

TO: Board Members

THROUGH: Carolyn L. Brittin, Deputy Executive Administrator,
Water Resources Planning and Information

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DATE: January 23, 2013

SUBJECT: Briefing and Discussion on Process for Development and Adoption of Population
and Water Demand Projections for the 2016 Regional Water Plans

ACTION REQUESTED

This is an informational item presenting the process of staff development and Board adoption of population and water demand projections for the 2016 regional water planning cycle. No action is required.

BACKGROUND

Planning for future water requirements in Texas is based on projections of the most-likely future demand for water for each of the State’s water use categories (irrigation, livestock, manufacturing, mining, municipal and steam-electric power) during time of drought. This presentation is intended to provide background information on the development of population and water demand projections for the 2016 regional water plans and on the Board’s role in adopting these demands.

KEY ISSUES

Texas Administrative Code 357.31(e) describes the role of the Board in the development of population and water demand projections used in regional and state water planning.

TAC 357.31(e)

(e) Source of population and water demands. In developing RWPs, RWPGs shall use:

- (1) Population and water demand projections developed by the EA that will be contained in the next state water plan and adopted by the Board after consultation with the RWPGs, Commission, Texas Department of Agriculture, and the Texas Parks and Wildlife Department.*
- (2) RWPGs may request revisions of Board adopted population or water demand projections if the request demonstrates that population or water demand projections no longer represents a reasonable estimate of anticipated conditions based on changed conditions and or new information. Before requesting a revision to population and water demand projections, the RWPG shall discuss the proposed revisions at a public meeting for which notice has been posted in accordance with §357.21(c) of this title (relating to Notice and Public Participation). The RWPG shall summarize public comments received on the proposed request for projection revisions. The EA shall consult with the requesting RWPG and respond to their request within 45 days after receipt of a request from a RWPG for revision of population or water demand projections.*

Each five-year cycle of water planning begins with the establishment of these projections. For the development of the 2016 Regional Water Plans, draft demands have been projected by Board staff for each decade from 2020 to 2070 for the five sectors of non-municipal water use and were distributed to the regional planning groups in November 2011. An update to mining water demand projections based on information from a recently-completed study was distributed to the regional planning groups on January 12, 2013. Draft projections of population and municipal water demands will be distributed to the regional planning groups for review in February 2013.

Since receiving the non-municipal water demand projections, the planning groups and their consultants have been reviewing the projections and submitting requested changes along with data and rationale to support these changes to Texas Water Development Board (TWDB) staff. Data to support requested changes can include evidence that the initial TWDB projections were based on incomplete data (such as irrigated acreage not included in the Farm Service Agency's inventory) or evidence of business operations opening or closing subsequent to the release of TWDB projections. Fourteen of the 16 regional planning groups have requested changes to projected demands in 170 counties. Additional requested changes may be submitted following review of the updated draft mining projections, population projections, and municipal demand projections.

After reviewing requested changes to projections, TWDB staff will consult with representatives from the Texas Commission of Environmental Quality (TCEQ), Texas Parks and Wildlife Department (TPWD), and the Texas Department of Agriculture (TDA) to develop a consensus recommendation for projections to be considered by the Board.

All population and water demand projections are anticipated to be brought to the Board for consideration in late 2013, potentially as early as September. Once adopted by the Board, the regional planning groups will be required to use such projections in the regional water plans.

Any revision to these projections must follow a process previously noted in Texas Administrative Code 357.31(e) that also requires approval by the Board.

PROJECTION METHODOLOGIES

TWDB staff is in the process of developing the draft population and municipal water demand project to be included in the 2016 regional water plans. In 2011, staff developed the draft water demand projections for the irrigation, livestock, manufacturing, mining and steam-electric power. The following describes the methodology used to develop such population and water demand projections.

Population:

The population projection methodology takes place in two steps: first, projections at the county level and then projections at the city/utility level. Staff is completing the development of the population projections at this time.

County Population Projections

Draft population projections are based on Texas State Data Center (TSDC)/ Office of the State Demographer county-level population projections. Such projections are developed based on recent and projected demographic trends, including the birth rates, survival rates, and net migration rates of population groups defined by age, gender and race/ethnicity.

The TSDC develops county-level population projections from 2011 to 2050 under three migration scenarios: no net migration (natural growth only), net migration rates of 2000-2010, and the 2000-2010 migration rates halved ("half-migration scenario"). As in previous plans, staff is in the process of drafting population projections based on the half-migration scenario for the following reasons:

- 1) The TSDC recommends using the half-migration scenario projections for long-range planning;
- 2) The projected population for Texas in 2010 in the 2012 State Water Plan was very close to the 2010 Census population, providing little justification for increasing the future projections from the 2012 plan. The 2020-2050 population projections from the 2012 State Water Plan are very close to the TSDC's half-migration projections; and
- 3) Evidence that the economic recession has had significant impact on both birth rates and international migration, slowing the nation's growth.

While the TSDC's projections extend to 2050, the 2017 State Water Plan will require projections to 2070. Staff has extended such projections to 2060 and 2070 by using the trend of average annual growth rates of the 2011-2050 TSDC projections. In 60 counties, the TSDC-projected population starts to decline sometime between 2011 and 2050. For these counties, staff will hold the county population at its highest point prior to the decline for the following reasons:

- 1) Small Impact - the difference between holding the populations of these 60 counties constant or projecting continued decline in 2050 is 21,987, or 0.05 percent of the state-wide population of over 41 million. The largest county-specific difference between constant population and declining population is 2,030, the smallest is 17, and the average county difference is 366;
- 2) Regional Requests - historically, the regional planning groups suggest that such declining populations be held constant; and
- 3) Constant System Requirements - projected population decline is often a decline in the number of people per household rather than a reduction in the number of connections that a water system must serve. The system must continue to have the capability to serve the customer connections regardless of population.

Water User Group Projections

The regional and state water plans require population projections for individual Municipal Water User Groups. Municipal water user groups in the regional planning process include:

- Cities with a 2010 population greater than 500;
- Select census designated places, such as military bases and in counties with no incorporated cities;
- Utilities providing more than 280 acre-feet of municipal water per year;
- Collections of utilities with a common water supplier or water supplies; and
- Remaining rural, unincorporated population summarized as "County-Other"

The criterion for including only cities with populations greater than 500 has been used throughout the regional planning process, beginning with the 2001 regional water plans and the 2002 state water plan. Smaller cities are included in the aggregated “County-Other” water use, but are not separately delineated because many such small cities may not have a public water system or may not be the owner of the system. The criterion for including non-city water utilities that provide more than 280 acre-feet of municipal water per year was introduced with the 2006 regional water plans and 2007 state water plan. The inclusion of non-city water utilities allowed for the inclusion of more water systems in the regional planning process while the volume-served criteria attempts to limit the burden on very small systems. Regional planning groups do have the option of combining smaller water systems/cities into a collective water user group when the systems share a similar source or provider and are anticipated to coordinate in meeting their future water needs. In addition, regions may request the inclusion of cities or systems below the criteria threshold as distinct water user groups.

Projections for these individual water user groups are developed by allocating growth from the county projections down to the cities, utilities, and rural areas. The methods of allocating future populations from the county to the sub-county areas include:

- 1) Share of Growth - applying the water use group’s historical share of the county’s growth to future growth;
- 2) Share of Population - applying the water user group’s historical share of the county population to projected county population; and
- 3) Constant Population - applied to military bases water user groups that had negative growth between 2000 and 2010 in a county with positive growth.

The share of growth allocation methodology is the default method, with staff using the other methods as necessary. The sum of all water user group populations within a county is reconciled to the total county projection prior to the finalization of draft projections.

Municipal Water Demands:

Draft municipal water demand projections utilize the population projections and a per-person water use volume for each city, water utility and rural area (County-Other). The draft projections will include 2011 per-person water use values (Gallons Per Capita Daily or GPCD) as the initial ‘dry-year’ water use. Staff then applies anticipated savings of water use due to water-efficient fixtures and appliances required by law.

Anticipated savings due to water-efficient fixtures/appliances include:

- 1) Toilets and Showerheads – savings of 16 GPCD;
- 2) Dishwashers – savings of 1.61 to 1.90 GPCD; and
- 3) Clothes Washers – 6.45 GPCD

For each municipal water user group, the 2011 GPCD, minus the anticipated savings due to water-efficient fixtures/appliances, is multiplied by the projected population to develop the municipal water demand projections.

Staff is in the process of developing the municipal water demand projections at this time.

Irrigation Water Demands:

Draft irrigation water demand projections utilized an average of TWDB's 2005-2009 irrigation water use estimates as a base. Annual water use estimates are developed at the county level by applying a calculated evapotranspiration-based "crop water need" estimate to reported irrigated acreage from Farm Service Agency (FSA). These estimates are then adjusted based on surface water release data from TCEQ and Texas Water Masters and comments from Groundwater Conservation Districts, Irrigation Districts and River Authorities. From the initial base year value, projections for each county are assumed to change decade-to-decade throughout the planning horizon at the same rates as was assumed in the 2012 State Water Plan.

Under these assumptions, total irrigation demand for Texas is projected to decline from approximately 8.5 million acre-feet per year in 2020 to 7.1 million acre-feet per year in 2070. These projections are approximately 1 million acre-feet per year less than those included in the 2012 State Water Plan, with significant demand reductions in Regions E, F, H, K, and O being only slightly offset by increased demand projections in Region A.

The use of the 2005-2009 average to establish the base does result in a conservative initial projection on a statewide basis, but staff believes it is the most appropriate method at this time. In previous regional water plans, some regions have preferred to use such a method to establish their demands, while others which may choose to establish demands on a higher, "dry-year" basis, will have that opportunity to document and request a different basis for the projections.

Livestock Water Demands:

Draft livestock water demand projections utilized an average of TWDB's 2005-2009 livestock water use estimates as the base. Water use estimates are calculated by applying a water use-coefficient for each livestock category to county level inventory estimates from Texas Agricultural Statistics Service. The rate of change for projections from the 2011 Regional Water Plans was then applied to the new base. Many counties chose to hold the base constant throughout the planning horizon.

Livestock demand is projected to increase from about 327 thousand acre-feet per year in 2020 up to 383 thousand acre-feet per year in 2070. These totals are slightly less than those used in the 2012 State Water Plan, with the only significant changes being an increase of about 40 percent for Region A and relatively significant decreases (though small in overall volume) for Regions E and F.

Manufacturing Water Demands:

Draft manufacturing water demand projections utilized 2004-2008 data from TWDB's Water Use Survey (WUS). In counties where reported employment from the companies returning surveys was low compared to manufacturing employment data reported by the Bureau of Economic Analysis (BEA), surveyed water use was adjusted to account for non-responses. The rate of change for projections from the 2011 Regional Water Plans was then applied to the new base year estimate.

Manufacturing demand is projected to increase from about 2.25 million acre-feet per year in 2020 to 3.15 million acre-feet per year in 2070, approximately 100 thousand acre-feet per year higher than in the 2012 State Water Plan. Projected demand is slightly higher in each of the regions with the largest manufacturing demand (D, H, and I), along with a relatively significant increase in Region G.

Mining Water Demands:

Draft mining water demand projections were re-released to the regional planning groups in February 2013 to incorporate an updated study by the University of Texas, Bureau of Economic Geology (UT-BEG) for the Texas Oil and Gas Association, which focused on the water use of hydraulic fracturing. The original study that was updated was the TWDB's 2011 *Current and Projected Water Use in the Texas Mining and Oil and Gas Industry* study conducted by the same investigators. The UT-BEG study estimated current mining water use and projected that use across the planning horizon using data collected from trade organizations, government agencies, and other industry representatives. County-level projections are compiled as the sum of individual projections for four sub-sector mining categories: oil and gas, aggregates, coal and lignite, and other.

While the change in mining demand resulting from the updated UT-BEG study was relatively small on a statewide basis, the composition and location of projected mining demands changed significantly. As would be expected from the changed conditions involving increased hydraulic fracturing activity in the state that generated the need to undertake this detailed study, mining demands are expected to be very different from those in the 2012 State Water Plan for most planning regions.

Steam-Electric Generation Water Demands:

Draft steam-electric power generation water demand projections are based on projections from the 2011 Regional Water Plans and the 2008 TWDB report *Water Demand Projections for Power Generation in Texas*. Recent data from the Public Utilities Commission of Texas on plant announcements, retirements, and capacity changes were incorporated to adjust the base. The rate of change for projections from the 2011 Regional Water Plans was then applied to the new base.

Steam-electric demand is projected to increase from just over 1 million acre-feet per year in 2020 to about 1.8 million acre-feet per year in 2070. The projections are virtually identical to those used in the 2012 State Water Plan, with differences in statewide totals for each decade of less than thousand acre-feet per year.

RECOMMENDATION

No action is required.