NAD83 Datum And Projection In DNRGarmin 5.1.1 – Getting It Straight

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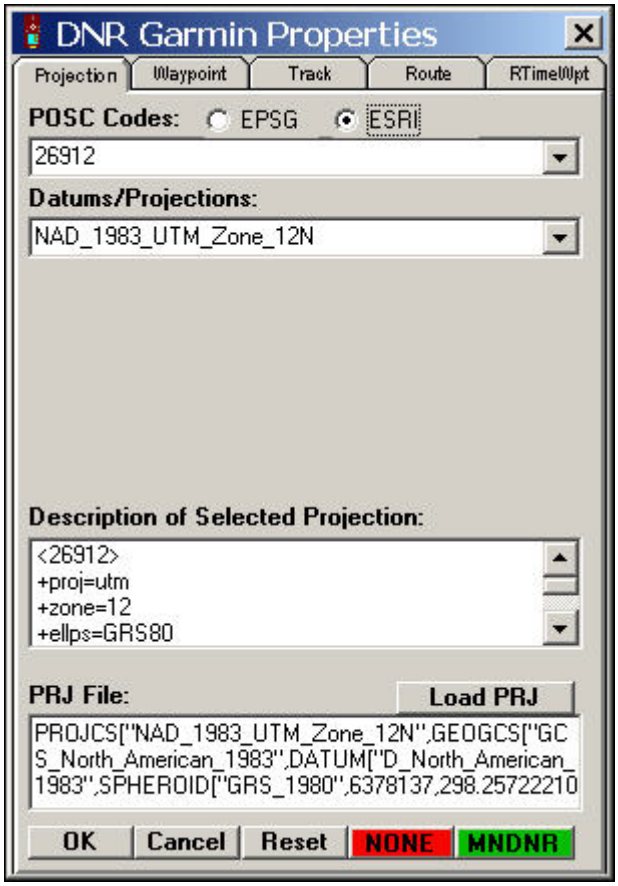
NOTE: This guidance assumes readers are generally familiar with DNRGarmin 5.1.1 and ArcToolbox 9.x.

Background

Converting GPS data to NAD83 GIS features is a two-step process. The first step transforms WGS84 latitude and longitude from the GPS receiver into NAD83 latitude and longitude. The second step projects NAD83 latitude and longitude into a UTM coordinate system and zone of the user's choice.

At least two methods are available for DNRGarmin users to convert GPS data to NAD83 GIS features. The first method skips the WGS84-to-NAD83 transformation. This provides a fast and easy solution, but introduces an additional meter, or so, of error to the data's existing, inherent error. In the second method, datum transformation occurs in DNRGarmin, and projection occurs in ArcToolbox. Though it's a bit more involved, this method avoids a meter, or so, of introduced error. Users will need to decide which method best facilitates their data's contemplated use.



Method 1 (one step, more error)

In DNRGarmin, download tracks or waypoints from a Garmin receiver, and then click **File – Set Projection**.

Select **`ESRI`** from the **POSC Codes:** choices, and then select a desired datum and projection, **`NAD_1983_UTM_Zone_12N`** for instance.

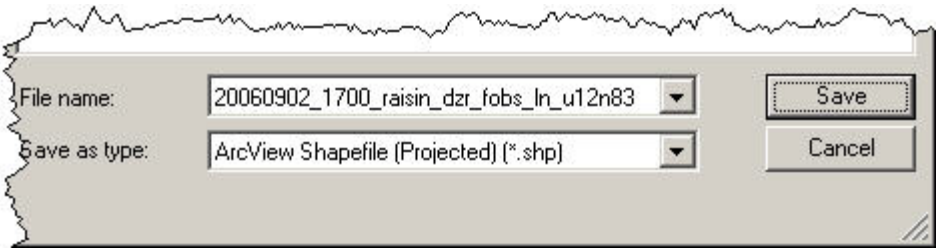
Click **Load PRJ**, navigate to, and select an ESRI projection (**`.prj`**) file corresponding to the selected datum and projection, NAD 1983 UTM Zone 12N.prj for example.

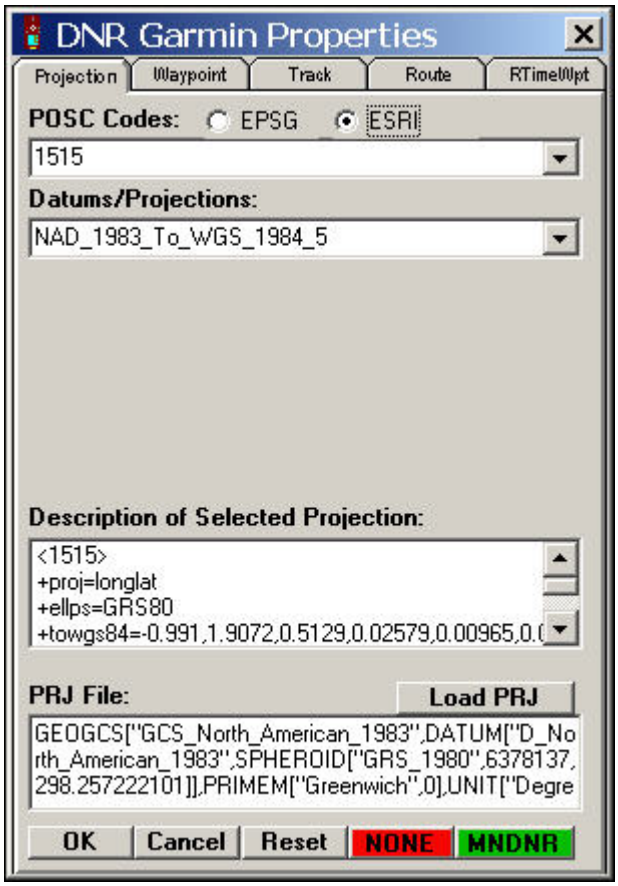
Click **OK**.

Now, click **File – Save To – File…**, navigate to the desired target folder, and name the shapefile that is to be created.

Be sure to select **`ArcView Shapefile (Projected)(*.shp)`** from the **Save as type:** dropdown list, as illustrated below.

Resulting shapefiles are projected to UTM Zone 12, and are nominally referenced to NAD83. The transformation step was bypassed, however, so shapefiles are actually referenced to WGS84. This introduces about a meter of additional error.





Method 2 (two steps, less error)

Method 2 has several variations, this being one of them. In DNRGarmin, download tracks or waypoints from a Garmin receiver, and then click **File – Set Projection**.

Select **`ESRI`** from the **POSC Codes:** choices, and then select **`NAD_1983_To_WGS_1984_5`** from the **Datums/Projections:** dropdown list.

Click **Load PRJ**, navigate to, and select the corresponding ESRI projection (**`.prj`**) file North American Datum 1983.prj.

Click **OK**.

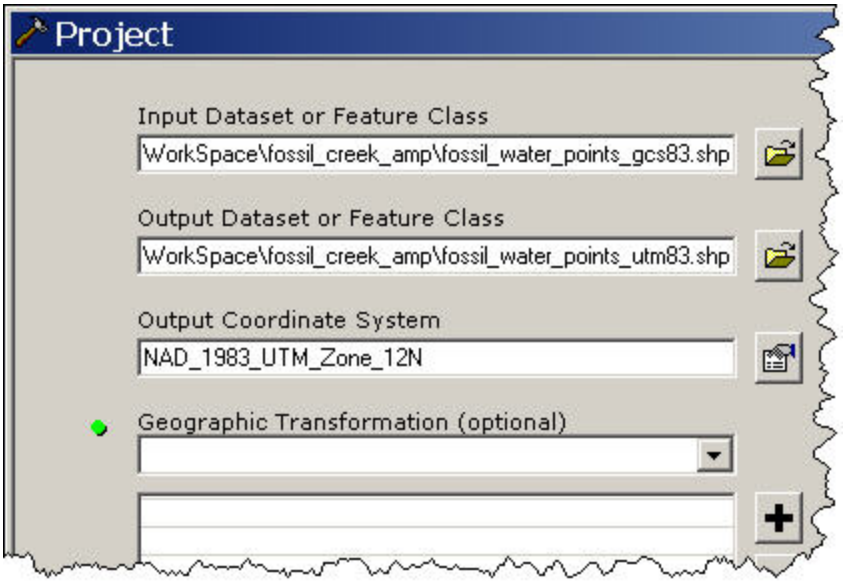
Now, click **File – Save To – File…**, navigate to the desired target folder, and name the shapefile that is to be created.

As in **Method 1**, be sure to select **`ArcView Shapefile (Projected)(*.shp)`** from the **Save as type:** dropdown list.

Resulting shapefiles are genuinely referenced to NAD83, but still need to be projected to a UTM coordinate system and zone of the user's choice.

To do so, open ArcToolbox 9.x, expand **Data Management Tools**, expand **Projections and Transformations**, and double-click the **Project** tool.

Complete the **Project** dialog, as illustrated at right. The **Geographic Transformation** needn't be specified, as that step already occurred within DNRGarmin. This method's several moments of easy, extra effort avoids about a meter of introduced error.



Does A Meter Really Matter?

That's a matter for you, agency data standards, and your data steward to determine.

But, consider this. Your project bought the GPS receiver. Your tax money paid for the GPS and WAAS satellites. Your agency covered your salary and travel costs while collecting GPS data.

Why not invest five minutes to harvest that extra meter?