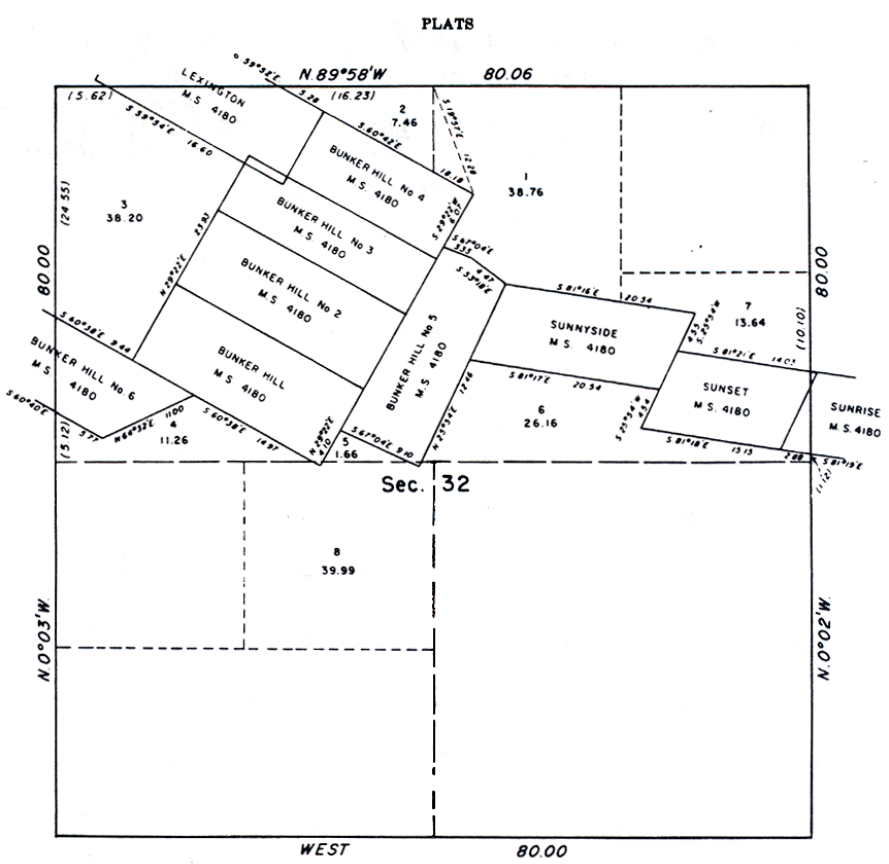


(Bureau of Land Management 1973)

GEOG 482 / 582 : GIS Data Management

Lesson 5: Land Records, Census and Addresses

Overview

Learning Objective Questions:

1. Why are land records important?
2. What are the US Public Land Survey System (PLSS) and Metes and Bounds cadastral control survey systems?
3. What are the elements of a land parcel data model?
4. How do tax parcels differ from development parcels?
5. What are the main differences between a multipurpose land cadastre and a multipurpose marine cadastre?
6. What are the elements of the census feature dataset?
7. Why are Census topological rules so important?
8. How are street address reference systems and coordinate reference systems similar and different?

Lesson Preview

Learning objective questions act as the lesson outline.

Questions beg answers.

Cadastres and Parcels

1. Why are cadastre records important?

Cadastre – a record of interest in earth coverage. Most interest deals with land coverage. However, some interest increasingly deals with water coverage. Thus, land cadastre versus marine cadastre.

Parcel land record is most used GIS data in the Puget Sound region based on a survey of GIS managers in 1988.

More applications use land data records data than any other single data category.

Most frequently used data in regional and urban GIS. Why?

Key terms
Land records

Parcel Thematic Layers

see graphic A&Z p. 175 – Oakland County CA GIS Installation

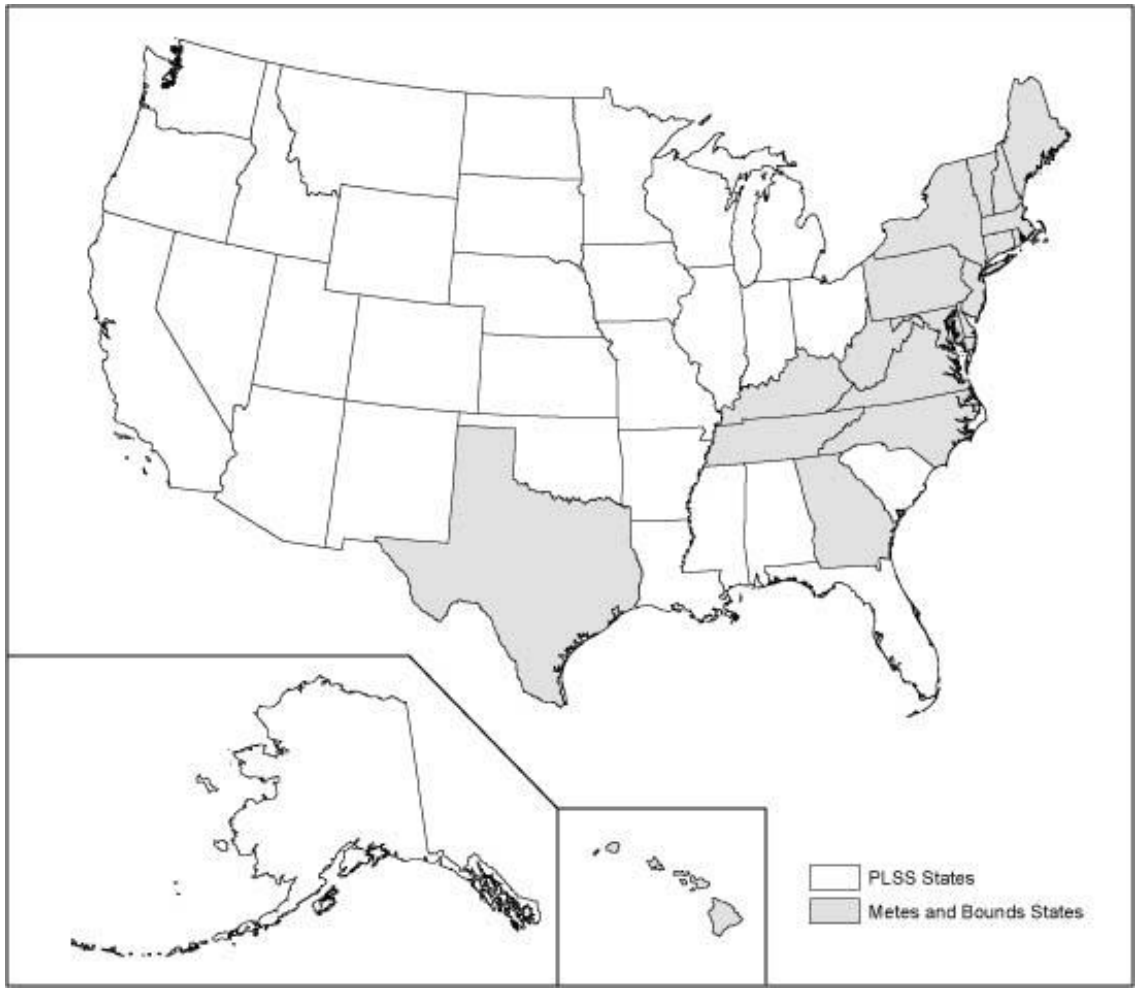
The following categories are for working with maps – not necessarily, a geodatabase structure

- Administrative areas – boundaries for spatial orientation
- Site Addresses, regulated use and restrictions – activities on the land
- Separated rights and encumbrances – rights, interests, limitations
- Ownership and tax parcels – (record of interest in ownership and taxation)
- Parcel framework – boundary control and framework
- Corners and boundaries – extent of land subdivisions
- Survey network – foundation of positional accuracy for coordinates
- Digital orthophotography and hydrography – map background and reference

Key terms
Parcel framework
Corners
orthophotography

Public Land Survey System – Survey of Public Lands

2. What are the US Public Land Survey System (PLSS) and Metes and Bounds cadastral control survey systems?



Key terms
PLSS
Metes and Bounds

PLSS states in white.

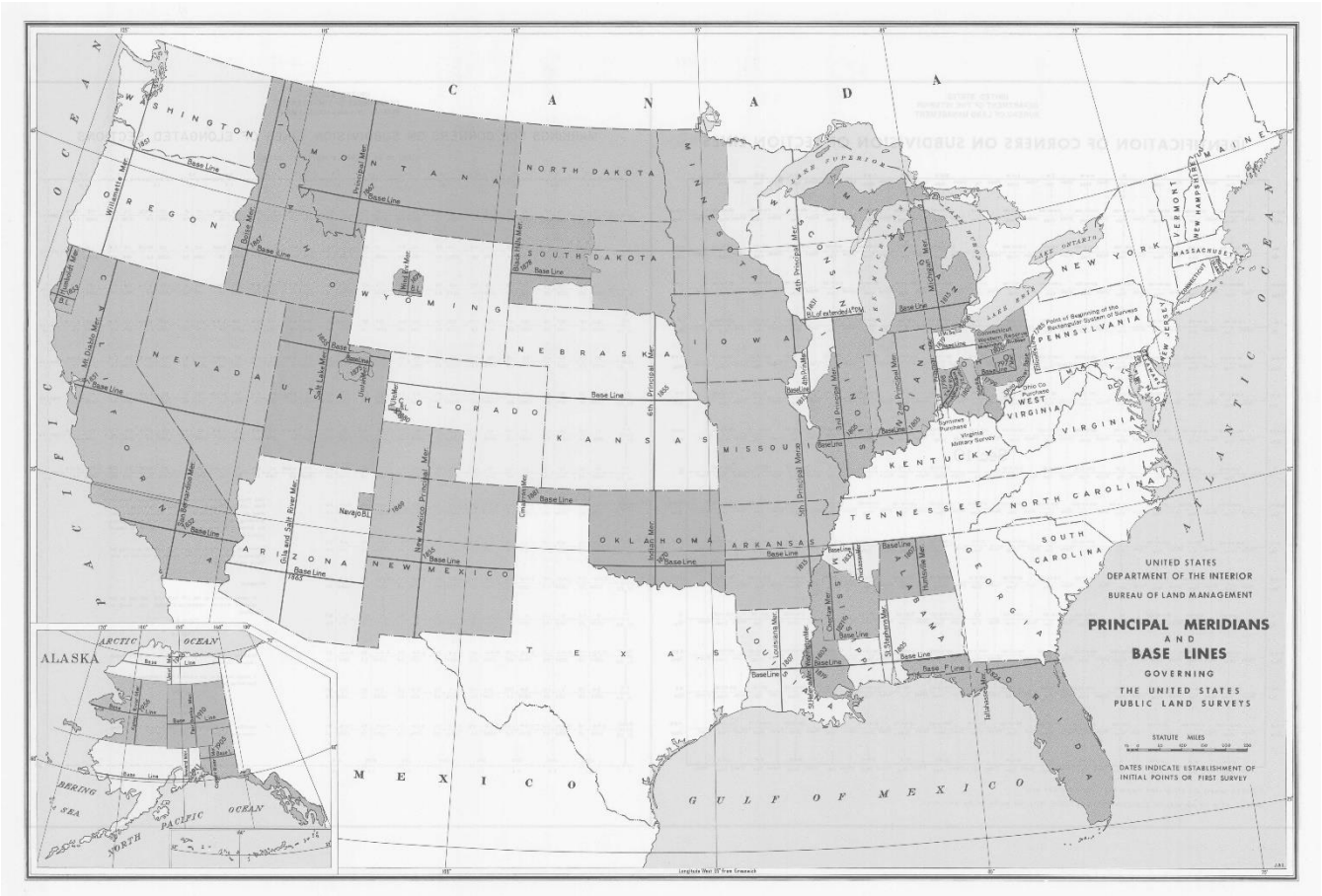
Metes and Bounds in shaded.

(Bureau of Land Management 1973)

PLSS framework

Roots in America revolutionary war; land sold to replenish USA treasury

First surveys are in Ohio; took five tries to get it right

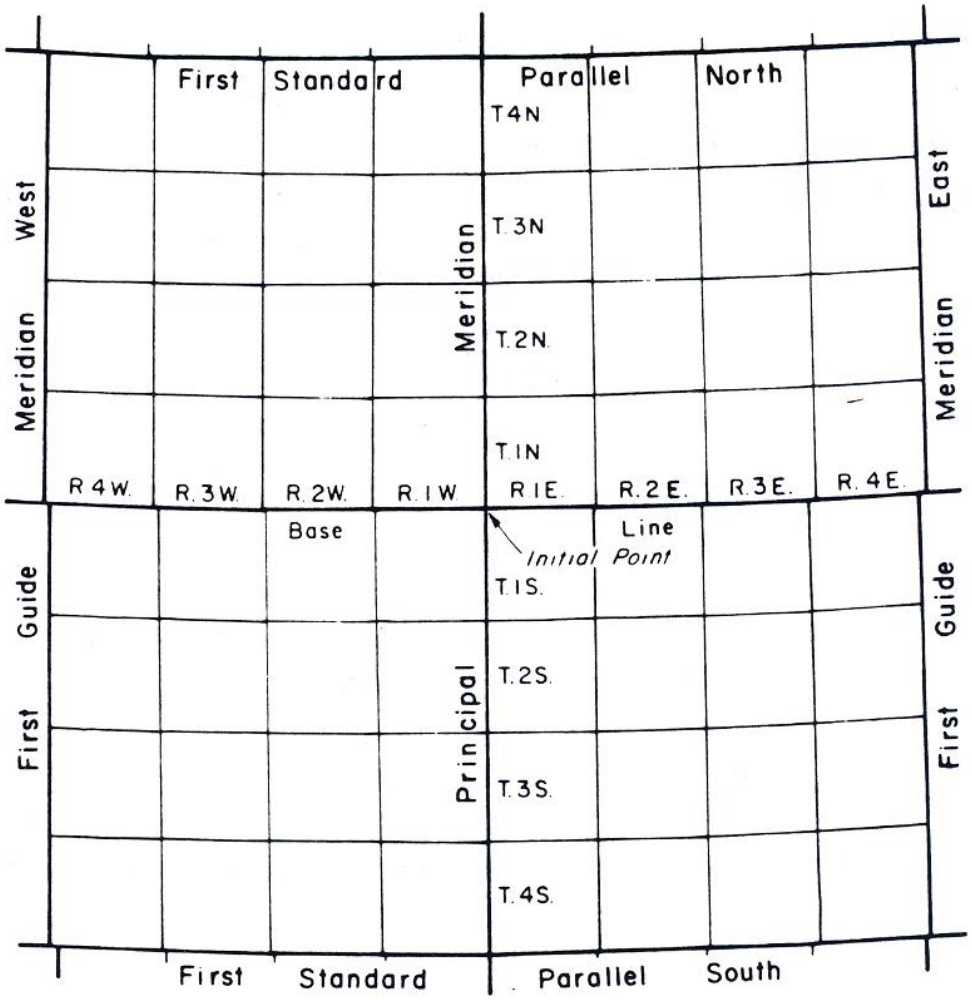


(Bureau of Land Management 1963)

Principal Meridian intersects Base Line to form Initial Point

Township (N-S) and Range (E-W) referencing for Townships

Township stacking has offset every fourth row N & S to address longitudinal convergence



Key terms

Township
Range
Principal Meridian
Baseline
Initial Point

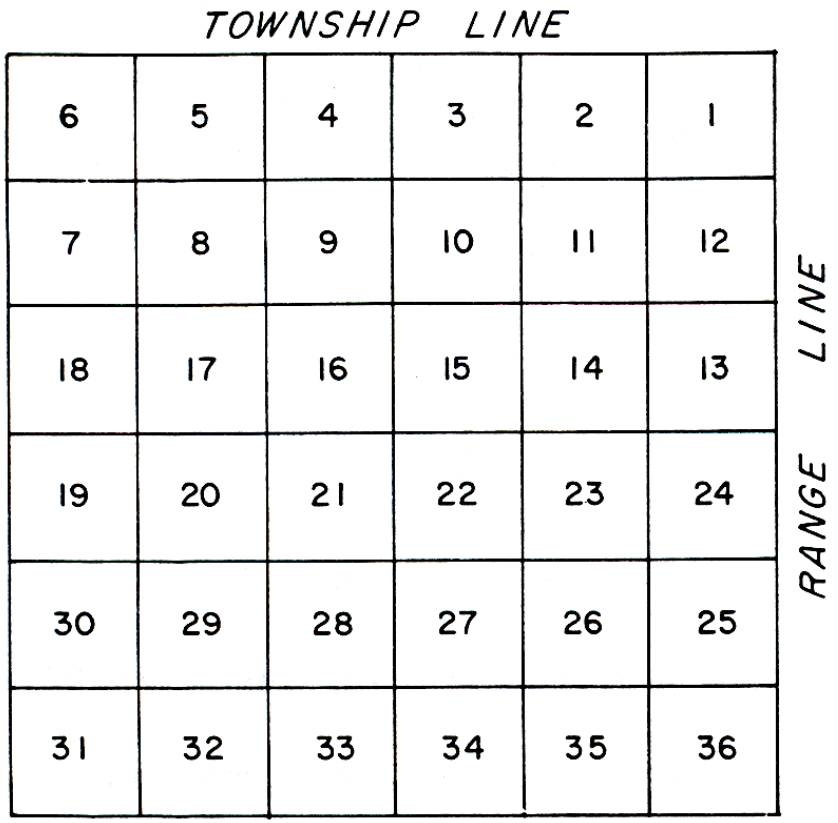
(Bureau of Land Management 1973)

Townships are subdivided into sections

36 sections in each township

Each section 1 mile on side (640 acres in one section)

One section in 36 sold to fund public education (land grant colleges)

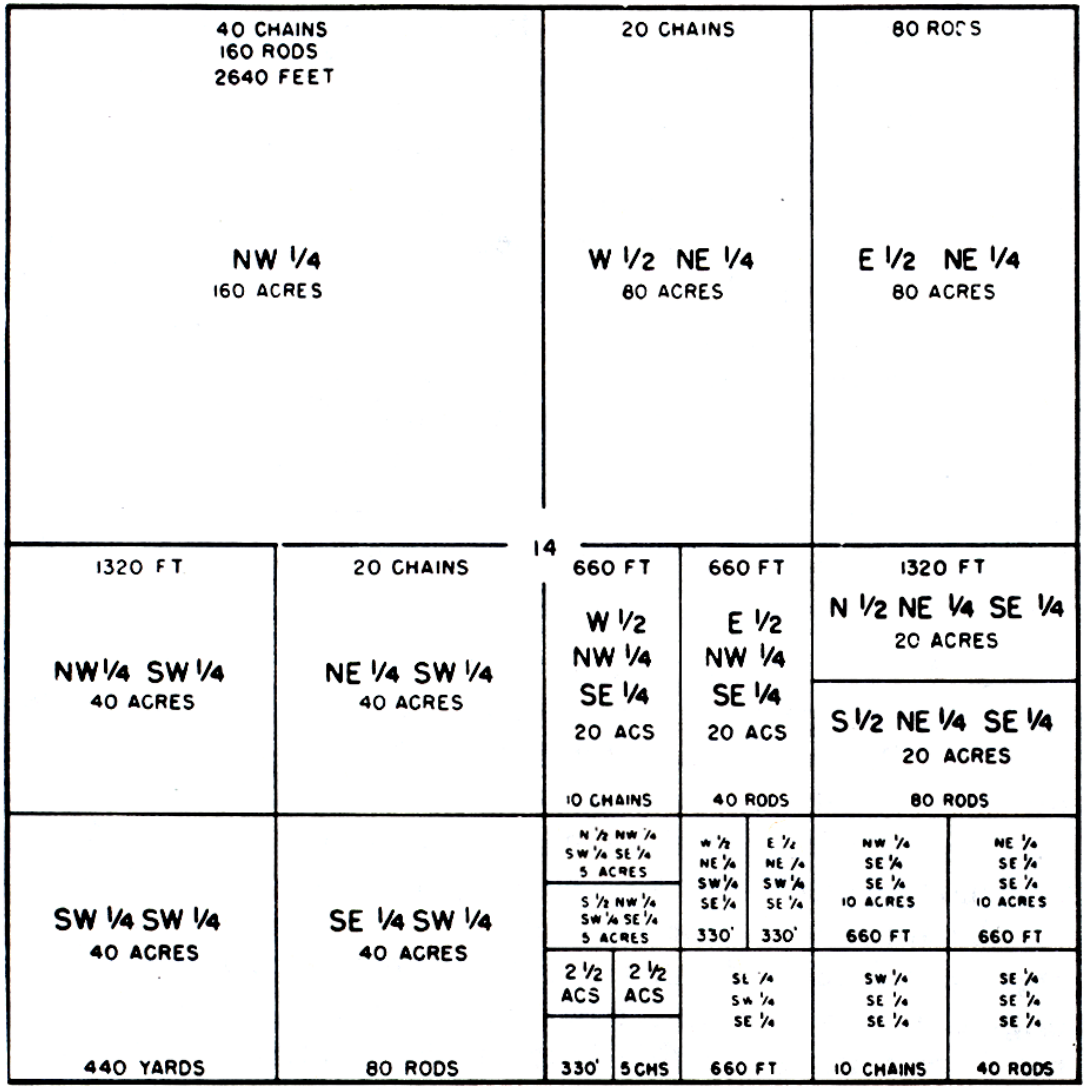


Key terms
Section

(Bureau of Land Management 1973)

Sections (640 acres) subdivided into ¼ sections (160 acres)

¼ ¼ section equivalent to “back 40 acres” on a farm



Key terms

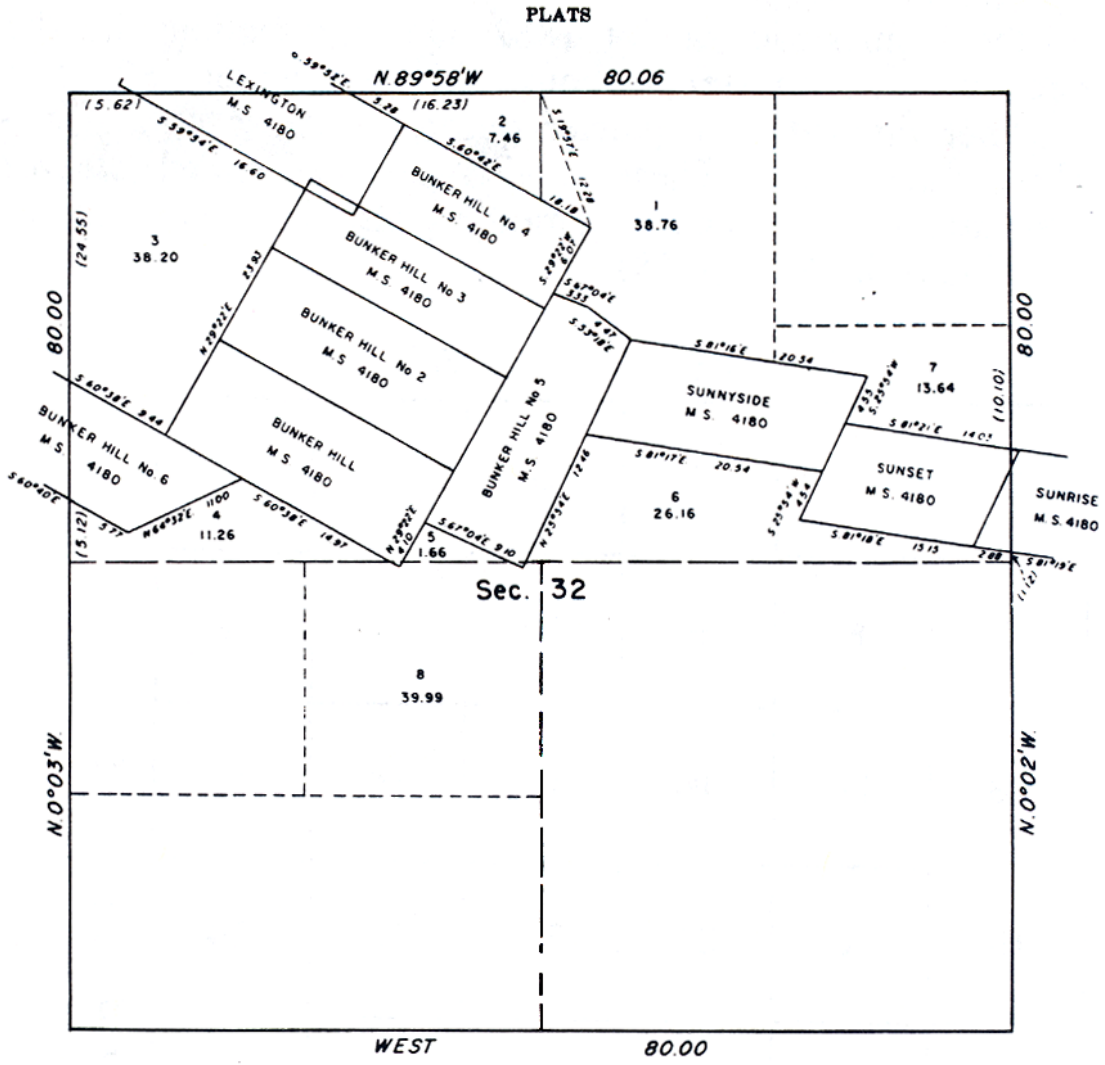
¼ section

¼ ¼ section

Bureau of Land Management 1973)

Sections subdivided with local properties

Local property survey (plats) within a section (Bureau of Land Management 1973)



Key terms
plat

Bureau of Land Management (1973)

Local Land Surveying

3. What are the elements of a land parcel data model?

See A&Z GDD graphic p. 177

Feature datasets - maroon

Feature classes – purple

Topology Rules – orange

Relationship classes – green

Feature Datasets

Administrative – feature dataset
- TaxDistrict – polygon feature class
- MapIndex - polygon feature class
- RegulatedUse - polygon feature class
- Restriction - polygon feature class
- SiteAddress - point feature class

ParcelFeatures - feature dataset
- PLSSTownship - polygon feature class
- PLSSFirst Division - polygon feature class
- PLSSsecondDivision - polygon feature class
- Encumbrance - polygon feature class

Key terms
Encumbrance

Table 5.3 City of Seattle and King County Parcel Data Record

Parcel feature record – City of Seattle

FEATURE: PARCEL

FEATURE DEFINITION:
An area of land, usually contiguous which is under the same ownership. A parcel is delineated based on the segregation/merger process of the King County Department of Assessments.

COMMENTS:
Parcels are created for taxation purposes and uniquely identified by a single Parcel Identification Number assigned by the King County Department of Assessments.
Parcels are created and altered as a result of platting activities, Lot Boundary Adjustments, and the segregation/merger process of the King County Department of Assessments.
New parcels are also created when property is acquired through the City's Open Space Program.
A parcel may be coincident with all or part of one or more platted lots.
A parcel will be coincident with tax lots in unplatted areas.

GRAPHIC ELEMENT TYPE: Polygon
GRAPHIC ELEMENT DEFINITION: The polygon is defined by the parcel boundaries as delineated for taxation purposes.

EXAMPLE:

ATTRIBUTES: (examples)

Parcel ID	Excise Tax Number		Taxpayer Address
Situs Address Area		Tax Status	
Jurisdiction	Owner Name		Property Unit Type
Zvalue	Taxpayer Name		Land Use Code
Legal Description	Recording Number		Sale Price/Type

Key terms
Feature record

ParcelFeatures_Topology

TaxParcel - polygon feature class

SimultaneousConveyance - polygon feature class

SurveyFirstDivision - polygon feature class

SurveySecondDivision - polygon feature class

Boundary - line feature class

Corner - point feature class

Corners, Monuments and Corner Coordinates

Monument - point feature class

CornerHasMonuments – relationship between Corner and Monument

See small inset A&Z p. 178 – logical depiction of relationship between feature classes

See GDD graphic A&Z p. 178-179

- Attributes for each
- Relationship classes between feature classes
- Note pointer IDs

Key terms
monument

Boundary – simple feature class (polyline)

See GDD graphic A&Z p. 181

Subtypes of Boundary - purple

Coded value domains - red

Properties of Parcel Frameworks

Commonly measured by survey, are tied to corners and monuments

- A hierarchical framework
- Describe boundaries, ownership, taxing, and other interests, often in separate cadastres
- Cadastre is a record of "interest" in earth coverage: land, water, air, subsurface (See A&Z p. 192)
- Boundaries must close, no leaks of interest.
- Oakland data model: simultaneous conveyance and PLSS

Key terms
Cadastre

Simultaneous Conveyance

- Several parcels are created at the same moment
- Non-parcels (aliquot part) have priority of senior conveyance to other parcels
- External boundary is senior to interior boundaries as in subdivision
- External boundary is often rendered as heavier line
- SurveyFirstDivision – subdivision boundary
- SurveySecondDivision - lot lines internal to the subdivision

See GDD graphic A&Z p. 184-185

Key terms
Simultaneous conveyance

4. How do Tax Parcels differ from Development Parcels?

TaxParcel – area to be assessed (valued) for levying “property taxes”

Tax Rolls – cadastre maintained as list
of ownership
of assessed value and tax

See GDD graphic A&Z p. 188-189

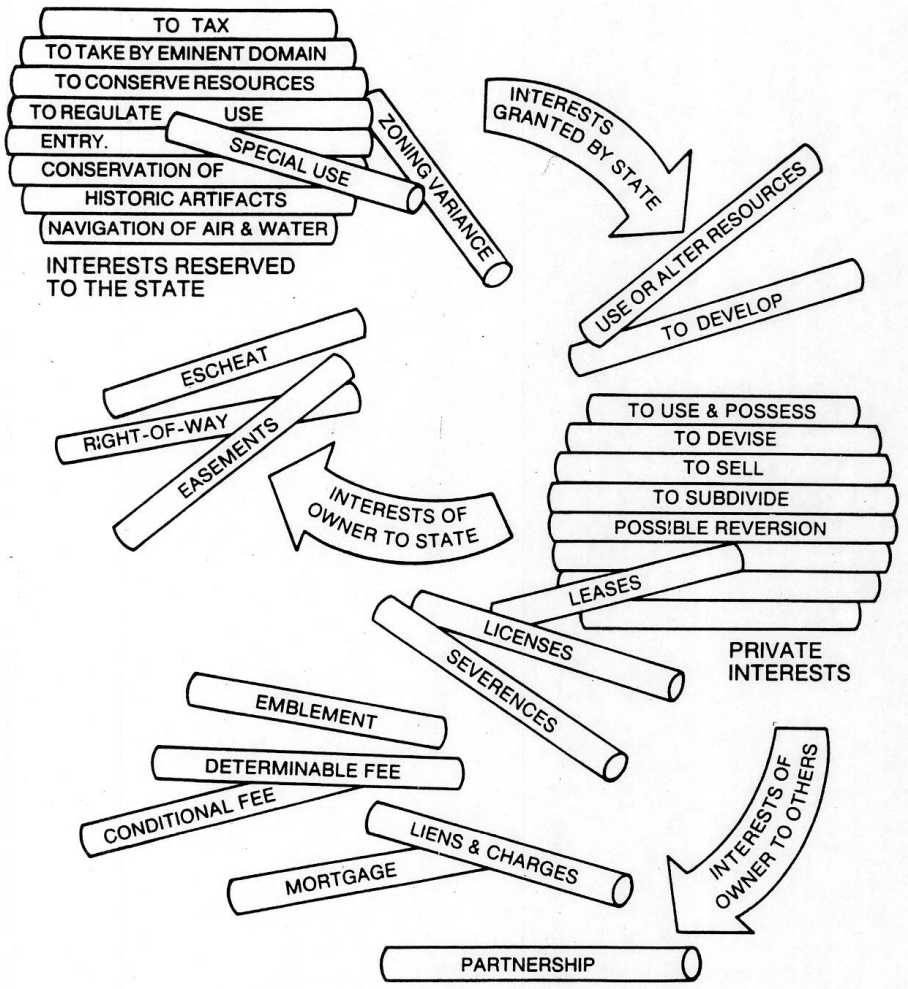
Development Parcel – ‘improvements’ that can be built on a land parcel.

Lot – boundary of a land parcel; one or more lots forms a land parcel; parcel has ownership

Property parcel – owned property, often referring to land, but more general

Key terms
Tax parcel
Development parcel

Ownership and Rights to Property Parcels



Key terms
Title
Deed

Title is the bundle of rights to interests in property

Documented in a deed to property

See GDD graphics A&Z p. 195

ParcelFeatures_Topology

Parcel…
Must not have dangling lines
Boundary must be covered by
Boundary must not overlap

GDD graphics A&Z p. 206-207

5. What are the main differences between a multipurpose land cadastre and a multipurpose marine cadastre?

http://marinecadastre.gov/

Marine waters application versus land applications

Application to coastal waters within US jurisdiction…

Territorial waters - https://en.wikipedia.org/wiki/Territorial_waters

- jurisdictional boundaries
- restricted areas
- laws
- critical habitat locations
- other important features.

Key terms
Multipurpose cadastre

Census and Addresses

Census Thematic Layer Framework

Census Administrative units – delineate census units such as blocks and block groups

Census boundaries - Linework from which other census features are generated

Points of Interest – Background map with point and polygon landmarks

Other Administrative units – Depict districts to local, regional, state, and federal level

Streets and addresses – Street network analysis and address locations

6. What are the elements of the census feature dataset?

Census_Topology

- Census Administrative Units - hierarchy
  - United States
  - Region
  - Division
  - State or equivalent – polygon feature class
  - County or equivalent
  - CenusTract / AmericanIndianCensusTract
  - BlockGroup /AmericanIndianBlockGroup
  - CensusBlock

Key terms
Administrative unit
Tract
Block Group
Block

Census_Topology - continued

- Census boundaries
  - Rail - Line feature
  - Road
  - Hydrography
  - MiscTransport
  - Physical
  - Water

Census_Topology - continued

Points of Interest

- KeyGeographicalLocation
- Landmark
- Other Area Landmark
- OtherPointLandmark
- CountySubdivision
- MetropolitanArea
- TrafficAnalysisZone
- VotingDistrict
- ZipCodeTabulationArea

Census_Topology - continued

Administrative Boundaries

Administrative boundaries, federal level

Several feature classes

Administrative boundaries, state level

Several feature classes

Administrative boundaries, county level

Several feature classes

7. Why are Census topological rules so important?

Census blocks cannot overlap and must nest within block groups

Block groups cannot overlap and must nest within census tracts

Traffic analysis zones must be covered by counties

Voting district layer must be covered by the county layer

Administrative_Topology

TIGER
Topologically Integrated Geographically Encoded Referencing

GDD graphics A&Z p. 97

Key terms
Traffic analysis zone

Principal Attributes

FENAME – feature name

FEDIRP – cardinal direction of the feature, e.g., N, SE, W

FETYPE – feature type, e.g. street, avenue

CFCC – Census feature class code

SOURCE – Origin of physical feature

TLID – TIGER line ID

Key terms
CFCC

Attributes for addressing

FRADDL – from address, left side
TOADDL – to address, left side
FRADDR – from address, right side
TOADDR – to address, right side

Key terms
From
To

Census unit ID

060710036021003

06	071	003602	1	003
State	County	Tract	Block group	Block

Key terms
Census Unit ID

8. How are street address reference systems and coordinate reference systems similar and different?

Coordinates and addresses are both geocodes; hence arise from geocoding (reference) systems. The dimensionality of the reference systems are different, thus the geocodes will be different.

Elements of coordinates are drawn from continuous dimensional domains.

Elements of addresses are drawn from continuous and discrete dimensional domains:

- House, building number, or numeric range
- Street name, e.g. Main, or Main Street
- Street Type, e.g. street, road or avenue
- Directional component, e.g., N, NW, W, SW
- Zones, such as city, state, or postal code

Key terms
Spatial reference
Coordinate
Geocode
Address

Two examples of addresses

816	High	Street		Redlands	CA	92391
Number	**Name**	**Street Type**		**City**	**State**	**Postal Code**
1052	N	300	W	Salt Lake City	UT	84119
House	**Prefix**	**Name**	**Suffix**	**City**	**State**	**Postal Code**

Thematic Layers of Address Data Model

Buildings – building footprints

Points of Interest – define addresses for points of interest

Parcels – Define land ownership and use for taxation

Streets – Street centerline network

Addresses and subaddresses – Address numbers for points of interest

Names – Define names for features and addresses

Zones – Define valid zone combinations for addresses

Geodatabase structure for addresses

See GDD A&Z p. 142-143
Streets with address ranges
Buildings with addresses
Parcels with addresses
Points of Interest with Addresses
Addresses and subaddresses
Names
Postal and Administrative Zones
Range Zones
Address ranges, zones, and names
Address locators

Summary

In this lesson, you learned about…

1. Importance of cadastre records
2. US Public Land Survey System (PLSS) cadastral control survey approach
3. Elements of a land parcel data model
4. Tax parcels and development parcels
5. Main differences between a multipurpose land cadastre and a multipurpose marine cadastre
6. Elements of the census feature dataset
7. Importance of Census TIGER system topological rules
8. Similarity and differences between street address reference systems and coordinate reference systems

Contact me at nyerges@uw.edu if you have questions or comments about this lesson.

GEOG 482/582: GIS Data Management

END Lesson 5: Land Records, Census and Addresses