



TOPIC TALK

ENVIRONMENTAL RISK MANAGEMENT CHALLENGES WITHIN THE LENS OF CLIMATE CHANGE

ED MORALES

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Environmental Risk Management Challenges

Within the Lens of Climate Change

2026 California Land Recycling Conference: Imagine,
Innovate, Implement

Sep/Oct 2026



Agenda

Climate Impacts Defined

Properties Most at Risk

Risk Management Strategies

Climate Due Diligence

Concepts of Community Based & Parametric Insurance

Hybrid Insurance Program to Mitigate Environmental Risks

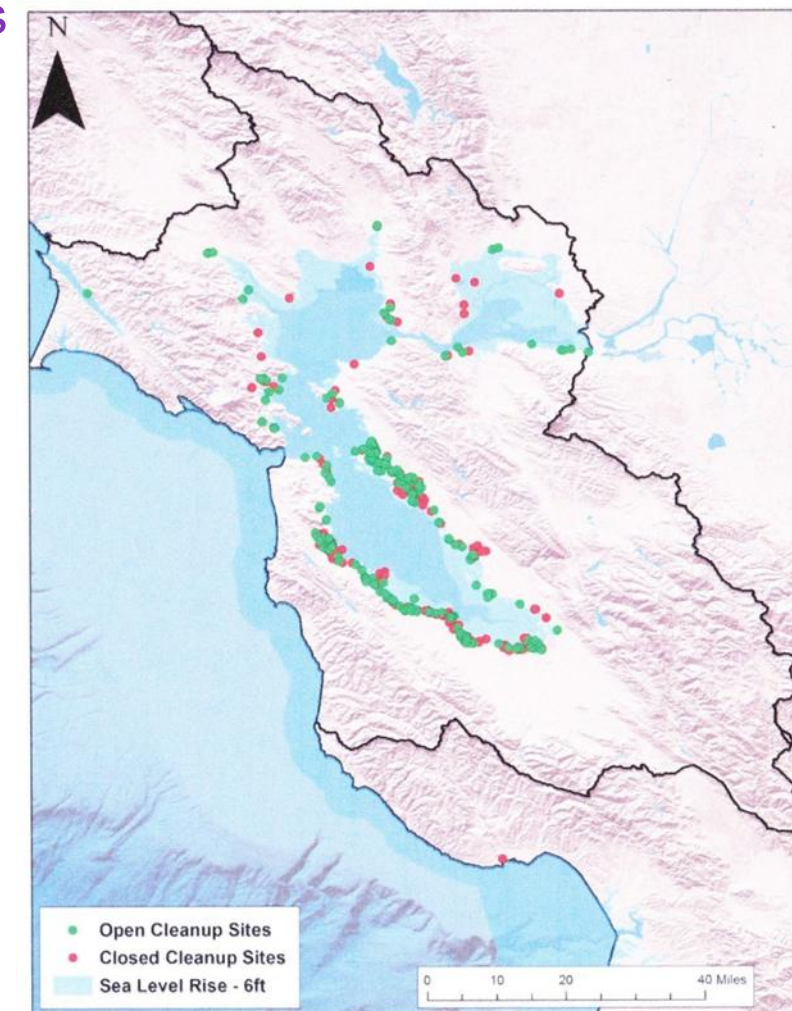
What are the Environmental Issues with Climate Change?

Impacts of Sea Level Rise (SLR) on Contaminated Sites

Contamination from Open and Closed Sites:

- ✓ Proximity to Soil Surface
- ✓ Mobility in Water
- ✓ Toxicity to Aquatic Life

Source: SFRWQCB



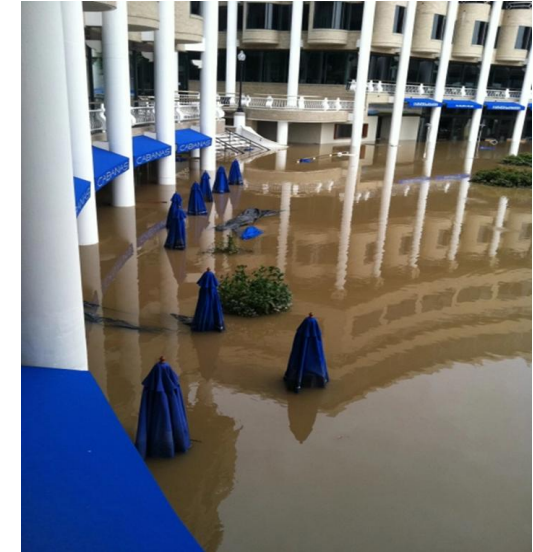
Real Estate Risks due to Climate Change

Properties at Risk: Waterfront Developments – Exposure to SLR

SLR is already impacting these developments.

This is not just a long-term issue but is an issue now.

The incremental effects are created via storm surge and flooding.



Under the Lens of Climate Change

Wildland – Urban Interface (WUI) Developments already impacted by Wildfire

- The WUI is defined as the area where houses/structures are in or near wildland vegetation, is the area where wildfires pose the greatest risk to people due to the proximity of flammable vegetation.
- Wildfires frequently burn structures in the WUI, and are most difficult to fight there.
- While fires are an integral part of many ecosystems and the Earth system as a whole, humans have changed fire regimes globally and throughout the United States, and climate change will increase fire frequency in the future, including in the WUI. *

* Proceedings of the National Academy of Sciences 2018



Under the Lens of Climate Change

Brownfield Developments are also at Risk

- In many areas across the country, waterfront developments are on Brownfields.
- Brownfields often contain residual contaminants that could potentially mobilize from the effects of SLR.
- Owners should take this into account since this is not just a long term impact but a short term impact.

Rebuilding in WUI areas are a kind of Brownfield redevelopment. Burnt structures leave a pollution mark. We are just at the tip of understanding these marks.

Managing Risks Associated with Climate Change

Permitting and Regulatory Controls – Adaptation: Can mitigate SLR risks

➤ BCDC, *Policies for a Rising Bay Project*, Final Report (November 1, 2016)

- ✓ Fill for Resilience and Adaptation – Habitat Restoration and Protection
- ✓ Fill for Resilience and Adaptation – Innovative Shoreline Solutions
- ✓ Environmental Justice and Social Equity Policies
- ✓ Adaptive Management Policies

➤ San Francisco Bay Shoreline Adaptation Atlas, SFEI & SPUR (April 2019)

- ✓ Report was funded by the San Francisco Regional Water Quality Control Board
- ✓ Establishes 30 Operational Landscape Units (OLU)
- ✓ Identifies suitable adaptation measures for the various OLU



Managing Risks Associated with Climate Change

San Francisco Bay Shoreline Adaptation Atlas, SFEI & SPUR

The Atlas defines and describes more than two dozen adaptation measures that are potentially appropriate to the Bay's OLU's. Four categories of adaptation measures are explored:

Structural, natural and nature-based measures: physical landscape features that are created and evolve over time through the actions of environmental processes, or features that mimic characteristics of natural features but are created by engineering and construction (in concert with natural processes) to provide coastal protection and other ecosystem services.

Structural, conventional physical (grey) infrastructure: physical features constructed by humans to provide coastal protection. Usually constructed with relatively hard materials such as concrete, rock, and steel, and without incorporation of biological components.

Non-structural, policy and regulatory measures: utilizing laws, policies, and regulations such as permits, zoning, and general plans to influence future land use and the built environment to manage risk.

Non-structural, financial measures: non-physical ways of creating financial incentives and disincentives to enable implementation of other structural and policy measures.

Managing Risks Associated with Climate Change

Climate Due Diligence – Should it be part of Your Environmental Due Diligence?

ASTM E3429-24

STANDARD GUIDE FOR PROPERTY RESILIENCE ASSESSMENT

4.1 This guide is intended for use on a voluntary basis by parties such as real estate investors, owners, operators, lenders, and insurers (users) who wish to better understand the natural hazards, including those made more extreme by climate change, that may be affecting a property. A user may include a purchaser, tenant, owner, investor, lender, developer, designer, building professional, or property manager of the target property. This guide outlines procedures for conducting a PRA for specific users, considering the user's requirements.



Climate Diagnostic – Analytics Group

Climate Check:

<https://climatecheck.com/>

Managing Risks Associated with Climate Change

Will Insurance be there in the long term to mitigate Climate Change risks?

Although insurance exists today to mitigate financial losses associated with flood, fire and pollution.

We cannot predict the future availability of this coverage.

As flooding becomes more chronic, flood insurers may decide not to insure some areas. This may be the same with fire losses.

The pollution marketplace may chose to alter coverage and perhaps offer shorter terms.

In 2023, the estimated total economic costs of direct physical damage and net-loss business interruption from global natural perils were USD357 billion. The private insurance market and public insurance entities covered an estimated USD123 billion of that total.

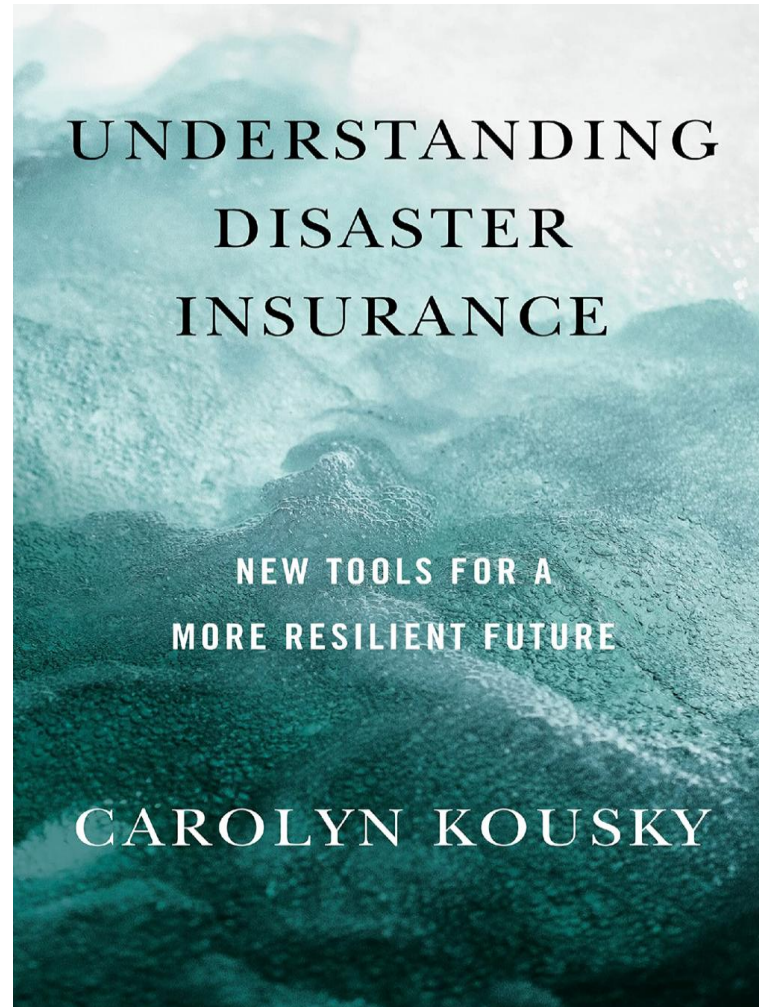
- Gallagher Re

Managing Risks Associated with Climate Change

Alternative Risk Transfer – Solutions for Climate Change Risk?

Understanding Disaster
Insurance: New Tools for a
More Resilient Future – by
Carolyn Kousky

<https://www.insuranceforgood.org/>



Managing Risks Associated with Climate Change

Community Based Insurance (Environmental or Other Risks) – How Does it Work?

Core Focus Areas

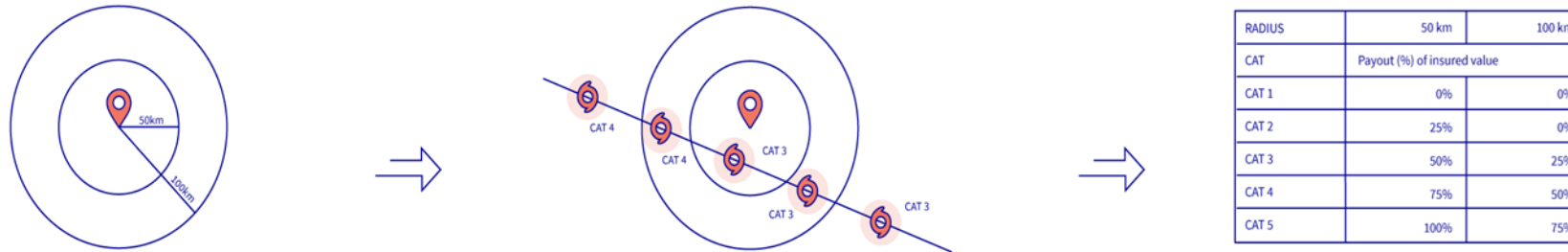
- * Climate Resilience: Funding pre-disaster risk reduction and post-disaster community recovery.
- * Equitable Access: Creating affordable protection models for vulnerable or marginalized populations.
- * Local Group Protection: Covering neighborhood associations, local utilities, and grassroots environmental non-profits.

Typical Coverages & Mechanisms

- * Shared Risk Pools: Non-profit networks or municipal groups joining together to negotiate broader terms than standalone policies.
- * Pollution & Remediation: Managing unexpected local contamination, storage tank leaks, or brownfield redevelopment liabilities.
- * Open-Source Innovation: Collaborative frameworks designed by groups like Insurance for Good(<https://www.insuranceforgood.org/>).

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Parametric Insurance – How Does it Work?



1. Insured selects radius around insured location.
2. If a Storm tracks through the radius, the Intensity is measured by a 3rd party.
3. Payout is triggered depending on the predetermined Storm Category.

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Parametric Insurance – Can it be applied to Pollution Exposures/Losses?



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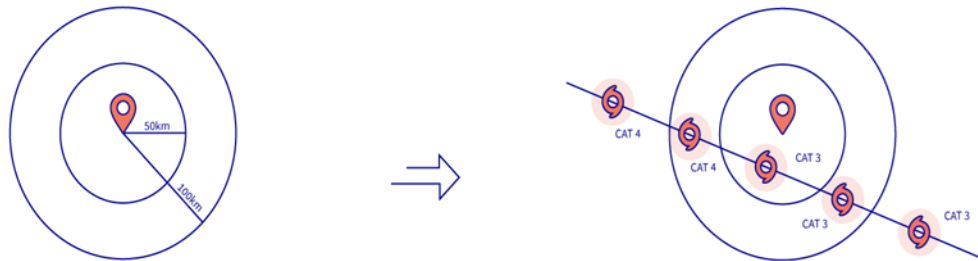
Possible New Insurance/Financial Product: Parametric Pollution Liability (NPPL)

Structure would be similar to what was already described.

Payout is based on anticipated Clean-up Costs.

Should include anticipated Tort damages such as NRD.

Consider coupling this with traditional environmental insurance to enhance liability protection and complement Parametric product.



RADIUS	50 km	100 km
CAT	Payout (%) of insured value	
CAT 1	0%	0%
CAT 2	25%	0%
CAT 3	50%	25%
CAT 4	75%	50%
CAT 5	100%	75%

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Thank You!

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CALIFORNIA LAND RECYCLING CONFERENCE

Imagine | Innovate | Implement
September 29 – October 1, 2026 | Foster City

THANK YOU!

IMAGINE, INNOVATE, IMPLEMENT
THE FUTURE OF LAND RECYCLING



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to submit an evaluation form on Whova.

Join the conversation, use #CALRC2026 to share
your photos, insights and highlights!



OFFICE OF BROWNFIELDS
Department of Toxic Substances Control - Cleanup in Vulnerable Communities Initiative



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