Population Projections for the Pennsylvania State Water Plan

DEP

BUREAU OF WATERSHED MANAGEMENT

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Topics of Discussion

- Purpose of population projections
- Population Projection Theory
- Population Projection Methodology
- Last Time, This Time, Differences
- Next Steps

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Purpose of Population Projections

- **In water resources planning, population data is an important basis for estimating water supply for:**

  - Public Water Supply
  - Recreation
  - Electric Power
  - Water quality control demands

- **The Department of Environmental Protection developed these projections specifically for the purposes of the State Water Plan and will be used for future Water Resources Planning on a Watershed Basis.**

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Population Projection Theory

- References
  - International Journal of Forecasting
  - State and Local Population Projections: Methodology and Analysis – regarded as "State of the Art"
- These sources maintain that there is no evidence that more complex data intensive models (Cohort Component, Structural Models) are proven to provide more accurate projections than extrapolative (regression curves) methods.
- However, it is maintained that a combined forecast has a smaller risk of making a very large error than an individual forecast curve.

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Population Projection Methodology

- TWO METHODS COMBINED.

- Cohort Component Method – Data intensive model based on statistics attempting to predict future fertility, mortality, and migration rates in a given community.
  - ◆ State Data Center County and State Total Projections
- Extrapolative Method – Past Census Data is used to develop regression curves to establish projections.

Population Projection Methodology -Cont.

- SDC County Projection Totals used as targets for regression equations. These equations project at a **municipal** level.
- **Regression equations supported by Excel.**
  - ◆ Forecast – a linear "least squares" regression
  - ◆ Growth – a more aggressive power curve
  - ◆ Curve can be a combination of these two. A combined forecast has a smaller risk of making a very large error that an individual forecast curve.
- **Idea is to "best fit" a projection curve using the County SDC targets**
 - ◆ i.e. census data from 1980, 1990, 2000 used to develop a curve that will hit the SDC 2010 target.

Population Projection Methodology -Cont.

- ◆ 2020 curve would compose of Census decades of 1990 and 2000, and SDC projection decade of 2020.
- ◆ 2030 curve projected on basis decades of 2000, 2010, 2020 would not have a SDC target. 2030 projection possibly controlled by an "averaged difference"
- Once a "best fit" curve is established for a particular projection decade, a final adjustment is made to all municipalities using a coefficient to make the projected County Total identical to the SDC County target.
- Any coefficient made to the 2030 projection, will again, be based on an "averaged difference".
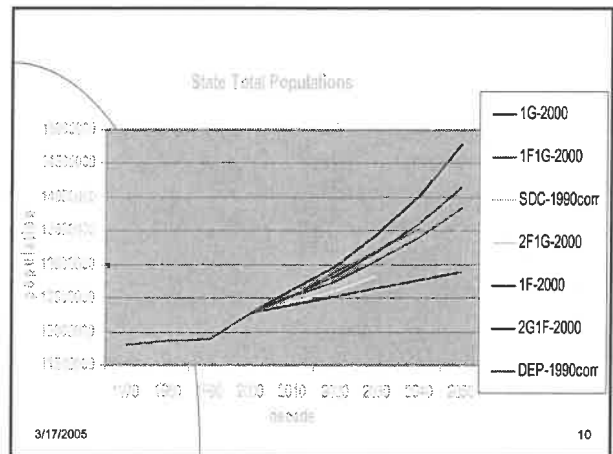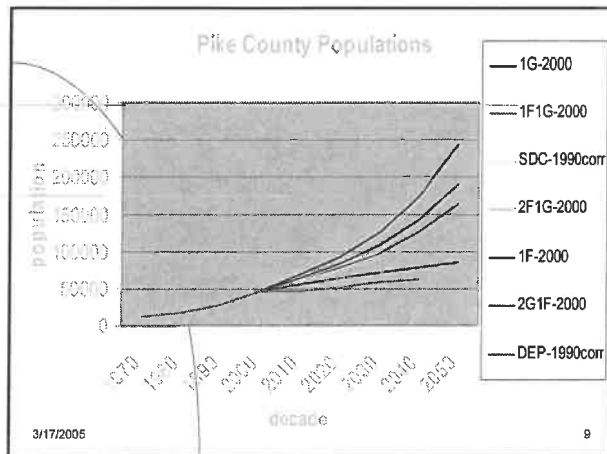
Population Projections for the Pennsylvania
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Pike County Populations
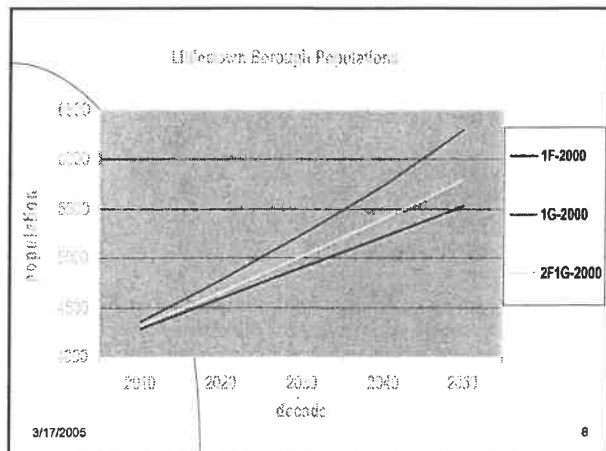
State Total Populations

Prior Projections

- Development of 2000 based population projections similar to 1990 projections.
  - ◆ Regression analysis
  - ◆ Uses Census Population Data
- Dissimilar in that:
  - ◆ SDC County total projections (2010, 2020) used as a control to determine "best fit" for 2000 based projections. 1990 based projections used prior decades to develop a best fit.

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Next Steps ?
Ideas:

- Get projections out to regions/committees so that they can review
- Distribute to county planning agencies
- Any changes to projections on a County or municipal level can be made as seen fit.
- Changes should be sent to Central Office so uniform projections can be available for the SWP.

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