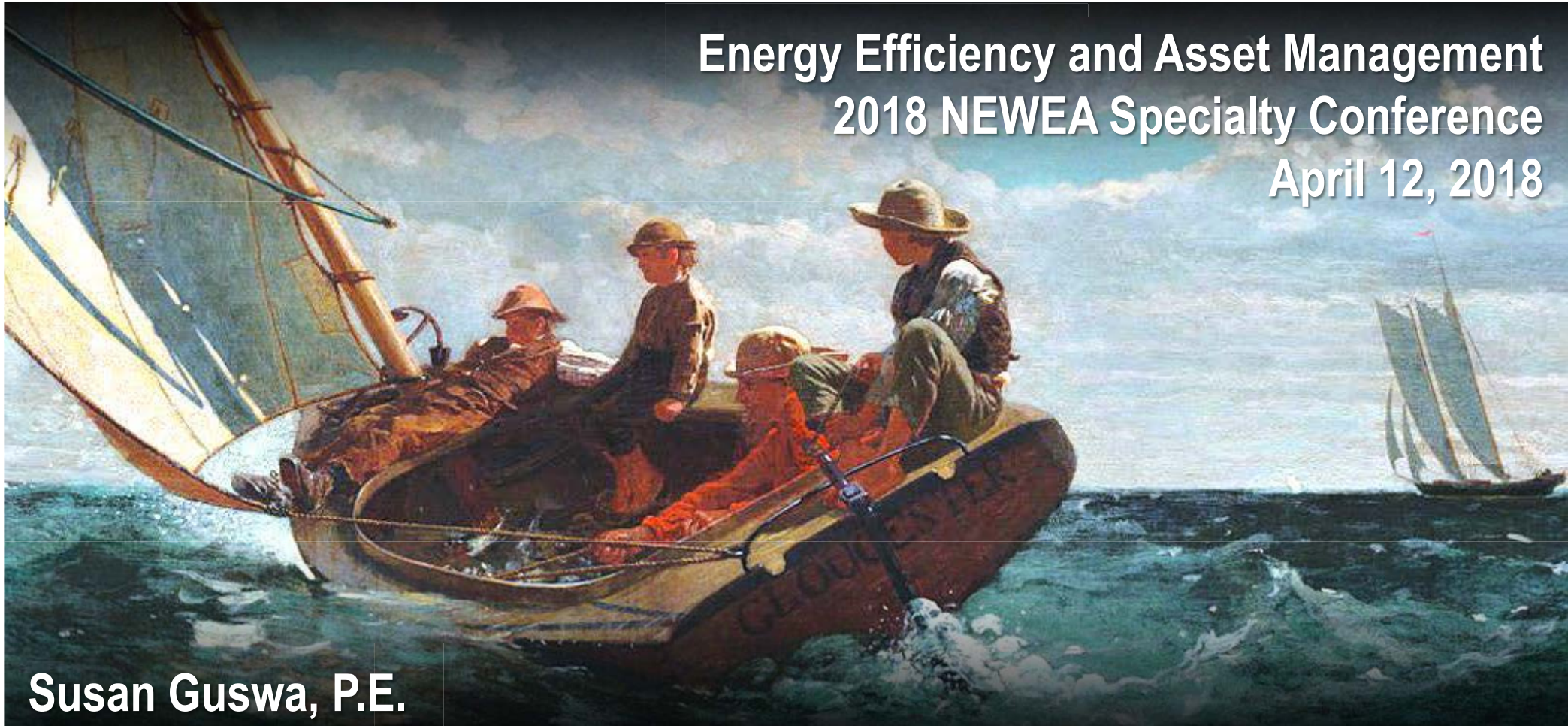# Are You Actually Using Your Data?

Going from Collection to Action to Solve Real-World Problems
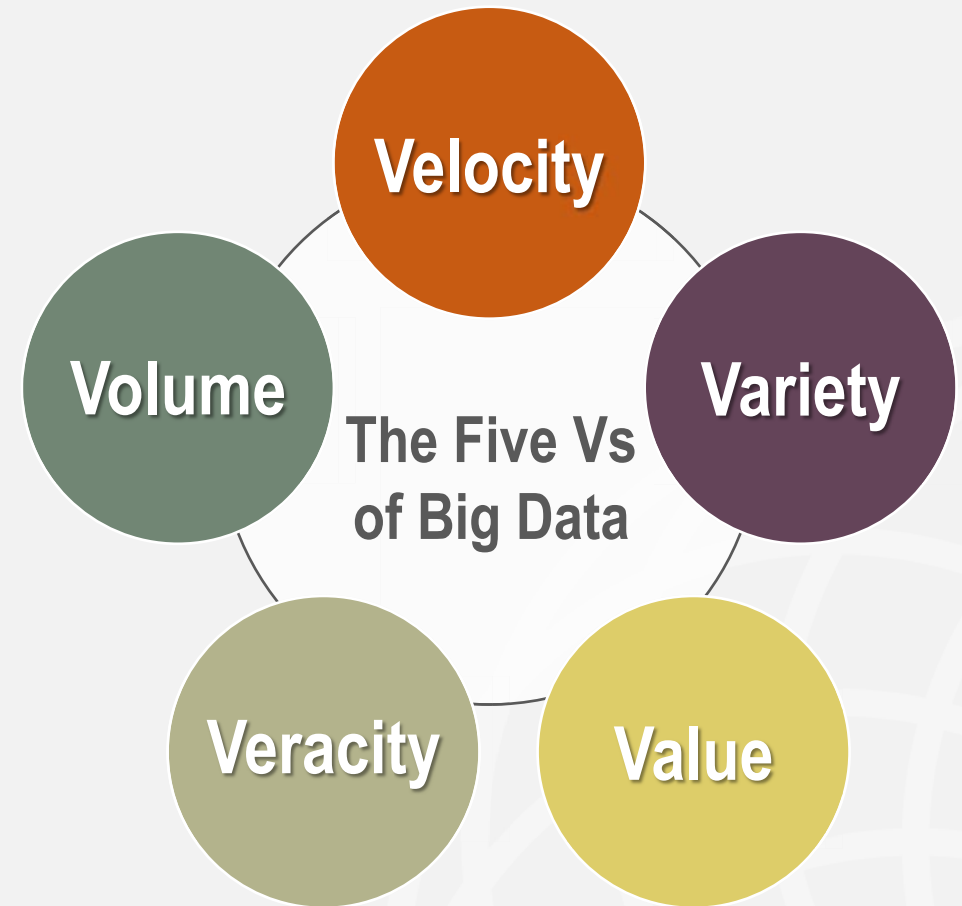
Energy Efficiency and Asset Management
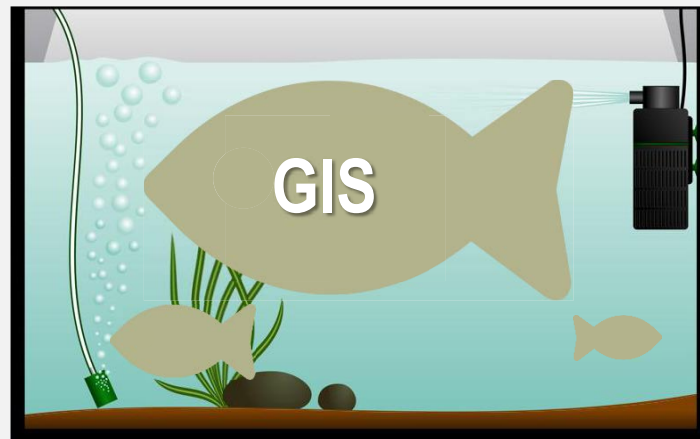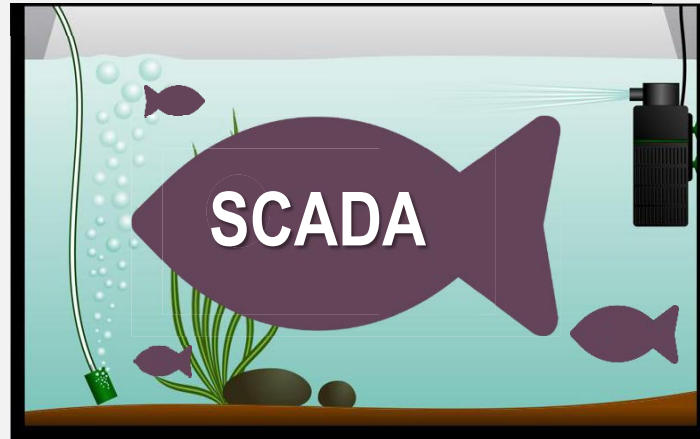**2018 NEWEA Specialty Conference**
April 12, 2018

Susan Guswa, P.E.

WOODARD &CURRAN

Current Buzz

- Technology
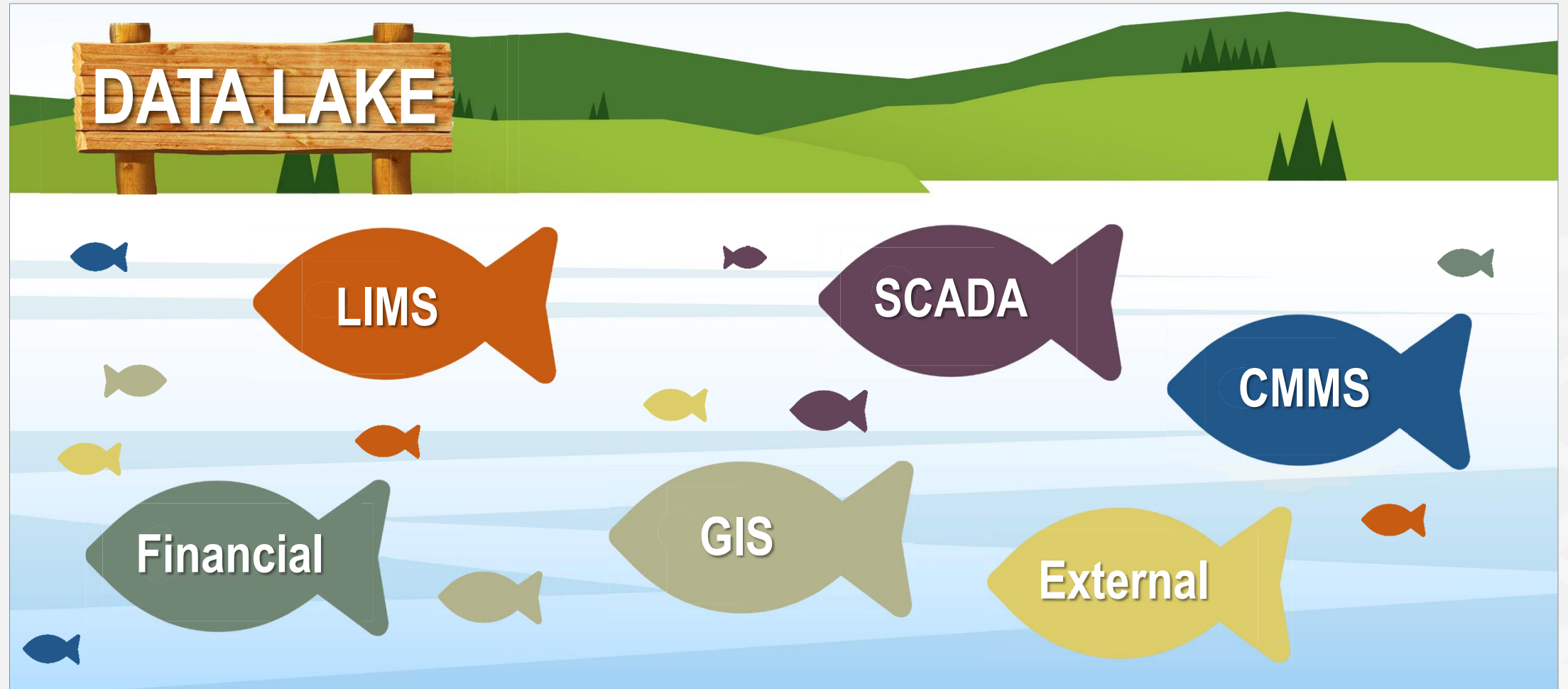 - ➢ Internet of Things (IoT)
  - ➢ Big Data
  - ➢ Data Analytics
  - ➢ Artificial Intelligence
- Decision Making
  - ➢ Intelligent Systems
  - ➢ Smart Cities
  - ➢ Asset Management

Velocity

Variety

Volume

The Five Vs of Big Data

Veracity

Value

Historical Data Management

Technology is Transforming Aquariums to Lakes

Nighttime in a small town nestled among rolling hills
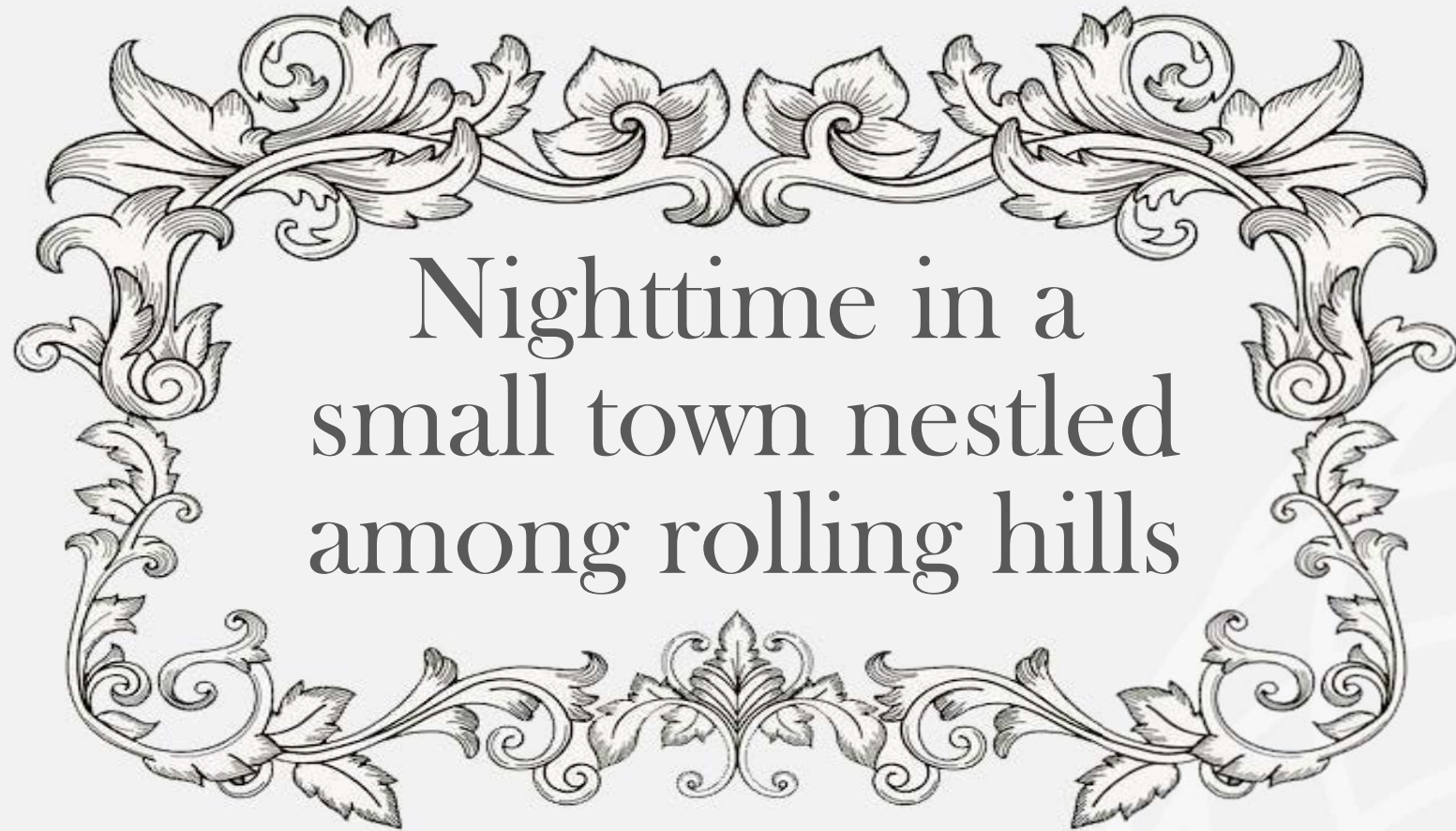
Did you imagine something like this?

Or something like this:

Vincent van Gogh *The Starry Night* 1886

The "Old Way" of Viewing Data

	Weather				Wastewater		Activated		GRIT	SEPTIC
				Efflu	Flow MG/D		Sludge		Removal	Delivery
	Precip	Temp	Temp	TEMP.	Total	Total	RAS	WAS		
DATE	Inches	Deg F	Deg C	Deg C	Infl	Effl	MGD	MGD	CU FT	Gal
1	0.02	69.0	20.6	22.7	2.164	1.940	3.237	0.053		18084
2		70.5	21.4	22.1	2.370	1.854	3.069	0.052		5756
3		67.2	19.6	22.0	1.930	1.614	3.061	0.051		7736
4		68.0	20.0	21.7	1.746	1.462	3.062	0.053		2370
5		53.4	11.9	21.2	1.891	1.750	3.050	0.054		1821
6		68.5	20.3	21.8	2.384	2.105	3.023	0.055		23605
7		71.0	21.7	22.4	2.444	2.161	2.996	0.055		15105
8	0.43	66.5	19.2	22.6	2.438	1.989	3.147	0.053		17596
9		74.8	23.8	23.3	2.529	2.126	2.998	0.051		21112
10	0.11	69.8	21.0	23.4	2.002	1.784	3.059	0.051		5180
11	0.03	65.4	18.6	23.4	1.938	1.818	3.060	0.053		1513
12		56.4	13.6	22.1	2.334	1.948	3.033	0.054		26665
13		55.9	13.3	21.7	2.286	1.899	3.013	0.055		16805
14		80.0	26.7	22.4	2.424	2.070	3.013	0.054		10808
15		60.8	16.0	21.8	2.219	1.770	3.159	0.053		11495
16		66.0	18.9	21.3	2.377	1.953	3.025	0.052		17114
17		48.0	8.9	19.2	2.022	1.766	3.026	0.052		7000
18	0.03	47.4	8.6	22.1	1.895	1.852	3.016	0.053		2253
19	1.28	72.8	22.7	22.5	2.796	2.515	2.939	0.048		15528
20		65.3	18.5	23.4	2.510	2.130	3.611	0.055		19041
21		63.1	17.3	22.4	2.582	2.108	3.020	0.053		14974
22		65.0	18.3	22.1	2.396	1.997	2.982	0.048		20019
23	0.01	60.0	15.6	22.1	2.472	2.125	2.849	0.048		20359
24		53.4	11.9	21.7	2.076	1.826	2.824	0.048		8336
25		42.4	5.8	20.7	1.954	1.731	2.837	0.049		
26		43.1	6.2	20.1	2.337	2.025	2.835	0.050		16721
27	0.31	60.4	15.8	20.7	2.408	2.079	2.819	0.051		27211
28		57.5	14.2	21.1	2.392	2.088	2.798	0.051		51197
29		56.4	13.6	18.8	2.070	1.883	2.877	0.050		15828
30		54.5	12.5	20.6	2.326	2.098	2.827	0.048		18578
31										

Now We Can Magnifying its Communication Potential
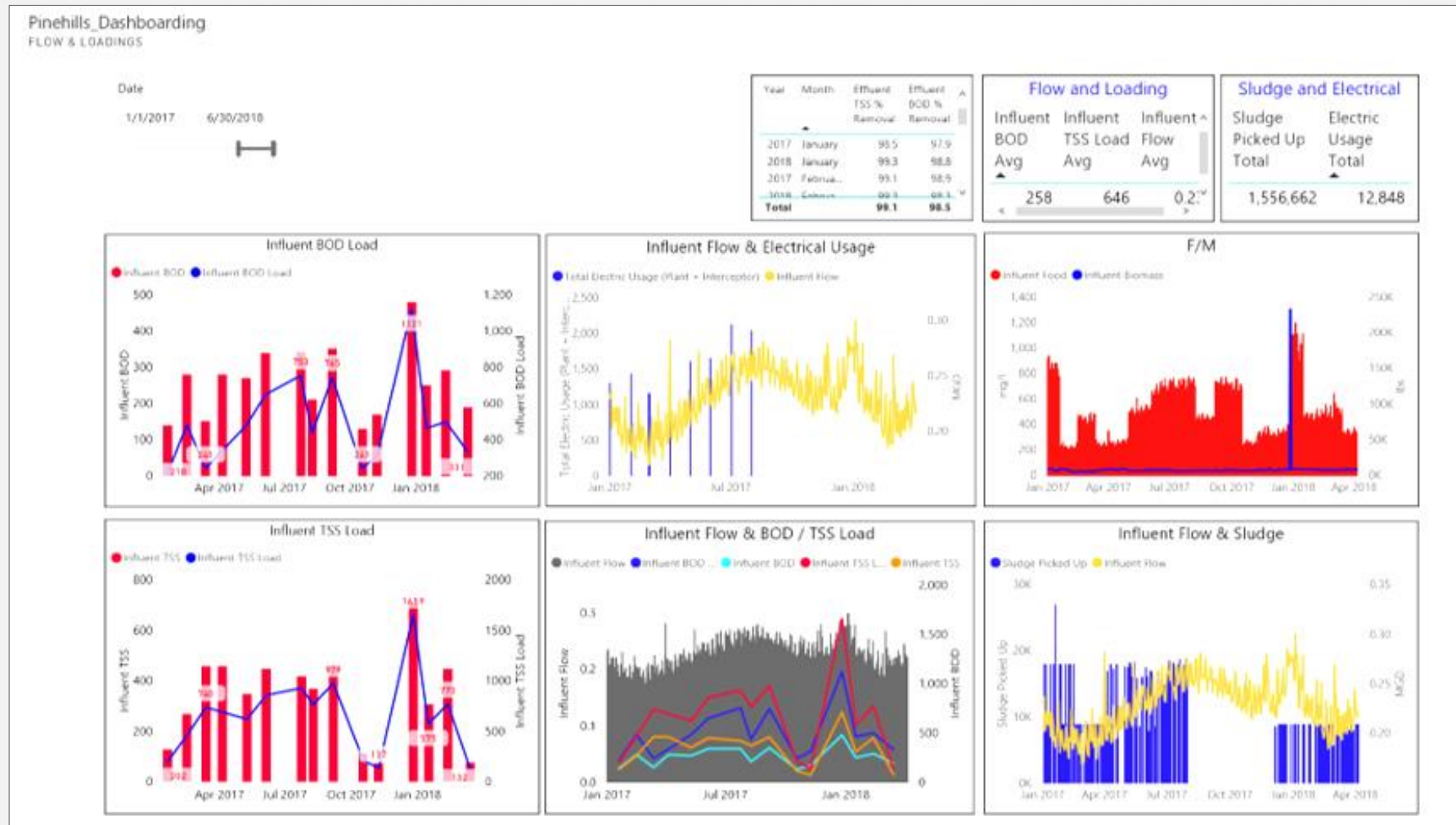
And Integrate Data from Various Sources

Start with Defining Value

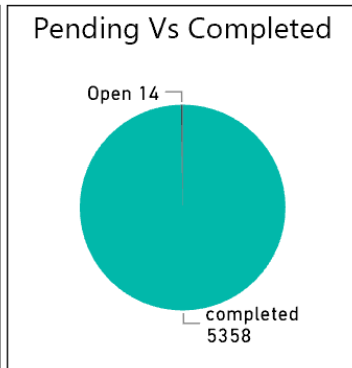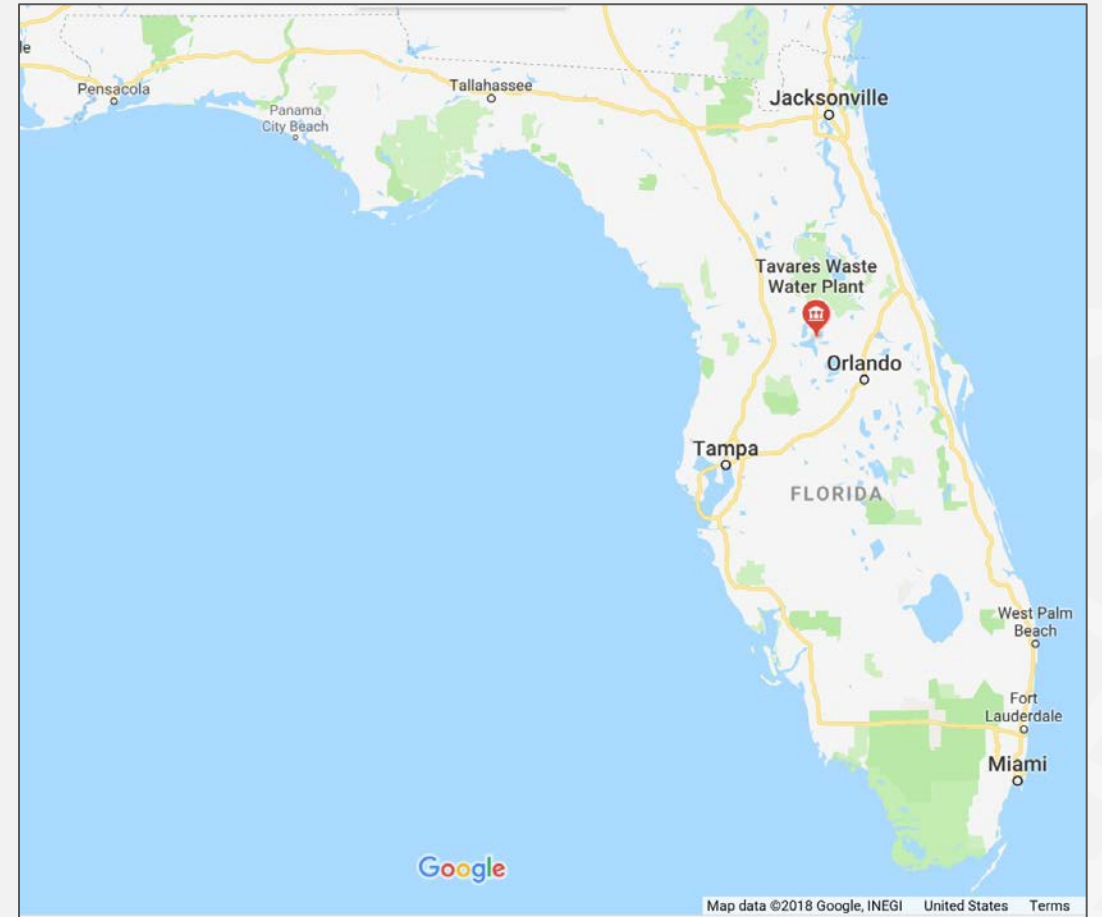- What question are you trying to answer?

- You don't have to fill the whole lake or catch all the fish at once

Case Study: Tavares, FL

Monthly Electric Bills at the WRRF

$35,000/month in 2006

$25,000/month in 2010

$18,000/month in 2012

Phase 1: Electricity Bill Reduction at WRRF

- Easy Answer: Shut it Off
  - ➤ But risk permit compliance

- Focused on solids handling improvements – aeration and pumping upgrades already completed

- Results: reduction in BFP processing time, chemical use, aerobic digestion air, and filtrate pumping

Phase 2: Electricity Bill Reduction at WRRF

- Joined Electric Utility Program
  - Unit cost reduction for operation on emergency generator power during brownout periods
  - Generator tied to SCADA with remote access, which allows full changeover within five minutes

- Needed to run generator anyway to meet FL DEP regulations; was able to comply and gain financial benefit
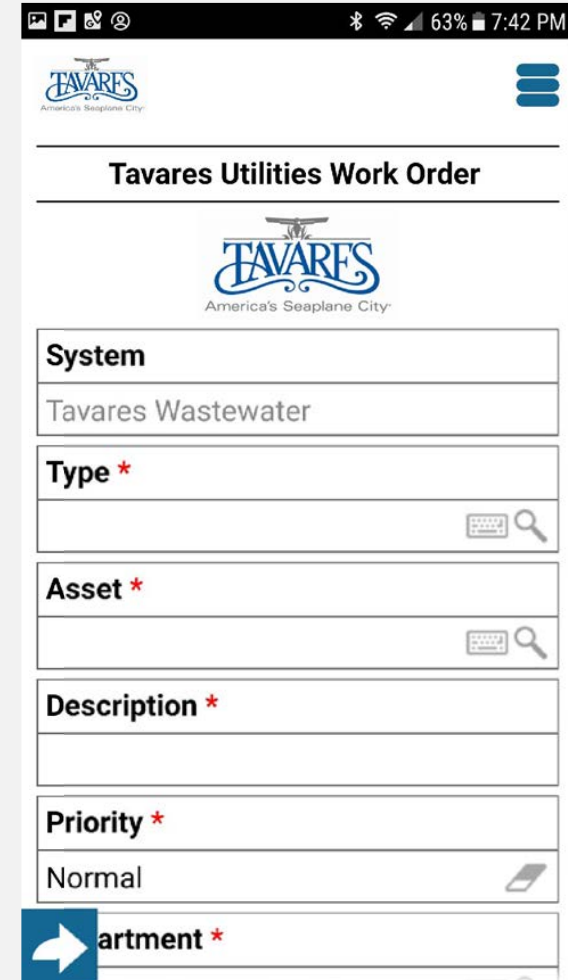
Tavares, FL – Data Integration Leads to New Insights

- 90 Pump Stations in the system

- 2008 started to collect data
  - Manually ➡ Multitrode ➡ SCADA

- Benchmarked for a year 2013-3014

- Integrated energy use data from utility companies and SCADA data
  - Identify performance issues
  - Prioritize upgrades

- **Data-driven decision making led to new insights into potential problems**

Tavares, FL – Next Steps

- The City has implemented a CMMS system on the wastewater side and is aggressively collecting data

- Using DoForms for mobile data collection with embeded pictures and GPS information

- Planned water system CMMS in Spring 2018

- SCADA Integration into CMMS for real time data

Create Culture of Data-Driven Decision Making

- Define Value

- Collect Accurate Data

- Empower the People

Emanuel Gottlieb Leutze *Washington Crossing the Delaware* 1851: This Photo by Unknown Author is licensed under CC BY-SA

Case Study: City of South Portland, ME

- Asset Management Enhancement Plan

- Builds on a strong foundation – GIS

- Joint project with Water Resource Protection Department and Public Works Department

Mission: *Integrate long-term standard operating procedures to analyze and prioritize the management of city-wide assets and data to support cost efficient decisions.*

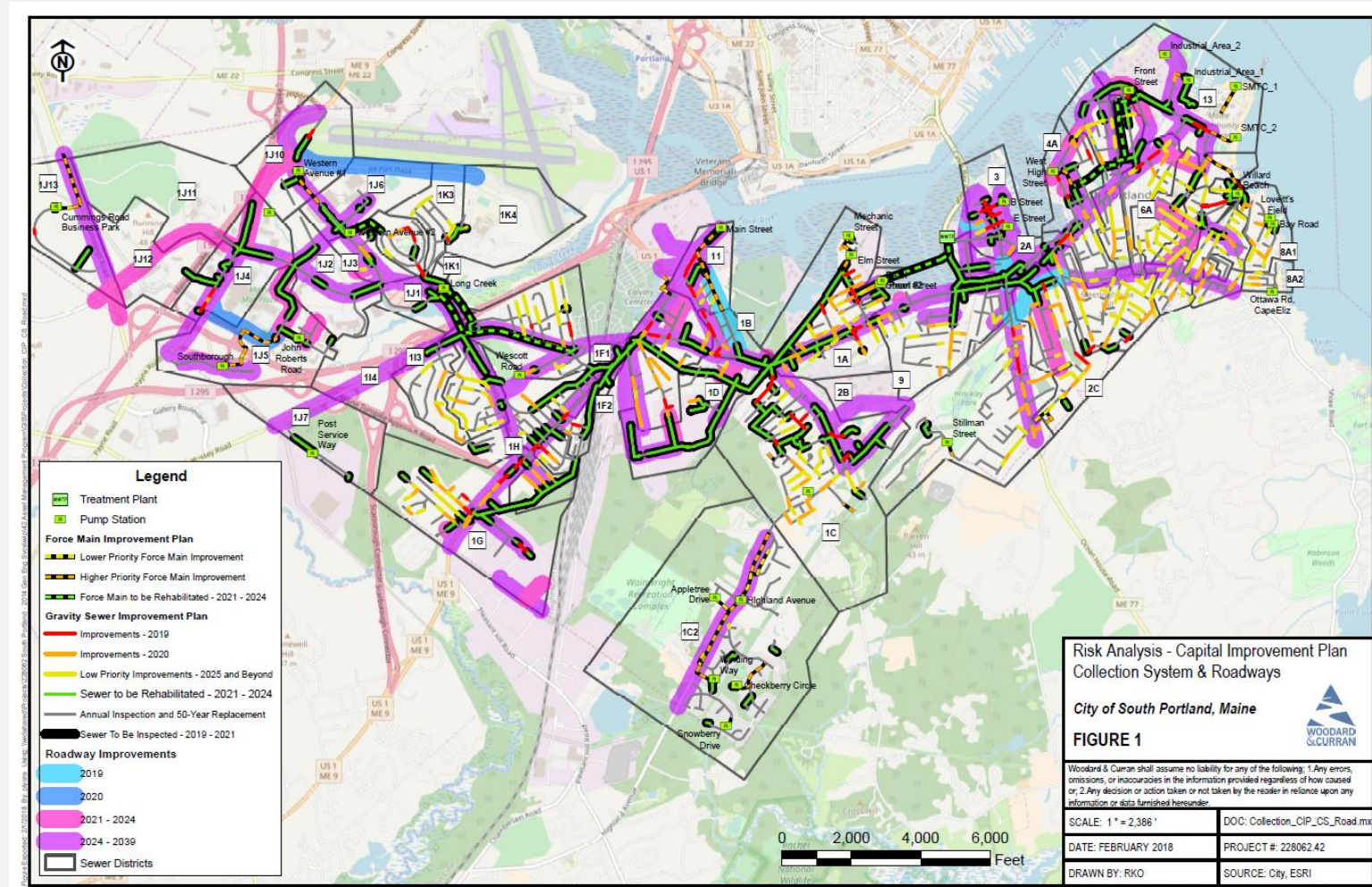**Vision:** *Be a self-sustaining and fiscally responsible entity providing effective solutions for public infrastructure needs.*

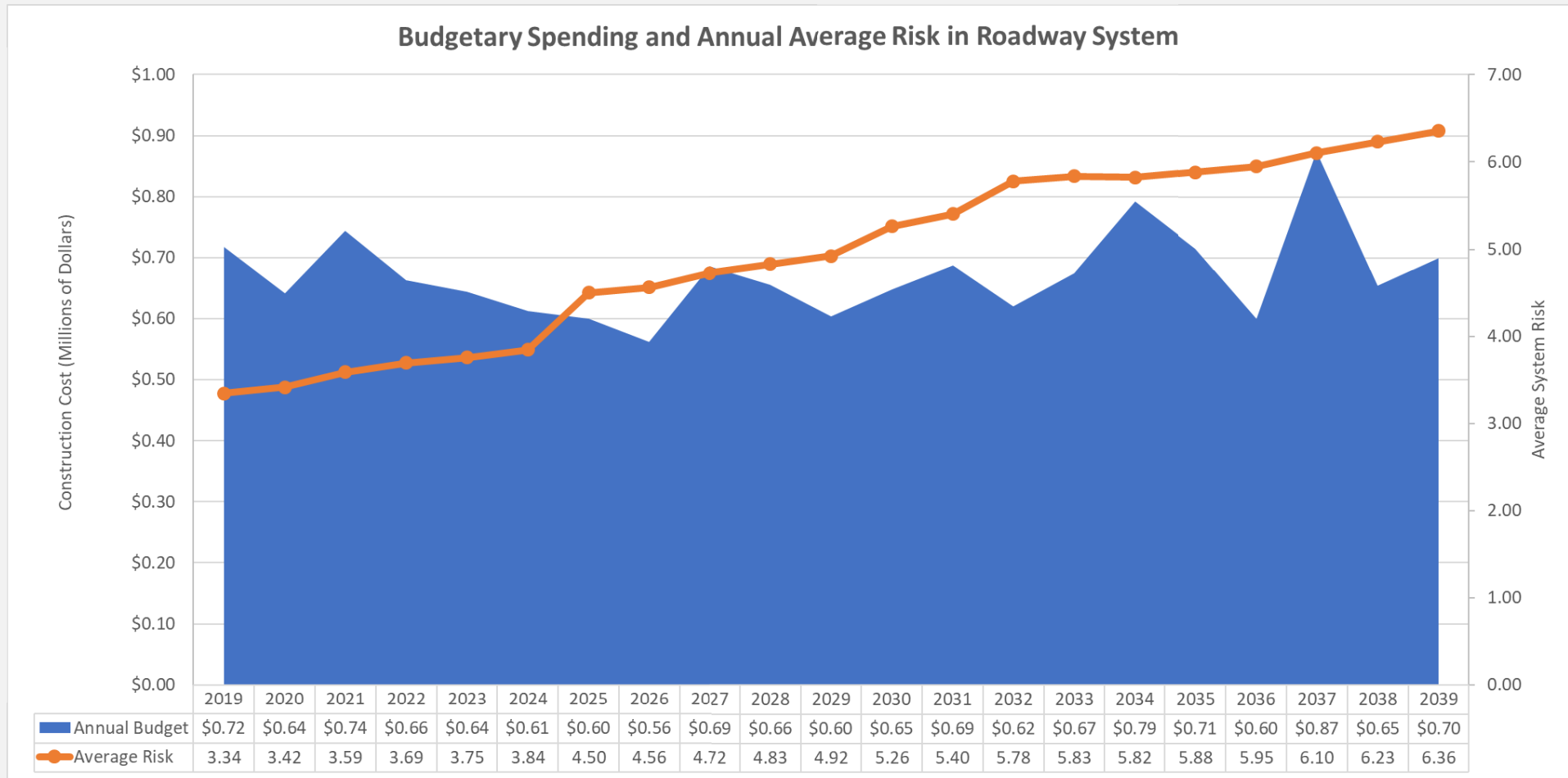# Asset Management Plan Enhancement Elements

1. Establish CoF and LoF for Roadways and Sanitary Sewer Collection Assets

2. Data and practices gap assessment

3. Level of Service standards and goals

4. Defensible, data-driven capital planning

5. CMMS
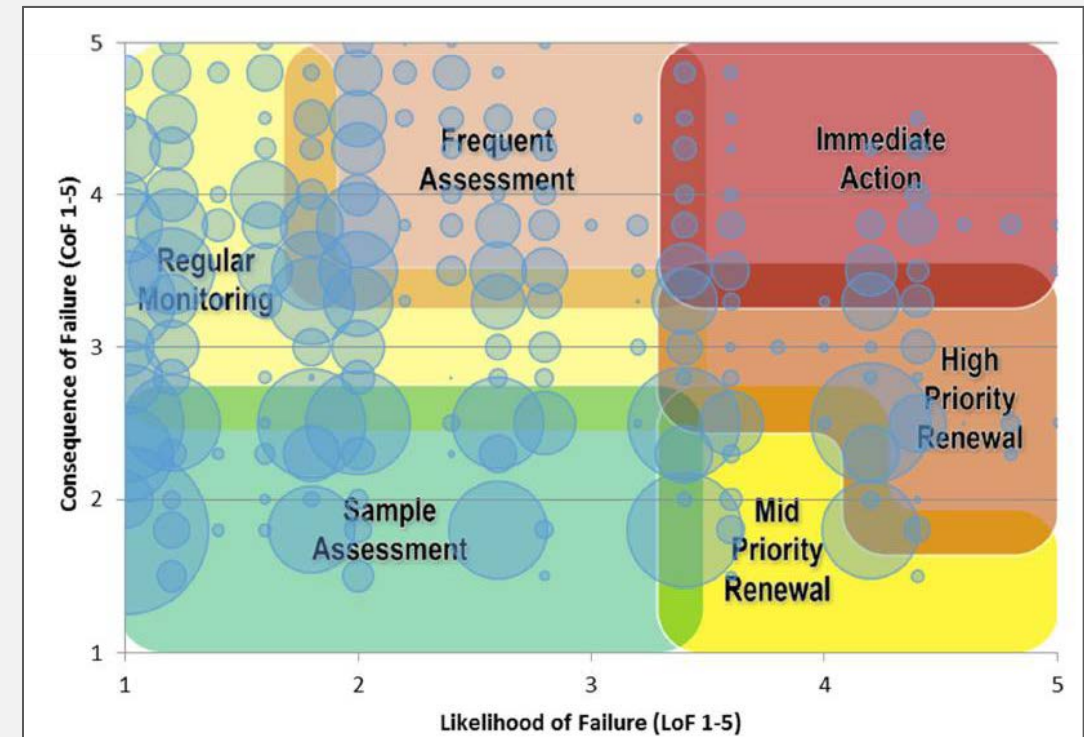
Roadway & Sewer Risk Analysis Results

This Data Tells a Story

Budgetary Spending and Annual Average Risk in Roadway System

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Annual Budget	$0.72	$0.64	$0.74	$0.66	$0.64	$0.61	$0.60	$0.56	$0.69	$0.66	$0.60	$0.65	$0.69	$0.62	$0.67	$0.79	$0.71	$0.60	$0.87	$0.65	$0.70
Average Risk	3.34	3.42	3.59	3.69	3.75	3.84	4.50	4.56	4.72	4.83	4.92	5.26	5.40	5.78	5.83	5.82	5.88	5.95	6.10	6.23	6.36

Data Management Plan
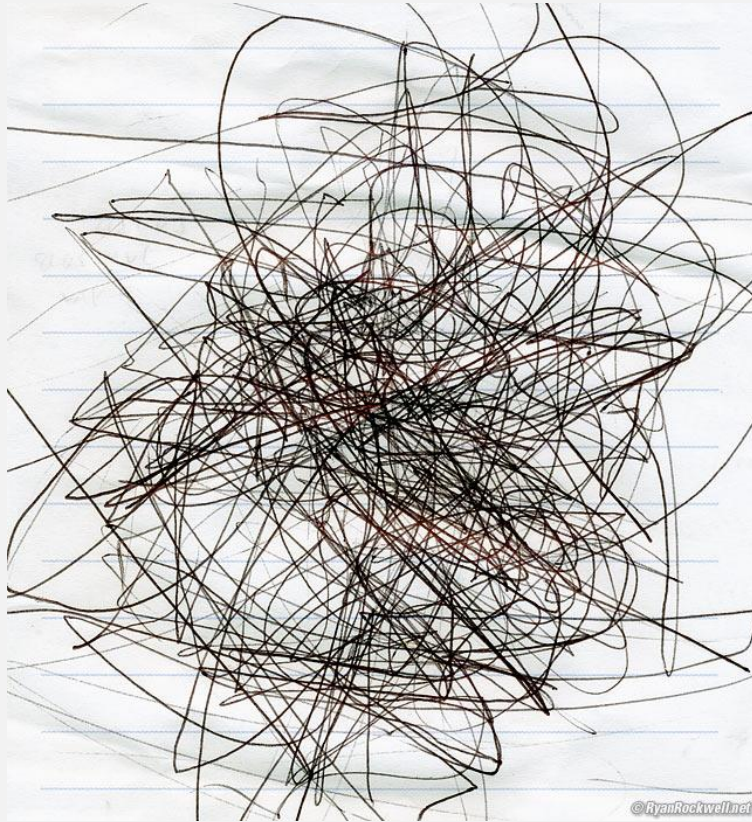
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- What data to collect

- Technology for collection and analysis

- Who manages - governance

- Data quality

Without it, run risk of not being able to see what the data are trying to tell you

Acknowledgements & Discussion

- **City of Tavares, FL**
  - Utilities Department - Brad Hayes, Director

- **City of South Portland, ME**
  - Water Resources Protection Department
  - Public Works Department

- **Woodard & Curran**
  - Bob Amaral
  - Megan McDevitt, P.E.

Winslow Homer, *Breezing Up (A Fair Wind)* 1873-76: This Photo by Unknown Author is licensed under CC BY-SA

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