Planning for Resilience

A Conversation with Steve Moddemeyer

By Hannah Buehler

HB: What are you learning about resilience doing the work that you do?

SM: Most of our attention in the practice of architecture and planning is very much centered around the near-term demands of today. It is difficult to look too far ahead because projects must address today's climate, today's technology, today's market, and today's financing. When technology, demand, and financing are short-term focused, innovation and resilience get short shrift. We continue to plan for, design, and build assuming that weather extremes will continue to be rare. Many of the strategies that we've relied on in the past are now misinforming us of our risks and of a safe pathway forward. When we do this, either willfully or inadvertently, we make ourselves more vulnerable. The result is that our investments don't deliver the service that we expect. This mismatch emerges during extreme events with the result that we needlessly compound the misery for folks whose lives and livelihoods depend on that infrastructure and who live and work in the buildings that infrastructure is designed to serve.

HB: As you're helping people and organizations to navigate uncertainty, what attributes of resilience do you use to inform your work?

SM: I became interested in resilience science when the International Water Association (IWA) based in The Hague, Netherlands hired me in 2008 to help them launch a global program called "Cities of the Future." For about three years, I worked with IWA members and staff to convene meetings in regions of the world including Turkey, China, Korea, Canada, and Europe. In the meetings we'd examine what forward-looking people in infrastructure design and city planning were doing and how we can all learn from them. Seeing on-the-ground built examples where people were planning for a climate-changed future demonstrated these ideas are not only not crazy, but already being implemented at full scale. This was more than a decade ago. The United States was an outlier—even then.

During that time, I came across the **Stockholm Resilience Center** founded by **Carl Folke**. I resonated with their approach to socio-ecological resilience. They look at how ecological and social systems adapt to change and persist over time, through good times and tough times. Istanbul is a great example of a social system that adapts and persists over time.

Istanbul has been a city for 5,000 years. It is thriving and dynamic. It has endured and rebounded from multiple pandemics, major wars, name changes, regime changes, and it still persists. So what is it that makes a city grow and thrive through thousands of years? Are there special attributes or systems that enable that? The same question arises

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with ecological systems. Any ecosystem or species that is with us today has managed to navigate and persist through all kinds of change: through glaciation, wildfires, disease, drought, floods, hunting, pests, pestilence… through everything. So what is it that makes them able to keep their identity and manage to navigate through those thousands and thousands of years?

Back in the late 1960s and early '70s, Canadian ecologist C.S. "Buzz" Holling had a great insight. He realized that it is not the ability to grow and prosper that makes a species or an ecosystem persist through time, rather it is their ability to keep their identity through times of loss and change. Resilience is not simply the ability to resist change, but to recover from it with your identity intact. In 2015, I drafted a paper *Applying Elements of Resilience to Prioritization and Decision Making* and asked Mike Jones of the **Swedish Biodiversity Institute** to be a co-author. It hasn't been published, but it outlines eight key attributes of resilience of particular importance to planners.

Eight Attributes of Resilience:

1. Diversity
2. Modularity
3. Connectivity
4. Storage
5. Feedback
6. Story
7. Trust
8. Self-organizing

The first principle is **diversity.** Diversity of species, food sources, ecological niches, even diversity of methods, systems, and cultures are all essential attributes of resilient systems. The broader the range of diversity, the more likely the system has the capacity to adapt to change. For planners, this means that if we only take one point of view, or one person's life experience into account, then we're not hearing all the other perspectives that can cast clarifying light or open up new perspectives on the challenges we face. It is often that the ideas that are on the edge are most relevant for survival when conditions change. Diversity is not just a good idea culturally, or as a nation. It is a fundamental attribute of the capacity for a system to be resilient.

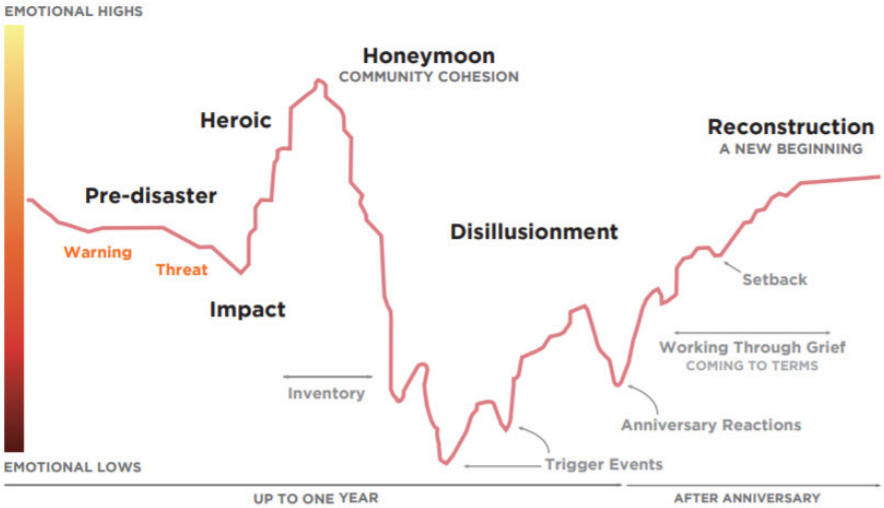
The second attribute of resilient systems is **modularity.** When we find a pattern that works, it makes sense to find ways to replicate that pattern in a smart way. Systems and species that survive through change have modular approaches that can work in various settings and can be repeated when the conditions are right. Modularity is closely tied to a distributed systems approach in infrastructure, where multiple modules offer services (or ecosystem services) that can dot the landscape. If one module winks out because of some disturbance, the others continue to function and can provide capacity to reestablish the affected areas.

Connectivity is the third attribute. If we're under-connected, then we risk being isolated and vulnerable. If we are over-connected, then we are vulnerable to contagion and exhaustion. It's when we maintain a balance of strong and weak links of connectivity then we can acquire resources from across distances and share insights. For example, the internet helps us to connect and we can learn more about what's going on in the world, but that's just one mode of connection. Connecting with where we are—right here in this place experiencing it with our senses—is another essential pathway for connectivity.

Storage is fourth. Storage that is distributed throughout a system allows for a resilient system to maintain viability when disaster strikes. The importance of storage became obvious during the pandemic when our just-in-time supply chains collapsed. Personal protective equipment (PPE) was not in adequate supply and the United States did not even have the capacity to make our own PPE as the pandemic impacts unfolded. We valued efficiency (and profitability) for the good times, but failed to recognize that it's the tough times that demonstrate if we have the capacity to be resilient. For individual families and businesses, storage can refer to financial savings and access to credit. Over and over it has been shown that minimal savings and limited access to credit can cripple the recovery of an impacted community.

Systems that have storage have better odds of survival and can speed recovery. Some communities are creating *"resilience hubs"* by retrofitting community halls, schools, or even building new facilities within walking distance of neighborhoods to store energy, water, food, tools,

Phases of Disaster



Source: Zunin/Meyers, as cited in Training Manual for Mental Health and Human Service Workers in Major Disasters, U.S. Department of Health and Human Services (2000).

and communication equipment. Communities need to be able to store enough that they can continue essential community functions on their own for some length of time, get information when mobile phone grids are down, and share resources with friends and neighbors when things get dicey.

The fifth aspect of resilience is **feedback.** Systems with resilient capacity are able to sense, hear, and incorporate new information when it comes their way. Failing to be sensitive to and responsive to feedback is a surefire way to become vulnerable to change.

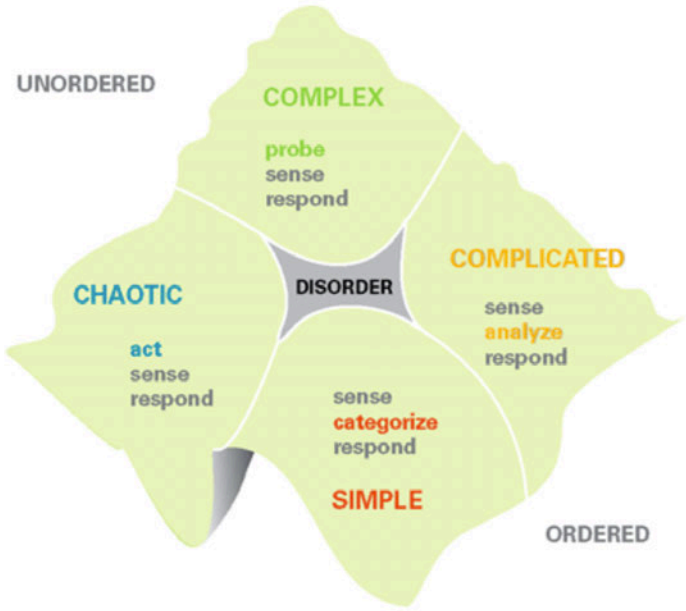
The sixth attribute is **story.** What does the story have to do with ecological systems and species? If we know the stories of salmon, we begin to know salmon: their life history, their will to survive, their ability to shift their bodies to salt water and then return home again to spawn in freshwater is how we know who they are. They are salmon and they bring wonderful gifts to us and the entire ecosystem.

We humans have our stories, too. The stories we tell ourselves about ourselves are a key element of how we maintain our identities. The cultures we grow in and the ceremonies we learn keep our stories alive through the generations. We share ceremonies and origin stories to remind ourselves of who we are and the breadth and depth of how we got here.

Community leaders are encouraged to remind impacted communities of "who we are." They retell our own story to us. They say we are going to work together to respond and recover. They say we will not stop until everyone that can be saved is saved. They say we are all in this together. And they mean it.

Trust is the seventh attribute. Trust is more than an element of social systems; it is also an attribute useful for species survival. For us humans, we know that when trust is broken, our ability to recover from setbacks can take longer or maybe forever.

So how can we repair trust when it is broken? Whole books have been written about that. A shorter answer is that trust is the result of three things: 1) demonstrating consistent behaviors of trustworthiness over time; 2) providing clear and unbiased communication; and, 3) respecting others, which means to re-spect i.e., relook at the outcomes of our actions on others and use that feedback to take responsibility, and when needed, begin to repair those outcomes.



The Cynefin framework

An aphorism we hear from emergency managers is, "During a disaster event is not the time we want to be exchanging business cards." They know local people need to know each other before disaster strikes so they know who they can trust *after* the disaster. That is important because disasters attract lots of help: some altruistic and effective, some incompetent, and some opportunistically malevolent. A pre-disaster strategy is to create opportunities for all different strata of a community to meet and work together, preferably when the stakes are low. This enables the local community with the ability to know who to trust so that they can safely leverage their diversity when they need it the most.

Self-organization is the last attribute in our list. Systems that self organize are more capable of being resilient and adaptable to changes in conditions. This distributes decision-making up and down the system and creates the opportunity for creative solutions to emerge. A resilient system has people that feel empowered to act and make decisions at every level.

Managing these kinds of self-organized impulses is not easy in the aftermath of a disaster, as initial response methods are command and control based. Command and control responses make sense when things are under extreme stress because someone in charge creates a sense of order despite the chaos of the disaster. Yet command and control has a relatively short shelf-life in many communities because most individuals, families, and businesses prefer to make their own decisions. The transition from command and control during response to distributed decision-making during recovery can often be uneven or awkward. The skills required to respond to a disaster in real time tends to be different than the skills needed to work with survivors and community members who must make their own recovery choices about their own future.

Taken together, these eight attributes of resilient systems can be thought of as a checklist for pre and post-disaster planning. We can evaluate our everyday spending on capital, operations, and investments against these attributes. Perhaps we can even use them to reduce our vulnerability, reduce future suffering and loss, and build stronger and more equitable communities.