

Modeling assumptions and methodology used by the Snyderville Basin Water Reclamation District to predict future demand for service

Assumptions

1. The District assumes that it will need to accommodate substantial predicted future regional population and visitation growth by expanding and upgrading the District's wastewater reclamation facilities and collection system.
2. Although development growth, measured by RE's (Residential Equivalents), will at times match the regional population growth of the Wasatch Front and Back, RE growth within the District's service area will generally be less than regional population growth because (a) development and visitation growth has been dramatically slowed over the short to intermediate term by the current economic downturn (the great recession) while regional population continues to grow and (b) development growth will be constrained over the long run by the potential for development (carrying capacity).
3. The potential for development is based on current master planning (primarily from Snyderville Basin Planning Commission and Developer information) and land use zoning densities designated by Summit County and Park City.
4. The District assumes that RE growth will take the form of a forward sloping S-shaped curve (S-shaped logistic growth model). Growth will be somewhat slow as the economy recovers from the great recession, then will go through a middle phase of more rapid growth, and then will enter a final slow growth phase as most of the more desirable properties in planned developments are built out, and the remaining less desirable properties will be absorbed at a slower rate. Although the growth curve depicts smooth growth, actual growth is expected to be in discrete pulses of varying duration with intervals of decline and stagnation.

Methodology

The S-shaped logistic growth model has been applied extensively to population growth modeling and other socio-technical systems (Meyer, 1994) and, has been specifically used to project community growth for water demand modeling (e.g., Capece, 2007). The S-shaped logistic growth model conforms to the District's assumptions and understanding of past and future growth as summarized in bullet 4 above. The logistic growth curve serves as the basis for the District's long term planning. Although the logistic curve is a beneficial planning tool, District personnel do not depend on, or expect, the logistic curve to unerringly predict the future. The District expects change to occur. The District's planning process allows for flexibility and adjustment as necessary.

It is important to note that the validity of the logistic model is dependent on a static growth paradigm. Any annexation(s) to the District or fundamental change in zoning will require modifications to the growth model. Other significant events, such as economic down turns, changes in water availability or change in Park City area appeal, perhaps due to competition from another nearby resort/bedroom community or change in perception due to some unanticipated event, could also alter the static growth paradigm and would require model modifications.

The District follows the two-pulse model (Bi-logistic) of Meyer (1994). The two-pulse curve allows the District to account for the present "shock" to the system caused by the current economic downturn (the great recession), then resume growth according to longer-term population growth assumptions, and then finally slow as the remaining less desirable properties are absorbed more slowly.

References

For the technical details that the District used to compute a logistic curve see the following references:

<http://phe.rockefeller.edu/LogletLab/#Documentation>

Meyer, Perrin, 1994. Bi-Logistic Growth. *Technological Forecasting and Social Change*, 47:89-102. Elsevier Science Inc., New York (<http://phe.rockefeller.edu/Bi-Logistic>).

Capece, John Ph.D., 2007. Population Growth and Water Demand Model for Port LaBelle, Florida. Intelligentsia International, Inc. (http://hendryutilities.com/docs/boxes/PLUS_Population_Study_070830.pdf).

IMPORTANT NOTICE

The RE growth projections computed by the Snyderville Basin Water Reclamation District (SBWRD) are designed to meet the specific needs of the SBWRD in planning for the collection and reclamation of wastewater from its entire service area as of the issue date of this document. Information and methods used to compute the projection(s) are the best known to SBWRD personnel as of the issue date of this document. RE growth may, or may not, be correlated with the growth of other utility or commercial services or goods. Other users of the SBWRD's RE growth projections should carefully evaluate the applicability to their specific needs including, but not limited to, similarity of service or market area, products or services and statistical uncertainty (the accuracy requirements of the user). In addition, the user should also understand the limitations of this, or any other growth projection and follow a planning process that includes flexibility to adapt to inevitably changing conditions. The user agrees that the use of SBWRD's growth projection(s) is done so entirely at the user's own risk. The SBWRD does not guarantee the accuracy of any growth projection(s) or data used and cannot be held liable for any damage that may be caused by the use, or misuse, of the growth projection(s) or any part thereof.

Year	REs	CumREs	Grow Rate	REs & CumREs Source	In City	County Part Of SBWRD	% In City	Grow Rate
2004	674.5	18,770.4	3.73%	Reconciled to 2008 Adjustment	10,119.5	8,650.9	53.9%	
2005	958.4	19,728.8	5.11%	Reconciled to 2008 Adjustment	10,383.3	9,345.5	52.6%	2.61%
2006	1052.3	20,781.1	5.33%	Reconciled to 2008 Adjustment	10,673.8	10,107.3	51.4%	2.80%
2007	722.9	21,504.0	3.48%	Reconciled to 2008 Adjustment	10,938.8	10,565.2	50.9%	2.48%
2008	353.5	21,857.5	1.64%	2008 Adjusted to Budget & Annual Report	11,291.3	10,566.2	51.7%	3.22%
2009	120.6	21,978.1	0.55%	Reconciled to 2009 Budget & Annual Report	11,351.6	10,626.5	51.6%	0.53%
2010	152.0	22,130.1	0.69%	Projected Logistic Growth (Fast Model)	11,379.6	10,750.5	51.4%	0.25%
2011	161.0	22,291.1	0.72%	Projected Logistic Growth (Fast Model)	11,409.2	10,881.9	51.2%	0.26%
2012	179.0	22,470.1	0.80%	Projected Logistic Growth (Fast Model)	11,442.1	11,028.0	50.9%	0.29%
2013	208.0	22,678.1	0.92%	Projected Logistic Growth (Fast Model)	11,480.4	11,197.7	50.6%	0.33%
2014	246.0	22,924.1	1.08%	Projected Logistic Growth (Fast Model)	11,525.7	11,398.4	50.3%	0.39%
2015	296.0	23,220.1	1.29%	Projected Logistic Growth (Fast Model)	11,580.1	11,640.0	49.9%	0.47%
2016	357.0	23,577.1	1.54%	Projected Logistic Growth (Fast Model)	11,645.8	11,931.3	49.4%	0.57%
2017	430.0	24,007.1	1.82%	Projected Logistic Growth (Fast Model)	11,724.9	12,282.2	48.8%	0.68%
2018	515.0	24,522.1	2.14%	Projected Logistic Growth (Fast Model)	11,819.7	12,702.4	48.2%	0.81%
2019	610.0	25,132.1	2.49%	Projected Logistic Growth (Fast Model)	11,931.9	13,200.2	47.5%	0.95%
2020	712.0	25,844.1	2.83%	Projected Logistic Growth (Fast Model)	12,062.9	13,781.2	46.7%	1.10%
2021	818.0	26,662.1	3.16%	Projected Logistic Growth (Fast Model)	12,213.5	14,448.6	45.8%	1.25%
2022	920.0	27,582.1	3.45%	Projected Logistic Growth (Fast Model)	12,382.7	15,199.4	44.9%	1.39%
2023	1012.0	28,594.1	3.67%	Projected Logistic Growth (Fast Model)	12,568.9	16,025.2	44.0%	1.50%
2024	1085.0	29,679.1	3.79%	Projected Logistic Growth (Fast Model)	12,768.6	16,910.5	43.0%	1.59%
2025	1132.0	30,811.1	3.81%	Projected Logistic Growth (Fast Model)	12,976.9	17,834.2	42.1%	1.63%
2026	1148.0	31,959.1	3.72%	Projected Logistic Growth (Fast Model)	13,188.1	18,771.0	41.3%	1.63%
2027	1130.0	33,089.1	3.54%	Projected Logistic Growth (Fast Model)	13,396.0	19,693.1	40.5%	1.58%
2028	1082.0	34,171.1	3.27%	Projected Logistic Growth (Fast Model)	13,595.1	20,576.0	39.8%	1.49%
2029	1008.0	35,179.1	2.95%	Projected Logistic Growth (Fast Model)	13,780.6	21,398.5	39.2%	1.36%
2030	915.0	36,094.1	2.60%	Projected Logistic Growth (Fast Model)	13,948.9	22,145.2	38.6%	1.22%
2031	811.0	36,905.1	2.25%	Projected Logistic Growth (Fast Model)	14,098.2	22,806.9	38.2%	1.07%

2032	705.0	37,610.1	1.91%	Projected Logistic Growth (Fast Model)	14,227.9	23,382.2	37.8%	0.92%
2033	602.0	38,212.1	1.60%	Projected Logistic Growth (Fast Model)	14,338.7	23,873.4	37.5%	0.78%
2034	506.0	38,718.1	1.32%	Projected Logistic Growth (Fast Model)	14,431.8	24,286.3	37.3%	0.65%
2035	420.0	39,138.1	1.08%	Projected Logistic Growth (Fast Model)	14,509.0	24,629.1	37.1%	0.54%
2036	345.0	39,483.1	0.88%	Projected Logistic Growth (Fast Model)	14,572.5	24,910.6	36.9%	0.44%
2037	281.0	39,764.1	0.71%	Projected Logistic Growth (Fast Model)	14,624.2	25,139.9	36.8%	0.35%
2038	227.0	39,991.1	0.57%	Projected Logistic Growth (Fast Model)	14,666.0	25,325.1	36.7%	0.29%
2039	182.0	40,173.1	0.45%	Projected Logistic Growth (Fast Model)	14,699.5	25,473.6	36.6%	0.23%
2040	146.0	40,319.1	0.36%	Projected Logistic Growth (Fast Model)	14,726.3	25,592.8	36.5%	0.18%
2041	116.0	40,435.1	0.29%	Projected Logistic Growth (Fast Model)	14,747.7	25,687.4	36.5%	0.14%
2042	92.0	40,527.1	0.23%	Projected Logistic Growth (Fast Model)	14,764.6	25,762.5	36.4%	0.11%
2043	73.0	40,600.1	0.18%	Projected Logistic Growth (Fast Model)	14,778.0	25,822.1	36.4%	0.09%
2044	58.0	40,658.1	0.14%	Projected Logistic Growth (Fast Model)	14,788.7	25,869.4	36.4%	0.07%
2045	46.0	40,704.1	0.11%	Projected Logistic Growth (Fast Model)	14,797.2	25,906.9	36.4%	0.06%
2046	36.0	40,740.1	0.09%	Projected Logistic Growth (Fast Model)	14,803.8	25,936.3	36.3%	0.04%
2047	29.0	40,769.1	0.07%	Projected Logistic Growth (Fast Model)	14,809.1	25,960.0	36.3%	0.04%
2048	25.0	40,794.1	0.06%	Projected Logistic Growth (Fast Model)	14,813.7	25,980.4	36.3%	0.03%
2049	26.0	40,820.1	0.06%	Projected Logistic Growth (Fast Model)	14,818.5	26,001.6	36.3%	0.03%
2050	26.0	40,846.1	0.06%	Projected Logistic Growth (Fast Model)	14,823.3	26,022.8	36.3%	0.03%
2051	26.0	40,872.1	0.06%	Projected Logistic Growth (Fast Model)	14,828.1	26,044.0	36.3%	0.03%
2052	26.0	40,898.1	0.06%	Projected Logistic Growth (Fast Model)	14,832.9	26,065.2	36.3%	0.03%
2053	26.0	40,924.1	0.06%	Projected Logistic Growth (Fast Model)	14,837.7	26,086.4	36.3%	0.03%
2054	26.0	40,950.1	0.06%	Projected Logistic Growth (Fast Model)	14,842.4	26,107.7	36.2%	0.03%
2055	26.0	40,976.1	0.06%	Projected Logistic Growth (Fast Model)	14,847.2	26,128.9	36.2%	0.03%
2056	26.0	41,002.1	0.06%	Projected Logistic Growth (Fast Model)	14,852.0	26,150.1	36.2%	0.03%
2057	26.0	41,028.1	0.06%	Projected Logistic Growth (Fast Model)	14,856.8	26,171.3	36.2%	0.03%
2058	26.0	41,054.1	0.06%	Projected Logistic Growth (Fast Model)	14,861.6	26,192.5	36.2%	0.03%
2059	26.0	41,080.1	0.06%	Projected Logistic Growth (Fast Model)	14,866.4	26,213.7	36.2%	0.03%

2060	26.0	41,106.1	0.06%	Projected Logistic Growth (Fast Model)	14,871.2	26,234.9	36.2%	0.03%
2061	26.0	41,132.1	0.06%	Projected Logistic Growth (Fast Model)	14,875.9	26,256.2	36.2%	0.03%
2062	26.0	41,158.1	0.06%	Projected Logistic Growth (Fast Model)	14,880.7	26,277.4	36.2%	0.03%
2063	26.0	41,184.1	0.06%	Projected Logistic Growth (Fast Model)	14,885.5	26,298.6	36.1%	0.03%
2064	26.0	41,210.1	0.06%	Projected Logistic Growth (Fast Model)	14,890.3	26,319.8	36.1%	0.03%
2065	26.0	41,236.1	0.06%	Projected Logistic Growth (Fast Model)	14,895.1	26,341.0	36.1%	0.03%

Projected RE Growth Since Beginning of 2010 3,545.8 15,698.7

Notes

1) Currently, the City contains 51.6% of District REs. Current projections indicate that proportion will diminish to 36.1% at build out.

2) The 2006 SBWRD parcel analysis, based on City/County zoning, showed that the City is approximately 79% built out.

3) Of the remaining District-wide growth, the City will account for only 18.4%.



