Planning for Resilience:
Using Resilience Thinking to Thrive

GBB Introduction

Defining Resilience

Resilience in Solid Waste Management Planning

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SOLID WASTE MANAGEMENT CONSULTANTS

VRA & SWANA 2020 Webinars
September 3, 2020

Gershman, Brickner & Bratton, Inc.

Our Vision

We believe in a world where **discarded materials are used as resources** rather than wasted – for the benefit of communities and the environment.

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Our Mission

We help our clients solve solid waste management issues by providing **innovative**, **responsible**, **sustainable**, and **economical** strategies and solutions for the benefit of communities and the environment.

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Innovative, Sustainable Solutions for Solid Waste Management

- We work in partnership with our clients to develop **innovative, cost-effective approaches that achieve measurable results**
- As an international management consulting firm, we help public- and private-sector organizations craft **practical, customized and technically sound solutions for complex solid waste management challenges**
- Headquartered in McLean, VA, GBB has focused exclusively on solid waste issues since 1980

GBB's Comprehensive Services

Strategic Solid Waste Management / Feasibility Studies	Sustainability & Resilience	Waste Conversion Technology / WTE	Curbside Collection & Route Optimization
Procurement & Negotiation	Material Recovery Facilities / Transfer Stations	Stakeholder Engagement & Public Education	Recycling, MSW & C&D Waste Characterization Studies
Financial Evaluation & Market Analysis	Design Review & Construction Monitoring	Organics Recycling / Composting / Anaerobic Digestion	System Administration / Landfill Mgmt. Consulting

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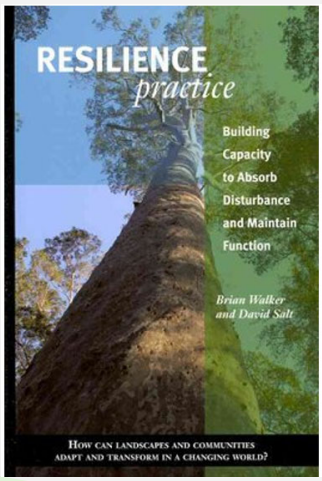
Resilience Thinking in Systems Planning



- "The **capacity of a system to absorb disturbance and reorganize** so as to retain essentially the same function, structure, and feedbacks—**to have the same identity**"
- In other words: "…resilience is **the ability to cope with shocks and keep functioning** in much the same kind of way"

Source: Walker, B. H., & Salt, D. A. (2012). *Resilience Practice: Building Capacity to Absorb Disturbance and Maintain Function.* Washington, DC: Island Press.

Resilience Thinking in Urban Planning

PIONEERED BY THE ROCKEFELLER FOUNDATION

100 RESILIENT CITIES

"The **capacity of individuals, communities, institutions, businesses, and systems** within a city **to survive, adapt,** and **grow** no matter what kinds of **chronic stresses** and **acute shocks** they experience"

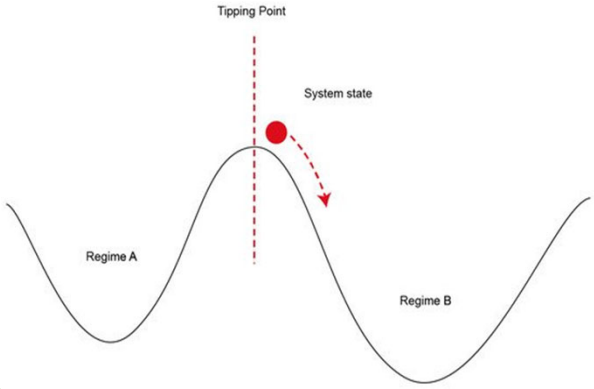
Source: Rockefeller Foundation's 100 Resilient Cities initiative. (2013). Retrieved from: https://www.100resilientcities.org/

Resilience Thinking in Climate Adaptation Planning

Sources: (1) National Oceanic and Atmospheric Administration. (2014). *US Climate Resilience Toolkit*. Retrieved from: https://toolkit.climate.gov/sites/default/files/Antioch_Workbook_v2_0.pdf
Graphic Source: Robertson, M. (2019, August 20). Are you ready for a wildfire? *AAA Northern California, Nevada & Utah*. Retrieved from: https://calstate.aaa.com/via/house-home/wildfire-preparedness

Limits to Resilience: Thresholds

Threshold: critical point at which conditions change so drastically that the system takes on a **new identity** – also called a **"tipping point"**



- **Chronic Stresses**: ***persistent*** challenges
- **Acute Shocks**: ***sudden*** events

Graphic Source: Rauter, M., Thaler, T., Attems, M., & Fuchs, S. (2019). Obligation or Innovation: Can the EU Floods Directive Be Seen as a Tipping Point Towards More Resilient Flood Risk Management? A Case Study from Vorarlberg, Austria. *Sustainability (11)*19, 5505. Retrieved from: https://doi.org/10.3390/su11195505

Thresholds & General vs. Specified Resilience

General resilience

- The system's capacity to manage disturbance and prevent reaching a threshold
  - The capacity of the system to absorb **disturbances *of all kinds*** so that ***all parts* of the system** keep functioning as in the past

Specified resilience

- How far the current state of a system is from a threshold
  - The resilience of a ***specific* part of the system** to a ***specific* type of shock or disturbance** to the system

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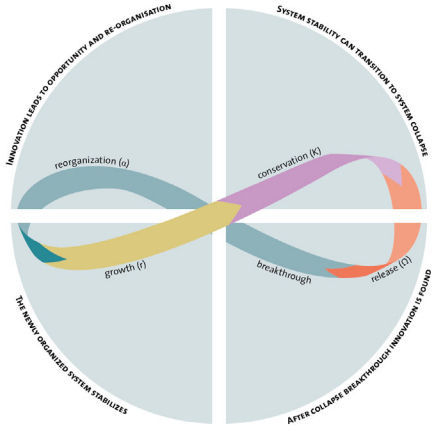
Key Characteristics of Resilient Systems

Complex Adaptive System



An adaptive cycle, represented here, consists of four stages of stabilization (r), conservation (K), destruction (Ω), and reorganization (α). Periodic phases of destruction (release) give opportunities for reorganization.

- **Adaptive** and **dynamic**
- **Capacity to transform,** not remain static
- Able to **absorb acute shocks** and **address chronic stresses** to prevent passing a threshold
- Incorporates strategies such as **reducing resource efficiency** and **increasing redundancy** to boost resilience

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Graphic Source: Center for Security Studies. (2018, July 26). Complex Adaptive Systems. *CSS Blog Network.* Retrieved from: https://isnblog.ethz.ch/international-relations/complex-adaptive-systems

Resilience ≠ Sustainability

Resilience
- Risk Reduction
- Diversity & Redundancy
- Reserves

Sustainability
- Resource preservation & efficiency
- Intergenerational justice

System preserves resources for the future *and* can withstand shocks and adapt over time

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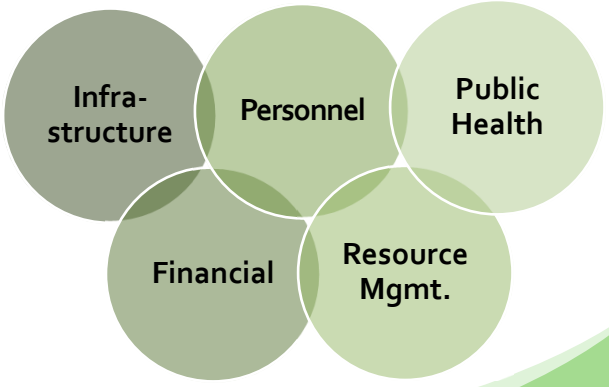
Planning for Resilience

Resilience Planning Steps:

- **Explore** Hazards
- **Assess** Vulnerability & Risks
- **Investigate** Options
- **Prioritize & Plan**
- **Take Action**

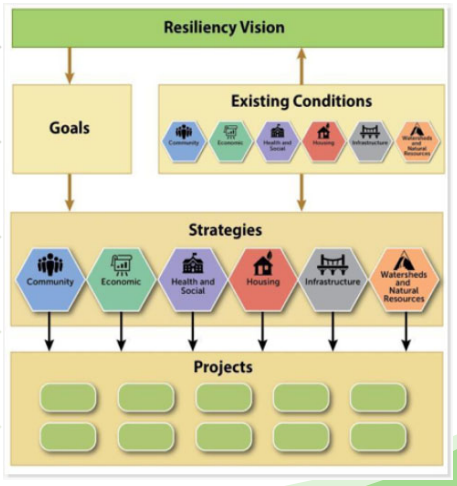
Common Areas of Vulnerability or Risk:



Source: National Oceanic and Atmospheric Administration. (2014). *US Climate Resilience Toolkit.* Retrieved from: https://toolkit.climate.gov/sites/default/files/Antioch_Workbook_v2_0.pdf

Planning for Resilience

- **Establish** a **vision** of resilience
- **Evaluate** the current condition of your solid waste system
- **Identify** risks
- **Develop** forward-looking goals
- **Incorporate** resilience into strategic planning



Source: *The Colorado Resiliency Resource Center's Resiliency Framework.* (2015). Retrieved from: https://www.coresiliency.com/resiliency-frameworks

Planning Strategies for Chronic Stresses

Chronic Resilience Strategy #1

Build **strong materials management systems** through **financial and policy incentives**

Chronic Resilience Strategy #2

Implement financial models that disincentivize wasting

- Establish **fees and rates that reflect the true costs of materials management**

Planning Strategies for Chronic Stresses

Chronic Resilience Strategy #3

Promote recyclables and organic waste diversion for residents and businesses

Chronic Resilience Strategy #4

Encourage sustainable purchasing strategies for department and vendors

Graphic Source: Klingbeil. A. (2017). *Calgary will start rolling out green cart composting in June. Here's what you need to know. The Calgary Herald*. Retrieved from: https://calgaryherald.com/news/local-news/calgary-will-start-rolling-out-green-cart-composting-in-june/

Planning Strategies for Chronic Stresses

Chronic Resilience Strategy #5

Promote diversity of infrastructure by creating recovery and recycling facilities and programs

- **Waste diversion** programs promote more **economic activity** and **employment opportunities** than **landfilling materials**

Graphic Source: Repair Café Palo Alto, Inc. (2012). Retrieved from: http://www.repaircafe-paloalto.org/

Planning Strategies for Acute Shocks

Acute Resilience Strategy #1

Ensure **basic parts** of the system have **adequate capacity**

- Understand the **total processing capacity** of the solid waste management system
- Add **modularity** to increase **capacity** when needed

Acute Resilience Strategy #2

Include **emergency spending funds** in solid waste management budget

- Define protocols that allow **quick access** to reserves

Planning Strategies for Acute Shocks

Acute Resilience Strategy #3

Revise **Emergency Operations & Management Plan** to include a reference to City's Solid Waste Management Plan

Acute Resilience Strategy #4

Update **Solid Waste Management Plan** to include **emergency response protocols**

- E.g., Disaster Debris Management Plan

Graphic Source: Urgo, J. L. (2013, February 20). Handful of shore residents find devastation in final town to reopen. *The Philadelphia Inquirer*. Retrieved from: https://www.inquirer.com/philly/news/new_jersey/20130224_Handful_of_Shore_residents_find_devastation_in_final_town_to_reopen.html

Planning Strategies for Acute Shocks

Acute Resilience Strategy #5

Create protocols to deal with waste when **infectious materials are unknown**

- Improve **safety culture** in solid waste facilities through **better PPE and protocols** concerning management of unknown infectious and hazardous materials

Graphic Source: Jitendra. *Disposal of Medical Waste*. (2011). *Waste Management*. Retrieved from: https://www.wastemanagement.in/disposal-of-medical-waste.html

Additional Resources

- The Continuous Improvement Fund (2020). *Guidebook for Developing a Waste Management Service Contingency Plan*. Retrieved from https://thecif.ca/wp-content/uploads/2020/04/CIF-Contingency-Plan-Guide-for-Service-Disruptions.pdf
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Thank you!

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