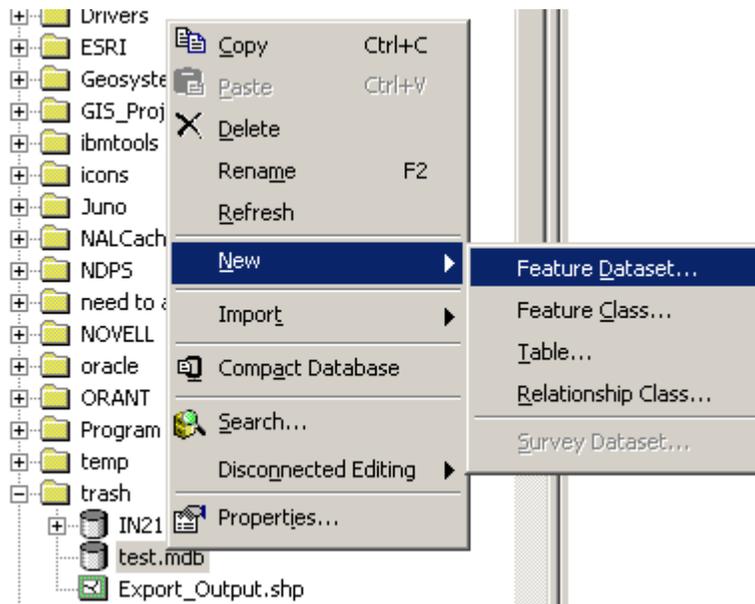


Working with Geodatabases in ArcGIS 8.3: How to Define the Spatial Reference of a Feature Dataset

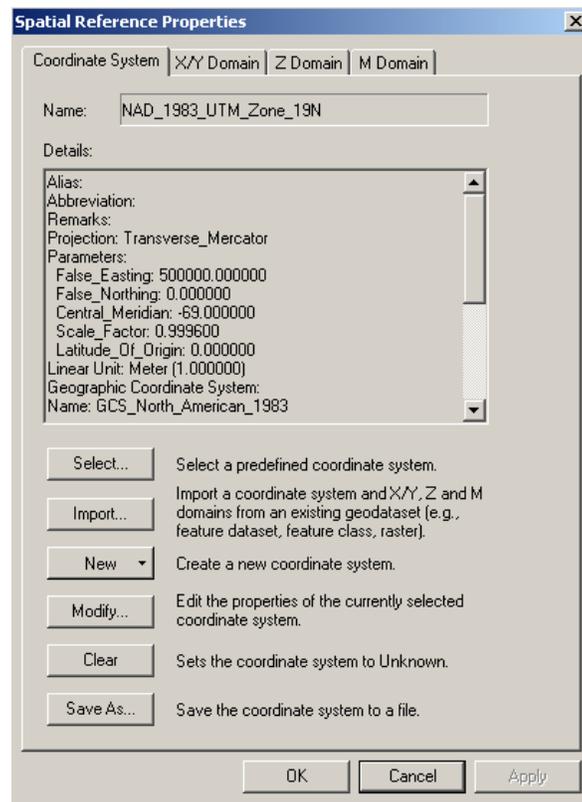
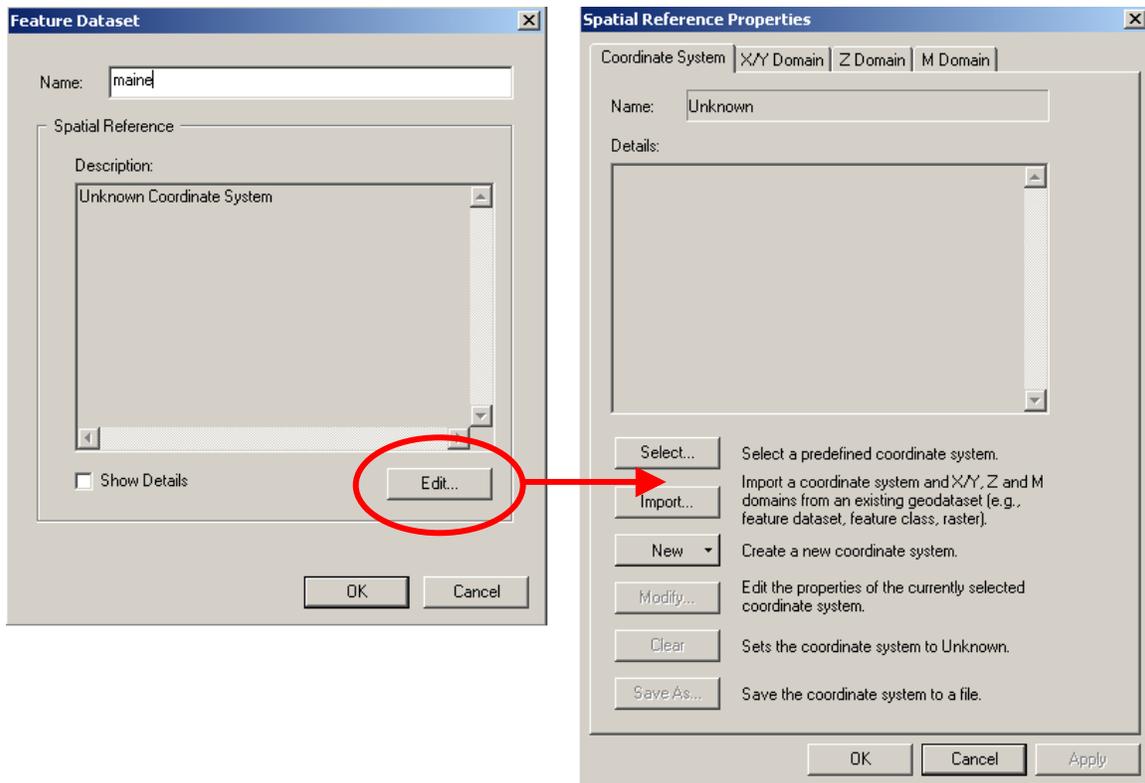
When adding a new feature dataset to a geodatabase, it is necessary to define the spatial reference. All feature classes in a feature dataset use the same coordinate system, and all coordinates in all features in all feature classes must fall within the coordinate domains.

A. Define the coordinate system

1. When you add a new feature dataset by right clicking on a geodatabase in ArcCatalog, you must first define the coordinate system of the new feature dataset.

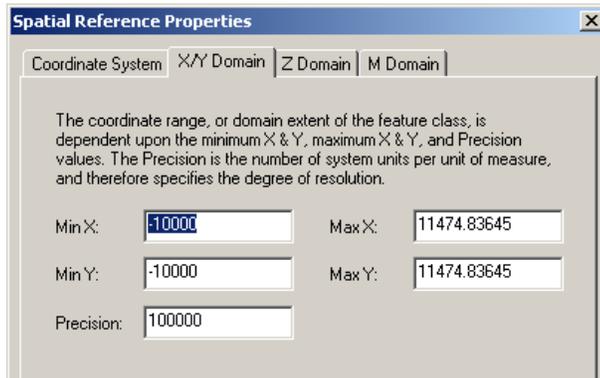


How to Determine the Spatial Reference of a Feature Dataset in a Geodatabase



B. Define the precision and X/Y domain

1. After defining the projection of the feature dataset, click on the X/Y Domain tab in the Spatial Properties dialog box. The x/y domain is the allowable coordinate range for x- and y-coordinates. Setting these values correctly is important in preserving the accuracy of the data and allowing for future growth.



You will notice that there are default values in the X/Y Domain tab. **Do not accept the default values.**

2. To determine the correct values, you should first determine the precision of your dataset.

Precision is the number of storage units in one map unit. A spatial reference with a precision of 1 will store integer values, while a precision of 1,000 will store three decimal places. The dataset precision is determined by dividing map units by storage units. For example, if the map units of your projection are in meters and the desired storage units are millimeters, the precision is 1000.

$\frac{1 \text{ meter}}{1 \text{ millimeter}} = \text{Precision}$
$\frac{1 \text{ meter}}{0.001 \text{ meter}} = 1000$

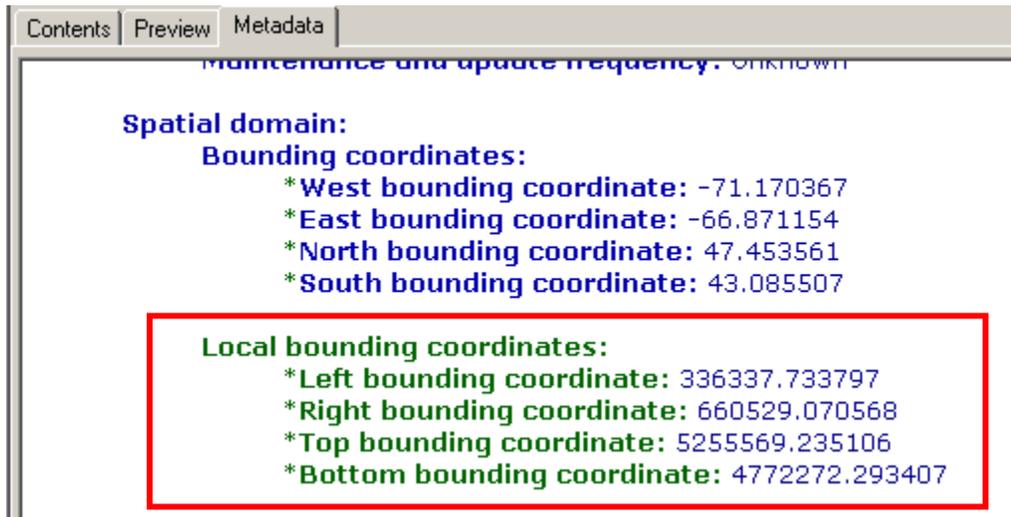
When determining the desired dataset precision, it is important to know the current precision of existing data in order to prevent the geodatabase from modifying data when it is loaded into the geodatabase. If an ArcInfo coverage has double precision allowing for sub-millimeter accuracy, setting the geodatabase precision to allow only centimeter accurate data may cause some slight modification or loss of the data as it is loaded into the geodatabase.

Because the x/y domain is a range, it is important to base it on the feature class with the largest extent that will reside within the new feature dataset. At your installation, for example, if you plan on including in your geodatabase spatial data that is outside of the boundary of your installation, the boundary will not suffice.

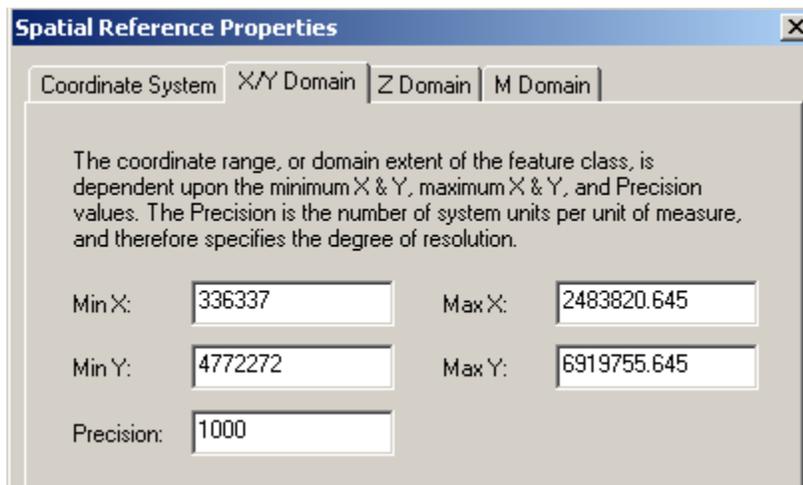
How to Determine the Spatial Reference of a Feature Dataset in a Geodatabase

Try instead your county, state, or country depending on the data you envision will be stored in this geodatabase. You cannot change this later so it is important to plan for the future of the geodatabase. It is better to have a larger extent than one that is not big enough.

3. To determine the correct x/y domain, open the metadata of the feature class with the largest extent and find the projected or local bounding coordinates.

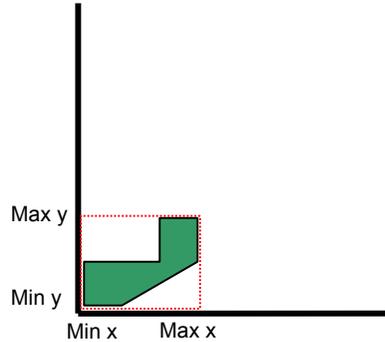


4. Copy the **projected or local** min x- and min y-coordinates into the X/Y Domain tab in the Spatial Reference Properties. Round down for min x and y values (and later up for max x and y values). It is not necessary to enter numbers to the right of the decimal.
5. Enter your desired precision and then ArcGIS will calculate the max x and max y.

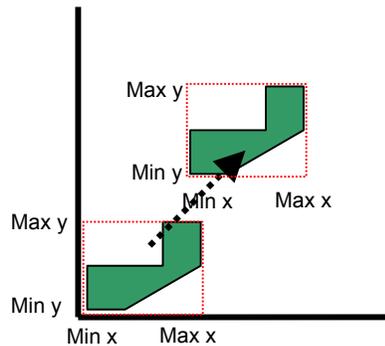


How to Determine the Spatial Reference of a Feature Dataset in a Geodatabase

You now know the bounding box of your feature dataset with the largest extent.



- Centering the dataset allows you to maximize your data storage potential. To center the dataset, open the Spatial Reference Excel spreadsheet.



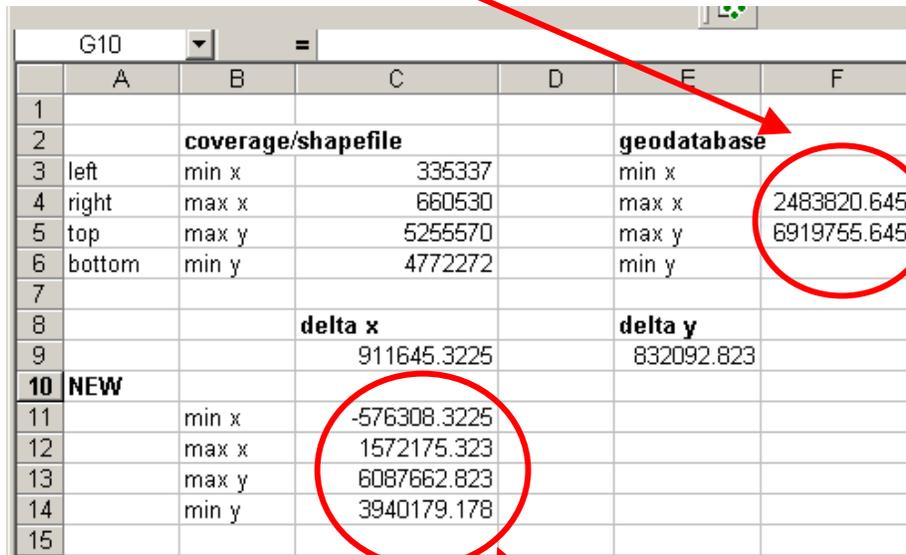
****Be sure to situate your desktop so you can see both the Excel sheet and the ArcCatalog Spatial Reference Properties box.**

- Enter the min x- and y-coordinates as well as the max x- and y-coordinates found in the metadata into the Spatial Reference Excel spreadsheet, under the coverage/shapefile section (column C).

	A	B	C	D	E
1					
2		coverage/shapefile			geodatabase
3	left	min x	335337		min x
4	right	max x	660530		max x
5	top	max y	525570		max y
6	bottom	min y	477272		min y
7					
8			delta x		delta y
9			-330265		-2627785
10	NEW				
11		min x	665602		
12		max x	330265		
13		max y	2627785		
14		min y	7400057		
15					

How to Determine the Spatial Reference of a Feature Dataset in a Geodatabase

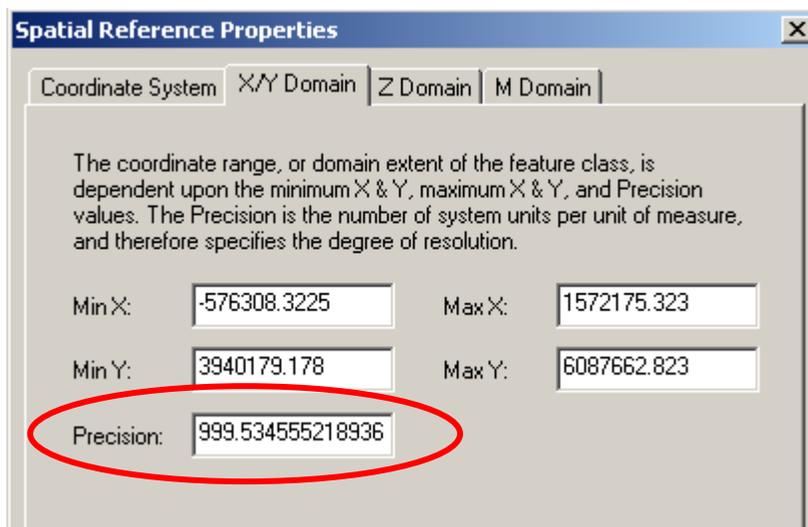
- Copy and paste the calculated max x- and max y-coordinates from the Spatial Reference Properties into the Excel spreadsheet under the geodatabase heading (column F).



	A	B	C	D	E	F
1						
2		coverage/shapfile			geodatabase	
3	left	min x	335337		min x	
4	right	max x	660530		max x	2483820.645
5	top	max y	5255570		max y	6919755.645
6	bottom	min y	4772272		min y	
7						
8			delta x		delta y	
9			911645.3225		832092.823	
10	NEW					
11		min x	-576308.3225			
12		max x	1572175.323			
13		max y	6087662.823			
14		min y	3940179.178			
15						

New coordinates are calculated under the **NEW** heading.

- Copy and paste all of the NEW numbers (from Excel sheet) into the Spatial Reference Properties dialog box (ArcCatalog) and ArcCatalog will calculate your precision. It should be close to the one you calculated above (1000 in this example).



Spatial Reference Properties

Coordinate System | **X/Y Domain** | Z Domain | M Domain

The coordinate range, or domain extent of the feature class, is dependent upon the minimum X & Y, maximum X & Y, and Precision values. The Precision is the number of system units per unit of measure, and therefore specifies the degree of resolution.

Min X: -576308.3225 Max X: 1572175.323

Min Y: 3940179.178 Max Y: 6087662.823

Precision: 999.534555218936

You have just centered your feature dataset and you are now finished with the X/Y domain tab.

How to Determine the Spatial Reference of a Feature Dataset in a Geodatabase

C. Define the Z domain and precision

1. Set the precision value for the Z extents to the same value you used for the X/Y.
2. Enter the Min value and Precision and allow the system to calculate the Max value.

**For the minimum value, it is important to account for underground features such as buildings, utilities and possibly bathymetry.

D. Define the M domain and precision

1. Set the precision value for the M extent to the same value you used for the X/Y and Z extents.
2. Enter the Min value and Precision and allow the system to calculate the Max value.