

CULTURAL HISTORY

The United States Public Land Survey System The Rectangular Grid

By Neal McLain

In last month's column, I discussed the origin of the United States Public Land Survey System (USPLSS, or just PLSS). I noted the Land Ordinance of 1785 specified that the Northwest Territory (land northwest of the Ohio River owned by the United States Government) was to be subdivided into "townships of six miles square, by lines running due north and south, and others crossing these at right angles..." Because these townships were created by an act of the Second Continental Congress, they came to be known as "Congressional Townships."

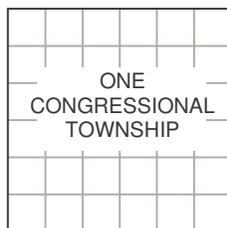


I also noted that the term "township" (or "town") means different things in different states. Even within the same state, the term may have different meanings depending on the context in which it is used.

In this column, I will consider only one type of township: Congressional Townships.

THE PROTOTYPICAL SIX-MILE-SQUARE CONGRESSIONAL TOWNSHIP

A Congressional township is a square parcel of land measuring six miles (more or less) on each side, oriented along cardinal (north-south and east-west) lines.



A theoretically ideal Congressional Township would measure exactly 6 miles x 6 miles, oriented along cardinal directions. Most real-world Congressional Townships are reasonably close to this ideal, although many are quite irregular due to such factors as uneven terrain, errors by the original surveyors, and shifts in local magnetic declination.

Of course, such an ideal township would be mathematically impossible: it is not possible to lay out a perfectly square parcel on the surface of a sphere, even a sphere as large as the earth.

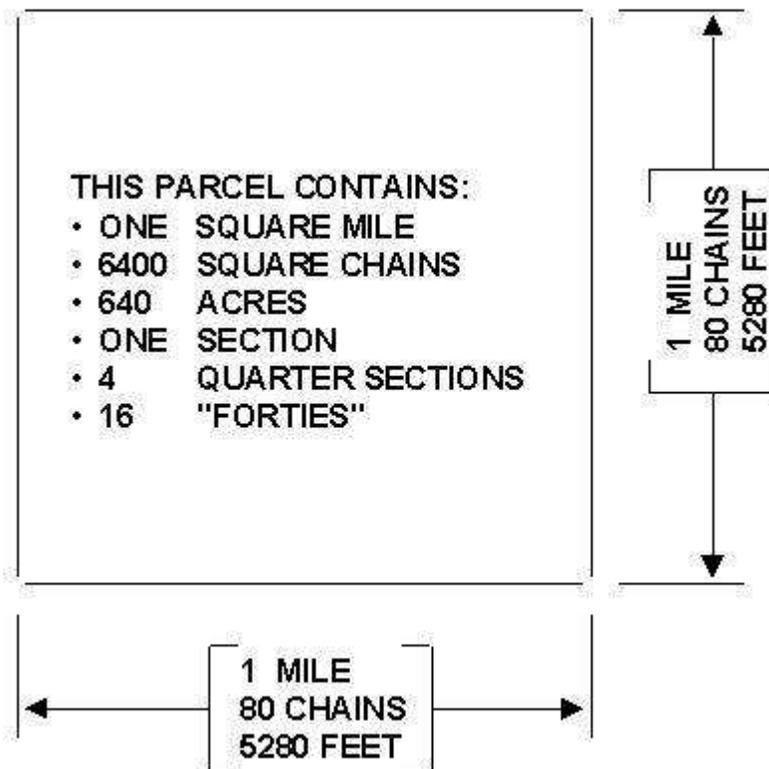
Nevertheless, most of the original land surveys conducted under the supervision of the General Land Office (GLO) were remarkably accurate given the monumental size of the task and the difficult working conditions.

USPLSS: The Rectangular Grid

Each Congressional Township is subdivided into 36 parcels called *sections* by survey lines called *section lines*. Sections within a township are numbered as follows:

| | | | | | |
|----|----|----|----|----|----|
| 6 | 5 | 4 | 3 | 2 | 1 |
| 7 | 8 | 9 | 10 | 11 | 12 |
| 18 | 17 | 16 | 15 | 14 | 13 |
| 19 | 20 | 21 | 22 | 23 | 24 |
| 30 | 29 | 28 | 27 | 26 | 25 |
| 31 | 32 | 33 | 34 | 35 | 36 |

Each section measures one mile square, or 640 acres. As we noted last month, one *chain* equals 66 feet; thus, 80 chains equal 5,280 feet, or one mile.

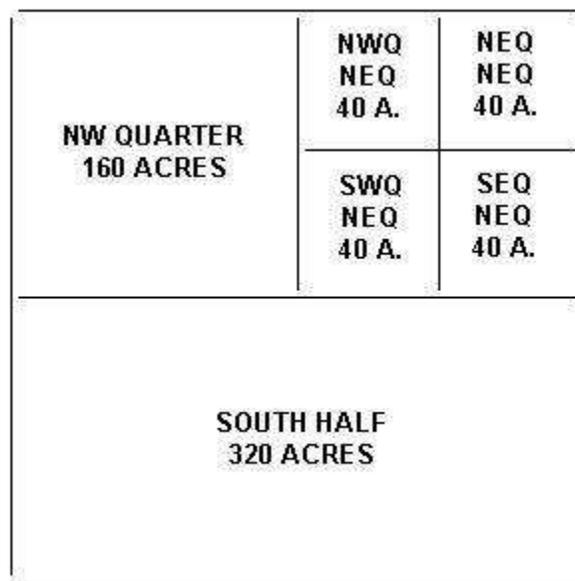


USPLSS: The Rectangular Grid

Each section can be subdivided into four 160-acre *quarter sections* by *quarter section lines*:



Each quarter section can be further subdivided into four 40-acre *quarter-quarter sections* ("forties") by *quarter-quarter-section lines*, also known as *forty lines*:



When the General Land Office began selling land in the Northwest Territory, it sold it in 40-acre parcels. Farmland has been bought and sold in 40-acre parcels ever since, and the word "forty," used as a noun (as in "the back forty"), has long been part of the vernacular language of rural America.

USPLSS: The Rectangular Grid

In the 30 Public Land states, Congressional Townships, together with their interior sections, quarter-sections, and forties, form a continuous rectangular grid across the land. Viewed from above, the grid of 40-acre parcels stands out clearly as a regular pattern of fences, fencerows, trees lines, roads and streets.



Rural farmland, Wisconsin.

Note:

- The rectangular grid pattern of roads, fences, and fields.
- Farmstead and adjacent roadway, left center.
- Old railroad right-of-way, at an odd angle, right center.

This photo also shows an example of contour farming (upper right). In the rolling terrain of southern Wisconsin, contour planting is utilized for erosion control. Although the planted rows do not interrupt the grid, they stand out because they are not parallel to the gridlines.

Photo: Neal McLain



Rural farmland, Kansas. Note:

- The rectangular grid pattern of 40-acre parcels.
- The circular fields resulting from center-pivot irrigation.
- The railroad running at an odd angle.



Center pivot irrigation.

Photos: Wikipedia [2,3]

USPLSS: The Rectangular Grid



Urban sprawl, Chicago. Note:

- The rectangular pattern of main streets centered on PLSS forty lines.
- Internal streets within forties, aligned parallel to forty lines.

This pattern of streets is typical of residential and commercial neighborhoods dating from the 1800s through the mid-1900s.

Photo: Neal McLain



Suburban sprawl, Denver suburbs. Note:

- The rectangular pattern of main streets centered on PLSS forty lines.
- Internal streets within forties, winding in curved alignments with numerous cul-de-sacs.

This pattern of streets is typical of residential "developments" dating from post-World War II years. These neighborhoods are often identified by romantically sounding "environmentally-correct" names.

Photo: Neal McLain

USPLSS: The Rectangular Grid

Many streets and road follow the original PLSS boundary lines. Since the days of the earliest English settlers, the standard roadway right-of-way has been one chain (66 feet) wide. One can imagine the scenario: two adjacent landowners each donates a 33-foot strip of land to form the right-of-way for a public road. Initially a farm lane, it would have evolved into a gravel road, then into a paved road. Even today, many urban streets and rural highways occupy 66-foot rights-of-way centered on section lines.

In many urbanized areas, the pattern of the streets — and even the names of the streets themselves — reflects the underlying PLSS grid.

- In the Chicago area, numbered streets fall every 1/8th mile, and main thoroughfares are centered on section lines at one-mile intervals: 47th Street, 55th Street, 63rd Street, 71st Street, 79th Street, 87th Street, 95th Street, 103rd Street.
- In the Detroit area, named streets fall at 1/8th-mile intervals, and "mile roads" are centered on section lines at one-mile intervals: 6 Mile Road, 7 Mile Road, 8 Mile Road, 9 Mile Road.
- In the Miami area, numbered avenues fall at 1/10-mile intervals, and main thoroughfares are centered on section lines at one-mile intervals: NW 37th Avenue, NW 47th Avenue, NW 57th Avenue, NW 67th Avenue.

Of course, many things can interrupt the regularity of the grid:

- Natural topographic features such as lakes, rivers, glaciers, mountains, and deserts.
- Railroads. Railroad surveyors had little interest in the PLSS boundaries; their goal was to lay out rights-of-way as short and as straight as possible. From the air, it's easy to spot railroads (or the old roadbeds of long-abandoned rails), running at odd angles.
- Old survey lines. The PLSS surveys did not (or were not supposed to) extend onto any previously-surveyed lands. The PLSS surveyors were expected to honor — and not overrun — existing boundary surveys of previously settled lands, Indian Treaty lines, or the boundaries of old British, Spanish, French, and Mexican Land Grants.

We'll take a closer look at these interruptions in a future article.

Next month: The PLSS Congressional Township Numbering System.

[1] Northwest-territory-usa-1787.png. Reprinted under Creative Commons Attribution ShareAlike 3.0 License.
<<http://en.wikipedia.org/wiki/File:Northwest-territory-usa-1787.png>>

[2] Crops Kansas AST 20010624.jpg. False-color presentation made to simulate natural color. Public domain photo.
<http://en.wikipedia.org/wiki/File:Crops_Kansas_AST_20010624.jpg>

[3] PivotIrrigationOnCotton.jpg. Public domain photo.
<<http://en.wikipedia.org/wiki/File:PivotIrrigationOnCotton.jpg>>