PLAN MAKING AND IMPLEMENTATION
Research and Analysis
Demographic Data

Demographic definitions:

- **Crude death rate** (deaths per 1,000 pop.)
- **Crude birth rate** (births per 1,000 pop.)
- **General fertility rate** (births per 1,000 women aged 15-49)
- **Age-specific fertility rate** (births per 1,000 women in specific age group)
- **Fecundity**: physiological capacity of a woman to produce a child
- **Fertility**: actual reproductive performance of an individual
- **Total fertility rate**: described as the number of children women are having today
  
  Examples: U.S. TFR in 2008: 2.1 births per woman
  U.S. TFR in 2012: 2.06 births per woman
  
  *Source: CIA World Factbook*

- **Replacement rate**: depends on the country’s survival rates; is about 2.06 for the U.S.
Demographic Terminology

- **Estimates**: measurement of past or present conditions that cannot be measured accurately.
- **Projections**: conditional what if statement about the future. What the future will likely be IF a set of assumptions proves to be correct.
- **Forecast**: represents a best guess about a most likely future.
1. **Cohort Survival (component):**
   - divides population into cohorts such as ages 0-5, 6-10 etc.
   - applies the rates for birth-fertility, death-mortality and migration within each cohort.
   - Complicated, lots of data good for large area projections

2. **Ratio-step down**
   - Looks at the population of a larger region and than applies the growth rate at the larger area to a smaller one.
   - Less technical, good for smaller area projections.

3. **Symptomatic Methods:**
   - Looking at related data include building permits, vital statistics, school enrollment, new telephone hookups, new electric meters, dwelling unit counts (windshield surveys), and voter registration.
   - The attractive feature of most types of related data is that it can be tailored to small areas.
Demographic Data
According to 2000 Census Data, where is the mean center of population for the United States?

A. Covington County, Kentucky  
B. Phelps County, Missouri  
C. Johnson County, Kansas  
D. Daviess County, Indiana

Source: US Census Bureau  
**Correct Answer: B**
Policy Analysis & Decision Making

Decision Matrix:
- A quantitative technique used to rank the multi-dimensional options of an option set
- Invented by Stuart Pugh
- Consists of establishing a set of criteria upon which the potential options can be decomposed, scored and summed to gain a total score which can then be ranked
Program Evaluation

Process

1. Define the problem
2. Detail the problem
3. Specify evaluation criteria
4. Identify impacts
5. Evaluate alternatives
6. Identify alternatives
7. Rank the alternatives
8. Restate the problem
9. Outline the next steps
Program Evaluation

Evaluation Tools

- Operation Research
- Linear Programming
- Systems Analysis
- Cost Effectiveness Analysis (alternatives address same singular goal)
- Cost-Benefit Analysis (comparisons across alternatives & multiple goals)
- Fiscal Impact Analysis
- Modeling
- Simulation
- Decision Analysis
- Political Analysis
- Scenario Writing
- Surveys
- Quick Thinking

Source: Microsoft Office Clip Art
Project & Program Management

Scheduling Techniques:
- Gantt Charts
- PERT
- Critical Path Method (CPM)
2010 US Census Highlights

- 81% of US population defined as living in “urban areas” in 2010
- Median age in 2010 was 37.2 years
- Population of largest cities
  - New York 8,175,133
  - Los Angeles 3,792,621
  - Chicago 2,695,598
  - Houston 2,099,451
  - Philadelphia 1,526,006
- Regional growth was much faster for the South and West (14.3% and 13.8%, respectively) than for the Midwest (3.9%) and Northeast (3.2%).
- Fastest growing states 2000–2010
  - Nevada (35%)
  - Arizona (25%)
  - Utah (24%)
  - Idaho (21%)
  - Texas (21%)
- Unlike the 1990s in which every state grew, one state (Michigan) declined over this decade, losing 0.6% of its population.

Source: www.census.gov
Demographic and Economic Data

Census Data

The following are some commonly used census statistical units.

- **Core Based Statistical Area (CBSA):** The general concept of a CBSA is that of a core area containing a substantial population nucleus (at least 10,000 population), together with adjacent communities having a high degree of social and economic integration. The US Office of Management and Budget defines CBSAs to provide a nationally consistent set of geographic entities for the United States and Puerto Rico for use in tabulating and presenting statistical data.

- **Metropolitan Statistical Area:** A CBSA associated with at least one urbanized area that has a population of at least 50,000. The metropolitan statistical area comprises the central county, or counties, containing the core, plus adjacent outlying counties having a high degree of social and economic integration with the central county or counties as measured through commuting.

- **Micropolitan Statistical Areas:** CBSAs associated with at least one urban cluster that has a population of at least 10,000 but less than 50,000. The micropolitan statistical area comprises the central county or counties containing the core, plus adjacent outlying counties having a high degree of social and economic integration with the central county or counties as measured through commuting.

- **Combined Statistical Areas (CSA):** Two or more adjacent CBSAs that have substantial employment interchange. Because CSAs represent groupings of metropolitan and/or micropolitan statistical areas, they should not be ranked or compared with individual metropolitan and micropolitan statistical areas.

- **Minor Civil Division (MCD):** A census unit that is only used in 29 states and corresponds to the primary governmental or administrative divisions of a county. MCDs include barrios, boroughs, charter townships, election districts, election precincts, towns, and townships. The District of Columbia is considered equivalent to an MCD for statistical purposes. **Census County Divisions** are used in the 21 states that don’t have MCDs.

- **Census Designated Places (CDP):** The statistical counterparts of incorporated places. They are delineated to provide data for settled concentrations of population that are not legally incorporated.

- **Census Tract:** A small relatively permanent statistical subdivision of a county or equivalent entity. Census tracts have a population size between 1,200 and 8,000 people, with an optimum size of 4,000 people.

- **Block Groups:** Statistical divisions of census tracts that are generally defined to contain between 600 and 3,000 people.

- **Census Blocks:** Generally census blocks are small in area but may encompass hundreds of square miles in remote areas. Census blocks nest within all other tabulated census geographic entities and are the basis for all tabulated data.

- **Tribal Census Tracts:** Tribal census tracts (also known as tribal tracts) are completely different from those used in 2000 when they were first introduced. For 2010, tribal census tracts are defined independently of the standard county-based tract delineation. For tribes with a population less than 2,400, a single tribal census tract is defined. Qualifying areas with a population greater than 2,400 could define additional tribal census tracts within their area.

Example hierarchical presentation:

State
 County
 County subdivision
 Place (or part)
 Census tract (or part)
 Block group (or part)
 Block
Demographic and Economic Data

Population Projections
Population projections are conducted based on historical and present conditions of the study area and can also be done between study areas as a comparison. First, some terms:

- **Estimates** are calculated for current population levels.
- **Projections** are calculated for future population levels.
- **Forecasts** are subjective and apply only to selected projections.
- **Migration** is the movement of people into and out of a given study area.
- The **Crude Birth Rate** is the total number of births per 1,000 people in the total population.
- The **General Fertility Rate** is the total number of babies born per 1,000 females in their childbearing years (typically 15–49).
- The **Age-Specific Fertility Rate** is the total number of babies born per 1,000 females in a given age group (for example, ages 20–24).
- The **Death Rate** is the total number of deaths per 1,000 people in the total population.
- The **Migration Rate** is divided into two subcategories and is used to measure the number of people in the total population that are moving into or out of the study area.
  - In-Migration measures the total number of people coming in.
  - Out-Migration measures the total number of people leaving.
  - The Migration Rate is calculated by subtracting out-migration from in-migration. If the result is positive there is a net in-migration. If the result is negative, there is a net out-migration. The rate itself reflects total net migrants per 1,000 people in population.
- **Longitudinal Data** are data over time.
- **Cohort Data** follow age groups over time.
- **Panel Data** follow the same individuals in a cohort over time.

1. **Historical Extrapolation** is a basic method of projecting or estimating a population. This method assumes that past trends will continue into the future. As with any extrapolation, projecting too far into the future will result in erroneous conclusions. Historical extrapolation comes in several flavors (formulas are given, though most use computers now):
   - **Linear** projections assume that the population change will continue at the same numeric increase over the life of the projection. The formula for linear projections is \( y = a + bx \). The result is a straight line on the graph.
   - **Geometric** projections assume the rate of change remains constant, resulting in a curved line. The formula is \( y = ab^x \).
   - **Exponential** projections assume that the population change will change exponentially over the life of the projection. The formula is \( y = ae^{bx} \). The result is a curved line on the graph.
   - **Modified Exponential** projections assume that the population change will change exponentially over the life of the projection, but the assumption is subject to an absolute cap on the change. The formula is \( y = c + ab^x \). The result is again a curved line, but the upper or lower limit modifies the line into an azimuth.
   - **Gompertz** projections are further modified exponential projections. It is used to project a change in direction over time. The formula is \( Yc = ca^{b^x} \).
   - **Polynomial** projections are calculated with the formula \( y = a + bx + cx^2 + dx^3 + \ldots + ax^n \).
Demographic and Economic Data

2. The **Ratio Method** compares the study area (i.e., a city) to a larger known entity (i.e., a state). The method is good for point-in-time comparisons as well as comparing relative changes over time.

3. **Cohort Component (a.k.a., Cohort Survival)** population projections are commonly used to predict what the population will be for a given area in the future. The projection is based on past trends and data. They are heavily dependent on the birth rate, death rate, and migration rate (see terms on previous page), and they give an easily interpreted visual picture of the distribution of the population. On the following page are examples of “population pyramids.”
   - It is difficult to conduct descriptive statistics on these data because each cohort represents a range of data for which the original distribution is unknown. Researchers fall into this trap often. For example, if the 0–5 year cohort shows 10,000 people, how are they distributed across the five years? 2,000 people each year? Perhaps they are all four years old. These two extremes help make the point. Be sure you know the limitations and workarounds before attempting to do a statistical analysis on this type of data.
   - A trick to making pyramids in a spreadsheet program is to multiply male data by \(-1\). (Male data is on the left; female on the right.)
   - Calculating the **Rate of Change** for each cohort, each gender, or the overall population can be done with this formula:
     \[
     r = \frac{x_{t+1} - x_t}{x_t}
     \]
   - To calculate the **Annual Growth Rate** given only decennial data, convert using this formula:
     \[
     g = \left(\frac{v_n}{v_0}\right)^{1/t} - 1,
     \]
     Where \(v_0\) is the population in the first year, \(v_n\) is the population in the final year, and \(t\) is the total number of years to be covered.
   - The cohort component “supreme equation” is:
     \[
     POP_{t+1} = POP_t + BIRTHS - DEATHS + IN-MIGRATION - OUT-MIGRATION
     \]
   - The process, in a nutshell takes eight steps:
     - Get age-sex data
     - Acquire “vital records” data (birth and death rates)
     - Calculate survival rates
     - Move the “survivors” into the next cohort
     - Calculate births
     - Allocate births to males/females
     - Project the population
     - Model migration as residual (can only model—there is no age-specific migration data available)

4. The **Distributed Housing Unit Method** calculates population based on housing data as follows:
   \[
   POPULATION_t = HOUSING UNITS_t \times OCCUPANCY RATE \times PERSONS PER HOUSEHOLD
   \]
   - This is the method the Census Bureau uses in its intradecennial census estimates.
   - Assumes that changes in the occupancy rate and persons per household numbers are constant throughout the subject county
   - This method is less reliable in quickly changing communities and smaller communities.
Economic Analyses

Economic Base Analysis

1. Economic base analyses divide regional industries into Basic (export) and Nonbasic (local) sectors and assume that the basic sector drives the economy. Economic base analysis is easy and straightforward in calculating and interpreting. They can be used for both determining the impact of a change in the economy and for predicting future growth.

2. The assumption that the basic sector is the driving force in the economy is based on two observations (which are assumptions in themselves): (1) exports from a region give the region a competitive economic edge, and (2) exports produce a multiplier effect that is beneficial to the local economy.

3. There are a number of limitations to economic base analysis due to its simple approach.
   - The classification into basic and nonbasic sectors leans heavily on assumptions discussed above as well as additional assumptions directly related to which industries are placed in which sector.
   - It does not account for demographics. People are what economy is really based on (if there were no people, there would be no economy). Ignoring demographics—especially migration trends—produces skewed results.
   - Economic base analyses have no spatial orientations. Therefore, as the size of the study area grows, the economic base declines. This is because the comparison is usually to the national economy. As the area grows, there is less area outside the study area, and as a result, more industries go from basic to nonbasic.
   - Most were developed before the “information age” and have difficulty overcoming the changes of the past thirty years (i.e., e-commerce, telecommuting, etc.).
   - They are almost exclusively demand-side economic models.

4. Economic data for these economic base models is available from several sources, including the US Census Bureau, the Department of Labor, and others. It is generally difficult to find data below the county level. Keep the following in mind when utilizing economic data, particularly employment data:
   - Know the sources and assumptions behind the data.
   - The shift from the SIC (Standard Industrial Code) system to the NAICS (North American Industrial Classification System) system has produced consternation for those seeking historical comparisons because the systems are not entirely compatible.
   - Economic data is sometimes seasonally adjusted—and sometimes not.

5. The export base can be defined in several ways. The direct approach can be used; however, it is time and resource intensive and produces results similar to the more cost-effective indirect approaches.
   - The “Empirical Approach” assigns industries into basic and nonbasic sectors through assumptions on each industry as well as good knowledge of the economy. For instance, most agriculture and manufacturing jobs were traditionally assumed to be basic because the goods were sent away once produced.
   - The “Minimum Requirements Approach” utilizes an outside study area for reference and calibration. It assumes that a regional economy will completely meet its own local demand before any exports are made. Any employment utilized above the meeting of local needs is considered to be in the basic sector.
   - All others are nonbasic by default.
   - A third indirect method of defining economic base is the “Location Quotient” method, which is currently the most popular. It will be discussed separately, below.

6. With the base sector activity and the total economic activity of a study area in hand, the “Economic Base Multiplier” can be applied to measure local economic growth. The economic base multiplier can be based on employment, output, or income. It is calculated as follows:
   \[
   EBM = \frac{\text{TOTAL ECONOMIC ACTIVITY}}{\text{BASIC SECTOR ACTIVITY}}
   \]
   A result of 3, for example, would mean that for every basic job, three non-basic jobs are needed/created in the economy (you can substitute “dollar” or “unit of output” for “job” here).
Economic Analyses

Location Quotient

1. Location quotients are the most commonly used indirect method of defining the base sector of a study area. The data are relatively easy to find and the formula is simple to calculate. Moreover, it can be used on a variety of data types, such as employment (most common), income, output, and consumption. Location quotients are used to tell us the amount of export-based [data type] in each industry.

2. Keep the limitations of economic base analysis in mind when using a location quotient. In addition, this particular method becomes more robust as the data become more detailed.

3. Location quotients are calculated for each individual industry, using this formula:
   \[ LQ_i = \frac{\text{PERCENT LOCAL EMPLOYMENT}_i}{\text{PERCENT NATIONAL EMPLOYMENT}_i} \]

4. The location quotient centers on the number 1. A result of 1 means that the industry’s local share of the economy is equivalent to the same industry’s share of the national economy. A result less than 1 indicates that the local share is less compared to the national, and a result greater than 1 indicates the local share is greater than compared to the national—it is a basic sector industry.

Shift-Share Analysis

1. Shift share is a standard regional analysis method that attempts to determine how much of regional job growth can be attributed to national trends and how much is due to unique regional factors. Shift share helps answer why employment is growing or declining in a regional industry, cluster, or occupation.

2. To conduct shift share analysis, we split regional job growth into three components: (1) industrial mix effect, (2) national growth effect, and (3) regional competitive effect. In addition, a time frame (start year and end year) is required to perform shift share analysis, since shift share deals with job growth over time.

3. For the purposes of this explanation, we will focus on shift share analysis of industries. The explanation works equally well for clusters, since they are simply aggregations of industries. For occupations, shift share analysis is primarily a workforce-oriented view of industry data, since occupational growth and decline is tied to the growth and decline of the major industries employing workers in those occupations.

4. The Industrial Mix Effect
   - The industrial mix effect represents the share of regional industry growth explained by the growth of the specific industry at the national level. To arrive at this number, the national growth rate of the total economy is subtracted from the national growth rate of the specific industry, and this growth percentage is applied to the regional jobs in that industry.

5. The National Growth Effect
   - The national growth effect explains how much of the regional industry’s growth is explained by the overall growth of the national economy: if the nation’s whole economy is growing, you would generally expect to see some positive change in each industry in your local region (the proverbial “rising tide that lifts all boats” analogy).

6. The Expected Change
   - This is simply the rate of growth of the particular industry at the national level. Algebraically, the expected change is the sum of the industrial mix and the national growth effects.

7. The Regional Competitive Effect
   - The regional competitive effect is the most interesting of the three indicators. It explains how much of the change in a given industry is due to some unique competitive advantage that the region possesses, because the growth cannot be explained by national trends in that industry or the economy as whole. This effect is calculated by taking the total regional growth of the given industry and subtracting the national growth for that same industry. Note that this effect can be positive even as regional employment in the industry declines. This would indicate that regional decline is less than the national decline.

Input-Output Economic Analysis

1. Input-output analysis focuses on intermediate sales between an economy’s sectors, or the circular flow of the economy. It is based on more of an accounting methodology than a theory (unlike economic base analysis).
Economic Analyses

2. Input-output analysis is similar to economic base analysis in that
   - It is used both to study an economy’s structure and to project that structure into the future.
   - It divides the involved economy’s activity into groups. However, while the economic base technique divides economic activity into basic and non-basic groups, the input-output technique classifies economic actors as either (1) primary suppliers (they purchase no inputs for producing outputs—they are usually households, their output is usually labor, and they usually purchase only final goods), (2) intermediate suppliers (they sell their outputs to either intermediate or final purchasers), (3) intermediate purchasers (they buy outputs from others and use them as inputs to produce outputs—intermediate purchasers and intermediate suppliers are actually the same), and (4) final purchasers (they use their inputs as a final goods; i.e., they consume them). Note that primary suppliers are not necessarily also final purchasers.

3. Input-output analysis makes the following assumptions:
   - Economies of scale do not exist.
   - The available technology and the quality of labor do not change.
   - The inputs of each industry’s production cannot be substituted.
   - Each industry produces only one bundle of goods (i.e., output).
   - Each industry’s consumption of inputs stays constant.
   - There are no national imports or exports.
   - An economy’s total output (i.e., the value of all sales in a limited time period) equals its total product (i.e., its final sales) plus its intermediate sales.
   - Final demand is outside of the economy being analyzed.

4. An input-output analysis is composed of three tables:
   - **The transactions table:** This table shows cash flows between intermediate economic sectors. Intermediate suppliers are listed on the y-axis (i.e., rows), and intermediate purchasers are listed on the x-axis (i.e., columns). Each row is summed to show the involved sector’s total production (i.e., total outputs), and each column is summed to show the involved sector’s total purchases (i.e., total inputs).
   - **The direct requirements table** (also called the “industry coefficients table” or the “technical coefficients table”): This table is produced by dividing each cell in the transactions table by the sum of that cell’s column. Thus, the sum of each column in the direct requirements table is one. If 0.05 was a number in a cell that belonged to manufacturing’s row and agriculture’s column, it would be interpreted as “0.05 of the money spent by the agricultural sector to produce one “unit” of output was used to buy intermediate goods (i.e., inputs) from the manufacturing sector.”
   - **The total requirements table:** This table is produced by reiterating the direct requirements table and summing the per dollar requirements of each economic sector. Each sector is listed as a row on the y-axis (e.g., agriculture, manufacturing, households). On the x-axis, the following items are usually column headings: “sales to final purchasers,” “sales as direct inputs” (one subcolumn is provided for each economic sector, and one subcolumn totals sales as direct inputs), “sales as indirect inputs” (one subcolumn is provided for each economic sector, and one subcolumn totals sales as indirect inputs), and “total sales.”
   - Multipliers describe “chain of effects.” This will continue until there are demand leakages $ leaves the region. The total effect will be no more than two or three times the size of the initial demand increase.
   - Direct – directly affected by business activity/development
   - Indirect – impacts caused by interindustry exchanges
   - Induced – impacts created by household spending of those directly and indirectly employed by the industry/development

5. Using input-output analysis
   - An input-output analysis is typically a far worse “data hog” than a corresponding economic base analysis. Performing an input-output analysis is very difficult, costly, and time consuming.
   - Even though most economists prefer input-output analysis to economic base analysis, input-output analyses sometimes don’t produce significantly better results.
   - Input-output analysis is most often used to project scenarios. After the three above tables have been completed for a particular economy the created “model” is “shocked” with a hypothetical economic event such as the opening of a new shopping center. As the involved economic sector changes (it grows, in this example), the resulting changes in its inputs and outputs ripple across the model—estimating the long-term effects of the hypothetical event on all of the particular economy’s sectors.
Economic Base Analysis
What is it?

• A simple tool for looking at the local economy.
• Divides the economy into basic and non-basic sectors
• Basic are what is exported
  • drives the economy based on two assumptions: gives the area competitive edge and multiplier effect that benefits the local economy.
• Because of the data needs, application is not good at less than the county level.
What data is needed?
- Standardized form of classifying industries SIC or NAIC
- Employment, output or income
- Sources: US Census, Department of Labor

Approaches to determining base vs non-base?
- Empirical studies
- Minimum Requirements Approach - region will meet their own demand and any employment above that minimum is export or base economy. (Farming)
- Location quotient most popular
- Economic Base Multiplier (EBM) measures local economic growth. The economic base multiplier can be based on employment, output, or income.

\[
\text{EBM} = \frac{\text{TOTAL ECONOMIC ACTIVITY}}{\text{BASIC SECTOR ACTIVITY}}
\]
Limitations?

- Assumption heavy
- Ignores demographics
- Ignores the geographic growth of regions - not good in growing
- Old technique, Worked for resources base economies in isolated geographies - not information age.
ECONOMIC DEVELOPMENT – REVITALIZATION – ANALYSIS – FORECASTING

Key Terms:
- **Agglomeration Economies**: The benefit of businesses locating close together to reduce costs and increase communication and partnership opportunities
- **Business Cluster**: A group of geographically close businesses that have a mutually beneficial relationship to each other, such as raw goods supplier and manufacturer
- **Base Industry**: An industry that produces enough of a good or service to export
- **Civic Entrepreneurialism**: Recognition of local government and community organizations (e.g. - chambers, redevelopment agencies, etc.) central role in stimulating economic activity
- **Community Shopping Center**: 100k to 450k sq. ft.; may have a mid-size department or discount store as anchor tenant
- **Neighborhood Shopping Center**: 30k to 100k sq. ft.; convenience and personal services oriented to meet daily need of nearby residents
- **Regional Shopping Center**: 300k to 1mil. sq. ft.; variety of merchandise offered, usually has a major national chain retailer as anchor of center
- **Tax Increment Financing (TIF)**: Financing mechanism used by local governments to redevelop and fund public improvements in blighted areas through collection of additional property tax revenue
- **Improvement District**: A Business (BID) or Local Improvement District (LID) is a special tax assessment district where the tax (TIF) funds redevelopment, services, activities or improvements in the district
- **Special Districts**: Geographically defined areas that serve a single purpose or service like water, sewer and airport districts. Taxes and debt may be issues and often user fees are the funding mechanism for special districts
- **Business Incubators (aka – Business Assistance Centers)**: Facilities dedicated to providing support systems to start-up businesses

Analysis:
- **Cost benefit analysis** considers the future benefits and costs of alternatives. Discounts values to present value.
- **Economic base analysis** (see Theory and Forecasting below)
- **Fiscal impact analysis** is used to determine if a particular project will generate adequate revenue through taxes to pay for the services (fire, police, water, schools, etc.) needed to support the project.
- **Input-Output analysis** measures the relationships among industries in a region to show what is used locally and what is exported.
- **Market-share analysis** tracks the local area’s share of a larger market for certain goods and services to determine if share is growing, declining or stable.
- **Retail market analysis** is a technique used for estimating how much retail activity and building space availability and land will be needed by a community in the future.
- **Shift-share analysis** is used to compare and contrast growth rates among industrial sectors. Distinguishes between trends in the local and national economies.
Measures:

- **Jobs to Housing Ratio**: The ratio between the expected jobs and the need for housing in a community. The higher the ratio the more the community is generating jobs in comparison to housing and is thereby exporting the housing element to other communities. *Linkage* is a program designed to balance the ratio; makes sure enough housing is provided for the number of jobs coming to a community.

- **Location Quotient**: This measurement is used to compare the concentration a local community’s share of a particular economic activity (industry) relative to the region or nation. When LQ is > 1, employment in the industry is greater than in the larger region/nation and the product is exported (NOTE: when the LQ is >1 the industry is said to be a *base industry*). When LQ is equal to 1 the product meets local demand; product is neither imported nor exported. When LQ is < 1 the local industry is not meeting local demand for the product.

  Example: 6% of a 10,000 person *local* workforce is employed in a specific industry while 3% of the 100,000 *regional* workforce is employed in that specific industry. The LQ is \[(600,000/10,000)/(3,000/100,000) \approx 2\]. So in this case there is a surplus and the industry/product is exported.

- **Multiplier Effect**: The full economic impact of spending a dollar, measured beyond the original expenditure. Example: You pay someone for a service and they turn around and buy something from someone else and so forth.

**Theory**: Theory says that the supply of a good or service increases as per unit price increases; demand for a good or service decreases as the per unit price increases. The point of equilibrium is where the supply and demand curves intersect.

![Supply and Demand Curve](source: wikipedia.org)

**Economic base theory** was developed by Robert Murray Haig in his work on the *Regional Plan of New York* in 1928 to forecast employment and jobs in NYC. Haig concluded that activities or industry in an area fall into two categories – basic and non-basic. Basic industries are those exporting from the region; non-basic (or service) industries support basic industries. The economic base analysis and location quotient, combined with the supply and demand principal, form the foundation of economic models.

**Models/Strategies of Economic Development**: Economic development strategies may include development of base industries, assessment of location assets and assessment of
knowledge resources. Communities that provide subsidies such as tax abatement, revolving loan funds, and/or make services and infrastructure readily available to industry have an advantage in recruiting new companies compared to those communities that do not provide incentives. In addition to incentives, communities can spur economic development though sales, marketing and public relations. A community’s quality of life, and workforce (and housing) availability also play into the economic development equation.

- **Harrod-Domar Model:** The Harrod-Domar Model delineates a functional economic relationship in which the growth rate of gross domestic product (g) depends positively on the national saving ratio (s) and inversely on the national capital/output ratio (k) so that it is written as \( g = \frac{s}{k} \). The equation takes its name from a synthesis of analysis of growth by the British economist Sir Roy F. Harrod and the Polish-American economist Evsey Domar. The Harrod-Domar model in the early postwar times was commonly used by developing countries in economic planning. With a target growth rate, and information on the capital-output ratio, the required saving rate can be calculated. (The Incremental Capital-Output Ratio (ICOR) is the ratio of investment to growth which equals to 1 divided by the marginal product of capital. The higher the ICOR, the lower the productivity of capital.)

- **Exogenous Growth Model:** The exogenous growth model (or neoclassical growth model) of Robert Solow and others places emphasis on the role of technological change. Unlike the Harrod-Domar model, the saving rate will only determine the level of income but not the rate of growth. The sources-of-growth measurement obtained from this model highlights the relative importance of capital accumulation (as in the Harrod-Domar model) and technological change (as in the Neoclassical model) in economic growth. The original Solow (1957) study showed that technological change accounted for almost 90 percent of U.S. economic growth in the late 19th and early 20th centuries. Creating business clusters is an example of using the Exogenous Growth Model.

**Forecasting:** Economic Forecasting is simply the prediction of any of the elements of economic activity. Basic and non-basic concepts are operationalized using employment data. The basic industries of the region are identified by comparing employment in the region to national norms (see Location Quotient above). Once basic employment is identified, the outlook for basic employment is investigated sector by sector and projections made sector by sector. In turn, this permits the projection of total employment in the region. Typically the basic/non-basic employment ratio is about 1:1. Extending by manipulation of data and comparisons, conjectures may be made about population and income in any given area.

**Federal Economic Development and Revitalization Programs:**
- **Public Works Administration (PWA), 1933,** used public works projects as a way to provide employment, stabilize purchasing power and improve public welfare (depression era). PWA funded the construction of more than 34k projects across the U.S., including dams, hospitals and schools. First public housing project was established under PWA. Program abolished in 1941, during WWII.
- **Works Progress Administration (WPA), 1935**, also known as Roosevelt’s New Deal Program. Linked urban planning and economic development through feds stimulating local economy through highway and building construction, slum clearance and rural rehabs.

- **Economic Development Administration, 1965**, was the successor to the Area Redevelopment Administration (ARA) of 1961. Program used regional poverty and unemployment stats to determine which counties were eligible for grant assistance. Money used primarily for site acquisition, grading and utilities. When sites were ready they were sold or leased at below cost to firms (further subsidized). EDA program created industrial parks and business incubators.

- **Community Development Block Grant (CDBG), 1974**, was enacted by President Gerald Ford and is one of the longest-running programs of the U.S. Department of Housing and Urban Development (HUD). The CDBG program funds local community development activities such as affordable housing, anti-poverty programs, and infrastructure development. CDBG, like other block grant programs, differ from categorical grants, made for specific purposes, in that they are subject to less federal oversight and are largely used at the discretion of the state and local governments and their subgrantees, thus the grants can be used in a variety of ways to revitalize communities. (See APA’s Policy Guide on *Supply of Public and Subsidized Housing* for more information.)

- **Urban Development Action Grant (UDAG), 1977**, was implemented under President Carter to support local economic development efforts by stressing inter-governmental coordination and public-private partnerships. Program was phased out under President Reagan.

- **Community Reinvestment Act (CRA), 1977**, required lenders to provide mortgage loans to economically depressed areas. Program was implemented to stop the practice of redlining of urban, low-income, minority neighborhoods. (Redlining refers to the drawing of a red line on a map where mortgages would not be allowed because of deteriorating conditions and/or racial composition of a neighborhood.) Gave community organizations and advocacy groups the power to intervene in regulatory hearings on bank acquisitions, expansions, and lending practices.

- **Enterprise or Empowerment Zones, 1994**, was created under President Clinton to make funds available to a limited number of distressed urban areas in order to make them economically competitive with suburban counterparts. Incentives such as property tax and sales tax reductions, wage tax credits, and low-interest financing were used to jumpstart investment in distressed downtowns.

- **Telecommunications Act, 1996**, provided a major overhaul of the telecommunication law of 1934. Attempted to reduce regulatory barriers to market entry and competition. Outlawed artificial barriers to entry in local exchange markets in its attempt to remove monopolies.

**AICP Policy:** In addition to the APA Policy Guides cited above, see the *Public Redevelopment* and *Smart Growth* Guides for further information on those elements of economic growth.
GEOGRAPHIC INFORMATION SYSTEMS (GIS)
The field of computerized mapping using a software systems that links databases and maps. It is used to determine exact property boundaries and to identify important environmental features as well as assisting with certain aspects of economic analysis when combined with assessors land data and in capacity analysis which identifies existing land use patterns, identifies vacant or undeveloped land, applies existing zoning densities, and forecasts the potential growth capacity of existing land uses.

MAPS
Aerial Photo— Actual photograph of existing features used create other layers within the map.

Cadastral Map —Designates the geographic boundaries of subdivisions, land parcels, and owned land — Tax Maps/Assessors Maps

Flood Map — Federal Emergency Management Agency Flood Insurance Rate Maps (FEMA FIRM)
  • Show all areas where flooding may occur (5%, 1% and Floodway)

Land Use Map — Two types used in Comprehensive Plans
  1) Current Land Use Map
  2) Future Land use map
    i. COLOR SYSTEM:
       1. Purple for industry
       2. Yellow for low-density housing
       3. Brown for high-density housing
       4. Red for retail and commercial
       5. Blue for institutional and public
       6. Green for recreation
       7. Gray for utilities

Land Classification Map- Provide information about Development areas and Non-development areas. Often show urban growth boundaries (UGB) (a line of demarcation between urban land and rural land). Help with promotion of the appropriate kind of growth and infrastructure for each area and include a list of incentives and disincentives for development.

Orthophoto Map — shows ground features like roads, landmarks, water features, plants, structures, etc. and can be used for (generally used at a 1:12,000 RF scale or 1” = 1000’ verbal scale):
  • Land use
  • Managing vegetation
  • Habitat, flood, watershed analyses
  • Environmental Impact and soil erosion assessments
  • Facility management

Soil Survey Map — Produced by the Natural Resources Conservation Service (NRCS). Provide a detailed description of soil types.
  • Determine best areas for agricultural & forestry
  • Locate areas for septic system placement
  • Determine best areas for urban expansion
  • Identify floodplains and wetlands
**Topographic Map** – Use contour lines to display differences in elevation of the earth’s surface. (Generally used at a 1:25,000, 1:50,000 or 1:100,000 scale, depending on the data needed) Example: All of Nampa’s defined city boundary can be seen on a map at the 1:25,000 scale with little detail

**Digital Elevation Models (DEM)** – Shows digital data about the elevation of the earth’s surface.

**Light Detection and Ranging (LIDAR)** – uses a laser instead of radio waves to provide detailed topographic information. Can provide dense data points.

- Slope data analysis
- Determine best locations for buildings and roads
- Obtain data for storm water runoff and drainage basins
- First Year a Topographic Map was produced - 1879

**TERMS**

**Projection** – Technique by which the curved, 3D surface of the earth is conveyed to a 2D image. Relies on a universal mathematic model, various projections are available and need to be rectified per jurisdictional requirements.

**Rectify** – Technique by which coordinates are assigned to images, this is necessary to integrate the image into a GIS layer.

**Digitizing** – Records the features of a map by tracing it using a computer mouse or digitizing tablet.

**GPS (global positioning system)** - A locations longitude and latitude coordinates.

**Orthophoto** - Aerial photograph that has been rectified.

**Layer** – Data within a GIS database that can be viewed individually or overlaid on top of another layer depending on the users needs.

**Overlay** – occurs when multiple layers are placed on the same map.

**Coverage** – Use of multiple data layers to describe the same area.

**Geocoding** – Technique to designate database records with an X & Y Coordinate so it shows on the map in the correct location.

**TIGER** – Topographical Integrated Geographical Encoding and Referencing Map – Used for Census Data. Includes streets, railroads, zip codes, and landmarks. Can be downloaded into a GIS system and used as a base layer.

**UrbanSim** – Simulation software program that models planning and urban development. Used by MPO’s.

**CommunityViz** – Software environment that allows agencies to analyze land use scenarios and create 3D images. Allows citizens to visualize potential for development and redevelopment.

**MEASUREMENTS**

- **Acre** = 43,560 square feet
- **Hectare** = 2.417 acres = 10,000 square meters
- **Mile** = 5,280 feet
- **Square Mile** = 640 acres
- **Kilometer** = 3,281 feet or 1000 meters
- **Density** = measures number of dwelling units per unit area of land.
- **Floor Area Ratio (FAR)** = ratio of lot size to the max floor area of a building allowed by code/ordinance.

**SCALE**

- Verbal Scale is actual measurement – 1” = 100’
- Representative Fraction (RF) Scale = units – 1:1,200 = 1”= 100’ (divisible by 12)
Research Methods:

Types of Measures

Nominal Scale: Discrete classification which data cannot be measured or ordered but allocated to distinct categories.

Examples:

- Gender
  - Boy or Girl
- Yes/No

Race/Ethnicity

- White
- Black
- Hispanic
- Asian
Research Methods:

*Types of Measures*

- **Ordinal Scale:** Data are shown simply in order of magnitude since there is no standard measurement of differences (data that can be ranked)

**Examples:**

- Height ORDER
- Population ORDER

1. Boise
2. Meridian
3. Nampa
4. Garden City
Research Methods:

*Types of Measures*

- **Interval scale:** comparison of differences of values; a scale having a fixed zero value.

**Examples:**

- 1- Completely agree
- 2- Somewhat agree
- 3- Neutral
- 4- Somewhat disagree
- 5- Completely disagree
Research Methods:

Types of Measures

- **Ratio** Scale: Data where the differences (intervals) between values can be quantified in absolute but not relative terms (do not have a true zero point)

Examples:

![Length Measurement](image)
Research Methods:
Types of Measures: Summary

Each type of measure changes what kind of analysis you can do with it.

- **Nominal**: Attributes are only named; weakest
- **Ordinal**: Attributes can be ordered
- **Interval**: Distance is meaningful
- **Ratio**: Absolute zero
Research Methods:

*Qualitative Research*

**Definition:** focuses on the "why" rather than the "what." Uses observation to gather non-numerical data.

**Variables:** Nominal or ordinal

**When to use it:** to study selected issues in depth and detail without being constrained by pre-determined categories of analysis

**Examples:** unstructured or semi-structured techniques: focus groups, individual interviews, open-ended survey questions, observations
Quantitative and Qualitative Research Methods

Measures

- **Nominal scale** is a discrete classification of data in which data are neither measured nor ordered but subjects are merely allocated to distinct categories: for example, gender, affiliation, race, etc.
- **Ordinal scale** is a scale on which data are shown simply in order of magnitude since there is no standard measurement of differences (i.e., class of 25 students ranked 1 through 15 based on height), population order of counties, or other data that can be ranked.
- **Internal scale** is the measurement of data where the differences (intervals) between values can be quantified in absolute but not relative terms such as degrees Fahrenheit and dates (intervals of days, months, years).
- **Ratio scale** is a scale of measurement that permits the comparison of differences of values; a scale having a fixed zero value. The distances travelled by a projectile, for instance, are measured on a ratio scale since it makes sense to talk of one projectile travelling twice as far as another.

Types of Variables

- **Qualitative** variables are nominal or ordinal.
- **Quantitative** variables are interval or ratio scale.
- **Discrete** variables are values drawn from a finite set.
- **Continuous** variables take on an infinite number of values including values such as 1.34692 or −45.683.
- **Dichotomous** variables take on only two possible values, often designated as 0 and 1; examples are male or female, pass or fail, or homeowner or renter.

Measures of Central Tendency are more commonly known as “averages.” There are multiple ways to compute an average but all measure data toward the center of the full data set.

- The **mean** is the sum of all the values in a data set divided by the total number of values in the set. It is often represented by the symbol $\bar{x}$ is calculated $\bar{x} = \frac{\text{sum of all values}}{n}$, where n is number of values.
- The **median** is the midpoint value in an ordered distribution. Represented by $M_d$.
- The **midrange** is the value produced by adding the highest value and the lowest value and dividing by two. It is calculated by $MR = \frac{(x_1 + x_2)}{2}$
- The **mode** is the most frequent entry in a distribution. If a distribution has more than one mode, that distribution is said to be bimodal. Represented by $M_o$.
- A **weighted mean** can be calculated where greater emphasis or importance is placed on particular entries or where the frequency distribution results in a representative value being assigned for each class.
- **Measures of dispersion (variance)** show how data flow outward from the center of the distribution. There are four basic measures of dispersion: range, standard deviation, variance, and the coefficient of variation.
Quantitative and Qualitative Research Methods

- The **range** is the difference between the highest and lowest value in the data set. The larger the number, the greater the range and the greater dispersion. The formula for range is:
  \[
  \text{Range} = x_n - x_1
  \]

- A **Standard Deviation** is a measure of how much the data in a certain collection are scattered around the mean. A low standard deviation means that the data are tightly clustered; a high standard deviation means that they are widely scattered. There are two common formulas used for standard deviation, both yielding the same result.
  \[
  s = \sqrt{\frac{\sum(x-x)^2}{n-1}} \quad \text{or the shortcut:} \quad s = \sqrt{\frac{n(\sum x^2) - (\sum x)^2}{n(n-1)}}
  \]

- **Variance** is the square of the standard deviation. It is a mathematical expectation of the average squared deviations from the mean. The formula is the same as that for the standard deviation except the “s” variable is squared, and no square root function is performed.

- The **Coefficient of Variation**, unlike the other three measures of dispersion, measures the relative dispersion from the mean rather than absolute dispersion across the field. It is merely the standard deviation divided by the mean (\( CV = \frac{s}{\bar{x}} \)).

**Frequency Distribution**

Frequency distribution is used to understand the raw data. Often in frequency distribution, the values are placed in some logical order (i.e., lowest to highest) so the researcher can quickly have a basic grasp of the “feel” of the data. There are several ways to undertake this display.

- **Tabular formats** create several columns. The first column contains all possible responses for the measure tested. The second column contains the total number of actual responses for each entry in the first column. Additional columns can contain cumulative frequencies, percentage of totals, and other basic measures.

- **Class formats** involve grouping the responses into logical categories. The total scope of the groups must encompass the full range of possible responses and must also be mutually exclusive. A well-known example is map legends showing data classes of population or grading scales.

- **Cross-Tabs** are tables showing the joint distribution of two or more categorical variables such as actual counts, percentages, expected values, and residuals. Various measures of association can be obtained between the variables.

- **Histograms** are a graphical display of frequency distribution. The range of responses is placed (usually) on the x-axis and the total number of each response is (usually) plotted against the y-axis. The resulting bar chart produces a very quick display of the data distribution.
Quantitative and Qualitative Research Methods

- One branch of knowledge related to frequency distribution is called **Exploratory Data Analysis**. This allows the researcher the advantage of “seeing” the data as in the traditional frequency distribution models discussed on the previous page but maintains data integrity such that the original data set can be reconstructed.
  - The most popular example of exploratory data analysis is the **Stem and Leaf Plot**. This plotting technique separates the digits of actual response values. The first digit(s) become the “stem” and are placed in the left column. The remaining digits become the “leaves” and are arranged in order in the second column, all on the same line. The result looks like a histogram rotated ninety degrees with the “bars” made of numerals.
  - Example: number set (2.1 2.6 2.7 3.2 4.1 4.3 5.2 5.1 4.8 1.8 1.4 2.5 2.7 3.1 2.6 2.8)
    
    Stem and Leaf Plot:
    
    | 1 | 48 |
    | 2 | 1566778 |
    | 3 | 12 |
    | 4 | 138 |
    | 5 | 12 |

**Hypothesis Testing**

Hypothesis testing is conducted to determine outcomes based on the scientific method. First, the statistician must declare the predicted (desired) outcome and then also identify and describe all possible outcomes.

- The **Research Hypothesis** (designated $H_1$) is a statement that describes the interrelationships between different characteristics. It is what the researcher is seeking to prove through the analysis.
- The **Null Hypothesis** (designated $H_0$) is the opposite of the research hypothesis. It is what the researcher is seeking to prove wrong so that the research hypothesis can be assumed to be correct by implication.
- Remember that it is easier to prove something wrong than correct (statistically speaking) so the null hypothesis is used.

**Concepts of Distribution**

There are two basic types of distribution, each with its own tests. Both are described here; however, for our purposes, more attention will be given to the parametric distributions.

1. **Parametric** assumes the data are arranged in a normal distribution and are measured on the interval scale.
   - A **Normal Distribution** is a probability distribution that is symmetrical about the mean (Bell curve).

   ![Normal Curve](https://source.regentsprep.org)

   - With a normal distribution, about 68% of the scores are within one standard deviation of the mean; about 95% are within 2 standard deviations of the mean; about 99% are within 3 standard deviations of the mean.
Quantitative and Qualitative Research Methods

- **The z-score** is a measure of the distance, in standard deviation units, from the mean. It is used to determine probability if something would, or would not, happen. The formula for this is \( z = \frac{x - \bar{x}}{s} \). Each of these variables is described earlier.

- **The t-test** allows us to compare the means of two groups and determine how likely the difference between the two means occurred by chance.
  - The calculations for a t-test require the researcher to know the number of subject in each group, the difference between the means of each group, and the standard deviation for each group.
  - A **correlated t-test** is concerned with the difference between the average scores of a single sample of individuals who is assessed at two different times (“before” vs. “after”) or on two different measures. The measures must be correlated (co-related), and so it can also compare average scores of samples of individuals who are paired in some way (i.e., parent-child).
  - An **independent t-test** compares the averages of two samples that are selected independently of each other. Independent t-tests come in “equal variance” and “unequal variance” flavors, but these go beyond the scope of this work.

- **ANOVA** is an extension of the t-test. It stands for Analysis of Variance. It allows a composite view of data by assuming that by placing variable x into groups, a better understanding of variable y will be found.
  - ANOVA identifies the relationship between two variables.
  - The x variable is always nominal.
  - The y variable is always interval.

- Mathematically, a line is expressed as \( y = mx + b \).

- **Correlation** measures the strength of the relationship between variables or the degree to which two variables are correlated (co-related). It is used to demonstrate relationships between situations and/or actors, even disparate ones (think apples and oranges). The test is linear.
  - The correlation is shown on a graph between two variables. The x variable is the independent variable and the y variable is the dependent variable. This merely means that what y becomes is dependent on what x actually is.
  - The correlation coefficient (represented as \( r \)) indicates both the type and the strength in the relationship between the variables. This coefficient can range from as low as \(-1\) to as high as 1. The formula is \( r = \frac{CV_{xy}}{s_x s_y} \).
  - A positive relationship is shown by a general trend of points on a graph moving from the lower left to the upper right. The tighter the points, the stronger the correlation. If the points line up exactly, it is a perfect correlation (numerically, \( r = 1 \)).
  - An inverse relationship is shown by a general trend of points on a graph moving from upper left to lower right. The same concepts apply for tightness and perfect alignment (numerically, \( r = -1 \)).
  - If the points are scattered all over the face of the graph, the correlation between the variable is weak or nonexistent (numerically, \( r = 0 \)).
  - By squaring the correlation coefficient (\( r^2 \)), the researcher can see how much one variable explains another. For example, if \( r^2 = .2312 \), then the independent variable x accounts for 23.12% of variable y’s variability.
  - Keep in mind that correlation does not demonstrate “cause and effect.”
Quantitative and Qualitative Research Methods

- **Regression** is a statistical test of the effect one variable (condition/actor) has on another while holding all other conditions constant. This test is also linear. If there is no correlation, there is no need to utilize a regression test. Regression allows us to predict the value of one variable given the value of the other, or to explore the relationships between variables.
  - There is always one dependent variable (y) in regression.
  - In **simple regression**, there is only one independent variable. The formula for simple regression is $y = b_0 + b_1x_1$.
  - In **multiple regression**, there are two or more independent variables. Multiple regression simply extends simple regression $y = b_0 + b_1x_1 + b_2x_2 + \ldots + b_nx_n$.
  - Regression answers one or more of these questions:
    - What is the association between x and y?
    - How can changes in y be explained by changes in x?
    - What are the functional relationships between y and x?
  - Beware of false relationships! Correlation and regression can be used to “prove” that fire trucks cause house fires (if there is a house fire, there are likely fire trucks).

2. **Nonparametric** is used when the data are arranged in a skewed or other non-normal pattern. There is little use for this in planning, but a few points are in order.
   - A **Positive Skew** indicates the value for mean is higher than the value for median. The “hump” for this distribution is to the left. It is sometimes called a Right Skew.
   - A **Negative Skew** indicates the value for mean is lower than the value for median. The “hump” for this distribution is to the right. It is sometimes called a Left Skew.
   - **Chi-Square** ($x^2$) tests for a relationship between two nominal- or ordinal-based variables as well as the joint probabilities between the two variables. The formula is
     \[
     x^2 = \frac{(e_1 - f_1)^2}{e_1} + \frac{(e_2 - f_2)^2}{e_2} + \ldots + \frac{(e_n - f_n)^2}{e_1}
     \]
     \[
     = \sum_{k=1}^{n} \frac{(e_k - f_k)^2}{e_k}
     \]
     In the above formula we are looking at n pairs of expected and observed counts. The symbol $e_k$ denotes the expected counts and $f_k$ denotes the observed counts. The result is a nonnegative number that tells us how different the actual and expected counts are. If $x^2 = 0$, then there are no differences between the observed and expected counts.

**Surveys**

Surveys are a method of collecting information by asking a set of predetermined questions in a predetermined sequence via a controlled questionnaire to a representative sample (subset) of a given population (whole).

1. A **cross-sectional survey** is used to evaluate a point in time. A **longitudinal survey** is used to evaluate a situation over time.
2. The size of a survey’s sample, relative to the population being surveyed, is crucial to the survey’s accuracy. An appropriate sample size is determined by statistical confidence, population size, and data integrity.
Quantitative and Qualitative Research Methods

3. The random nature of a survey’s sample is also crucial to the survey’s accuracy.

4. There are three commonly used types of surveys.
   - **Mailed surveys**: Mailed surveys are inexpensive, do not involve training or recruiting interviewers, allow the subjects to respond at their own convenience, and provide the subjects with time to answer detailed questions that may require some research (e.g., How much of your monthly mortgage payment is escrowed for local property taxes?). However, they are slow, have a low response rate (15% on average), require clear questions, are inhospitable to open-ended questions, and do not work well with the elderly or the poorly educated.
   - **Telephone surveys**: Telephone surveys are fast, are cheaper than in-person surveys, and avoid biases caused by subjects reading ahead. However, they ignore people who don’t have telephones, and they require trained interviewers—as well as the monitoring of those interviewers. Furthermore, the quality of telephone survey responses decreases if the questionnaire takes too much time.
   - **In-person surveys**: In-person surveys work well with long questionnaires, can get to hard-to-reach populations, and can record the subject’s visual clues. However, they are very expensive and the interviewer can introduce biases.

5. The **sampling frame** is the source and/or method used to draw the sample.

6. Types of **sample designs**
   - **Probability Sampling**
     - **Random** – everyone in the population has an equal chance of being selected
     - **System** – a list is developed, with every xth person selected
     - **Stratified** – a given population is divided into multiple strata (classes) from which sampling is conducted
     - **Cluster** – a given population is divided into logical sections, with selections made from selected sections
   - **Nonprobability Sampling**
     - **Convenience** – use the individuals and/or results that are readily available
     - **Volunteer** – individuals volunteer their participation
   
   Nonprobability sampling designs may lead to biased and ungeneralizable findings.

7. Survey questions can be either closed-ended (answers predetermined in a multiple choice environment) or open-ended (respondent provides answers in own words).

8. Improper survey methods commonly in use today include internet polling, customer response, and surveys with improperly written questions.
Lesson 4 covers quantitative methods and data collection. Familiarize yourself with basic statistics such as nominal (named) and ordinal (ranked, as in order) measures and central tendency measures such as mode, mean, and median. Know whether a variable is dependent (fact that is sought to be explained) or independent (variables used to explain the dependent variable). An important part of data collection is understanding the accuracy and appropriateness of data for the task at hand - analyzing data that is available and knowing what types of data to obtain for a planning effort.
Statistical analysis includes simple frequency graphing (such as a histogram or bar chart), different kinds of hypothesis testing, and regression analysis. These methods are described in more detail in the “Quantitative Methods” handout. Non-probability surveys use individuals who are readily available or those who volunteer their participation. Probability sampling includes random, system, stratified, and cluster.
Qualitative data can include sources such as literature review and descriptive summaries and compilations of written comments. It can also include charts and flow diagrams to visualize concepts or information flow.
Data can be collected in text documents, spreadsheets, GIS, MIS, databases and other means. Know terms such as Gantt Chart, Bubble Chart, Flow Chart, matrix, etc., and what is useful when.
This slide shows data expressed in two slightly different ways. On the left is a conventional “pie chart”. The graphic on the right is a type of bubble chart that shows percentages as proportionately sized circles. The bubble chart should be accurately scaled and not merely an approximation of relative sizes.
Demographic & Economic Data

Three basic types of demographic analysis used by planners:

- **Descriptive**- tools, data, and methods to describe the population of an area
- **Trends**- look at how demographic data has changed over time
- **Projections**- estimates of future population and population structure

See the handout “Census Highlights” for more U.S. Census information.

Demographic data includes population counts and descriptors such as race, gender, average age, and age distribution. The most common source of data is the U.S. Census Bureau which produces the decennial census and the annual American Community Survey. The Census is a count of the existing population that occurs every 10 years. The ACS is a survey that is used to collect household information between the censuses. The Census Bureau uses birth, death and migration data for intercensal population estimates. Familiarize yourself with basic population and demographic trends shown in the latest census.
As shown in this U.S. census graphic, the center of the U.S. population has been moving westward and slightly to the south over the decades. The 2010 population center for the country was in Texas County, Missouri.
Employment, wage, and industry data are available from the U.S. Census, the Bureau of Labor Statistics and the Bureau of Economic Analysis. Examination of these two graphs shows that the unemployment rate soared between 2008 and 2010 due to the largest recession since the 1930s Great Depression. The graph on the right shows that employment fell in 2009 and 2010 and rose slightly in 2011.
Important demographic definitions include birth and death rates, and general and age-specific fertility rates. The birth rate for women ages 15 to 49 is considered the general fertility rate and not the age-specific rate. Fecundity describes how many children a woman is capable of having and fertility is the actual reproduction rate. The total fertility rate is the number of children women are having today.
Future population can be estimated in a number of ways. The Ratio/Step-down method uses projections at a larger regional level and applies the growth rate to a smaller area’s current population count. Cohort component or cohort survival divides population into groups or cohorts and applies the three components of demography—fertility, mortality and migration—to each cohort. The Housing Unit Method uses data such as utility meters and housing construction to estimate population increases.
An age pyramid graphically demonstrates a population’s age structure. This age pyramid shows a demographic bulge in the 40-54 year old age groups and another bulge in teenagers from 10-19. Characteristics such as retirement communities, prisons, or military bases can dramatically influence a community’s age pyramid.
Location quotient, shift-share analysis, economic base analysis and fiscal impact analysis are a few types of employment and financial data analysis methods. These are described in the next slides and in the Quantitative Methods handout.
A location quotient measures the degree of economic specialization in an area compared to a larger area. It is simply the percent of an area’s employment in a given sector divided by the larger area’s percent employment in that sector. Values greater than 1 indicate specialization. This example shows the county is more specialized in manufacturing compared to the rest of the U.S. by a factor of more than two, and that this sector can have a stronger ripple effect in the local economy and community.
Geographic Information Systems or GIS is a critical tool for planners to map and analyze land use and many other kinds of data. Spatial data collection can be entered into a GIS, but is not a totally new concept. Ian McHarg in “Design with Nature” helped introduce the concept of layering information onto a map back in the 1960s. More information on GIS is provided in the “Quantitative Methods” handout.
The use of new technology for planning purposes has exploded in the past 10-15 years and will continue to grow. Some of the terminology shown here refers to methods used to capture and disseminate electronic information. For example, RFID sensors could be installed in buses to transmit arrival times to a central server and then back to the rider through an API such as a mobile application on a smart phone. Users can use near field communication capability in their smart phones or tablets to scan information from a public kiosk or other device.

**GIS/Spatial Analysis & Information Systems**

New technologies and terminology:
- **APR** – Application Programming Interface
- **AR** – Augmented Reality
- **Crowdsourcing** – obtaining ideas by asking for contributions from a large group of people, typically in an online community
- **NFC** – Near Field Communication
- **QR Code** – Quick Response Code is a machine-readable bar cod that is attached to an item
- **RFID** – Radio Frequency Identification
- “Mash up” – digital file that is produced by the integration of various types of files
- **Social media scraping** – a way to gather information from Facebook and other social media for analysis of topic trends and public sentiment
- **Visual surveys** – used to gauge visual location preferences based on given criteria
Impact Analyses

Net Present Value
1. The net present value formula is used to show the net monetary value of a project, discounted to present value. So, if the net present value of a proposed convention center will be greater than zero, then the monetary benefits of the convention center will outweigh its monetary costs.

2. \( \text{NPV} = \frac{t(B_t - C_t)}{(1 + r)^t} \), where \( t \) = the number of years in the project’s life-span, \( B_t \) = the monetary benefits, \( C_t \) = the monetary costs, and \( r \) = the interest rate (for discounting purposes).

3. Internal Rate of Return: This analysis technique uses a variation of the net present value formula. A project’s net present value formula is set to zero, and the interest variable (\( r \)) is left blank. If the resulting interest variable is greater than the available market interest rate, then the project should be considered.

Cost-Benefit Analysis
1. Cost-benefit analysis is used both to determine the net monetary value of a project and to weigh the net monetary values of alternative, competing projects. Like net present value, its close cousin, cost-benefit analysis discounts to present value.

2. \( \frac{\text{BCR}}{t} = \frac{\text{NPV}}{t}\left(\frac{C_t}{(1 + r)^t}\right) \). If this ratio results in a number greater than one, then the monetary benefits of the project outweigh its monetary costs. If project “a” earns a higher “benefit/cost ratio” than project “b,” then project “a” has a superior net monetary value. Note that this ratio can be manipulated by hiding some costs in the numerator as a “net annual benefit.”

3. Cost-benefit analysis can only address impacts that are quantifiable in terms of money. Furthermore, it can obviously only address known impacts. Thus, it tends to ignore secondary impacts.

4. The results of a cost-benefit analysis and the net present value formula can conflict over the same project. Alternatives to cost-benefit analysis include the following:
   - **The Total Cost of a Project over Its Lifetime and the Annualized Cost of a Project:** These two costs can be used to compare two or more projects that will provide identical benefits. However, if the benefits of the alternative projects are not identical, then cost-benefit analysis must be used.
   - **Planning Balance Sheets:** A planning balance sheet is actually an evaluation matrix, with competing projects forming the rows and evaluation criteria forming the columns. With a little creativity, a planning balance sheet can evaluate economic, social, and environmental criteria—on both a short-term and a long-term basis—that are difficult to quantify in terms of money, and thus, hard to include in cost-benefit analyses.
   - **Goals Achievement Matrix:** A goals achievement matrix is only a simple variation of a planning balance sheet. The various socioeconomic groups that the competing projects could cost or benefit compose the table’s columns, instead of the evaluation criteria found in planning balance sheets.

Cost Effectiveness Analysis
1. Cost effectiveness analysis (or CEA) is usually used to compare two competing projects that will provide roughly the same benefits. However, it is more complex than merely comparing the total or annualized costs of the projects over their lifetimes (see the previous page).

2. Like cost-benefit analysis, CEA discounts costs to present value.

3. CEA is based on a simple ratio: \( e / c \). The “\( e \)” is a composite measure of effectiveness that can consider direct impacts, secondary impacts, and negatives—such as the traffic congestion that comes with economic growth. Note that metrics can be used to control for both the differences in measurement units and the relative importance among variables. The “\( c \)” addresses monetary costs.

4. **Equivalent Uniform Annual Cost Analysis (EUAC) and Equivalent Uniform Annual Benefit Analysis (EUAB):** These two techniques are close relatives of CEA. EUAC is a more complex form of comparing the annualized costs of two or more competing projects with roughly identical benefits (see the previous page). On the other hand, EUAB compares the benefits of two or more competing projects with roughly the same costs. EUAC and EUAB both address costs at their present values and allow alternatives with different lifespans and cost/benefit streams to be compared equally.
Impact Analyses

**Fiscal Impact Analysis**
1. In general, fiscal impact analysis is used to estimate the costs and revenues that a proposed development will bring to an area’s governments and schools.
2. The *Practice of Local Government Planning* lists six types of fiscal impact analyses (on page 468), each of which is differentiated by (1) the method that it uses to estimate costs, (2) the particular type of development that it studies, and (3) whether it focuses on average costs or marginal costs.
3. All six types of fiscal impact analysis estimate the revenues that will be earned by a proposed development in a similar manner. Note that revenues for utility services and building permits are typically ignored, since they are usually user charges and just cover the costs of operation.
   - For proposed residential development, per capita school district revenues are calculated by dividing all school nontax revenues and tax revenues (except for real property tax revenues and earned income tax revenues) by the current number of residents in the school district.
   - For proposed residential development, per capita municipal government revenues are calculated by dividing all municipal nontax revenues and tax revenues (except for real property tax revenues, earned income tax revenues, and state liquid-fuels tax revenues) by the current number of residents in the municipality.
   - The per capita school district and per capita municipal government revenues are then applied to the expected number of residents in the new development.
   - The increase in real property tax revenues due to the proposed development is calculated using information provided by the developer, the school district’s millage rate, and the municipality’s millage rate.
   - For proposed residential development, the increase in earned income tax revenues is calculated using information provided by the developer, statewide average household income per unit multipliers, the school district’s earned income tax rate, and the municipality’s earned income tax rate.
   - For proposed commercial or industrial development, the increase in wage taxes is calculated using the developer’s employment and wage estimations as well as the wage tax rates of the school district and the municipality.
   - The per resident municipal spending for roads, police services, fire protection, government administration, and all other services is applied to the expected total number of residents in the new development on a category by category basis.
   - The above items are then totaled to show the total increased revenues due to the new development.
4. **The Per Capita Multiplier Method:** Of the six types of fiscal impact analyses listed in *The Practice of Local Government Planning*, the per capita multiplier method is by far the most commonly used. It is used for estimating the average costs of a proposed residential development. Its typical steps are summarized as follows:
   - First, the number of school-aged residents and the total number of residents expected to reside in the new development are calculated using statewide per unit multipliers.
   - The per pupil school district spending rate is applied to the expected number of school-aged residents in the new development.
   - The per resident municipal spending for roads, police services, fire protection, government administration, and all other services is applied to the expected total number of residents in the new development.
   - The above items are then totaled to show the total increased costs due to the new development.
   - The simple per capita multiplier technique summarized above could be made more sophisticated by detailing the types of residences included in the new development and applying specific multipliers to each. For instance, townhouses generally house fewer school-aged children than single-family detached dwellings do. Senior apartments often require less police services than college student apartments do.
   - Note that the simple per capita multiplier technique summarized above assumes that the proposed development will not necessitate major infrastructure construction projects (e.g., the school district will not have to build a new school to handle the increase in students). More sophisticated versions of this technique can deal with such complications.
Impact Analyses

5. Of the six types of fiscal impact analyses listed in *The Practice of Local Government Planning*, the following three—like the per capita multiplier method—are used for estimating the average costs of a proposed residential development:
   - **The Case Study Method:** The characteristics of the proposed development are shown to various municipal and school district officials, who collectively estimate a range of possible future costs to serve the development.
   - **The Service Standard Method:** This method, which is similar to the per capita multiplier approach, focuses on the manpower requirements needed to service the proposed development—using specific service categories.
   - **The Comparable City Method:** This method, which is rarely used, estimates the costs of the proposed development using information from other municipalities who have experienced similar developments.

6. Of the six types of fiscal impact analyses listed by *The Practice of Local Government Planning*, the following two are used for estimating the costs of a proposed commercial or industrial development:
   - **The Proportional Valuation Method:** This method is used to estimate the average costs of a proposed nonresidential development. It assigns a proportion of the municipality’s costs to the proposed development based on that development’s real property valuation in comparison to that of the community as a whole.
   - **The Employment Anticipation Method:** This method is used to estimate the marginal costs of a proposed nonresidential development. It is based on the assumption that a municipality’s costs in serving a facility are related to that facility’s total number of employees.

7. There are several critiques of fiscal impact analysis:
   - Fiscal impact analyses usually consider only direct, monetary impacts on the public sector. Indirect or nonquantifiable impacts are often ignored—as are impacts on the private sector.
   - Fiscal impact analyses often focus exclusively on current dollar costs.
   - Fiscal impact analyses usually ignore the costs and revenues imposed on county, state, or federal governments.
   - For better or worse, these analyses can force developers to change their site plan. A single-family detached subdivision that would overload the local school system may be manipulated into shifting towards townhouses or senior apartments.
   - The result of a fiscal impact analysis is often dependent on the community in which it is performed. The same moderate-income residential development may receive a negative result in a high-income municipality and a positive result in a low-income municipality. This may lead to ethical and legal problems with fair housing.
Geographic Information Systems

A GIS works by providing a way to capture or input data; store, retrieve, and manage the data; manipulate and analyze the data; and finally a way of displaying that data as a map or as a document or both.

**Data Input**

- Typing: Reports, survey documents, population statistics, and so forth all have to be entered into the computer, preferably in a database format or as tabular data.
- Scanning: Paper maps, such as USGS Topographic maps, aerial photographs, and remotely sensed images, if not already in a digital format, need to be scanned and then georeferenced or georectified. When a picture or a map or an aerial photo is georeferenced, it will open in a GIS program in the right place on a map in relation to other map objects being viewed. They will be in the proper place spatially.
- Digitizing: Maps can also be digitized if more than just a photograph of an existing map is desired. Digitizing is basically tracing points, lines, or areas from a paper map, or aerial photo, so that instead of a photograph or a raster image, there is now a digital line graphic or vector file.
- GPS data capture: Data can also be placed in a GIS as points, lines, and polygons from a global positioning system (GPS) unit if it has the capability of recording such information.

**Data Storage, Retrieval, and Management**

- The different types of information required for a GIS require storage that allows the information to be updated and queried for analysis by the user. There are two types of information to be stored: spatial data and attribute data.
- Spatial data: Spatial data are usually stored as themes, layers, or coverages. The georeferenced spatial data is displayed in a GIS in its proper place in relation to other spatial data because of the georeference information attached to the data. An example could be the latitude and longitude in decimal degrees of Bonneville Elementary School in Pocatello, Idaho (42° 52' 14" N, 112° 26' 28" W). The latitude and longitude of this school is embedded in the file so it will be displayed in a GIS in its proper location in relation to other features in the city. Themes can be anything that are currently located on a traditional paper map, such as roads, rivers, cities, wells, forest boundaries, school district boundaries, and so on, and they are all georeferenced.
- Attribute data: Attribute data are the information about an object or feature. An example could be a school: its name, location, what district, how many children attend each year, and so on. Attribute data are usually stored in a database, tabular, or spreadsheet format.
- Data manipulation and analysis: A good system and/or software package allows the user to define and execute spatial and attribute procedures. This is commonly thought of as the heart of the GIS.
- Overlaying, buffering, modeling, and analysis are some of the methods used in building a coverage or project. It also requires the user’s knowledge to recognize what is seen in the resulting map and data.

**Data Output**

- Usually this is a map or graphic that the user has generated after analyzing the data. Tabular data and reports can be generated as well to help explain the details seen in the map or graphic.
**GEOGRAPHIC INFORMATION SYSTEMS (GIS)**
The field of computerized mapping using a software systems that links databases and maps. It is used to determine exact property boundaries and to identify important environmental features as well as assisting with certain aspects of economic analysis when combined with assessors land data and in capacity analysis which identifies existing land use patterns, identifies vacant or undeveloped land, applies existing zoning densities, and forecasts the potential growth capacity of existing land uses.

**MAPS**

**Aerial Photo**—Actual photograph of existing features used create other layers within the map.

**Cadastral Map**—Designates the geographic boundaries of subdivisions, land parcels, and owned land—Tax Maps/Assessors Maps

**Flood Map**—Federal Emergency Management Agency Flood Insurance Rate Maps (FEMA FIRM)
   - Show all areas where flooding may occur (5%, 1% and Floodway)

**Land Use Map**—Two types used in Comprehensive Plans
   1) Current Land Use Map
   2) Future Land use map
      i. **COLOR SYSTEM:**
         1. Purple for industry
         2. Yellow for low-density housing
         3. Brown for high-density housing
         4. Red for retail and commercial
         5. Blue for institutional and public
         6. Green for recreation
         7. Gray for utilities

**Land Classification Map**—Provide information about Development areas and Non-development areas. Often show urban growth boundaries (UGB) (a line of demarcation between urban land and rural land). Help with promotion of the appropriate kind of growth and infrastructure for each area and include a list of incentives and disincentives for development.

**Orthophoto Map**—shows ground features like roads, landmarks, water features, plants, structures, etc. and can be used for (generally used at a 1:12,000 RF scale or 1” = 1000’ verbal scale):
   - Land use
   - Managing vegetation
   - Habitat, flood, watershed analyses
   - Environmental Impact and soil erosion assessments
   - Facility management

**Soil Survey Map**—Produced by the Natural Resources Conservation Service (NRCS). Provide a detailed description of soil types.
   - Determine best areas for agricultural & forestry
   - Locate areas for septic system placement
   - Determine best areas for urban expansion
   - Identify floodplains and wetlands
**Topographic Map** – Use contour lines to display differences in elevation of the earth’s surface.  
(Generally used at a 1:25,000, 1:50,000 or 1:100,000 scale, depending on the data needed)  
Example: All of Nampa’s defined city boundary can be seen on a map at the 1:25,000 scale with little detail)

**Digital Elevation Models (DEM)** – Shows digital data about the elevation of the earth’s surface.
**Light Detection and Ranging (LIDAR)** – uses a laser instead of radio waves to provide detailed topographic information.  Can provide dense data points.
- Slope data analysis
- Determine best locations for buildings and roads
- Obtain data for storm water runoff and drainage basins
- First Year a Topographic Map was produced - 1879

**TERMS**
**Projection** – Technique by which the curved, 3D surface of the earth is conveyed to a 2D image.  Relies on a universal mathematic model, various projections are available and need to be rectified per jurisdictional requirements.
**Rectify** – Technique by which coordinates are assigned to images, this is necessary to integrate the image into a GIS layer.
**Digitizing** – Records the features of a map by tracing it using a computer mouse or digitizing tablet.
**GPS (global positioning system)** - A locations longitude and latitude coordinates.
**Orthophoto** - Aerial photograph that has been rectified.
**Layer** – Data within a GIS database that can be viewed individually or overlaid on top of another layer depending on the users needs.
**Overlay** – occurs when multiple layers are placed on the same map.
**Coverage** – Use of multiple data layers to describe the same area.
**Geocoding** – Technique to designate database records with an X & Y Coordinate so it shows on the map in the correct location.
**TIGER** – Topographical Integrated Geographical Encoding and Referencing Map – Used for Census Data.  Includes streets, railroads, zip codes, and landmarks.  Can be downloaded into a GIS system and used as a base layer.
**UrbanSim** – Simulation software program that models planning and urban development.  Used by MPO’s.
**CommunityViz** – Software environment that allows agencies to analyze land use scenarios and create 3D images.  Allows citizens to visualize potential for development and redevelopment.

**MEASUREMENTS**
- **Acre** = 43,560 square feet
- **Hectare** = 2.417 acres = 10,000 square meters
- **Mile** = 5,280 feet
- **Square Mile** = 640 acres
- **Kilometer** = 3,281 feet or 1000 meters
- **Density** = measures number of dwelling units per unit area of land.
- **Floor Area Ratio (FAR)** = ratio of lot size to the max floor area of a building allowed by code/ordinance.

**SCALE**
Verbal Scale is actual measurement – 1” = 100’
Representative Fraction (RF) Scale = units – 1:1,200 = 1”= 100’ (divisible by 12)
Lesson 5: Land use and environmental issues

- Natural and built environments
- Environmental analysis
- Land use and development regulations
- Growth management techniques
- Development plan and project review

Narrative:

This is Lesson 5 of Plan Making and Implementation, addressing Land Use and Environmental Issues.

There are critical land use and environmental issues to understand in relation to plan making. Some of these issues are covered in more detail, and from a different angle, in the Functional Topics and Spatial Planning modules.

I am going to start with an overview comparison of the natural versus built environment, and then move into environmental analysis. From there I’ll focus on regulations, including growth management techniques, and development and project review. All of this will be with the perspective of how it’s related to plan-making and implementation.

Natural and built environment

- Natural environment
  - Woodlands
  - Waterways
  - Wetlands
  - Air

Narrative:

There are many components to the natural environment. Details on these resources are provided within the Functional Areas, so here I’ll simply mention some of the functions that planners need to be aware of during plan preparation or project review.
Presentation Narrative – Plan Making & Implementation (Lesson 5)

Important considerations for woodlands include wildlife habitat, carbon sequestration, and the relationship to stormwater runoff and water quality.

For waterways, consideration needs to be given to both surface and groundwater, and their interaction. Consideration also needs to be given to quality, with regard to both aquatic species and drinking supply. Quantity is another issue – too little in some places, and too much in others. Flooding is an expected occurrence in the natural environment, but problems arise where the built environment has infringed on the floodplain or changed patterns of runoff and subsequently flooding.

Wetlands play a critical role in the natural environment, filtering sediment and contaminants from runoff, acting as groundwater recharge areas, slowing runoff, and providing valuable habitat for wildlife.

Our atmosphere is another critical part of the natural environment. Planners need to understand the environmental and health impacts that poor air quality has and the activities, such as decreased vehicle emissions, that improve air quality.

With population growth continuing, management of resources to move society closer to sustainability is critical.

Natural and built environment

- Built environment
  - Development patterns
    - Ordinance of 1785
    - The Regional Survey of NY and Its Environs (1929) – “Neighborhood Unit”

Narrative:

It’s important to understand that the built environment is a result of evolving development patterns, some with more lasting impacts than others. Some of these patterns are a result of federal efforts and legislation, while others evolved over time or emerged from academia and practicing planners or architects. More of this history can be found in the History Law and Theory module, but two things I want to point out are the Ordinance of 1785 and the 1929 Regional Survey of NY.

The 1785 Ordinance provided for the rectangular land survey and settlement of the “Old Northwest” – opening the area west of the Appalachians to settlement, and changing how settlement occurred. The settlement pattern under the 1785 Ordinance was drastically different from the original colonies, which had towns laid out in a grid pattern, but overall were generally landscape based.

The 1785 Ordinance established that each township would be a square with each side to be 6 miles in length, for a total of 36 sq miles of territory. Each township would be divided into 36 sections, each one-square mile and encompassing 640 acres. Portions of each township were reserved for uses such as a
Presentation Narrative – Plan Making & Implementation (Lesson 5)

public school or ownership by war veterans, but most was to be sold by the federal government at public auction. Looking across a map of the United States, it’s clear this ordinance influenced municipal layout.

The 1929 Survey of NY was important for a couple reasons: First, it set a precedent regarding regional planning, with a reliance on data for existing conditions and future projections, and then second, with the advancement of the “neighborhood unit” as the basic building block in a city.

Clarence Perry advanced this concept, which established the preference of an elementary school as the center of a neighborhood and that the neighborhood should extend no further than comfortable for a school-aged child to walk. Industrial and commercial uses were to be beyond that neighborhood. This concept – of a local school centered pattern and segregation of uses – became a pattern that was constructed again and again in suburbs after WWII.

- Natural and built environment
  - Built environment
    - Urban Design Concepts
      - Monumental city
      - Garden suburbs and Garden City
      - Modernism
      - Megastructure

Narrative:

To get a little more specific about urban design concepts that have influenced the built environment, I’ll touch on a few and their impact on the built environment. Again, more information on these and related movements is within the history, law and theory module. With Monumental City, a focus was an axis with similar architectural massing on either side of a centerline. The plan for Washington D.C. was based in this concept. Ideas from this concept with staying power include organizing buildings around squares, designing streets with an eye toward the terminal view, and planning avenues with similar groups of buildings.

Garden suburbs focused on incorporating nature into developed areas, with curving streets, irregularly shaped lots, and parks and greenways. Garden City went further, advancing the concept of self-contained and self-sufficient communities of a limited size that were surrounded by greenbelts.

Modernism has been defined by its focus on large-scale street grid, tower-type structures, and being modern, in contrast to grounded in historic architecture. Redevelopment in the mid-1900s was heavily influenced by modernism, and in time the limitations – creation of social isolation and a lack of street activity – were evident. Modernism did work to directly address the need for fundamental changes in urban development.
Megastructure is sometimes referred to as “the city as a building”, and it has a focus on an urban framework with interchangeable pieces. There are real world obstacles to design of this scale, but the Denver airport terminal is an example of this concept in practice.

- **Natural and built environment**
  - **Built environment**
    - **Types of Development**
      - Greenfield
      - Leapfrog
      - Redevelopment
      - Brownfield/Grayfield
      - Infill
      - Transit Oriented Development (TOD)
      - Mixed use

**Narrative:**

A little closer to ground level, development can be classified into various types. There is overlap and sometimes specific projects don’t fit neatly into a category, but it’s useful to understand the basics of the different types and the relationship with the natural and existing built environments, including implications regarding services and facilities.

Greenfield development is development in an area not previously developed, and brings up questions of impacts to natural and agricultural resources, as well as questions as to how or where services and facilities will be provided.

Leapfrog development is usually a type of greenfield development – a development has gone well beyond existing developed areas, leaving a green area between the established developed area and the new development. This green area acts as a barrier to services and facilities.

Redevelopment of course is going into an existing developed area and creating new uses, usually when there are real or perceived deficiencies. Typically services and facilities already exist in these areas, and transportation options are greater than with Greenfield development.

Brownfield and Grayfield are types of redevelopment – brownfield refers to areas with the presence or potential presence of a hazardous substance, pollutant, or contaminant, while grayfield refers to areas with abandoned or underperforming uses, perhaps due to changing market conditions or other factors. Redevelopment of this type can address existing problems and provide an asset in an existing community.
Presentation Narrative – Plan Making & Implementation (Lesson 5)

Infill development broadly refers to development taking place within an existing developed area. This can be either redevelopment of an existing use or developing a vacant parcel. As with redevelopment overall, infill takes advantage of existing infrastructure.

Transit Oriented Development specifically looks to take advantage of existing infrastructure in the form of public transit – positioning office, retail, and residential uses close to transit options in a pedestrian friendly scale and arrangement. In that respect, it overlaps with Mixed Use development, which incorporates, in close proximity, a variety of uses – potentially residential, commercial, retail, and institutional.

As with redevelopment, transit oriented development and mixed use development have greater transportation options. In addition to the public transit that is integral to transit oriented development, the density and mixing of uses with development of this types makes it more convenient for bicyclists and pedestrians to get around, as long as their movements have been part of the plan development.

- **Natural and built environment**
  - **Built environment**
    - **Existing Conditions/Characteristics**
      - Agricultural
      - Rural
      - Small Town
      - Suburban
      - Urban
    - **Future Vision**

Narrative:

All of this discussion of how the built environment has been shaped and different types of development is necessary because a planner needs to understand all of it when they work with a community. To plan for the future, a community and its planner need to understand the existing conditions and characteristics of the community, how they came to be, and most importantly, how to make those characteristics evolve into the vision a community has for its future.

Understanding all of this creates a solid “jumping off” point for the future. Is an area an agricultural community that wants to stay that way? Is an area a suburb in need of retrofitting? Communities are very unique, and it’s the planner’s job to understand where a specific community is, help the community identify where it wants to go, and explain the tools of how to get there. Additional detail on planning for specific types of communities is provided in the Functional and Spatial modules.

- **Natural and built environment**
  - **Built environment**
Presentation Narrative – Plan Making & Implementation (Lesson 5)

- Federal Actions
  - Housing
  - Transportation

Narrative:

One of the things a planner must understand is relevant federal action. With respect to the built environment, there is a long history of housing and transportation legislation. Much of this is covered in other modules, but I wanted to tie things together here a bit, because understanding that the federal government has heavily influenced the built environment with various legislation is critical.

Housing acts from as early as the 1930s and transportation legislation – including the 1956 Federal Aid Highway Act - have profoundly influenced the way our built environment looks today. A planner needs to understand past legislation to see how we’ve evolved, and know current legislation to know what is possible and where federal dollars are going. More detail on transportation and housing is provided in the Functional Module.

- Natural and built environment
  - Policy Guides
    - Environment: Water Resources Management
    - Environment: Wetlands
    - Endangered Species and Habitat Protection
    - Public Redevelopment
    - Neighborhood Collaborative Planning
    - Housing
    - Planning for Sustainability
    - Smart Growth

Narrative:

For more information, the APA’s Policy Guides are a good source for specific topics, especially if you do not work in the topic area. The guides provide you with APA’s vision of what is important and why its important. Several are listed here that are relevant to the natural and built environments.

- Environment analysis
  - Federal legislation
  - Case law
  - Local environmental analysis
  - Techniques

Narrative:
Going back to the natural environment, I want to discuss in more detail the background that federal legislation and case law have created. Planners need to be aware of this background, and also how environmental analysis is carried out. Additional detail on legislation is provided in the Environmental handout.

Environment analysis

- **Federal legislation**
  - Clean Air Act (1963)
  - DOT Act – Section 4(f) (1966)
  - National Flood Insurance Act (1968)
  - Environmental Protection Agency – EPA - created (1970)
  - Clean Water Act (1972)
  - National Coastal Zone Management Act (1972)
  - Endangered Species Act (1973)

**Narrative:**

This slide lists several major pieces of federal environmental legislation. As you can see on the slide, I included the original enactment dates for these. Many have been amended, some significantly, but I wanted to make clear that, relatively speaking, federal environmental legislation is recent and was created within a condensed timeframe. Public awareness of environmental problems, many of which impacted public health, forced action.

Each piece of legislation is important to understand on its own, and as it interacts with other legislation. Quite often, falling under one requirement will force a project to consider other requirements – an Army Corps of Engineers wetland permit will force an applicant to evaluate for the presence of endangered species, for example.

With these pieces of legislation and their implementation the federal government identified resources and areas of concern, and with its jurisdictional authority and funding ability, forces its own projects and the projects of others to consider impacts, work to avoid and minimize those impacts, and as a last resort mitigate for impacts.

Planners need to be aware of this background to appropriately advise and work with communities and clients. I am going to cover NEPA in more detail; for information on the other federal legislation noted, please refer to the Environmental Handout and the H/L/T and the Spatial modules.
• Environment analysis
  o Federal legislation
    ▪ National Environmental Policy Act - NEPA

Narrative:

The National Environmental Policy Act, or NEPA, is one of the key pieces of environmental legislation. It required an environmental review for any project with federal ties – permits, funding, or federal action. Within NEPA’s reach are impacts to historic, cultural, and natural resources – so a broad interpretation of “environmental”. The NEPA procedural framework has three levels of analysis – the Categorical Exclusion, Environmental Assessment, and Environmental Impact Statement.

The CE level is for projects with limited impacts, while an EIS is conducted when impacts are anticipated to be significant. EAs are conducted when the level of impact is unclear. This framework has been in places for decades at this point, and its basics are very clear – identify the project need, identify the project area, research and evaluate existing conditions, evaluate project alternatives, evaluate impacts from those alternatives, select an alternative and then avoid, minimize and mitigate impacts, with public and stakeholder involvement throughout the process.

Environment analysis
  o Case law
    ▪ Citizens to Preserve Overton Park v Volpe (1971): hard look doctrine for environmental impact review
    ▪ Calvert Cliffs Coordinating Committee v Atomic Energy Commission (1971): NEPA requirements judicially enforceable
    ▪ Sierra Club v Morton (1972): citizens can bring lawsuits to discipline resource agencies
    ▪ Tennessee Valley Authority (TVA) v Hill (1978): enforcement of the Endangered Species Act
    ▪ Rapanos v United State (2006): limits to the ACOE’s wetlands’ jurisdiction
    ▪ Warren v Maine Board of Environmental Protection (2006): hydroelectric dams under Section 401 of the Clean Water Act
Presentation Narrative – Plan Making & Implementation (Lesson 5)

Narrative:

I am not going into any more detail on these cases than is listed – additional information can be found in the H/L/T module and associated handout, but simply wanted to point out that case law has clarified the reach and the limits of federal environmental legislation. From a quick review of the dates of cases, it is clear that in the early years after enactment, the courts were instrumental in ensuring that environmental reviews were conducted as the legislation called for. More recently, case law has been more about the limits of legislation.

- Environment analysis
  - Local environmental analysis
    - Site specific
    - Inventory of existing conditions
    - Identification of alternatives
    - Impact analysis
    - Measures to avoid, minimize, and mitigate impacts

Narrative:

Following the footsteps of the federal government, states and local municipalities often created their own version of environmental analysis. Terminology will vary, but the process is generally the same. Checklists are often used as a starting point of items to take into consideration. At the most local level, environmental analysis could consist of a residential subdivision, with the environmental review being conducted by a private company and reviewed by the local municipality. Reviews of this nature are typically much more streamlined than a NEPA review, and projects can be exempt based on thresholds set up locally.

Some of these reviews can still be quite complicated projects though, as the Candlestick Point-Hunters Point Shipyard Phase II EIR shows. PLEASE PAUSE THE LESSON AND VIEW THE VIDEO ON THE CANDLESTICK POINT-HUNTERS POINT SHIPYARD PHASE II EIR PRIOR TO ADVANCING IN THIS LESSON.

Environmental analysis

- Techniques
  - Ian McHarg – Design with Nature
  - GIS

Narrative:
There are a couple of key techniques that greatly advanced environmental analysis at different points along the way. One was the publication of Design with Nature, by Ian McHarg, which focused on an ecologically based design process and described the use of overlays to compare site plans with existing resources. Published in 1969, Design with Nature set the stage for greater consideration of environmental resources during the development process.

And Geographic Information Systems, of course, is the other key advancement. Based on the same concepts Ian McHarg advanced, GIS has made inventory of resources and analysis a much more efficient and effective process, allowing planners and other professionals, and the public, to more easily see the implications of projects.

- **Land use and development regulations**
  - **Federal action**
    - State Zoning Enabling Act (1922 – 1926)
    - Standard City Planning Enabling Act (1928)

Narrative:

Much earlier than environmental legislation and analysis, the federal government, through the Dept of Commerce under Herbert Hoover, put out two publications in the 1920s that were essentially model language for states to adopt to enable planning and zoning.

The Zoning Enabling Act discussed delegating the state’s police power to municipalities for zoning, procedures for establishing and amending zoning ordinances, and procedures for appeals and variances.

The Standard City Planning Enabling Act discussed a municipal planning commission and preparation of a master plan, which could include the zoning plan. The City Planning Enabling Act was useful in promoting planning, but was less than ideal regarding the language discussing a master or comp plan and a zoning plan. Both publications were very influential in states adopting some type of planning and zoning enabling legislation.

There was various early regulation of development by municipalities. I will leave the detail of the early history to the H/T/L module, and here focus on New York’s development regulations, which were very influential in their content and scope. Limited regulations were drafted as early as 1867, but it wasn’t until 1901 that really useful regulations were drafted and enforced.

These addressed light, air, and plumbing, and became a model for the rest of the country. The New York Zoning Code, which was adopted in 1916, was the first comprehensive zoning code – addressing controls on land use, height, and setbacks and yards, and it also become a model for the rest of the country.
Zoning

Narrative:

Zoning is a very basic land use regulatory tool, and its use is enabled in all 50 states – which isn’t to say that zoning covers all areas of the U.S. That is not the case, although it is very widely implemented, and is a critical part of implementing a comprehensive plan or master plan, as Philadelphia’s Integrated Planning and Zoning Process exemplifies.

PLEASE PAUSE THE LESSON AND VIEW THE VIDEO ON PHILADELPHIA’S INTEGRATED PLANNING AND ZONING PROCESS PRIOR TO ADVANCING IN THIS LESSON.

Land use and development regulations

- Zoning
  - Map and text: definitions, general provisions, zoning district regulations, special development standards, administration and enforcement
  - Regulate uses, density, area and bulk
  - Types: Euclidean, Cumulative, Form-Based, Performance
  - Case law: Hadacheck v Sebastian (1915), Pennsylvania Coal Company v Mahon (1922), Village of Euclid v Ambler Realty Co (1926), Nectow V City of Cambridge (1928)

Narrative:

At its core a zoning ordinance includes a map of districts and supporting text. Zoning ordinances regulate uses, density, area and bulk, as well as address administration and enforcement, and can include standards for overlay areas such as floodplains. Regarding terminology, things will vary from state to state. For example, many states handle appeals and grant variances through a Board of Adjustment, but other terms, such as Zoning Hearing Board, are also used.

In preparing for the exam, don’t get too fixated on your state’s specific terminology; pay attention to alternative language that may be more broadly used nationwide. There are various types of zoning, some of which are listed here. These are more fully addressed in the Functional module. I also have listed a few different court cases that established the legality of zoning. These are covered further in the H/L/T module.

Land use and development regulations

- Subdivision and land development
  - Process/procedures
    - Preliminary plan and final plat; sketch plans
Narrative:
Subdivision and land development regulations have been around almost as long as zoning – NJ required all land subdivision plans to be reviewed by the local planning board in 1913. Together zoning and subdivision and land development are the most commonly used legal tools to implement a comprehensive plan. Subdivision regulations focus on the division of land into two or more lots, parcels, or sites for building. The regulations focus on the process as well as design and construction standards for features such as roadways, block, lots, and grading, and can get into E&S and stormwater if they are not addressed on their own.

The process and procedures are multi-step, at minimum requiring a preliminary plan that shows existing features as well as proposed features, to be followed by a final plat, which creates a record of legal land title for lots after approval and registering. In some areas, or at certain thresholds, additional steps can be required, such as a sketch plan early on, or significant reports on anticipated resource impacts. Identification of tie-ins to or extensions of infrastructure such as roadways, public water, or public sewer are also addressed through the process.

- Land use and development regulations
  - Building Codes
  - Housing Code/Standards
  - Erosion and sedimentation
  - Stormwater management

Narrative:
Listed here are a few other ways that local municipalities can control and influence land use and development. Building codes are very detailed and widely used, but obviously limited to the structures being constructed or renovated. Some municipalities use a separate housing standard, or minimum housing code, to ensure basic standards are met. These are typically used to enforce minimum standards on rental units. A community may also combine housing standards with property maintenance standards, which can address a variety of public health issues on properties, indoors or out.

Erosion and sedimentation controls address runoff and impacts to soils and waterways during construction, while stormwater management focuses more long-term on runoff from a site. Some municipalities combine these regulations while others keep them separate.

- Land use and development regulations
Narrative:

Listed here are some of the other ways that land use and development can be influenced, if not necessarily regulated. Agricultural preservation or protection zoning, at times referred to as effective agricultural zoning, is a type of zoning that works to ensure that agricultural uses can continue in an area. Large minimum lot sizes – in the range of 20 acres or more - have been used, and minimizing conflicts with non-agricultural uses is typically part of the provisions.

Going the other direction, density bonuses are an incentive that can be worked into an ordinance reward activities that are a priority. An example of this would be giving additional density to a proposed residential development if they preserve an existing historic structure on the site. Some communities are providing additional density if construction meets energy efficient standards.

Conservation subdivisions are a type of subdivision that are specifically permitted in some ordinances, and require preservation of open space and other critical natural or historic resources. The residential uses are clustered in portions of the overall tract, typically on small lots, while a significant portion of the tract is left undeveloped. As part of this type of subdivision, the undeveloped area is required to be protected from future development through a deed restriction or easement.

Deed restrictions or easements are used by local governments and non-profits to prevent certain types of development in certain areas and preserve specific features. Easements can be handled many different ways – from broadly removing future development rights to requiring a specific resource to be preserved and managed in a certain manner. Easements are a voluntary transaction between a landowner and another entity, and can be brought into use through a developer choosing a subdivision process that requires an easement. Other regulatory methods to influence land use and development are covered in the Functional module.

In areas of high growth with limited management or regulation, conversion of farmland and other open lands to residential, commercial, or office uses can rapidly outpace the actual population growth. Growth management is a response to that sprawl and all of its negative impacts. Growth management is a critical part of effective plan making and implementation, particularly in areas that are experiencing growth or seeking growth.

Directing growth to areas supported by infrastructure, encouraging the type of growth that the community needs, and limiting growth in areas of sensitive resources are all part of growth management. Growth management techniques need to be authorized by statutory or case law, meet constitutional requirements for substantive due process, and not exclude protected classes under the federal Fair Housing Act. Early growth controls at times did not meet all of these requirements.
Current growth management techniques and other details are provided in the Functional module. Effective growth management can have a profound impact on land use in an area, as the Plan for the Valleys shows. PLEASE PAUSE THE LESSON AND VIEW THE VIDEO ON THE PLAN FOR THE VALLEYS PRIOR TO ADVANCING IN THIS LESSON.

- **Growth management techniques**
  - Techniques
    - See the Functional module
  - Annexation and extraterritorial jurisdiction (ETJ)

**Narrative:**
Specific growth management techniques are covered in detail in the functional module. Here I want to cover two related concepts: annexation and extraterritorial jurisdiction or ETJ. These processes are not available in every jurisdiction, but are common enough that every planner needs to understand the basic concepts.

Annexation is the process of incorporating territory into a town or borough or city. This varies by state, but in many places unincorporated areas of a county can be claimed by an incorporated area through a specific process set by the state. Annexation expands the incorporated area, and so expands where the local government can plan, regulate, and provide services.

In some states, incorporated areas are permitted to have some level of zoning or other regulatory control over unincorporated areas that are directly adjacent – this area is referred to as the ETJ. Allowing some control over an ETJ works to improve consistency in basics such as the street grid and public services if the area is eventually brought into the incorporated entity. Controlling development beyond a municipal border has always been an issue, and states have handled it in a variety of ways. The various processes for annexation and ETJ are one example of that.

- **Development plan and project review**
  - Site specific
  - Existing conditions
  - Regulation at various levels of government

**Narrative:**
Moving on to development plan and project review, it is important to keep in mind that these are very site specific. I’ve been covering plan making and implementation largely at a municipal or broader level, here is where we shift into what those municipal plans and regulations mean to an individual project.

First, it’s important that a planner understand the existing conditions on and around the project site. This includes both the natural and built existing conditions - are there wetlands on the site? Are there critical community facilities in the area? What is the transportation infrastructure in the area?

It’s also important to specifically be aware of the presence of any regulated or designated resources – such as endangered species, or resources listed on the National Register of Historic Places, for example.
**Presentation Narrative – Plan Making & Implementation (Lesson 5)**

In reviewing existing conditions, and then moving through the project review process, keep in mind the various level of government that could be regulating any activities on the site – local, state, federal or perhaps a regional entity.

- **Development plan and project review**
  - SLDO process and impact analysis
  - Plan/project review

**Narrative:**
I’ve already discussed the basics of a subdivision and land development ordinance process, but here I want to specifically mention the possibility of impact analysis. A subdivision and land development ordinance, depending on the municipality and authority to require such, can ask a project for an analysis or report documenting the potential impacts to things such as environmental resources, historic resources, the transportation system, or even, in more limited application, a fiscal impact analysis. This allows the municipality to more fully understand the implications of a project, and the burden to assess the impacts is on the applicant.

With plan review, keep in mind that a local government planner is the technical resource, first and foremost. There is an expectation that the planner is providing professional, technical information to the decision-making body, which is typically elected or appointed. Depending on the exact circumstances, a planner could also be making a formal recommendation for action.

From the perspective of the process itself, it needs to ensure due process for all parties, allow all parties to be heard, make plans available for inspection and review, and provide an appeal process for decisions.

**Development plan and project review**

- **Exactions**
  - Improvement or dedication of land
  - Fees in lieu
  - Impact fees
- **Performance guarantees**

**Narrative:**

There are a few financial aspects to the regulation of development at the local government level that are important to understand. Exactions such as improvements or dedication of land, or fees in lieu, as well as impacts fees, are mechanisms set up by the local government to help ensure that the new uses created by a development will be adequately served by public facilities such as parks, utilities, and roadways.
Presentation Narrative – Plan Making & Implementation (Lesson 5)

For example, a developer could be required to provide land for a park or construct a park on land within the development. If this isn’t appropriate, fees in lieu could be provided to improve existing public recreation facilities.

Impact fees are levied for improvements beyond a development, and are more generally associated with transportation facilities – impact fees are provided for improvements to the transportation system to offset the increased traffic from a new use. With exactions and impact fees, it is critical that there be the authority to impose the exaction or fee, and that the fee has a reasonable relationship to the fair share of the cost of facilities.

Performance guarantees are bonds, cash escrows, letters of credits or similar financial guarantees provided by a developer to ensure that if public improvements are not finished to the appropriate standards by the developer during the development process, the funds exist for the local government to ensure the public infrastructure for the development is completed.

Land use and environmental issues

- **Policy Guides**
  - Smart Growth
  - Agricultural Lands Preservation
  - Planning for Sustainability
  - Public Redevelopment
  - Neighborhood Collaborative Planning
  - Impact Fees

**Narrative:**

Again, a few of APA’s policy guides to use as a resource in your exam prep. These are related more to development and growth management than the prior list. Keep in mind that the more unfamiliar you are with a topic area, the more important it becomes that you review any relevant policy guides.

This concludes Lesson 5.
Plan Making and Implementation – Suggested Reading List
Lesson 5: Land Use & Environmental Issues

Section: Natural and Built Environments

APA PAS Reports

APA Zoning Practice
- 2013-3: Planning Outside the Growth Boundary (Rural Protection)

APA PAS Quick Notes
- QN44 – Brownfield Redevelopment. 2013

Planning and Urban Design Standards
- “Air”; pp. 101-106
  - “Heat Islands”; pp 105-106
- “Water”; pp. 107-134
  - Rivers & Streams; pp. 115-117
  - Wetlands; pp. 125-129
- “Land”; pp. 135-147
  - Habitat; pp. 139-140
  - Biodiversity Protection; pp. 143-144
- Building Types; pp. 185-218
- Development Types; pp. 447-459
  - “Infill development”; pp. 456-457
- Planning Movements; pp. 68-96
  - “Garden Cities”; pp. 71-72
  - “City Beautiful”; pp. 73-74
  - The Regional Survey of New York and Its Environments; p. 77
  - Neighborhood Unit; p. 89
- Urban Growth and Environmental Concerns; pp. 84-85
- “Brownfields”; pp. 633-634

Local Planning: Contemporary Principles & Practice
- “From townsites to metropolis”; pp. 3-22
- “The environment and environmentalism”; pp. 74-80
- “Environmental planning”; pp. 112-113
- “Reusing brownfields”; pp. 137-140
- Greenfields; pp. 277-278; 307-311

APA Links

APA Policy Guide
- Endangered Species & Habitat Protection
  http://www.planning.org/policy/guides/adopted/endanger.htm
- Water Resources Management
  http://www.planning.org/policy/guides/adopted/waterresources.htm
- Wetlands
  http://www.planning.org/policy/guides/adopted/wetlands.htm
Section: Environmental Analysis

Planning and Urban Design Standards
- “Design with Nature”; pp. 84-85
- “Environmental Impact Analysis”; pp. 514-517
- “Environmental Site Analysis”; pp. 460-462
- “National Environmental Policy Act”; pp. 569-571
- Federal Environmental Laws; pp. 566-578

Local Planning: Contemporary Principles & Practice
- NEPA; pp. 18-19
- “Environmental impact assessment”; pp. 279-280
- “Impact Assessment” (Environmental); pp. 335-339

Section: Land Use and Development Regulations

APA PAS Reports
- PAS 570 - The Rules That Shape Urban Form. 2012

APA Zoning Practice
- 2008-11: Rural Zoning: Return to the Village
- 2012-11: Beyond the Density Standard

APA PAS Quick Notes
- QN6 – Zoning for Mixed Uses. 2006
- QN12 – Density. 2008
- QN43 – The Consistency Doctrine. 2013

Planning and Urban Design Standards
- “Erosion and Sedimentation”; pp. 151-153
- “Innovations in Local Zoning Regulations”; pp. 601-603
- “Regulating Slums”; p. 79
- “State Enabling Legislation”; p. 589
- “Subdivision Regulation”; pp. 597-598
- “Zoning”; p. 75
- “Zoning Regulation”; pp. 593-596
- Stormwater Management; pp. 336-344

Local Planning: Contemporary Principles & Practice
- “The foundations of local planning”; pp. 7-14
- “The interplay between property rights and regulation”; pp. 38-42
- “The urban watershed”; pp. 388-
- “Transforming policy into reality”; pp. 273-281
- Zoning; pp. 287-295

APA Links
Standard Zoning and Planning Enabling Acts
http://www.planning.org/growingsmart/enablingacts.htm
Local Land Development Regulations
Section: Growth Management and Development Review

APA PAS Reports
- PAS 520 - Urban Containment in the United States: History, Models, and Techniques for Regional and Metropolitan Growth Management. 2004
- PAS 545 - Planned Unit Developments. 2007
- PAS 556 - Smart Codes: Model Land-Development Regulations. 2009

APA Zoning Practice
- 2012-1: Zoning Across Boundaries: Annexation, Joint Planning Boards, and the Challenges of Cooperative Planning (Annexation; Planning across boundaries)
- 2014-2: Development Review as Economic Development

APA PAS Quick Notes
- QN10 – Site Plan Review. 2007

Planning and Urban Design Standards
- “Growth Management”; pp. 604-615
  - “Adequate Public Facilities & Concurrency Management”; pp. 604-605
  - “Urban Growth Areas”; pp. 606-608
  - “Development Impact Fees”; pp. 609-610
  - “Smart Growth Audits”; pp. 611-612

Local Planning: Contemporary Principles & Practice
- “From zoning to smart growth”; pp. 298-307
- “Preserving agricultural land”; pp. 312-315

APA Links

APA Policy Guides
- Agricultural Land Preservation
- Impact Fees
- Smart Growth