked Mat Sorum with organizing all the ARCN survey data a few years back, which he did. So he may be in the best position to assess where we are at on those surveys. Attached is a spreadsheet that was developed. While I was on a bunch of the western surveys, I didn't end up with the data, Brad did. I assume Raime and Letty manage these datasets now.

For GAAR, we have 2 moose surveys: the Koyukuk and the upper Kobuk. So I would modify your naming conventions to reflect that. The upper Kobuk survey is really upstream of KOVA (ie it doesn't cover much of KOVA) and covers GAAR "boot". All the survey data for these 2 areas can be found here: N:\Natural\GAAR\Moose\GAAR Moose Surveys. Hopefully that will turn some of your reds green.

The Tagagawik (not Tagagawiki as spelled in first 2 lines) and the Tag are the same river, in case that helps you.

Kyle

An example data entry session using FileToSql

An example data entry session using FileToSql

There are many ways to enter data into the moose monitoring database. The example below shows the step I took to to enter the 2013 DENA Moose Survey data into the database.

There are a couple of resources that are ideally at hand for data entry of a moose survey in addition to the ones in the Data management resources table:

Resource	Location
Survey report	Not available as of writing. Probably not written. DENA biologist did not have it.
Data deliverable file (GSPE or older Gasaway format spreadsheet).	J:\Monitoring\Moose\Data\2013 DENA Moose Survey

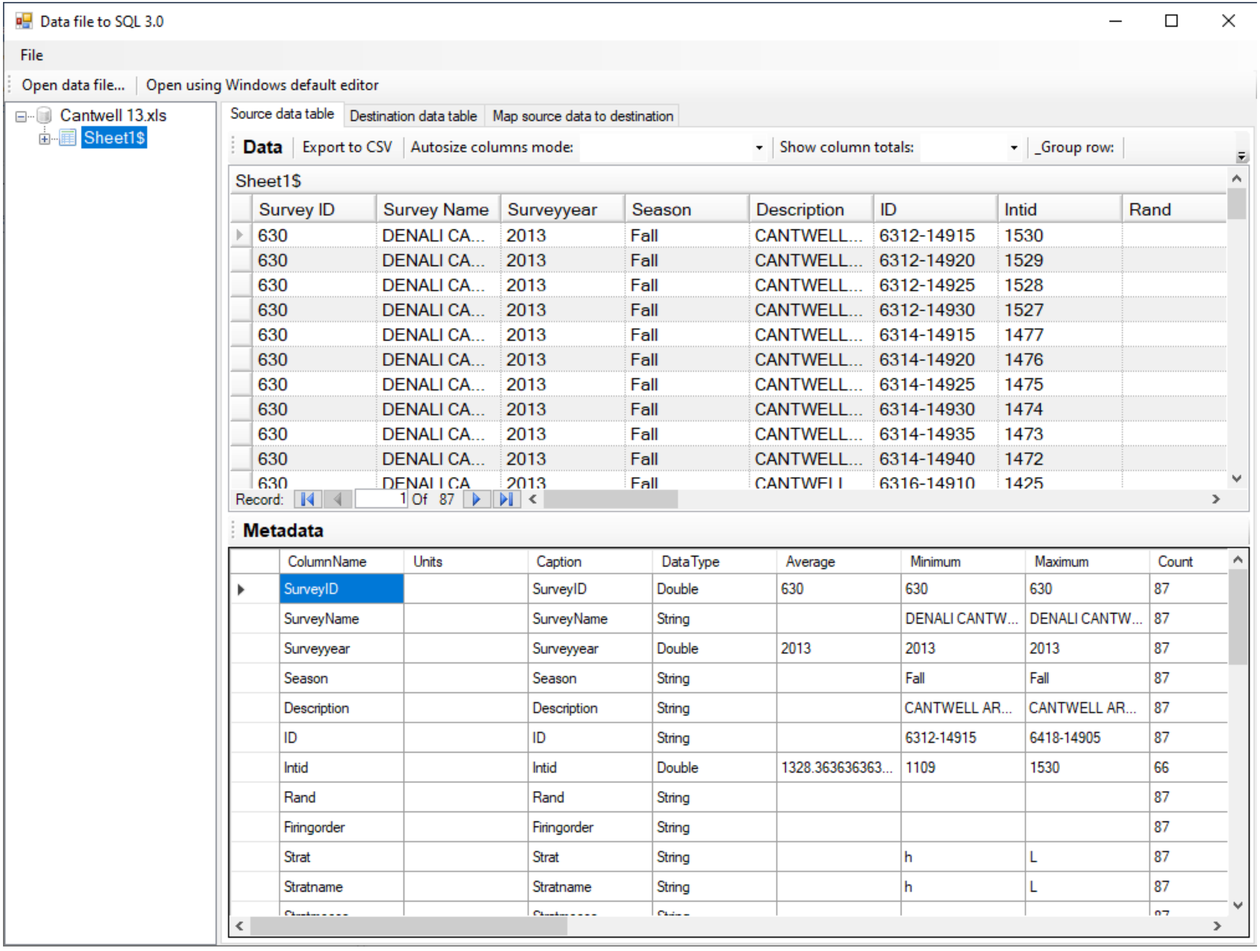
There are a number of ways to import data into a SQL Server database. These include:

1. SQL Server Import and Export Wizard
2. Writing INSERT queries as an Excel formula
3. Scripting with Python, R or other language
4. Using ARCN's FileToSql tool

I used the FileToSql tool but the SQL Server Import and Export wizard would work just as well.

Procedure

Ensure the parent Survey record exists in the moose monitoring database for the data you wish to import. The Survey table must have a parent row before any child GSPE data records can be related to it. In this example I've ensured the parent '2013 DENA Moose Survey' records exists in the Surveys table.
Copy down or remember the unique SurveyName because you will need it later.
Start FileToSql
Drag the Excel file to be imported into the database onto the FileToSql tool

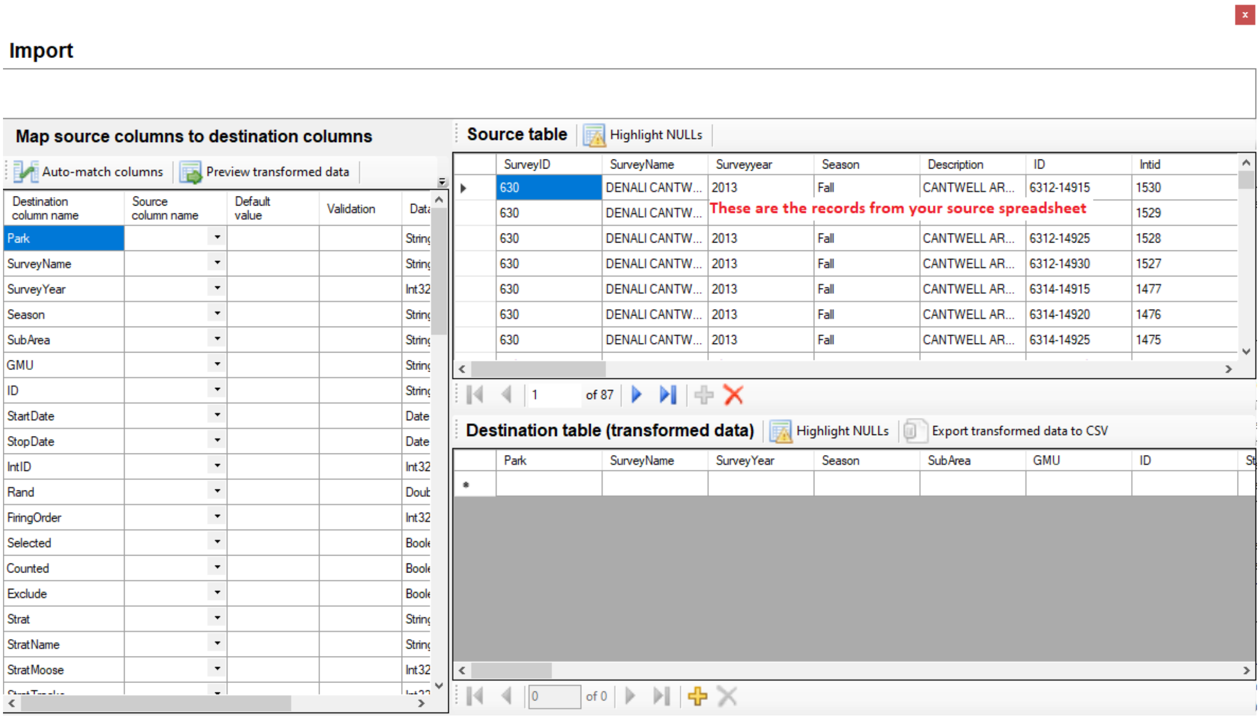


Sheet1$

Survey ID	Survey Name	Surveyyear	Season	Description	ID	Intid	Rand
630	DENALI CA...	2013	Fall	CANTWELL...	6312-14915	1530	
630	DENALI CA...	2013	Fall	CANTWELL...	6312-14920	1529	
630	DENALI CA...	2013	Fall	CANTWELL...	6312-14925	1528	
630	DENALI CA...	2013	Fall	CANTWELL...	6312-14930	1527	
630	DENALI CA...	2013	Fall	CANTWELL...	6314-14915	1477	
630	DENALI CA...	2013	Fall	CANTWELL...	6314-14920	1476	
630	DENALI CA...	2013	Fall	CANTWELL...	6314-14925	1475	
630	DENALI CA...	2013	Fall	CANTWELL...	6314-14930	1474	
630	DENALI CA...	2013	Fall	CANTWELL...	6314-14935	1473	
630	DENALI CA...	2013	Fall	CANTWELL...	6314-14940	1472	
630	DENALI CA	2013	Fall	CANTWELL	6316-14910	1425	

ColumnName	Units	Caption	DataType	Average	Minimum	Maximum	Count
SurveyID		SurveyID	Double	630	630	630	87
SurveyName		SurveyName	String		DENALI CANTW...	DENALI CANTW...	87
Surveyyear		Surveyyear	Double	2013	2013	2013	87
Season		Season	String		Fall	Fall	87
Description		Description	String		CANTWELL AR...	CANTWELL AR...	87
ID		ID	String		6312-14915	6418-14905	87
Intid		Intid	Double	1328.363636363...	1109	1530	66
Rand		Rand	String				87
Firingorder		Firingorder	String				87
Strat		Strat	String		h	L	87
Stratname		Stratname	String		h	L	87

The spreadsheet and tabs show up in the tree at left. Ensure the data in the Data grid exactly represents what is in the source spreadsheet.The information in the Metadata grid below may help to elucidate any problems with the data. Look at the data types, max and min values.
If the source dataset looks good click on the Destination data table tab
Enter a connection string to the moose monitoring database. As of Oct. 2021 it is
Server=inpyugamsvm01\nuna_dev;Database=moose;Trusted_Connection=True;
Enter an SQL query that duplicates the data fields in the source data file you would like to import. In most cases the following query will work: **select top 10 * from GSPE**
Click Execute
If your permissions, connection string and query are all good then you should see some database records from the GSPE table of the Moose database and a columns mapping tool should appear. The source data should appear under the Source Table grid. On the left is a tool you will use to match source data columns to destination database table columns.



Import

Map source columns to destination columns

Destination column name	Source column name	Default value	Validation	Data
Park				Strin
SurveyName				Strin
SurveyYear				Int32
Season				Strin
SubArea				Strin
GMU				Strin
ID				Strin
StartDate				Date
StopDate				Date
IntID				Int32
Rand				Doub
FiringOrder				Int32
Selected				Boole
Counted				Boole
Exclude				Boole
Strat				Strin
StratName				Strin
StratMoose				Int32

Source table

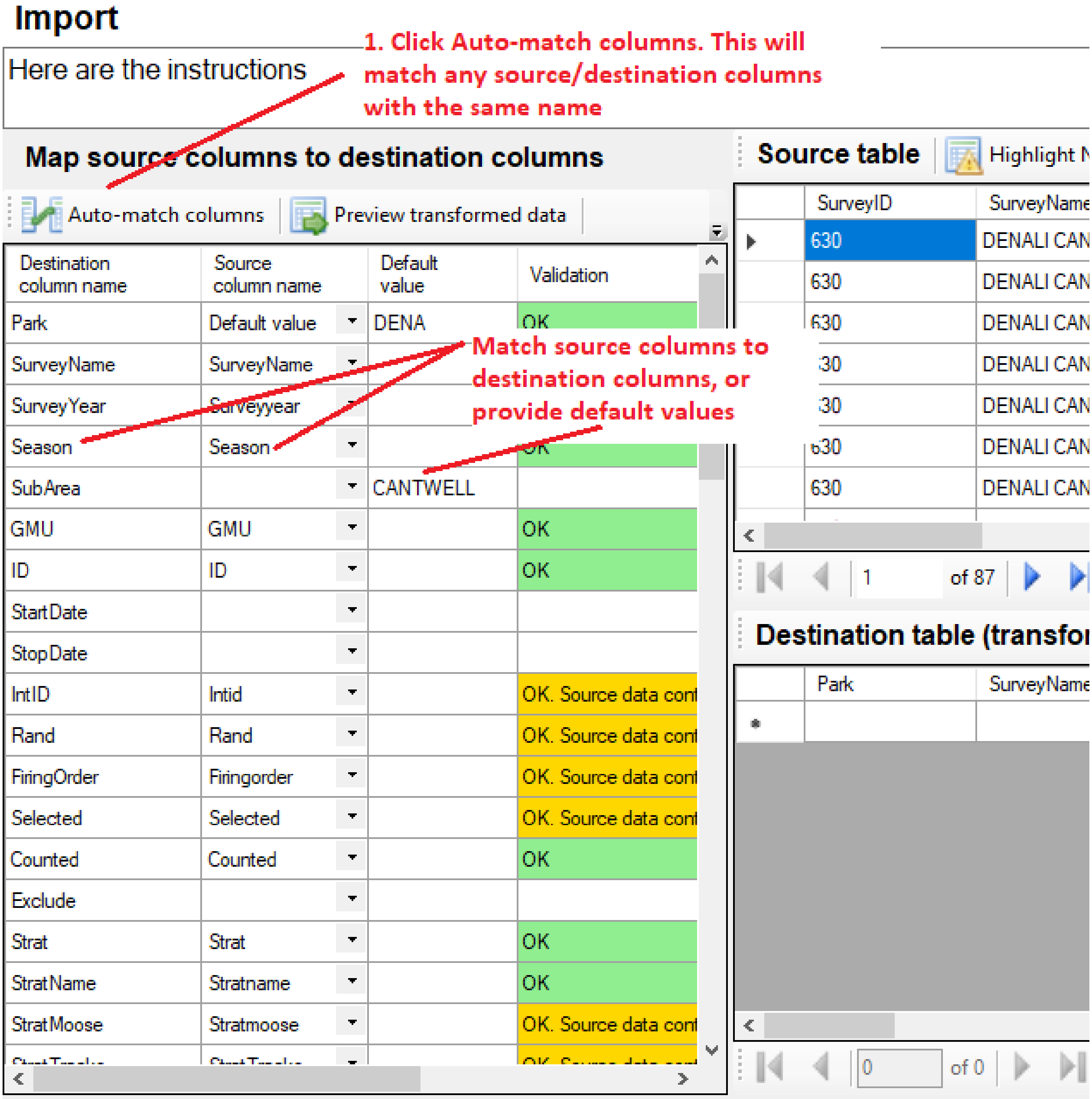
SurveyID	SurveyName	Surveyyear	Season	Description	ID	Intid
630	DENALI CANTW...	2013	Fall	CANTWELL AR...	6312-14915	1530
630	DENALI CANTW...					1529
630	DENALI CANTW...	2013	Fall	CANTWELL AR...	6312-14925	1528
630	DENALI CANTW...	2013	Fall	CANTWELL AR...	6312-14930	1527
630	DENALI CANTW...	2013	Fall	CANTWELL AR...	6314-14915	1477
630	DENALI CANTW...	2013	Fall	CANTWELL AR...	6314-14920	1476
630	DENALI CANTW...	2013	Fall	CANTWELL AR...	6314-14925	1475

These are the records from your source spreadsheet

Destination table (transformed data)

Park	SurveyName	SurveyYear	Season	SubArea	GMU	ID	St

Click Auto-match columns



Import

Here are the instructions

1. Click Auto-match columns. This will match any source/destination columns with the same name

Map source columns to destination columns

Destination column name	Source column name	Default value	Validation
Park	Default value	DENA	OK
SurveyName	SurveyName		
SurveyYear	Surveyyear		
Season	Season		OK
SubArea		CANTWELL	
GMU	GMU		OK
ID	ID		OK
StartDate			
StopDate			
IntID	Intid		OK. Source data cont
Rand	Rand		OK. Source data cont
FiringOrder	Firingorder		OK. Source data cont
Selected	Selected		OK. Source data cont
Counted	Counted		OK
Exclude			
Strat	Strat		OK
StratName	Stratname		OK
StratMoose	Stratmoose		OK. Source data cont

Match source columns to destination columns, or provide default values

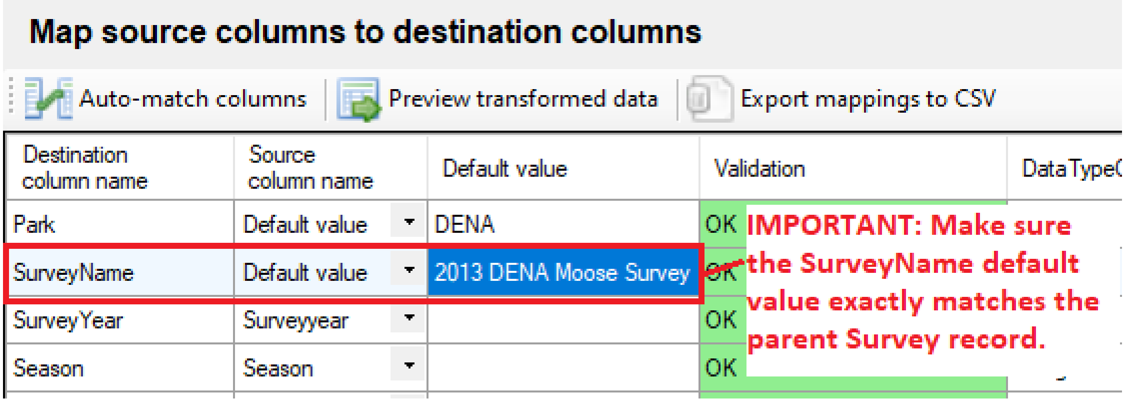
Source table

SurveyID	SurveyName
630	DENALI CAN
630	DENALI CAN
630	DENALI CAN
30	DENALI CAN
30	DENALI CAN
630	DENALI CAN
630	DENALI CAN

Destination table (transfor

Park	SurveyName

IMPORTANT: Ensure the default value for SurveyName exactly matches the SurveyName field of the parent Survey record in the database. If this is not done you will get referential integrity errors and the data import will fail. It is OK to override the existing SurveyName source column values.



Map source columns to destination columns

Destination column name	Source column name	Default value	Validation	DataType(
Park	Default value	DENA	OK	
SurveyName	Default value	2013 DENA Moose Survey	OK	
SurveyYear	Surveyyear		OK	
Season	Season		OK	

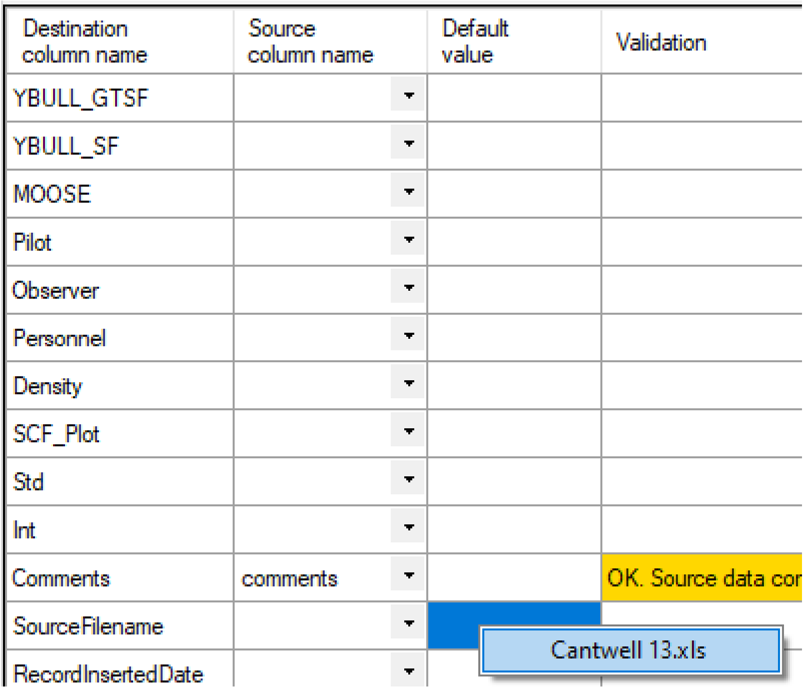
IMPORTANT: Make sure the SurveyName default value exactly matches the parent Survey record.

Ensure the default value for SurveyName matches exactly the SurveyName of the parent Survey record; '2013 DENA Moose Survey', for example.
Match any remaining columns from the source spreadsheet to the database table columns, or provide default values.

Click in the **SourceFilename** row

Right click the Default value column for SourceFilename

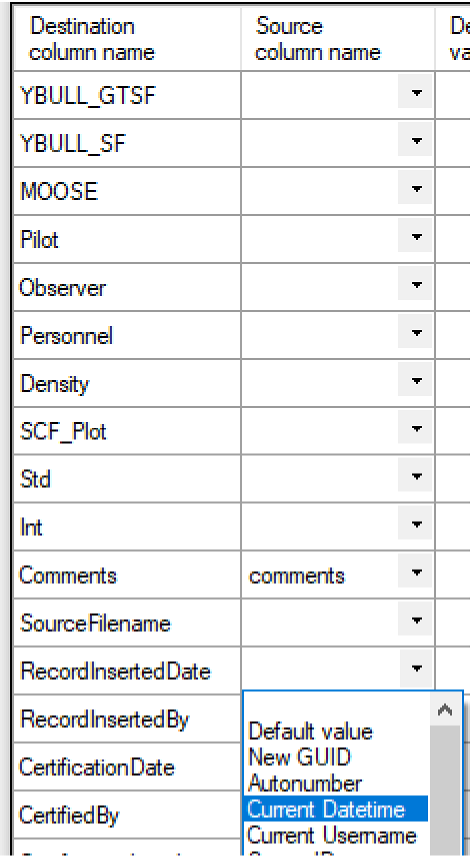
The source filename appears, select it to auto-fill the SourceFilename default value to the file name.



Destination column name	Source column name	Default value	Validation
YBULL_GTSF			
YBULL_SF			
MOOSE			
Pilot			
Observer			
Personnel			
Density			
SCF_Plot			
Std			
Int			
Comments	comments		OK. Source data cor
SourceFilename			
RecordInsertedDate			

Select the **RecordInsertedDate** row

Right click the Source column name column and select Current datetime



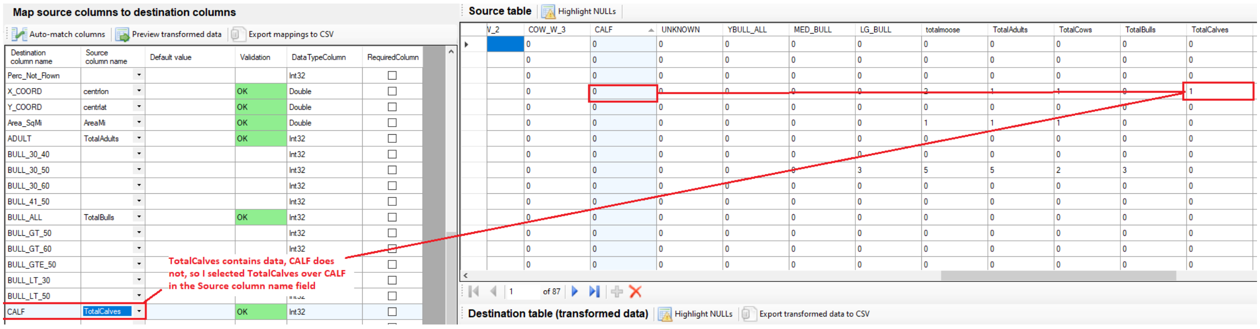
Destination column name	Source column name	De va
YBULL_GTSF		
YBULL_SF		
MOOSE		
Pilot		
Observer		
Personnel		
Density		
SCF_Plot		
Std		
Int		
Comments	comments	
SourceFilename		
RecordInsertedDate		
RecordInsertedBy		
CertificationDate		
CertifiedBy		

Select the RecordInsertedBy column and set its default value to Current username using the same steps as above.

Set CertificationLevel default value to 'Provisional'

Gotchas

Notice that the source column CALF contains all zeroes where TotalCalves contains count data. Auto-match columns would have gotten this match wrong.



Map source columns to destination columns

Destination column name	Source column name	Default value	Validation	DataTypeColumn	RequiredColumn
Perc_Not_Flown				Int32	□
X_COORD	centrlon		OK	Double	□
Y_COORD	centrlat		OK	Double	□
Area_SqMi	AreaMi		OK	Double	□
ADULT	TotalAdults		OK	Int32	□
BULL_30_40				Int32	□
BULL_30_50				Int32	□
BULL_30_60				Int32	□
BULL_41_50				Int32	□
BULL_ALL	TotalBulls		OK	Int32	□
BULL_GT_50				Int32	□
BULL_GT_60				Int32	□
BULL_GTE_50					□
BULL_LT_30					□
BULL_LT_50				Int32	□
CALF	TotalCalves		OK	Int32	□

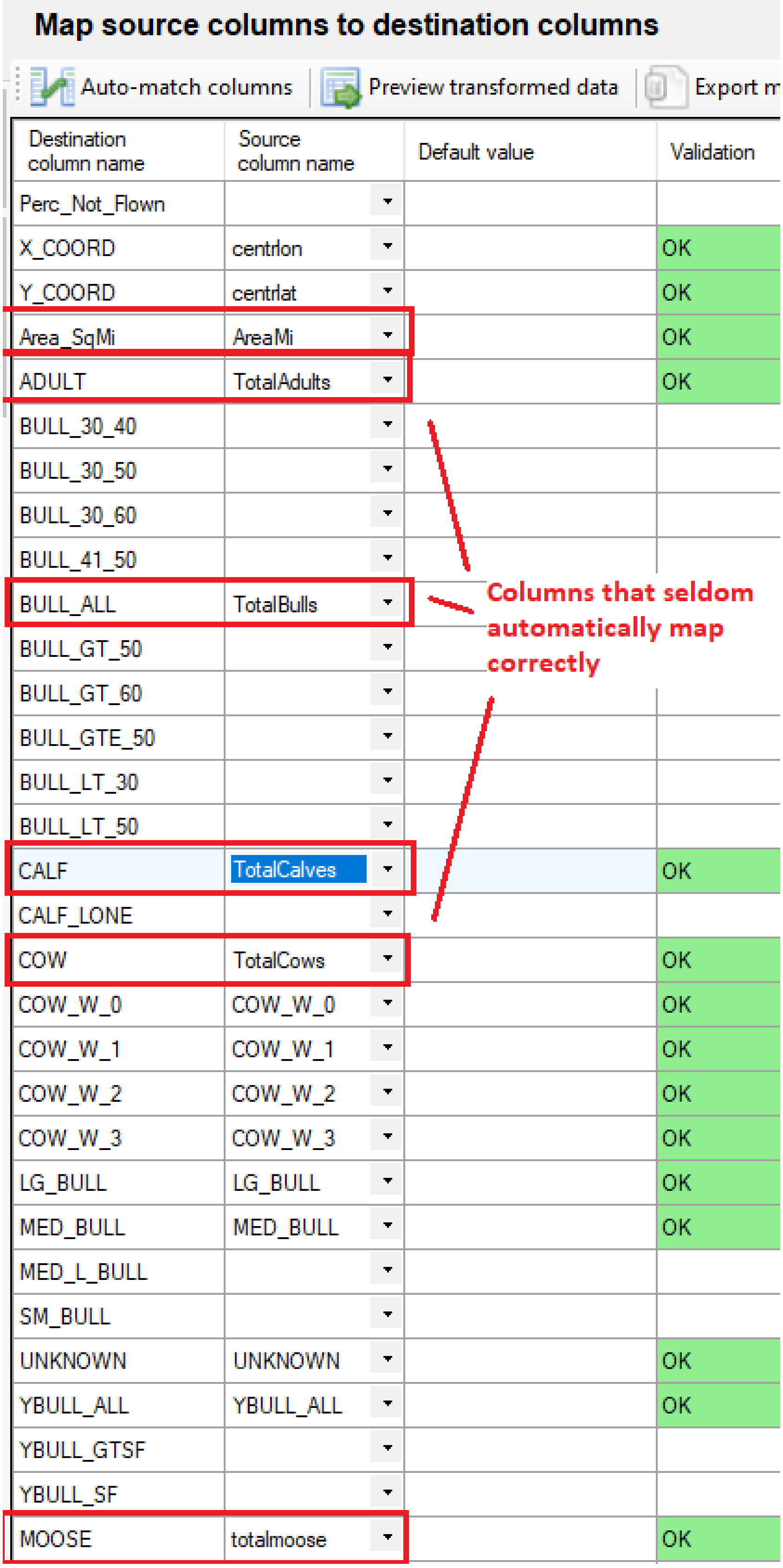
TotalCalves contains data, CALF does not, so I selected TotalCalves over CALF in the Source column name field

Source table

V_2	COW_W_3	CALF	UNKNOWN	YBULL_ALL	MED_BULL	LG_BULL	totalmoose	TotalAdults	TotalCows	TotalBulls	TotalCalves
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	2	1	1	0	1
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	1	1	1	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	3	5	5	2	3	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0

Destination table (transformed data)

Other columns that seldom map correctly automatically appear below

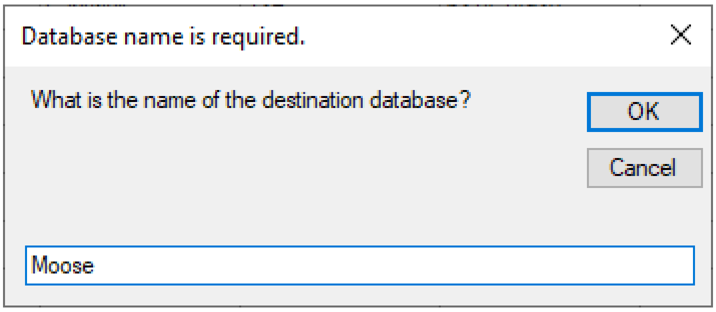


Map source columns to destination columns

Destination column name	Source column name	Default value	Validation
Perc_Not_Flown			
X_COORD	centrlon		OK
Y_COORD	centrlat		OK
Area_SqMi	AreaMi		OK
ADULT	TotalAdults		OK
BULL_30_40			
BULL_30_50			
BULL_30_60			
BULL_41_50			
BULL_ALL	TotalBulls		
BULL_GT_50			
BULL_GT_60			
BULL_GTE_50			
BULL_LT_30			
BULL_LT_50			
CALF	TotalCalves		OK
CALF_LONE			
COW	TotalCows		OK
COW_W_0	COW_W_0		OK
COW_W_1	COW_W_1		OK
COW_W_2	COW_W_2		OK
COW_W_3	COW_W_3		OK
LG_BULL	LG_BULL		OK
MED_BULL	MED_BULL		OK
MED_L_BULL			
SM_BULL			
UNKNOWN	UNKNOWN		OK
YBULL_ALL	YBULL_ALL		OK
YBULL_GTSF			
YBULL_SF			
MOOSE	totalmoose		OK

Columns that seldom automatically map correctly

Carefully check your mappings and if all looks good click Import transformed data
A dialog appears requesting the database name. Enter 'Moose'.



Database name is required.

What is the name of the destination database?

Moose

Another dialog appears requesting the name of the destination database table. Enter 'GSPE'.

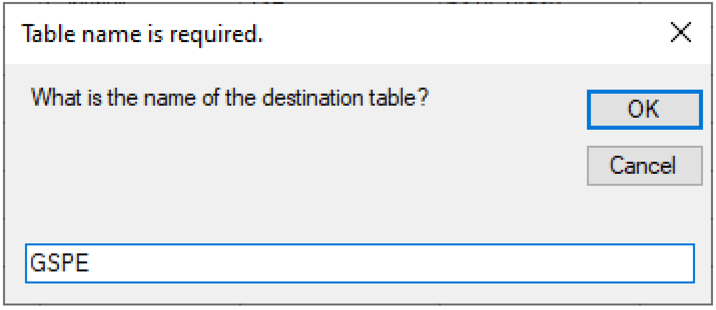
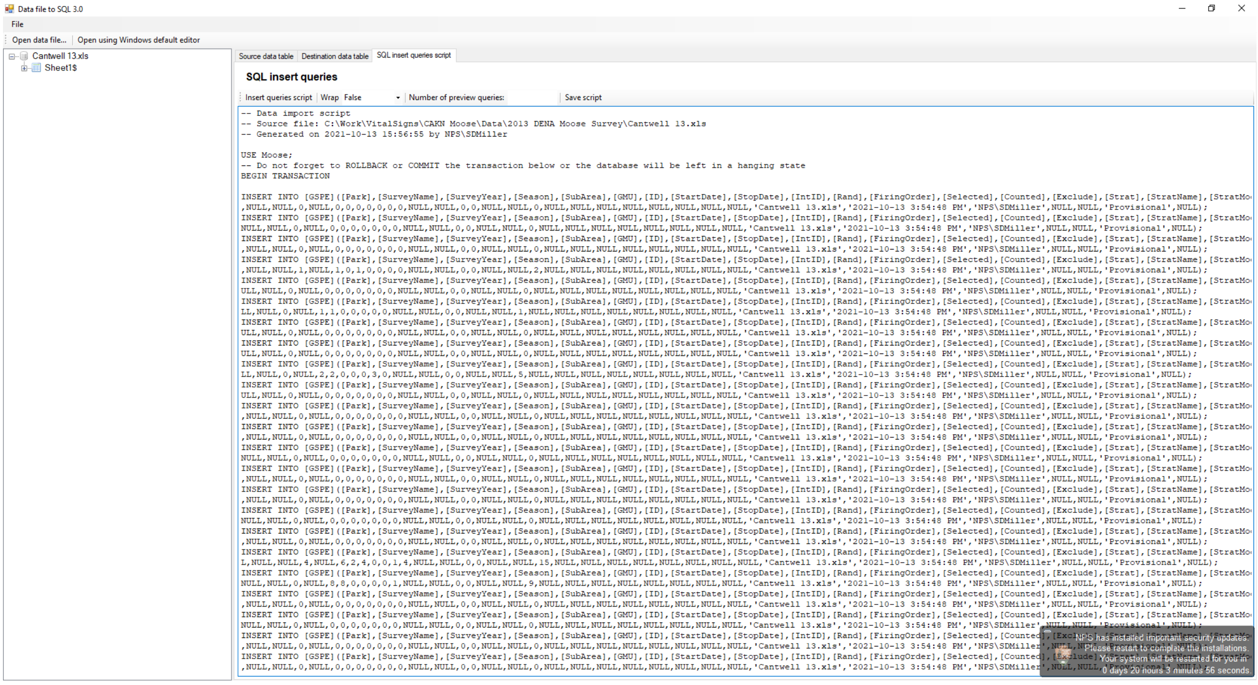


Table name is required.

What is the name of the destination table?

GSPE

If all goes well the tool will generate a script of SQL insert queries that you may execute in SQL Server Management Studio to insert the records.



```
-- Data import script
-- Source file: C:\Work\VitalSigns\CAKN Moose\Data\2013 DENA Moose Survey\Cantwell 13.xls
-- Generated on 2021-10-13 15:56:55 by NPS\SDMiller

USE Moose;
-- Do not forget to ROLLBACK or COMMIT the transaction below or the database will be left in a hanging state
BEGIN TRANSACTION

INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
,NULL,NULL,0,NULL,0,0,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,0,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
NULL,NULL,0,NULL,0,0,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,0,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
,NULL,NULL,0,NULL,0,0,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,0,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
,NULL,NULL,1,NULL,1,0,1,0,0,0,0,NULL,NULL,0,0,NULL,NULL,2,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
ULL,NULL,0,NULL,0,0,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,0,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
LL,NULL,0,NULL,1,1,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,1,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
ULL,NULL,0,NULL,0,0,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,0,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
ULL,NULL,0,NULL,0,0,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,0,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
LL,NULL,0,NULL,2,2,0,0,0,3,0,NULL,NULL,0,0,NULL,NULL,5,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
ULL,NULL,0,NULL,0,0,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,0,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
,NULL,NULL,0,NULL,0,0,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,0,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
,NULL,NULL,0,NULL,0,0,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,0,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
NULL,NULL,0,NULL,0,0,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,0,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
,NULL,NULL,0,NULL,0,0,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,0,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
,NULL,NULL,0,NULL,0,0,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,0,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
NULL,NULL,0,NULL,0,0,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,0,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
,NULL,NULL,0,NULL,0,0,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,0,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
L,NULL,NULL,4,NULL,6,2,4,0,0,1,4,NULL,NULL,0,0,NULL,NULL,15,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
NULL,NULL,0,NULL,8,8,0,0,0,0,1,NULL,NULL,0,0,NULL,NULL,9,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
,NULL,NULL,0,NULL,0,0,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,0,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted],[Exclude],[Strat],[StratName],[StratMo
NULL,NULL,0,NULL,0,0,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,0,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller',NULL,NULL,'Provisional',NULL);
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted]
,NULL,NULL,0,NULL,0,0,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,0,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller
INSERT INTO [GSPE]([Park],[SurveyName],[SurveyYear],[Season],[SubArea],[GMU],[ID],[StartDate],[StopDate],[IntID],[Rand],[FiringOrder],[Selected],[Counted]
,NULL,NULL,0,NULL,0,0,0,0,0,0,0,NULL,NULL,0,0,NULL,NULL,0,NULL,NULL,NULL,NULL,NULL,NULL,NULL,NULL,'Cantwell 13.xls','2021-10-13 3:54:48 PM','NPS\SDMiller
```

NPS has installed important security updates. Please restart to complete the installations. Your system will be restarted for you in 0 days 20 hours 3 minutes 56 seconds.

Copy the text of the insert queries script.
Open SSMS
Navigate to the moose monitoring database.
Open a new query window and copy the insert queries script into it.
Execute the script.
If all the queries executed with no failures then highlight the word COMMIT in the 6th line and execute the command to commit the new records to the database.
If SSMS reported any errors then highlight the work ROLLBACK to revert the insert queries. Fix any errors and try again.
YOU MUST COMMIT OR ROLLBACK or the database will be left in a hanging state with no access to others.
Issue an SQL query to ensure the records exist. Example: SELECT * FROM GSPE WHERE SurveyName='2013 DENA Moose Survey'.
Ensure the number of records inserted matches the number of rows in the source data table.
Sum the data in the source spreadsheet using a formula and compare the result to summed data in the database. Example SELECT Sum(CALF) as TotalCalves FROM GSPE WHERE SurveyName='2013 DENA Moose Survey'.

Data access

Data access

Most modern data consuming software can connect to the moose monitoring database. This section shows typical connection methods.

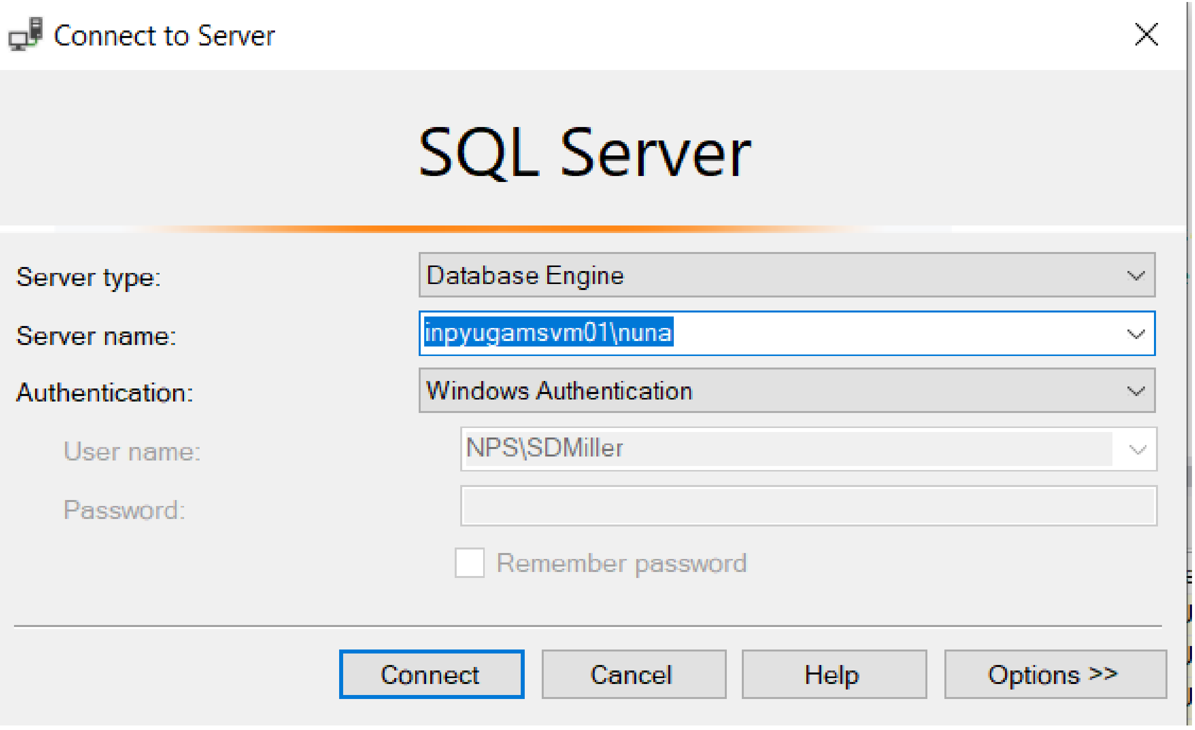
Microsoft Sql Server Management Studio

Microsoft Sql Server Management Studio

Microsoft Sql Server Management Studio (SSMS) is the best tool for administering the database and has good functionality for querying, analyzing and summarizing results. While the software is not difficult to use, it does require an advanced understanding of relational databases.

Process

1. Open SSMS.
2. In the Object Explorer click Connect
3. In the connection dialog enter the server and database details:



Server type: Database Engine

Server name: inpyugamsvm01\nuna

Authentication: Windows Authentication

User name: NPS\SDMiller

Password:

□ Remember password

4.
5. Expand the server node.
6. Expand the Databases node and select Moose.
7. Consult the SSRS help and online documentation for further information on working with the Moose database.

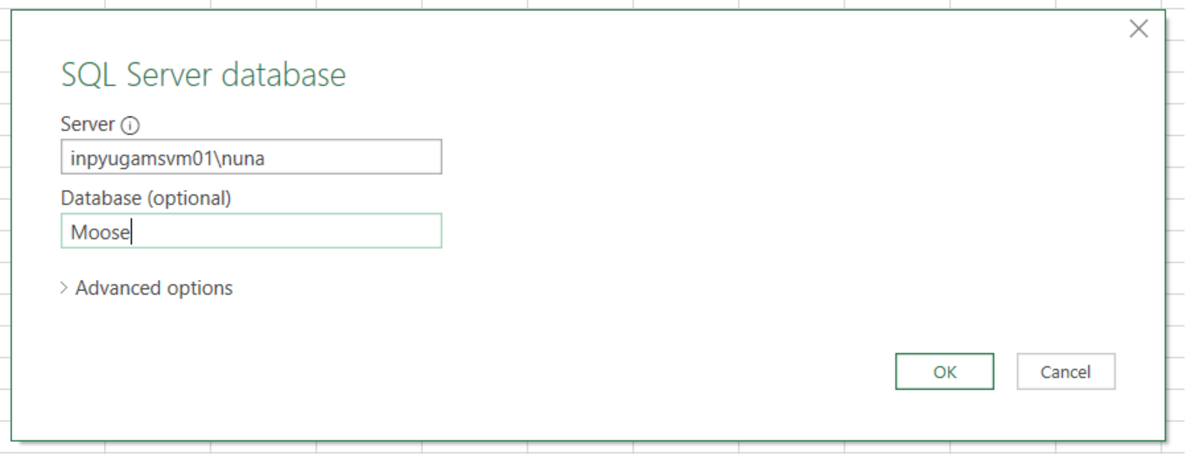
Microsoft Excel

Accessing the Moose database with Microsoft Excel

Prerequisite
At least datareader permissions. Contact your data manager.

Process

1. Open an Excel workbook
2. From the Data menu select **Get Data -> From Database -> From Sql Server Database**
3. Enter **inpyugamsvm01\nuna** for the Server and **Moose** for the database.

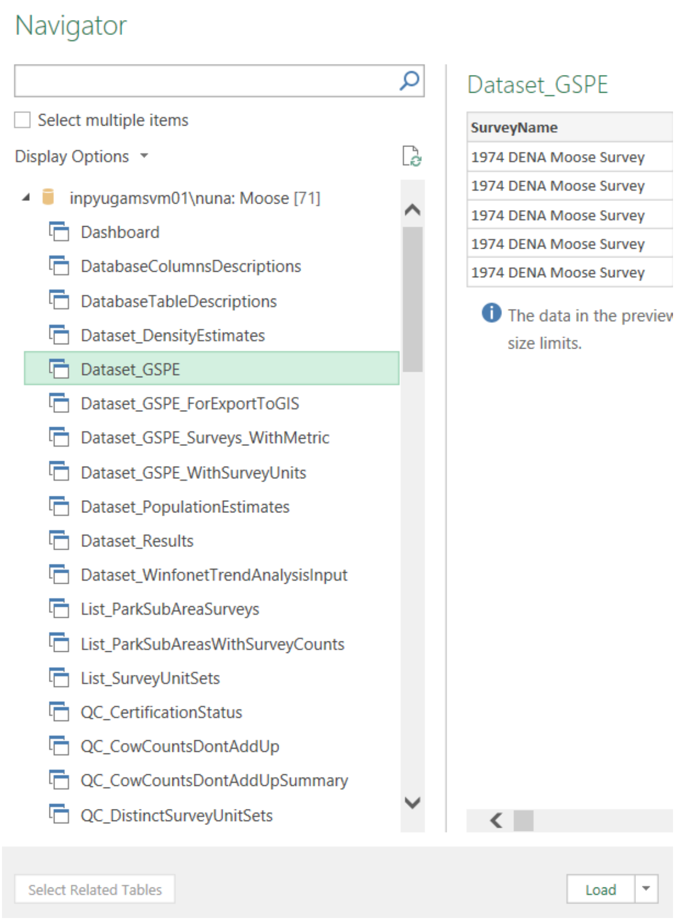


SQL Server database

Server: inpyugamsvm01\nuna

Database (optional): Moose

4.
5. From the Navigator choose the query you would like to pull. Typically, you will request Dataset_GSPE to pull the whole dataset. Note: this dataset contains tens of thousands of records and may take a minute or so to retrieve depending on your network speed.


Navigator

☐ Select multiple items

Display Options ▾

- inpyugamsvm01\nuna: Moose [71]
  - Dashboard
  - DatabaseColumnsDescriptions
  - DatabaseTableDescriptions
  - Dataset_DensityEstimates
  - Dataset_GSPE
  - Dataset_GSPE_ForExportToGIS
  - Dataset_GSPE_Surveys_WithMetric
  - Dataset_GSPE_WithSurveyUnits
  - Dataset_PopulationEstimates
  - Dataset_Results
  - Dataset_WinfonetTrendAnalysisInput
  - List_ParkSubAreaSurveys
  - List_ParkSubAreasWithSurveyCounts
  - List_SurveyUnitSets
  - QC_CertificationStatus
  - QC_CowCountsDontAddUp
  - QC_CowCountsDontAddUpSummary
  - QC_DistinctSurveyUnitSets

Dataset_GSPE

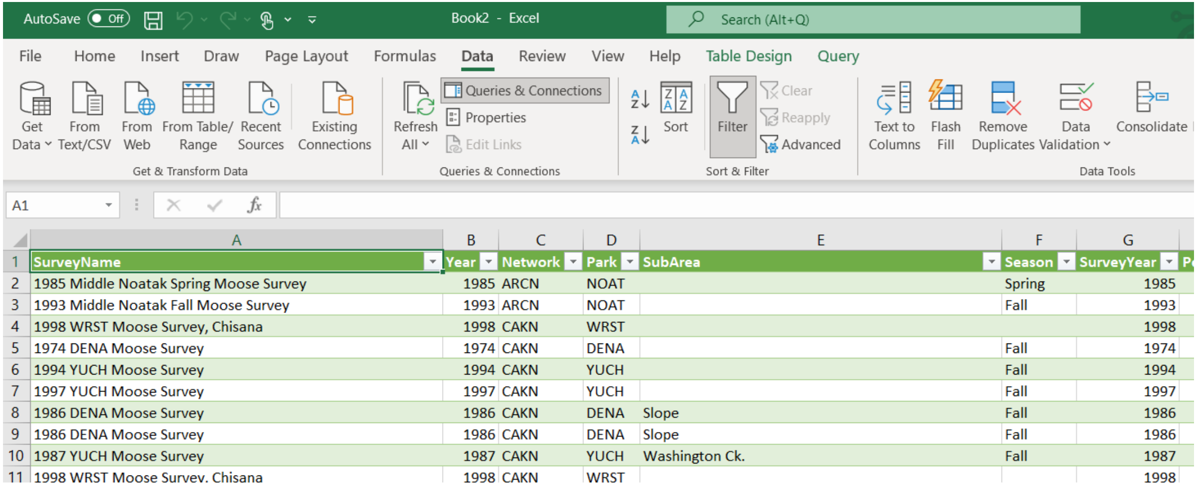
SurveyName
1974 DENA Moose Survey
1974 DENA Moose Survey
1974 DENA Moose Survey
1974 DENA Moose Survey
1974 DENA Moose Survey

The data in the previev size limits.

Select Related Tables

Load ▾

6.
7. Click Load or Transform data.
8. The GSPE dataset appears.



SurveyName	Year	Network	Park	SubArea	Season	SurveyYear	P
1985 Middle Noatak Spring Moose Survey	1985	ARCN	NOAT		Spring	1985	
1993 Middle Noatak Fall Moose Survey	1993	ARCN	NOAT		Fall	1993	
1998 WRST Moose Survey, Chisana	1998	CAKN	WRST			1998	
1974 DENA Moose Survey	1974	CAKN	DENA		Fall	1974	
1994 YUCH Moose Survey	1994	CAKN	YUCH		Fall	1994	
1997 YUCH Moose Survey	1997	CAKN	YUCH		Fall	1997	
1986 DENA Moose Survey	1986	CAKN	DENA	Slope	Fall	1986	
1986 DENA Moose Survey	1986	CAKN	DENA	Slope	Fall	1986	
1987 YUCH Moose Survey	1987	CAKN	YUCH	Washington Ck.	Fall	1987	
1998 WRST Moose Survey, Chisana	1998	CAKN	WRST			1998	

9.

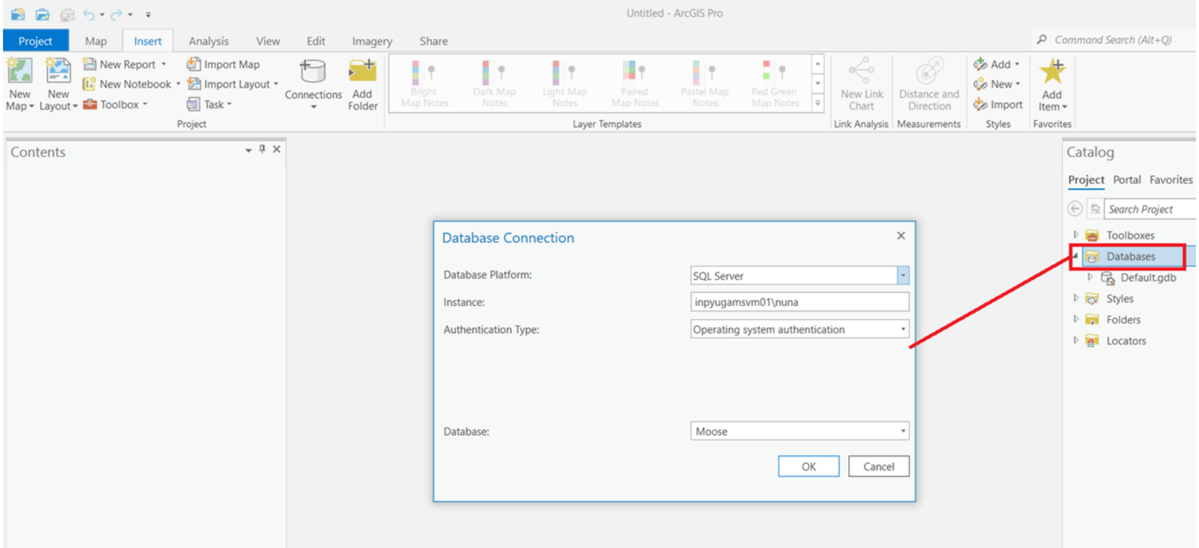
ArcGIS Pro

Accessing the Moose database with ArcGIS Pro

Prerequisite
At least datareader permissions. Contact your data manager.

Process
1. Open ArcGIS Pro

2. Locate the Catalog
3. Right click Databases -> New database connection
4. Enter the server/database information as shown in the screenshot below:



Database Connection

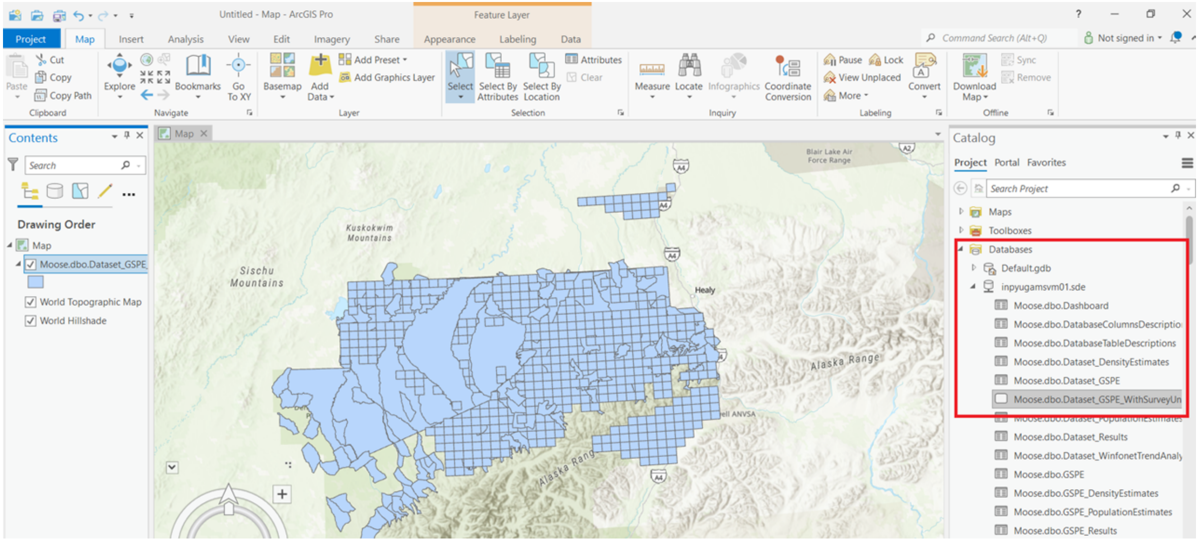
Database Platform: SQL Server

Instance: inpyugamsvm01\nuna

Authentication Type: Operating system authentication

Database: Moose

5.
6. All the database tables and queries become available to you. Select Dataset_GSPE_WithSurveyUnits and drag it onto the map (there are tens of thousands of records which may take a while to load).
7. If all goes well the data will appear on the map



8.

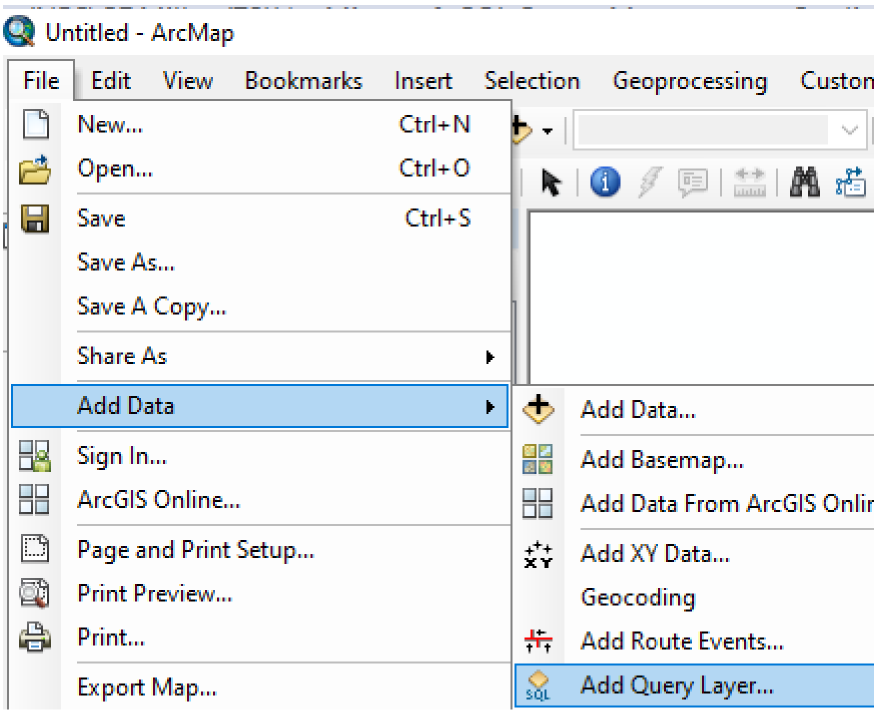
ArcMap

Accessing the Moose database with ArcMap

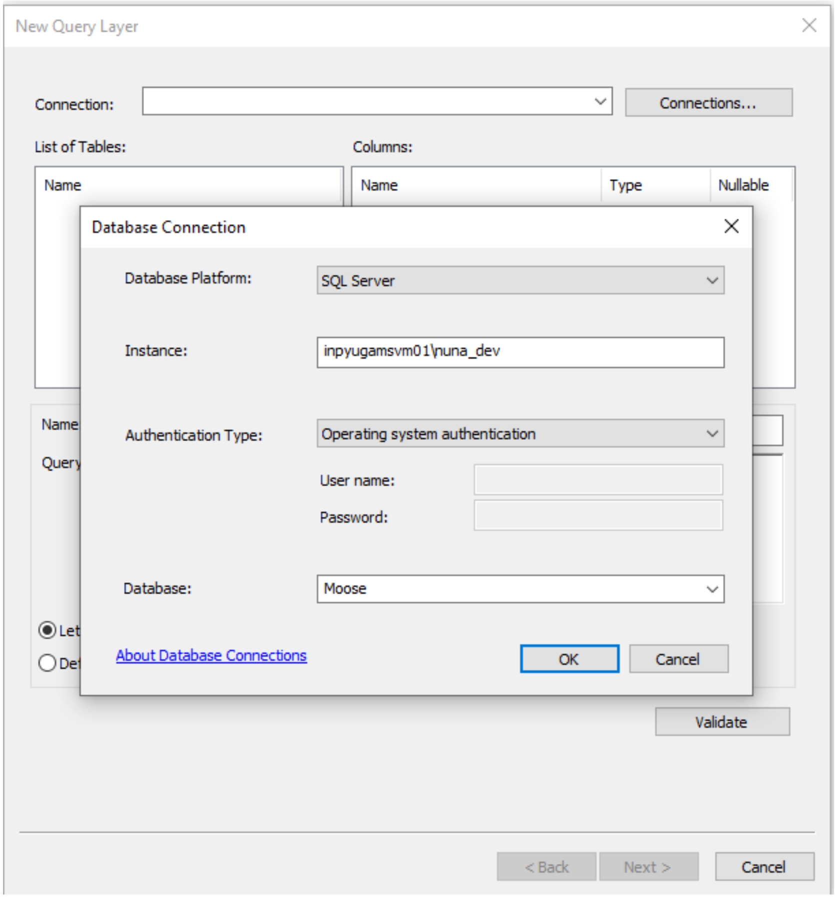
Using ArcMap to access data in the Moose Monitoring database is possible, but not recommended. It just doesn't work well. There is much better support for SQL Server database connections with ArcGIS Pro. See ArcGIS Pro.

Prerequisite
At least datareader permissions. Contact your data manager.

Process
1. Open ArcMap
2. Add a Query Layer: File -> Add Data -> Add Query Layer



3.
4. Make a new connection to the Moose database



Database Platform: SQL Server

Instance: inpyugamsvm01\nuna_dev

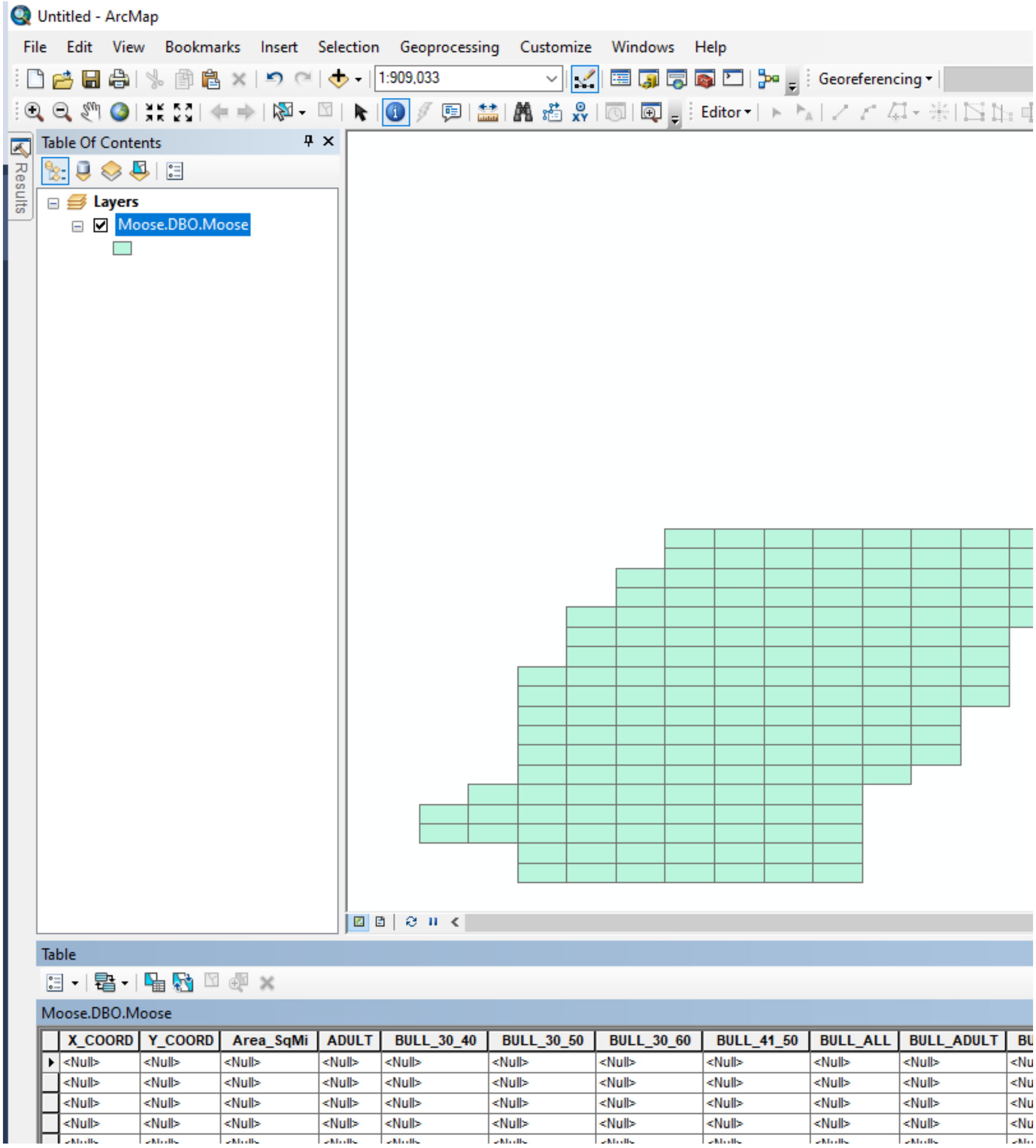
Authentication Type: Operating system authentication

User name:

Password:

Database: Moose

5.
6. Enter a query. The most likely query you will want is Dataset_GSPE_WithSurveyUnits. This is the same query as Dataset_GSPE but it includes the survey unit polygons with the GSPE data. Note: You will almost certainly want to filter your query with a WHERE clause to prevent overloading ArcMap with tens of thousands of polygons.
7. An example query: `SELECT * from Dataset_GSPE_WithSurveyUnits WHERE SurveyName='2015 DENA Moose Survey'`
8. Click Validate and move through the rest of the wizard.
9. The data should appear:

10. 

Moose.DBO.Moose

X_COORD	Y_COORD	Area_SqMi	ADULT	BULL_30_40	BULL_30_50	BULL_30_60	BULL_41_50	BULL_ALL	BULL_ADULT	BU
<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Nu
<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Nu
<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Nu
<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Nu

11. Consider exporting the data to a local shapefile or geodatabase to make analysis quicker by eliminating round trip passes over the network which will be slow. Otherwise analyze like any other GIS layer.
12. If you find errors please take the time to communicate them to the I&M data managers so they can be corrected for other users of the dataset!

R

Accessing the Moose database with R

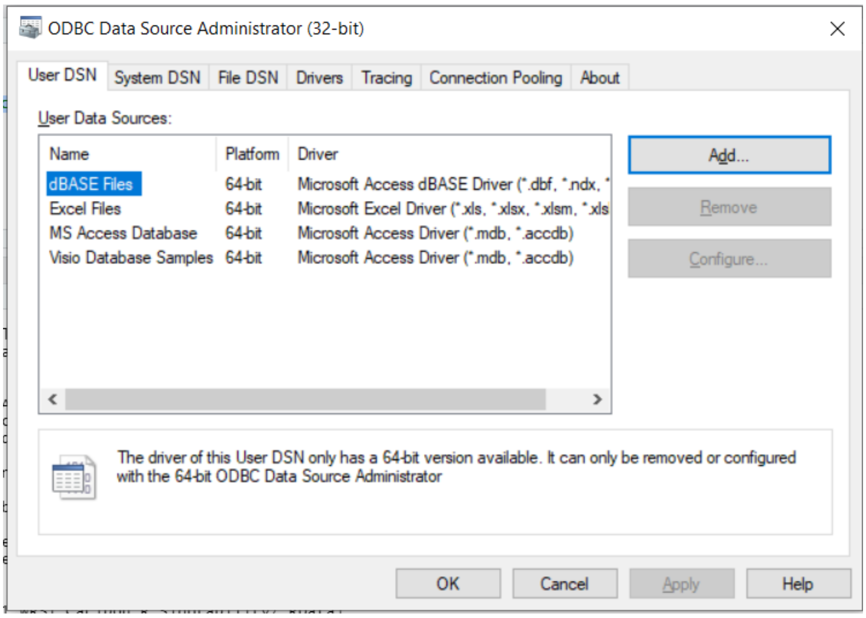
Prerequisite
At least datareader permissions. Contact your data manager.
An ODBC database connection to the Moose database.

Create an ODBC connection

Process

1. Click the Windows key and search 'ODBC' to start the ODBC Data Source Administrator

2. Click through the Wizard to create an ODBC connection to the Moose database
3. Click Add...

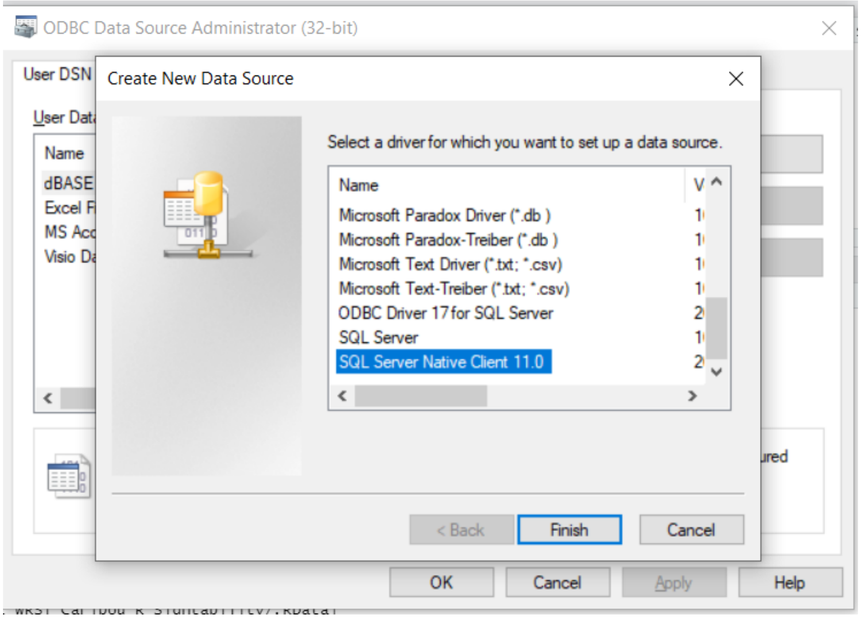


User Data Sources:

Name	Platform	Driver
dBASE Files	64-bit	Microsoft Access dBASE Driver (*.dbf, *.ndx, *
Excel Files	64-bit	Microsoft Excel Driver (*.xls, *.xlsx, *.xlsm, *.xls
MS Access Database	64-bit	Microsoft Access Driver (*.mdb, *.accdb)
Visio Database Samples	64-bit	Microsoft Access Driver (*.mdb, *.accdb)

The driver of this User DSN only has a 64-bit version available. It can only be removed or configured with the 64-bit ODBC Data Source Administrator

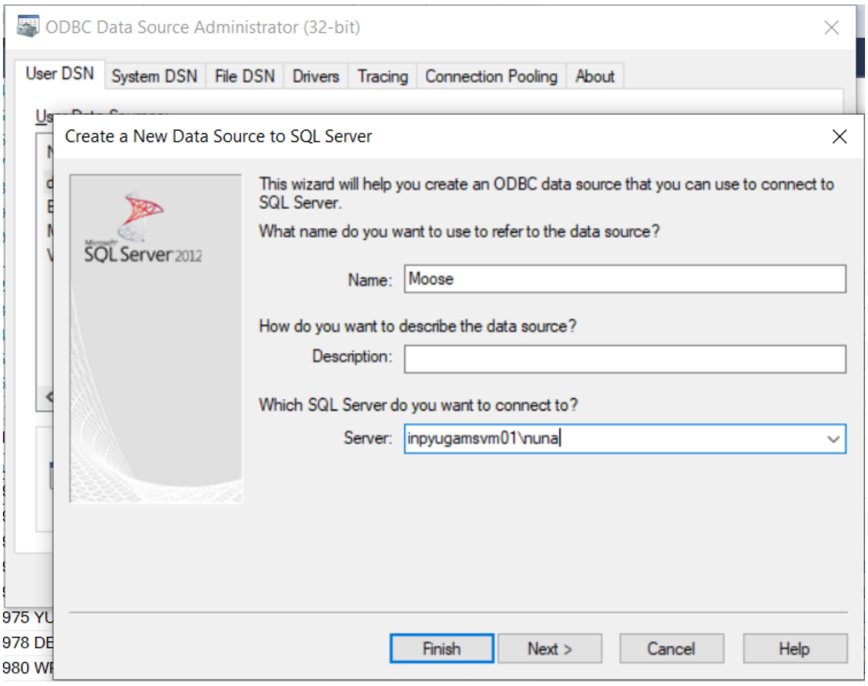
1.
2. Scroll down to Sql Server or Sql Server Native Client.If you don't have on ODBC driver for Sql Server see [Download ODBC Driver for SQL Server]()



Select a driver for which you want to set up a data source.

Name	V
Microsoft Paradox Driver (*.db)	1
Microsoft Paradox-Treiber (*.db)	1
Microsoft Text Driver (*.txt; *.csv)	1
Microsoft Text-Treiber (*.txt; *.csv)	1
ODBC Driver 17 for SQL Server	2
SQL Server	1
SQL Server Native Client 11.0	2

3.



4. Create a New Data Source to SQL Server

This wizard will help you create an ODBC data source that you can use to connect to SQL Server.

What name do you want to use to refer to the data source?

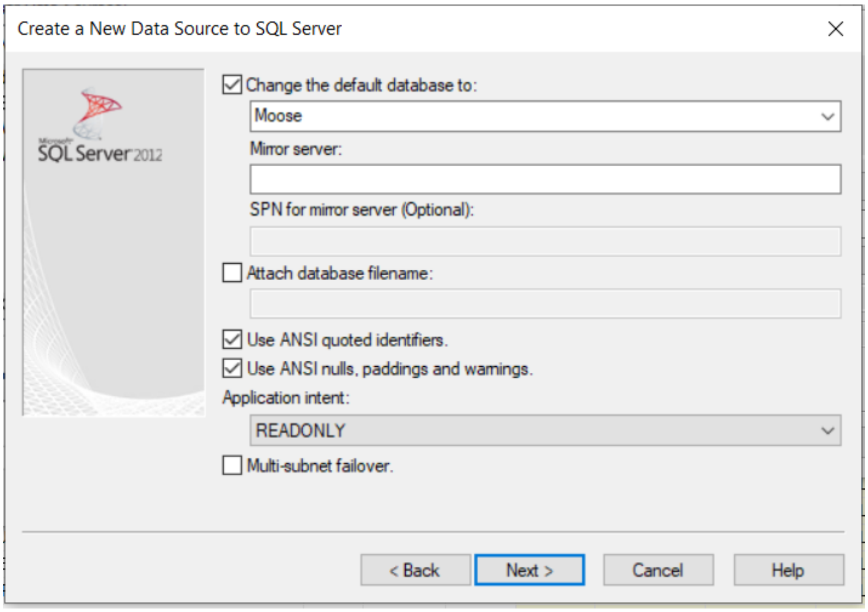
Name: Moose

How do you want to describe the data source?

Description:

Which SQL Server do you want to connect to?

Server: inpyugamsvm01\nuna



5. Create a New Data Source to SQL Server

☑ Change the default database to:

Moose

Mirror server:

SPN for mirror server (Optional):

☐ Attach database filename:

☑ Use ANSI quoted identifiers.

☑ Use ANSI nulls, paddings and warnings.

Application intent:

READONLY

☐ Multi-subnet failover.

4. Test the connection. If all goes well you can now connect to the database through this connection using R.

Example R script that connects to the Moose database

The example below shows how to connect to the Moose database and access the GSPE dataset. Modify the query as needed or omit the WHERE clause to pull the whole dataset (tens of thousands of records).

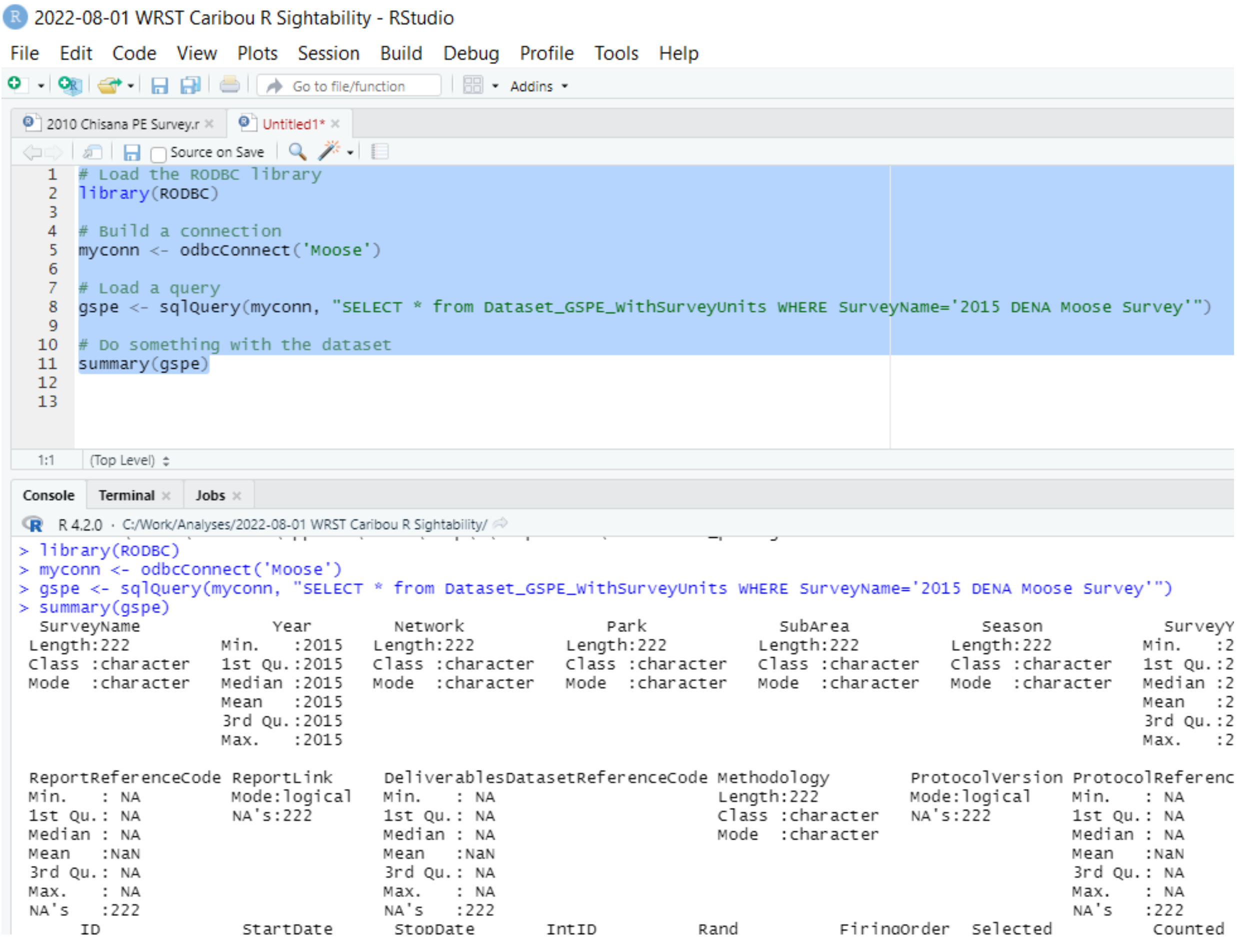
```
# Load the RODBC library
library(RODBC)

# Build a connection using the Moose ODBC connection
myconn <- odbcConnect('Moose')

# Load a query
gspe <- sqlQuery(myconn, "SELECT * from Dataset_GSPE_WithSurveyUnits WHERE
SurveyName='2015 DENA Moose Survey'")

# Do something with the dataset
```

```
summary(gspe)
```



2022-08-01 WRST Caribou R Sightability - RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function
Addins
2010 Chisana PE Survey.r
Untitled1*
Source on Save
1:1
(Top Level)
Console
Terminal
Jobs
R 4.2.0 · C:/Work/Analyses/2022-08-01 WRST Caribou R Sightability/

```
# Load the RODBC library
library(RODBC)

# Build a connection
myconn <- odbcConnect('Moose')

# Load a query
gspe <- sqlQuery(myconn, "SELECT * from Dataset_GSPE_WithSurveyUnits WHERE SurveyName='2015 DENA Moose Survey'")

# Do something with the dataset
summary(gspe)
```

```
> library(RODBC)
> myconn <- odbcConnect('Moose')
> gspe <- sqlQuery(myconn, "SELECT * from Dataset_GSPE_WithSurveyUnits WHERE SurveyName='2015 DENA Moose Survey'")
> summary(gspe)
  SurveyName             Year         Network              Park               SubArea              Season              SurveyY
 Length:222         Min.   :2015   Length:222         Length:222         Length:222         Length:222         Min.   :2
 Class :character   1st Qu.:2015   Class :character   Class :character   Class :character   Class :character   1st Qu.:2
 Mode  :character   Median :2015   Mode  :character   Mode  :character   Mode  :character   Mode  :character   Median :2
                    Mean   :2015                                                                               Mean   :2
                    3rd Qu.:2015                                                                               3rd Qu.:2
                    Max.   :2015                                                                               Max.   :2

 ReportReferenceCode ReportLink     DeliverablesDatasetReferenceCode Methodology        ProtocolVersion ProtocolReferenc
 Min.   : NA         Mode:logical   Min.   : NA                      Length:222         Mode:logical    Min.   : NA
 1st Qu.: NA         NA's:222       1st Qu.: NA                      Class :character   NA's:222        1st Qu.: NA
 Median : NA                        Median : NA                      Mode  :character                   Median : NA
 Mean   :NaN                        Mean   :NaN                                                         Mean   :NaN
 3rd Qu.: NA                        3rd Qu.: NA                                                         3rd Qu.: NA
 Max.   : NA                        Max.   : NA                                                         Max.   : NA
 NA's   :222                        NA's   :222                                                         NA's   :222
       ID              StartDate         StopDate          IntID            Rand             FiringOrder   Selected          Counted
```

Python (ArcPy)

Accessing the Moose database with Python (ArcPy)

Prerequisite
At least datareader permissions. Contact your data manager.

The most likely scenario for accessing the Moose database using Python is to extract some or all of the dataset for analysis. There is a Python script at Dataset publication that loads the GSPE data into ArcMap and exports it as a shapefile. This script can be modified to suit your needs.

Power BI

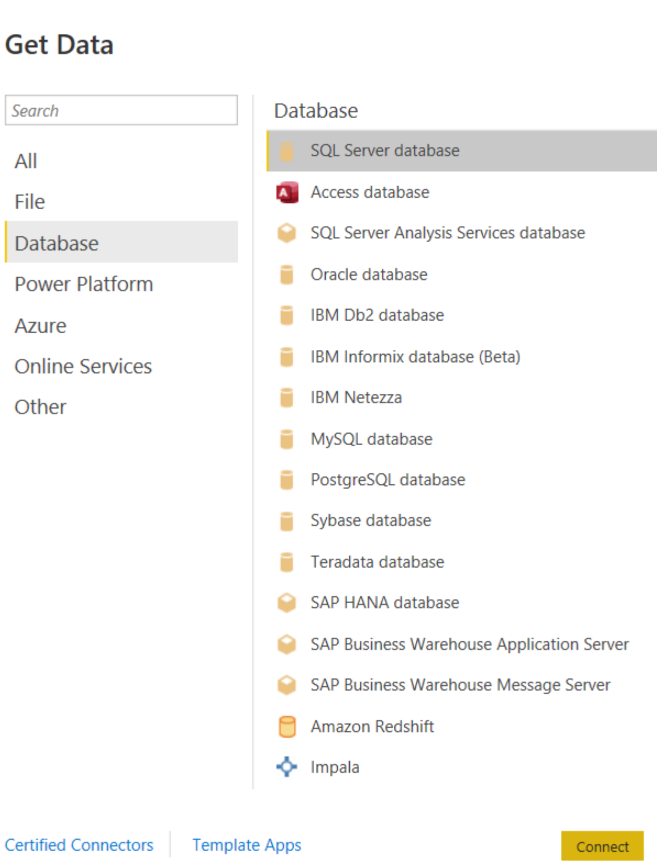
Accessing the Moose database with Microsoft Power BI

Prerequisite
At least datareader permissions. Contact your data manager.
Power BI. Download here https://inp2300sqlsas02.nps.doi.net/PBIReports/browse/Development/CAKN

Process

1. Open Power BI

2. Click Get data
3. Select Database -> SQL Server database



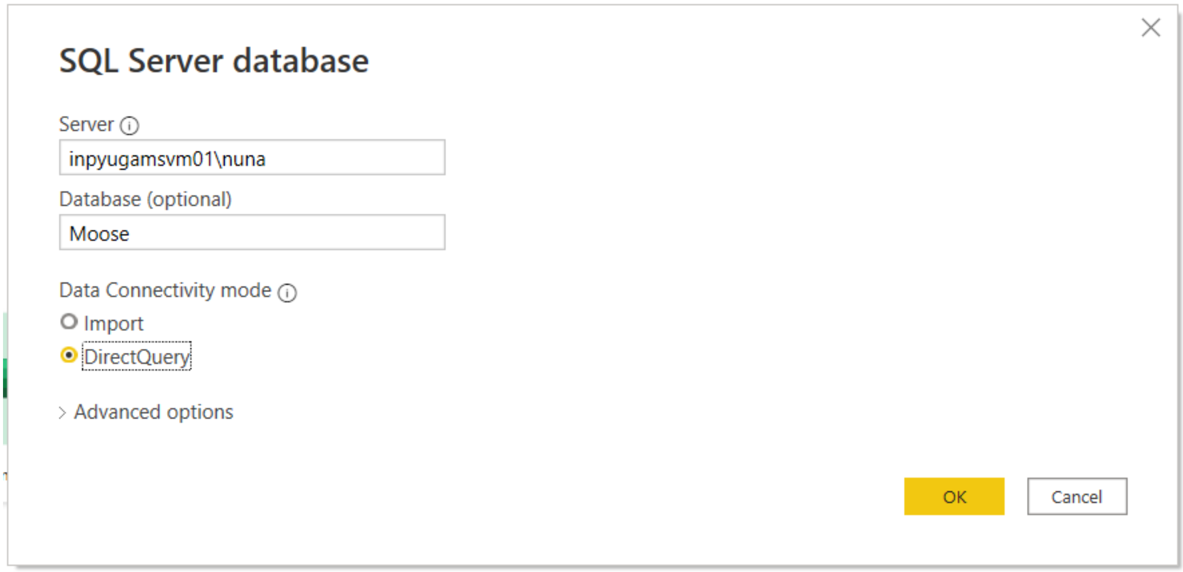
Get Data

Search

Database

- SQL Server database
- Access database
- SQL Server Analysis Services database
- Oracle database
- IBM Db2 database
- IBM Informix database (Beta)
- IBM Netezza
- MySQL database
- PostgreSQL database
- Sybase database
- Teradata database
- SAP HANA database
- SAP Business Warehouse Application Server
- SAP Business Warehouse Message Server
- Amazon Redshift
- Impala

4.
5. Click Connect
6. Enter the server and database names



SQL Server database

Server ⓘ: inpyugamsvm01\nuna

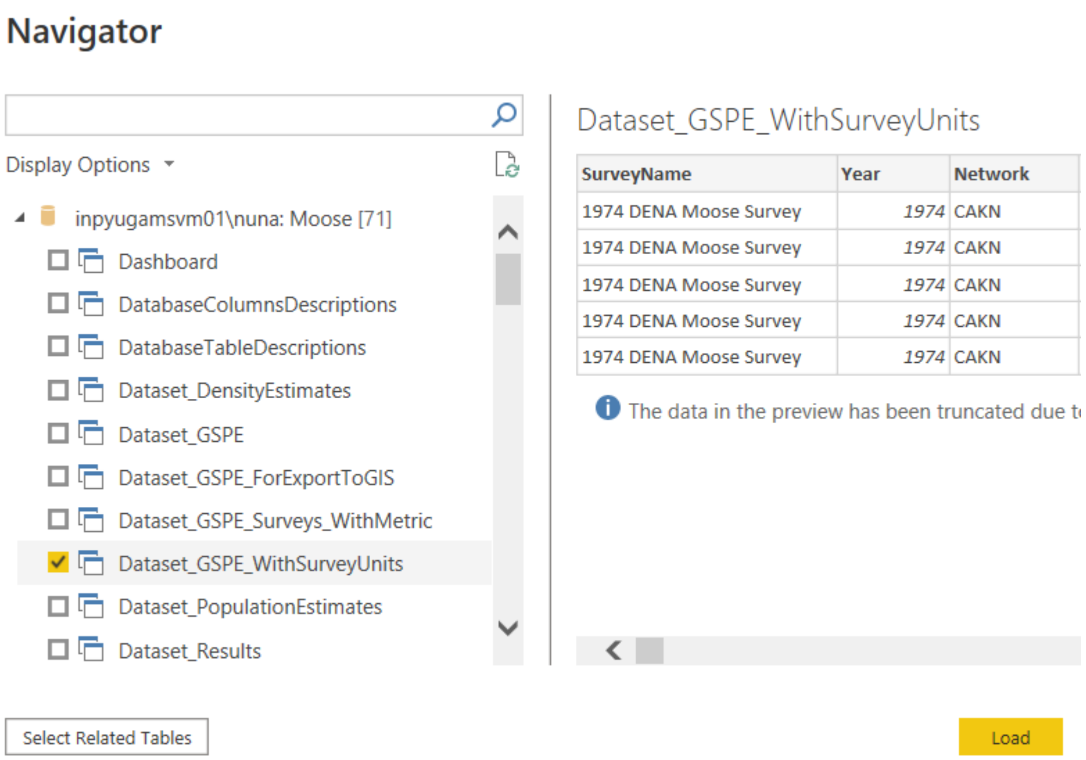
Database (optional): Moose

Data Connectivity mode ⓘ

○ Import

● DirectQuery

7.
8. The database Navigator opens:



Navigator

inpyugamsvm01\nuna: Moose [71]

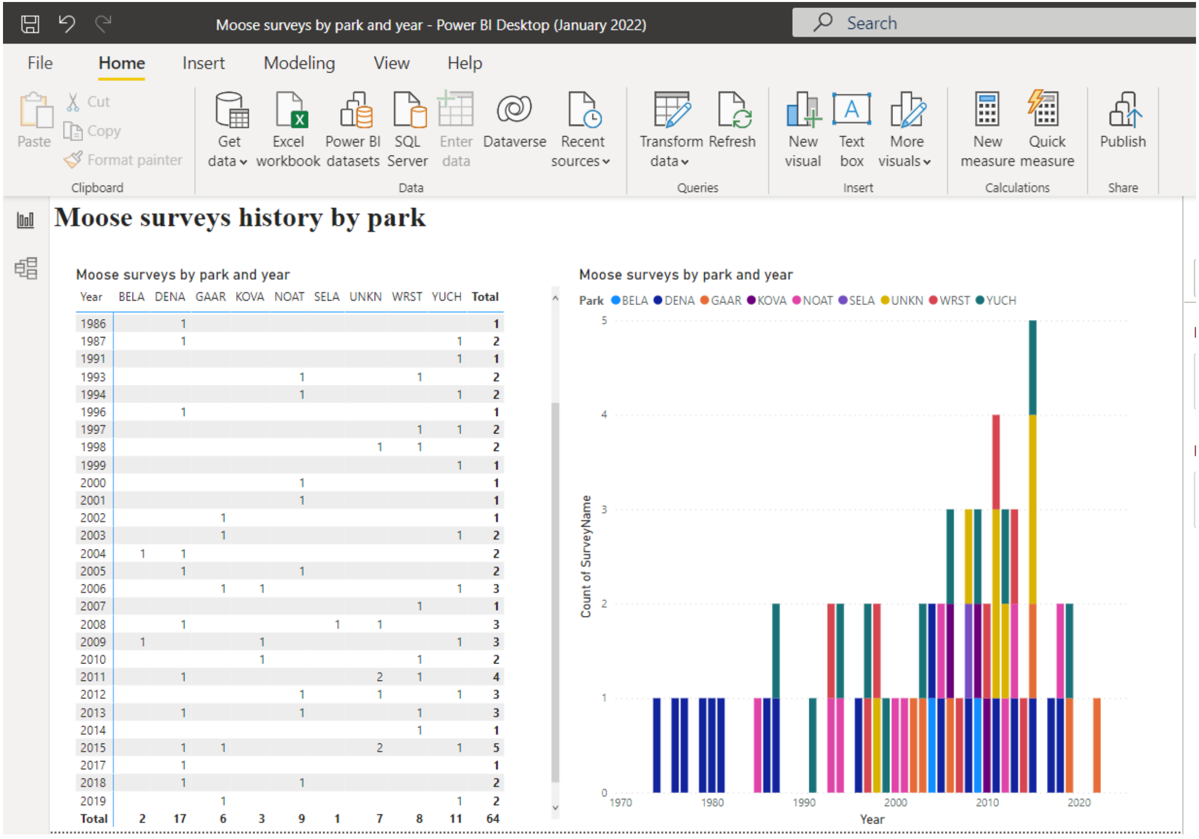
- □ Dashboard
- □ DatabaseColumnsDescriptions
- □ DatabaseTableDescriptions
- □ Dataset_DensityEstimates
- □ Dataset_GSPE
- □ Dataset_GSPE_ForExportToGIS
- □ Dataset_GSPE_Surveys_WithMetric
- ☑ Dataset_GSPE_WithSurveyUnits
- □ Dataset_PopulationEstimates
- □ Dataset_Results

Dataset_GSPE_WithSurveyUnits

SurveyName	Year	Network
1974 DENA Moose Survey	1974	CAKN
1974 DENA Moose Survey	1974	CAKN
1974 DENA Moose Survey	1974	CAKN
1974 DENA Moose Survey	1974	CAKN
1974 DENA Moose Survey	1974	CAKN

The data in the preview has been truncated due t

9.
10. Select Dataset_GSPE_WithSurveyUnits
11. Develop your visuals



Moose surveys history by park

Moose surveys by park and year

Year	BELA	DENA	GAAR	KOVA	NOAT	SELA	UNKN	WRST	YUCH	Total
1986		1								1
1987		1							1	2
1991									1	1
1993					1			1		2
1994					1				1	2
1996		1								1
1997								1	1	2
1998							1	1		2
1999									1	1
2000					1					1
2001					1					1
2002			1							1
2003			1						1	2
2004	1	1								2
2005		1			1					2
2006			1	1					1	3
2007								1		1
2008		1				1	1			3
2009	1			1					1	3
2010				1				1		2
2011		1					2	1		4
2012					1		1		1	3
2013		1			1			1		3
2014								1		1
2015		1	1				2		1	5
2017		1								1
2018		1			1					2
2019			1						1	2
Total	2	17	6	3	9	1	7	8	11	64

Moose surveys by park and year

Park ● BELA ● DENA ● GAAR ● KOVA ● NOAT ● SELA ● UNKN ● WRST ● YUCH
Count of SurveyName
0
1
2
3
4
5
1970
1980
1990
2000
2010
2020
Year

12.

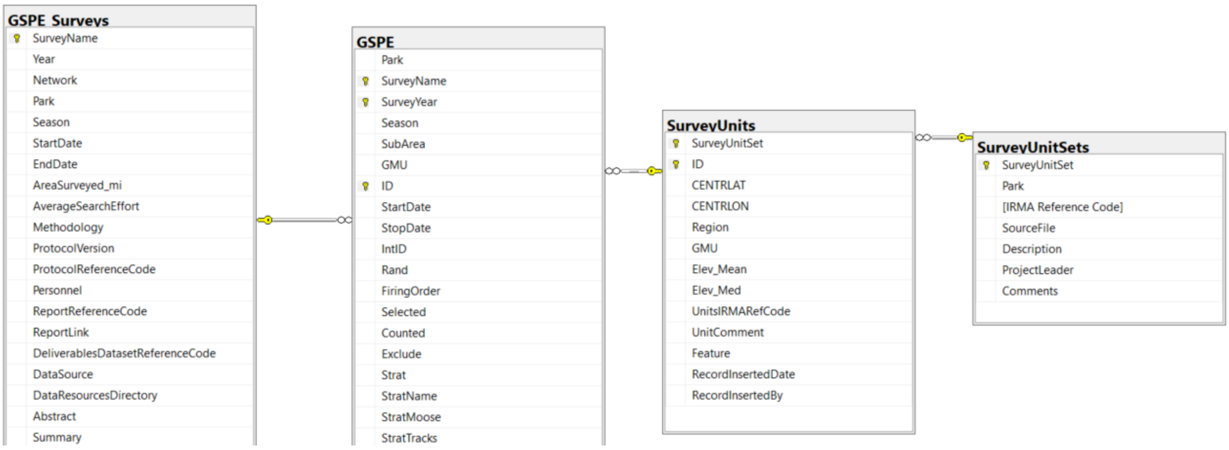
Database documentation

Database documentation

Database details

SQL Server: inpyugamsvm01\nuna
Database: Moose

Data model



Columns descriptions

Table	Column	DataType	Length	Precision	Scale	Nullabl
GSPE	ADULT	int	4	10	0	1
GSPE	Area_SqMi	float	8	53	NULL	1
GSPE	BULL_30_40	int	4	10	0	1
GSPE	BULL_30_50	int	4	10	0	1
GSPE	BULL_30_60	int	4	10	0	1
GSPE	BULL_41_50	int	4	10	0	1
GSPE	BULL_ADULT	int	4	10	0	1
GSPE	BULL_ALL	int	4	10	0	1
GSPE	BULL_GT_50	int	4	10	0	1
GSPE	BULL_GT_60	int	4	10	0	1
GSPE	BULL_GTE_50	int	4	10	0	1
GSPE	BULL_LT_30	int	4	10	0	1
GSPE	BULL_LT_50	int	4	10	0	1
GSPE	CALF	int	4	10	0	1
GSPE	CALF_LONE	int	4	10	0	1
GSPE	CertificationDate	datetime	8	23	3	1

GSPE	CertificationLevel	varchar	15	15	NULL	0
GSPE	CertifiedBy	varchar	50	50	NULL	1
GSPE	Comments	varchar	255	255	NULL	1
GSPE	Counted	bit	1	1	NULL	1
GSPE	COW	int	4	10	0	1
GSPE	COW_W_0	int	4	10	0	1
GSPE	COW_W_1	int	4	10	0	1
GSPE	COW_W_2	int	4	10	0	1
GSPE	COW_W_3	int	4	10	0	1
GSPE	DateCounted	date	3	10	0	1
GSPE	Density	float	8	53	NULL	1
GSPE	Exclude	bit	1	1	NULL	1
GSPE	FiringOrder	int	4	10	0	1
GSPE	GMU	varchar	20	20	NULL	1
GSPE	ID	varchar	10	10	NULL	0
GSPE	Int	int	4	10	0	1
GSPE	IntID	int	4	10	0	1
GSPE	IsIntensivePlot	bit	1	1	NULL	1
GSPE	IsStdPlot	bit	1	1	NULL	1
GSPE	LG_BULL	int	4	10	0	1
GSPE	MED_BULL	int	4	10	0	1
GSPE	MED_L_BULL	int	4	10	0	1
GSPE	MOOSE	int	4	10	0	1
GSPE	Observer	varchar	50	50	NULL	1

GSPE	Park	varchar	4	4	NULL	0
GSPE	Perc_Not_Flown	int	4	10	0	1
GSPE	Personnel	varchar	100	100	NULL	1
GSPE	Pilot	varchar	50	50	NULL	1
GSPE	Rand	float	8	53	NULL	1
GSPE	RecordInsertedBy	nvarchar	100	50	NULL	0
GSPE	RecordInsertedBy	sysname	100	50	NULL	0
GSPE	RecordInsertedDate	datetime	8	23	3	0
GSPE	SCF_Plot	bit	1	1	NULL	1
GSPE	SearchMin	float	8	53	NULL	1
GSPE	Season	varchar	20	20	NULL	1
GSPE	Selected	bit	1	1	NULL	1
GSPE	SM_BULL	int	4	10	0	1
GSPE	SourceFilename	varchar	255	255	NULL	1
GSPE	StartDate	datetime	8	23	3	1
GSPE	Std	int	4	10	0	1
GSPE	StopDate	datetime	8	23	3	1
GSPE	Strat	varchar	1	1	NULL	1
GSPE	StratHab	varchar	100	100	NULL	1
GSPE	StratMoose	int	4	10	0	1
GSPE	StratName	varchar	10	10	NULL	1
GSPE	StratTracks	int	4	10	0	1

GSPE	SubArea	varchar	50	50	NULL	1
GSPE	SurveyID	int	4	10	0	1
GSPE	SurveyName	varchar	100	100	NULL	0
GSPE	SurveyUnitSet	varchar	100	100	NULL	1
GSPE	SurveyYear	int	4	10	0	0
GSPE	UNKNOWN	int	4	10	0	1
GSPE	X_COORD	float	8	53	NULL	1
GSPE	Y_COORD	float	8	53	NULL	1
GSPE	YBULL_ALL	int	4	10	0	1
GSPE	YBULL_GTSF	int	4	10	0	1
GSPE	YBULL_SF	int	4	10	0	1
GSPE_Surveys	Abstract	varchar	-1	-1	NULL	1
GSPE_Surveys	AreaSurveyed_mi	float	8	53	NULL	1
GSPE_Surveys	AverageSearchEffort	float	8	53	NULL	1
GSPE_Surveys	Comments	varchar	-1	-1	NULL	1
GSPE_Surveys	DataResourcesDirectory	varchar	1000	1000	NULL	1

GSPE_Surveys	DatasetProcessingSteps	varchar	-1	-1	NULL	1
GSPE_Surveys	DataSource	varchar	2000	2000	NULL	1
GSPE_Surveys	DeliverablesDatasetReferenceCode	int	4	10	0	1
GSPE_Surveys	EndDate	date	3	10	0	1
GSPE_Surveys	Methodology	varchar	50	50	NULL	1
GSPE_Surveys	Network	char	4	4	NULL	1
GSPE_Surveys	Park	varchar	4	4	NULL	1
GSPE_Surveys	Personnel	varchar	200	200	NULL	1
GSPE_Surveys	ProtocolReferenceCode	int	4	10	0	1
GSPE_Surveys	ProtocolVersion	float	8	53	NULL	1
GSPE_Surveys	RecordInsertedBy	varchar	50	50	NULL	0
GSPE_Surveys	RecordInsertedDate	datetime	8	23	3	0
GSPE_Surveys	ReportLink	varchar	2000	2000	NULL	1
GSPE_Surveys	ReportReferenceCode	int	4	10	0	1
GSPE_Surveys	Season	varchar	10	10	NULL	1
GSPE_Surveys	StartDate	date	3	10	0	1
GSPE_Surveys	Summary	varchar	-1	-1	NULL	1
GSPE_Surveys	SurveyName	varchar	100	100	NULL	0
GSPE_Surveys	ValidatedBy	varchar	50	50	NULL	1
GSPE_Surveys	ValidatedDate	date	3	10	0	1

GSPE_Surveys	Year	int	4	10	0	0
SurveyUnits	CENTRLAT	float	8	53	NULL	1
SurveyUnits	CENTRLON	float	8	53	NULL	1
SurveyUnits	Elev_Mean	float	8	53	NULL	1
SurveyUnits	Elev_Med	float	8	53	NULL	1
SurveyUnits	Feature	hierarchyid	-1	-1	NULL	1
SurveyUnits	Feature	geometry	-1	-1	NULL	1
SurveyUnits	Feature	geography	-1	-1	NULL	1
SurveyUnits	GMU	varchar	5	5	NULL	1
SurveyUnits	ID	varchar	10	10	NULL	0
SurveyUnits	RecordInsertedBy	nvarchar	100	50	NULL	0
SurveyUnits	RecordInsertedBy	sysname	100	50	NULL	0
SurveyUnits	RecordInsertedDate	datetime	8	23	3	0
SurveyUnits	Region	int	4	10	0	1
SurveyUnits	SurveyUnitSet	varchar	100	100	NULL	0
SurveyUnits	UnitComment	varchar	1000	1000	NULL	1
SurveyUnits	UnitsIRMARefCode	int	4	10	0	1
SurveyUnitSets	Comments	varchar	-1	-1	NULL	1
SurveyUnitSets	Description	varchar	4000	4000	NULL	1
SurveyUnitSets	IRMA Reference Code	int	4	10	0	1
SurveyUnitSets	Park	varchar	4	4	NULL	1
SurveyUnitSets	ProjectLeader	varchar	50	50	NULL	1
SurveyUnitSets	SourceFile	varchar	255	255	NULL	1
SurveyUnitSets	SurveyUnitSet	varchar	100	100	NULL	0

Source code repository

Source code repository

Source code for the Moose Monitoring Database Application is available through GitHub at https://github.com/NPS-ARCN-CAKN/Moose3