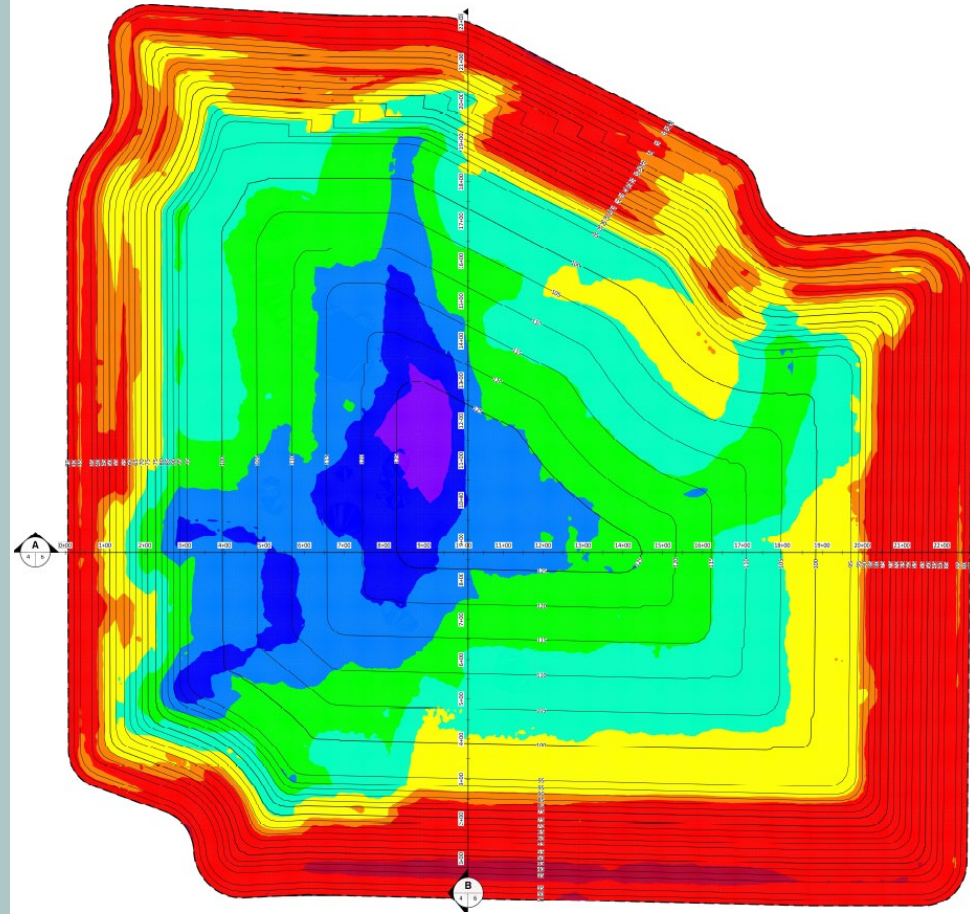


Keeping it Simple: Multiple Approaches to Site Life Calculations

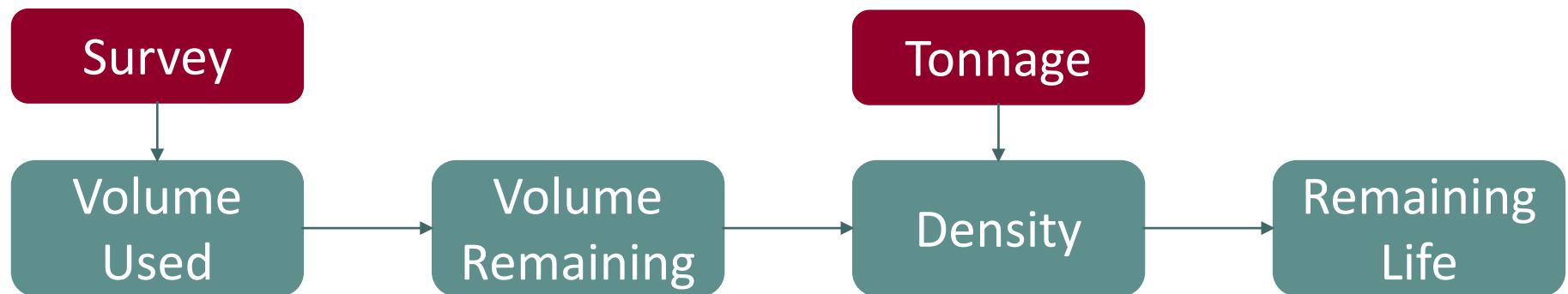
Presented by
Kollan Spradlin &
Fauve Herron

SCS ENGINEERS



What is Site Life?

- Condition of FDEP Solid Waste Permit
 - *Maintain an annual estimate of the remaining life and capacity in cubic yards of the existing, constructed landfill and an annual estimate of the life and capacity in cubic yards of other permitted areas not yet constructed.*
- Estimate Made and Reported Annually to Department



Implications



- Financial Assurance Funding
- CIP/Business/Master Planning
- Siting New Landfill Locations
- Optimization of Airspace

Choose from FA instruments adopted by Rule.

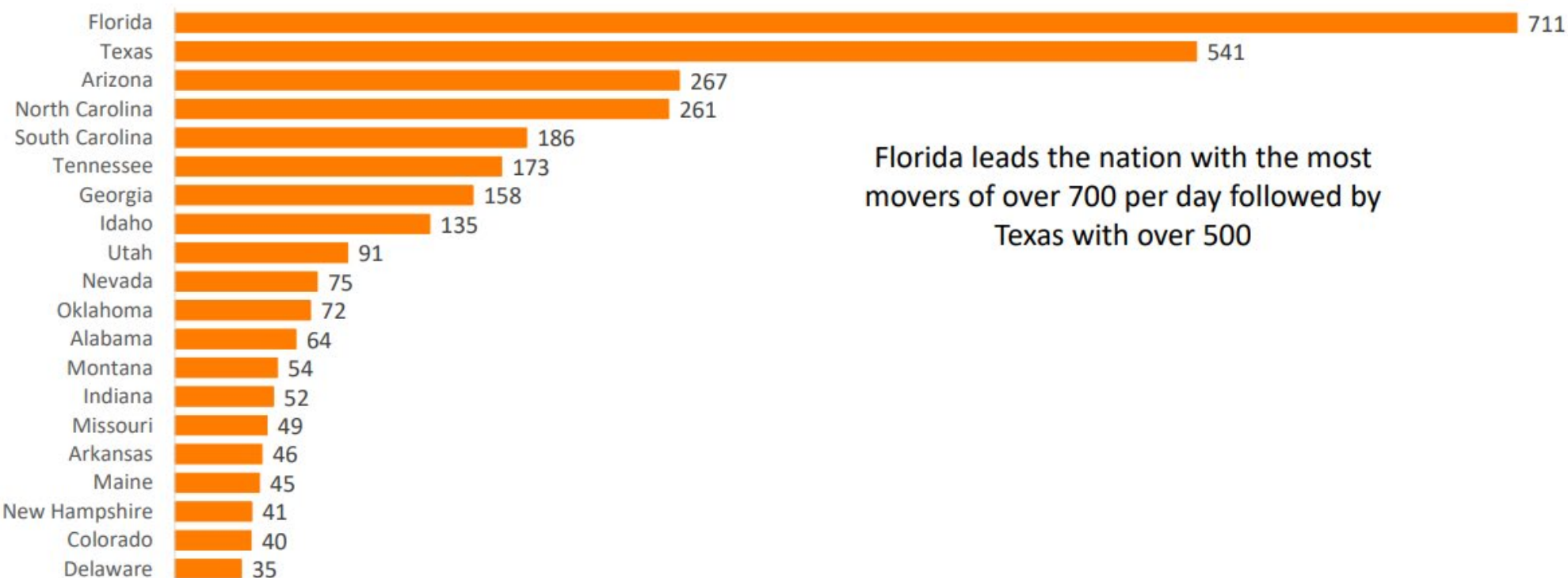
- | | |
|---------------------------------|---------------------------------|
| » Irrevocable Letter of Credit* | » Trust Fund Agreement |
| » Financial Guarantee Bond* | » Financial Test |
| » Performance Bond* | » Corporate Guarantee** |
| » Insurance Certificate* | » Standby Trust Fund Agreement* |

* - When a Letter of Credit, Bond or Insurance is used, a Standby Trust Fund Agreement is also required.

** - When a Corporate Guarantee is used, a Financial Test is also required.

Top 20 States With the Most Number of Residents Moving In Per Day

People Moving Per Day

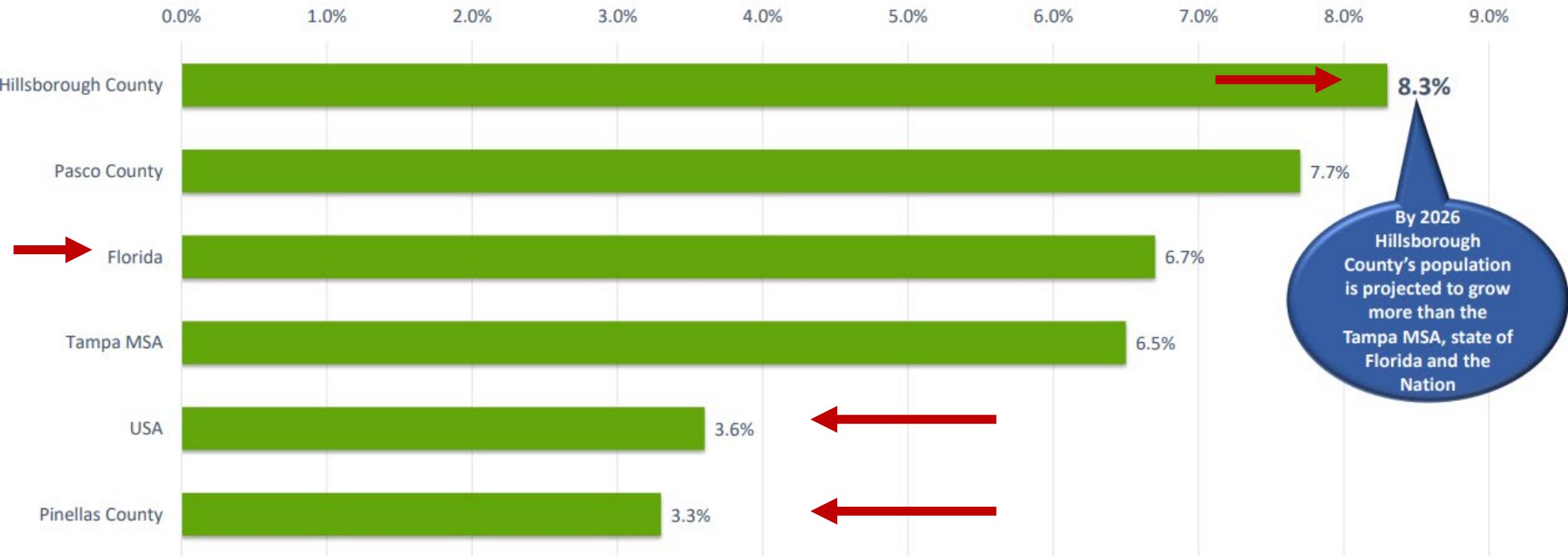


Source: U.S. Census July 2020 to July 2021
Prepared by Tampa Bay EDC Research Department March 2022



2021 – 2026 Population Growth

2021-2026 % Population Growth



By 2026 Hillsborough County's population is projected to grow more than the Tampa MSA, state of Florida and the Nation

Source: Esri June 2021

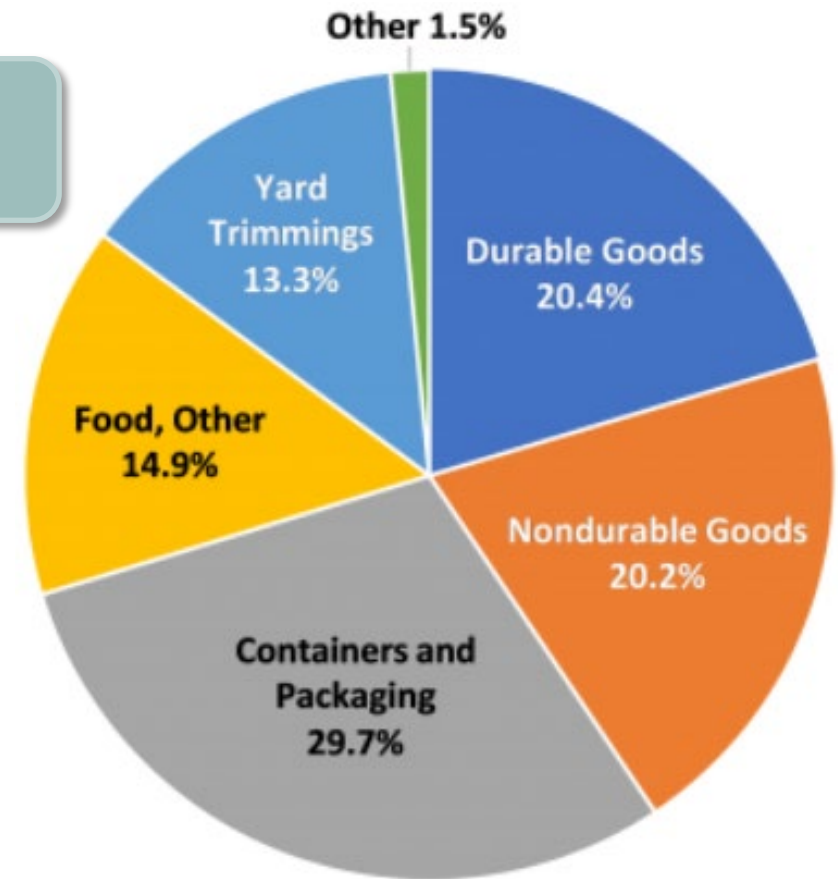


Calculation Methods

Population
Based

Volume
Based

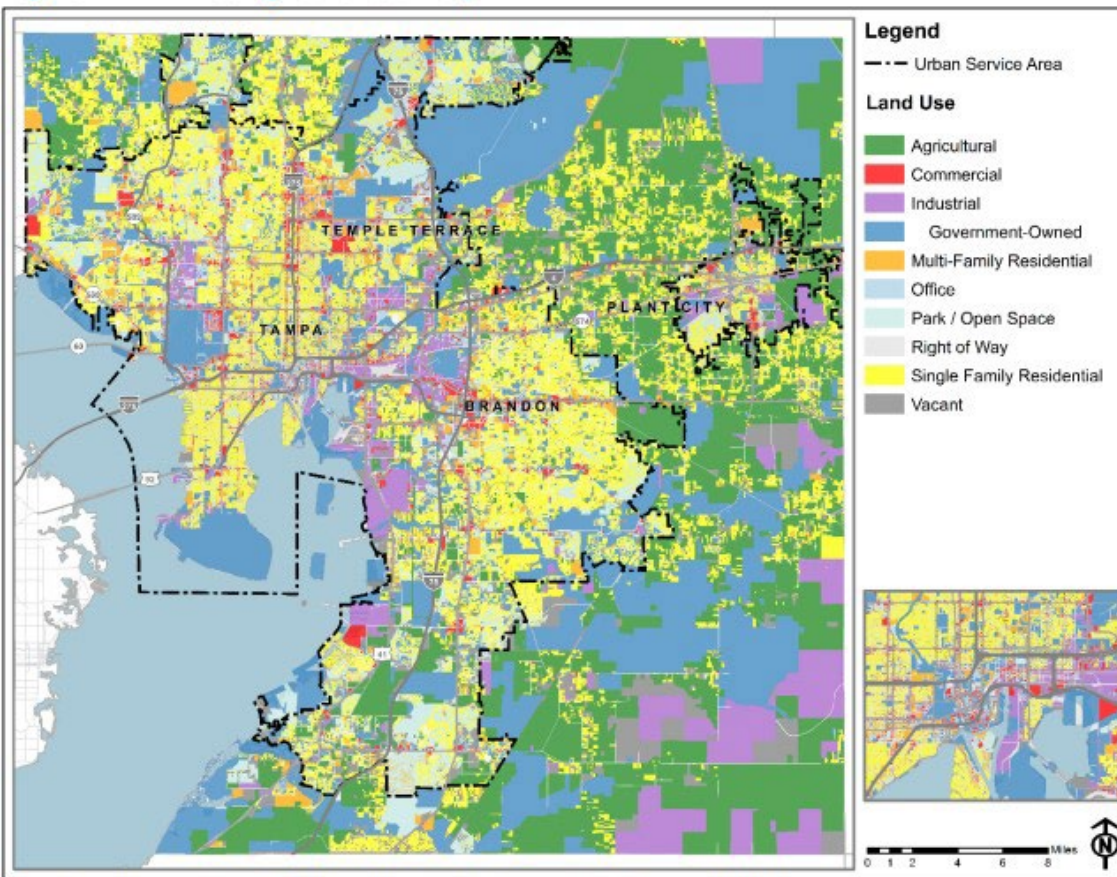
Annualization vs Rounding



Both methods rely on past data
to predict future trends

Population Method (Traditional)

Figure 4.1 Existing Land Use Map



Source: Land use reported in Hillsborough County Property Appraiser parcel database.

- Population Projection
 - Often a Planning or Development Plan
- Latest CensusUse Population Projections Assume Future Tonnage
 - Convert total future tonnage to volume based on a density

Population Based Calculations

- Dependent on Waste Generated Per Capita
 - Usually assumed constant per/person
- Can be Linear or Variable Growth Rate

	Design Life Estimates from Table Below:			Total Remaining Net Air Space (Gross Air Space - Final Cover Soils) =				7,571,018	CY
	Sections 2A - 2C	6.3	years				Annual Disposal Rate Increase =	1.5%	
	Sections 5A - 5C	24.5	years				Apparent Waste Density =	2,000	lbs/CY
Year	Projected Disposal Rates ^{1,2}	Diversion to Section 2A	Diversion to Section 2B	Waste to Section 2C	Waste to Section 5A	Waste to Section 5B	Waste to Section 5C	Remaining Capacity for Sections 2A - 2C	Remaining Capacity for Sections 5A - 5C
	Tons	%	%	Tons	CY ³	Tons	CY ³	CY	CY
Beginning Capacity as of July 16, 2017								6,717,144	853,874
2017	128,344	50%	50%	64,172	64,172	64,172	64,172	6,652,972	789,702
2018	260,539	50%	50%	130,270	130,270	130,270	130,270	6,522,702	659,432
2019	264,447	50%	50%	132,224	132,224	132,224	132,224	6,390,479	527,209
2020	268,414	50%	50%	134,207	134,207	134,207	134,207	6,256,272	393,002
2021	272,440	50%	50%	136,220	136,220	136,220	136,220	6,120,052	256,782
2022	276,527	50%	50%	138,263	138,263	138,263	138,263	5,981,788	118,518
2023	280,675	42.2%	57.8%	162,156	162,156	118,518	118,518	5,819,632	0
2024	284,885	0%	100%	284,885	284,885	0	0	5,534,748	0
2025	289,158	0%	100%	289,158	289,158	0	0	5,245,590	0

Population Based Results

- Dependent on Assumptions about Population growth

- Dependent on Historic Per Capita Disposal or Book Value

Year	Population Projection ¹	Percent Inc. in Pop. 5-year	Est. Population	Waste Disposed ² (tons)	Disposal per Capita ² (tons/person)
2000	141,627		141,627	110,141	0.78
2001			144,189	112,832	0.78
2002			146,751	117,210	0.80
2003			149,314	130,331	0.87
2004			151,876	349,563	2.30
2005	154,438	0.09	154,438	196,115	1.27
2006			159,314	188,501	1.18
2007			164,190	161,248	0.98
2008			169,065	126,452	0.75
2009			173,941	125,794	0.72
2010	178,817	0.16	178,817	121,500	0.68
2011			180,537	111,942	0.62
2012			182,258	111,947	0.61
2013			183,978	120,886	0.66
2014			185,699	118,420	0.64
2015	187,419	0.05	187,419	127,224	0.68

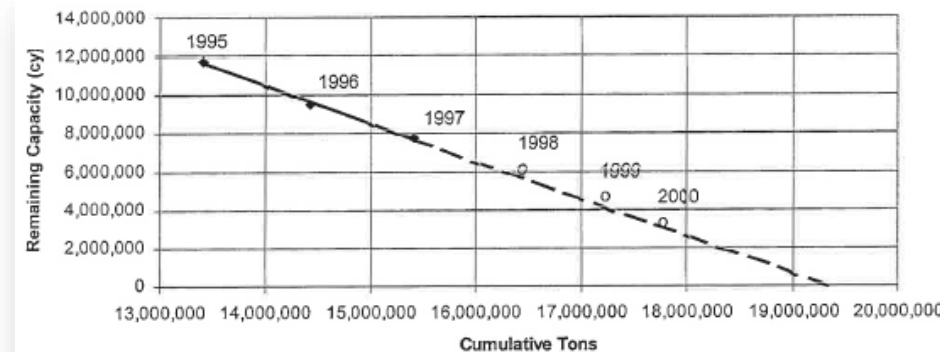
Volume Method (RCM)

- 3-5 years of Historic Volume and Tonnage Data
- Calculate Total Volume Consumption Trend
- Consolidates Other Variables into Single Most Important Trend
- Bob Stearns' Method

PREDICTING LANDFILL FILLING RATES, ULTIMATE CAPACITY, AND CLOSURE DATES

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SCS Engineers
Sacramento, California

Robert P. Stearns, P.E., DEE
President/CEO
SCS Engineers
Long Beach, California

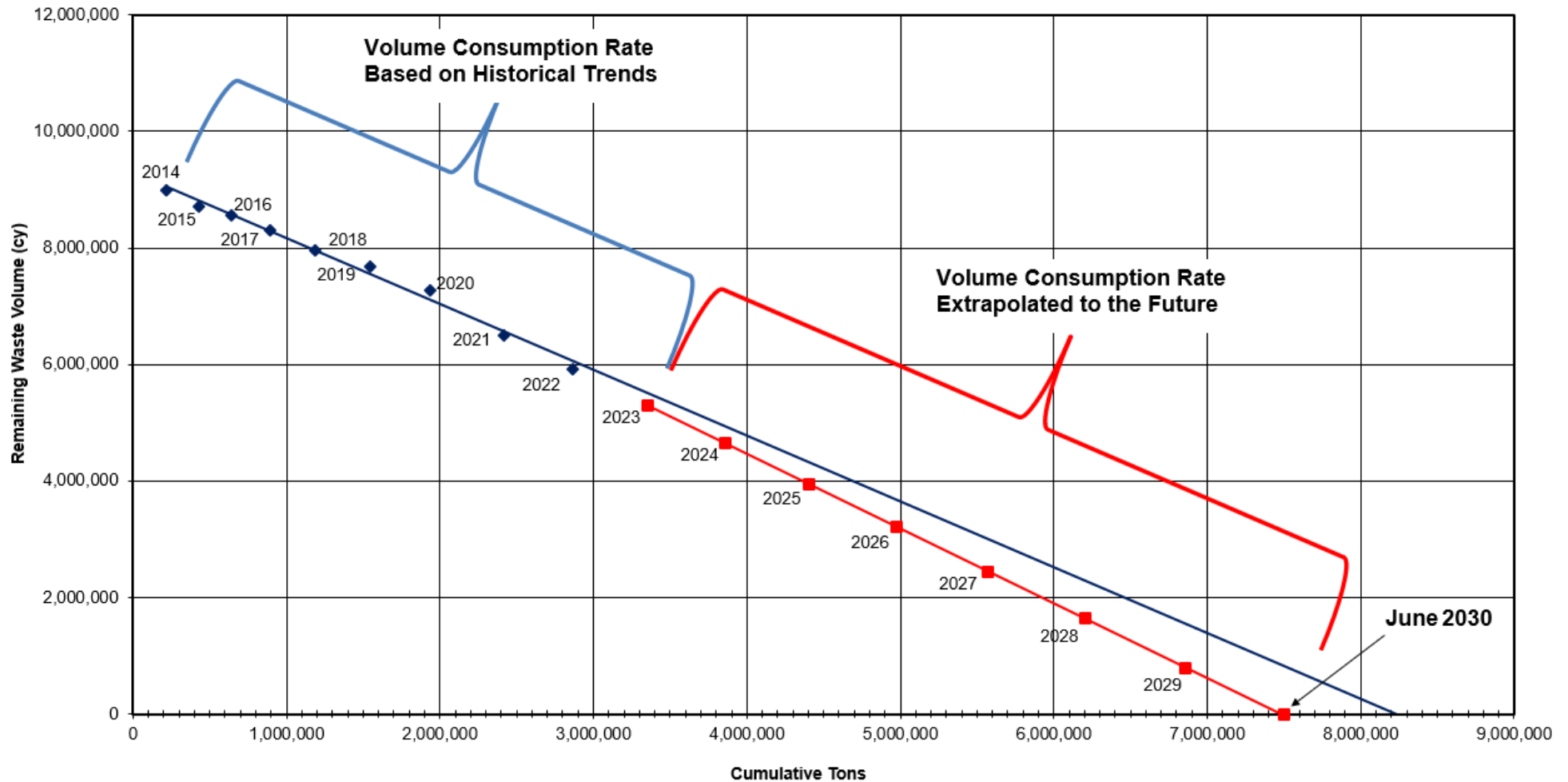


<https://www.scsengineers.com/scs-white-papers/predicting-landfill-fill-rates-ultimate-capacity-and-closure-dates/>

Volume Based Calculations

	Per Year			Cumulative		
Survey Date	Volume Used Between Air Surveys (cy)	Waste Disposed Between Air Surveys (tons)	Airspace Utilization Factor Between Air Surveys (pcy)	Volume Remaining (cy)	Waste Disposed (tons)	Airspace Utilization Factor (pcy)
July 1, 2014	-	218,868	-	8,992,644	218,868	-
July 1, 2015	275,823	211,808	1,536	8,716,821	430,676	1,536
July 1, 2016	165,321	206,761	2,501	8,551,500	637,437	1,898
July 1, 2017	248,414	256,689	2,067	8,303,086	894,126	1,959
July 1, 2018	335,902	295,872	1,762	7,967,184	1,189,998	1,894
July 1, 2019	296,551	357,405	2,410	7,670,633	1,547,403	2,010
July 1, 2020	399,829	390,346	1,953	7,270,804	1,937,749	1,997
August 1, 2021	637,403	478,161	1,500	6,498,006	2,415,910	1,761
January 14, 2022	285,363	207,826	1,457	6,190,322	2,623,737	1,716
July 1, 2022	312,526	241,380	1,545 ¹	5,877,796	2,865,117	1,699
July 1, 2023	625,051	482,760	1,545	5,252,745	3,347,877	1,673
July 1, 2024	663,015	512,082	1,545	4,589,730	3,859,959	1,654
July 1, 2025	700,979	541,403	1,545	3,888,751	4,401,362	1,639
July 1, 2026	738,942	570,724	1,545	3,149,809	4,972,086	1,627
July 1, 2027	776,906	600,046	1,545	2,372,903	5,572,132	1,617
July 1, 2028	814,870	629,367	1,545	1,558,033	6,201,499	1,609
July 1, 2029	852,833	658,688	1,545	705,199	6,860,187	1,603
April 2030	705,199	558,942	1,545	0	7,419,129	1,601

Volume Based Results



Model Interpretation



- Predictive Model (gets you in the ball park)
- Like Other Models you Can Make More or Less Conservative Assumptions
- Accuracy more Important Toward End of Landfill Life
- One Way is Not Better than Another

There is no one correct answer.

Other Factors

Economy/
Consumer Trends

Severe Weather /
Debris

Local
Industry

WTE Plant
Outages and
Diversions



Cover Soil
Utilization
Efficiency

Fill Sequencing
and Compaction
Practices

Incoming
Waste Type

Helpful Hints

- QC Survey File Upon Receipt
- Account for Stockpiles within Landfill Footprint
- Account for Outside Factors and Regional Solid Waste Management System
- Keep Expectations Realistic
- Sanity Check your Density

https://www.epa.gov/sites/default/files/2016-04/documents/volume_to_weight_conversion_factors_memo_04192016_508fml.pdf - EPA Waste-In-Place Density Reference

Helpful Links

- <https://www.scsengineers.com/scs-white-papers/predicting-landfill-fill-rates-ultimate-capacity-and-closure-dates/> – Bob Stearns White Paper
- <https://www.epa.gov/landfills/requirements-municipal-solid-waste-landfills-mswlf> – EPA Financial Assurance
- https://www.epa.gov/sites/default/files/2016-04/documents/volume_to_weight_conversion_factors_memorandum_04192016_508fml.pdf - EPA Landfill Density Paper
- https://floridadep.gov/sites/default/files/FA_Intro2020.pdf - FDEP Financial Assurance Slideshow
- <https://tampabaycdc.com/market-intelligence/> - Tampa Bay Economic Development Council Research Department



Thank You.



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