SRI@JB

Science and Resilience Institute at Jamaica Bay

Improving resilience through science and learning

Fact sheet

Research

SRIJB advances a coordinated program of research on the physical, social, and ecological systems of the bay and its watershed and how they change over time. The questions in need of answers are many and varied. How does water quality in the bay change over time? How do salt marshes and other ecosystems respond to changes in water quality and future sea level rise? How have Bay communities recovered from the effects of Hurricane Sandy? How do different groups understand the resilience of Jamaica Bay and envision its future?

A few themes define current research efforts:

- Understanding ecosystem resilience
- Improving water quality
- Storm damage reduction
- Community resilience
- Policy, planning, and adaptive management
- Monitoring the pulse of the bay's systems
- Integrated systems modeling
- Knowledge coordination and information management

To learn more about projects in each research area, please visit our website at http://www.srijb.org/research-projects/

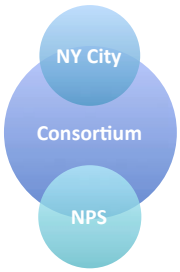
Fast facts

Research funding	More than $4 million
Capital funding	More than $9.5 million
Program office	Located at Brooklyn College
Permanent facility	Planned for Floyd Bennett Field
Participation	More than 14 public agencies and 12 NGOs

Partnership

SRIJB was established in 2013 as a partnership among a consortium of top-tier research universities, the City of New York and the National Park Service.

- City University of New York
- Columbia University
- Cornell University
- Rutgers University
- NASA Goddard Institute for Space Studies
- New York Sea Grant
- Stevens Institute of Technology
- Stony Brook University
- Wildlife Conservation Society



SRIJB works with different groups–coastal communities, public agency decision-makers, research networks–to create and translate knowledge that can be used to help improve the resiliency of estuary life in Jamaica Bay and beyond.

The Institute extends the reach of science through a few complementary forms of public engagement. Activities include coordinating venues for inter-agency dialogue and learning, facilitating community engagement around science, supporting decision-making with expertise and new tools, and communicating the latest research to the public.

To learn more about our activities, please contact us at info@srijb.org or by phone at (718) 951-5415. More information can also be found on our website at www.srijb.org.

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What is resilience?

For communities around Jamaica Bay, Hurricane Sandy's landfall on October 29, 2012 was a tragic reminder of how much damage a large-scale and rapidly moving disturbance can make. Lives were lost. Transportation, food, and energy were disrupted. Physical and natural infrastructure was destroyed. But successful stories of recovery in the aftermath of Hurricane Sandy were a more hopeful reminder of the many ways that people, plants, and animals can potentially re-group, recover, and sometimes thrive in the face of adversity. In brief, they may have resilience.

The complexity of systems

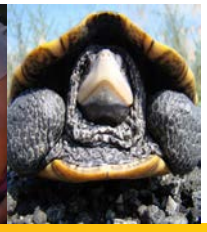
In the natural, physical, and social sciences, resilience refers to the capacity of a complex system to recover from disturbance. The urban watershed of Jamaica Bay is an example of a complex system. People, plants, and animals are tied together in intricate and dynamic exchanges with the waters, land, air, and built infrastructure that support life. Complex systems such as these are always being disturbed, whether it is a high-intensity shock such as a hurricane, a series of shocks such as cycles of capital investment and disinvestment, or a long-term lower intensity stress such as sea level rise or changing water quality. In the face of such disturbances, a highly resilient system will be able to bounce back from a shock and steadily adapt over the long-term. In contrast, another system may be less resilient to a similar disturbance or reach a tipping point after which it is unable to regroup and recover in a recognizable form.

Resilience science

To better understand the way complex systems work requires a unique approach that can make connections across physical, social, and ecological sciences. To better understand the resilience of salt marshes in Jamaica Bay, for example, may require physical science to describe the ways plants uptake chemicals in water, ecological science to describe how communities of plants adapt to changes in the environment, and social science to elaborate the ways people make decisions about conserving water quality or ecosystems. It may require someone to set up machines to monitor changes in the chemical and physical inputs to the salt marsh and another to develop mathematical models to represent changes. Together, scientists may develop metrics and indicators as meaningful measures of the salt marsh as a system, its function, and its position with respect to system-level thresholds or tipping points.

Putting resilience into practice

To improve resilience, we need to better understand how systems respond to disturbance but also make decisions about what constitutes well-being and what system interventions might work. This is not a straightforward effort. Resilience in practice is interpreted in various ways. Ecologists, for example, extend resiliency practice to the restoration of coastal wetland habitats that can help strengthen the capacity of the ecosystem to absorb stresses or shocks. Resilient local ecosystems can support well-being by protecting biodiversity, reducing natural disaster risk, and offering recreation and natural amenities. Distinct from ecologists, engineers often emphasize a different aspect of resilience. They may envision resiliency practice as a structurally defensive notion—for example, building seawalls or abatements to defend against storm surge pushing into the bay. Furthering the complexity, communities of residents may have a still different concept of resiliency practice that focuses priority on strengthening the capacity of the human community to cope with stressors and shocks. As a partnership among diverse groups and people, the Institute seeks opportunities to engage and harmonize the many approaches to resilience. The Institute works with many different groups to improve understanding of how different systems function and change. It helps these groups design and test the effects of different interventions and to help make decisions about what values should prioritize action. Putting resilience into practice requires a particular approach to management that is open to innovating, experimenting, learning, and adapting as new information becomes available. Addressing this need is a key goal of the Institute.



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