



San Diego Regional Climate Change Adaptation Roundtable

A report on climate change adaption success and opportunities in the
San Diego Region

08 June 2015 DRAFT





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Objective: Identify current and future best practices that can be taken by our regional public agencies and local governments that will help us anticipate and respond to the changing climate

EXECUTIVE SUMMARY

On Friday, April 17, DNV GL hosted a climate change adaptation roundtable focused on the San Diego region. In attendance were nearly 20 of the local leaders in climate change adaptation thinking; they represented cities, public agencies, nonprofits and the private sector. The agenda was simple: to inventory the local efforts related to climate change adaptation planning and to understand the obstacles barriers and opportunities related to faster acceleration of climate change resilience efforts.

re·sil·ience

/rə'zilyəns/

The capacity of systems to respond or reorganize in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation

ad·ap·ta·tion

[ad-uh p-tey-shuh n]

The process of adjustment to actual or expected climate and its effects

Adaptation is therefore a process which increases resilience, and resilience is about the ability to restore functionality after disruption as well as reducing vulnerability. Resilient systems continually adjust to threats so they are able to recover swiftly.

Based on the input from the roundtable participants; this will likely be one of many conversations on regional resilience supported by the San Diego Climate Collaborative.

DNV GL has produced this white paper to inventory local adaptation strategies and opportunities, identify a framework for the regional approach to climate resilience and present tools for the public- and private-sector to accelerate climate change adaptation work.

Summary of Findings

Based on the roundtable discussion, the following findings emerged as a means to build on success and ensure a resilient future for California. Some of the key findings of the roundtable included:

- ▶ **The San Diego region as a whole has a good understanding of its risks and vulnerabilities but has more work to do to determine the most effective actions.** Regional efforts are noteworthy in establishing risks and have been supported by local non-profit organizations like The San Diego Foundation.
- ▶ **Many of the San Diego public-sector entities are doing work that encourages climate change adaptation,** but are not necessarily approaching it with a clear vision or a comprehensive approach, with the notable exception of the City of Chula Vista.

- ▶ **The nonprofit sector desires to support public-sector efforts for building resilience** and has played a significant role in establishing regional leadership in understanding risk, and identifying climate change adaptation/resilience opportunities. Recognizing that political will is driven by constituents, the non-profit sector has an opportunity by keeping this front and center in the minds of the San Diego community.
- ▶ **The regional approach to adaptation and resilience is not yet clearly defined.** Leadership will be needed from multi-agency jurisdictions and the non-profit sector to support the efforts of the agencies and municipalities.
- ▶ **The private sector (and public institutions) recognized an opportunity** in the management of their land holdings and building facilities to make changes to their operations with climate change adaptation in mind.
- ▶ **Systems-based approaches will be necessary to advance resilience solutions.** Cities are systems of systems with complex interactions between natural, social, economic layers that must be considered in synergy to create workable solutions to climate change.

Key Points of Discussion:

- Current Adaptation Activities
- Collaboration between Departments, Agencies and Jurisdictions
- External Resources and Tools
- Adaptation Barriers
- Adaptation Opportunities
- Looking Ahead - Next Steps

CONTEXT AND HISTORY

Extreme and unpredictable weather is on the rise worldwide. Pairing this with increasingly more sophisticated and more expensive buildings and failing infrastructure has resulted in financially catastrophic weather-related events. According to Munich RE's Geo Risk Research, there were 980 loss events worldwide in 2014 (see image on next page).

Not only is there the immediate risk to life during natural disasters, but there is a risk associated with the cost of the aftermath – especially when dealing with an unprepared city. The risks associated with these events include the cost to insure, cost to operate, cost of business disruption, cost to rebuild, etc. What happens when the city experiences systematic failures? And how is this prevented?

In order to bounce back, cities and counties, as well as individual buildings, need to take steps to adapt and build resilience. They need to prepare for present and future conditions, as well as reduce their vulnerabilities to uncertain future conditions.

Current Adaptation Activities in San Diego

The San Diego region as a whole has a very good understanding of the risks and vulnerabilities it faces. This is a function of a comprehensive regional approach to understanding climate change impacts supported by local non-profit organizations like [The San Diego Foundation](#). Below are some examples of climate action and adaptation plans for the San Diego area.

- San Diego's Changing Climate: A Regional Wake-Up Call
- County of San Diego Climate Action Plan, June 2012

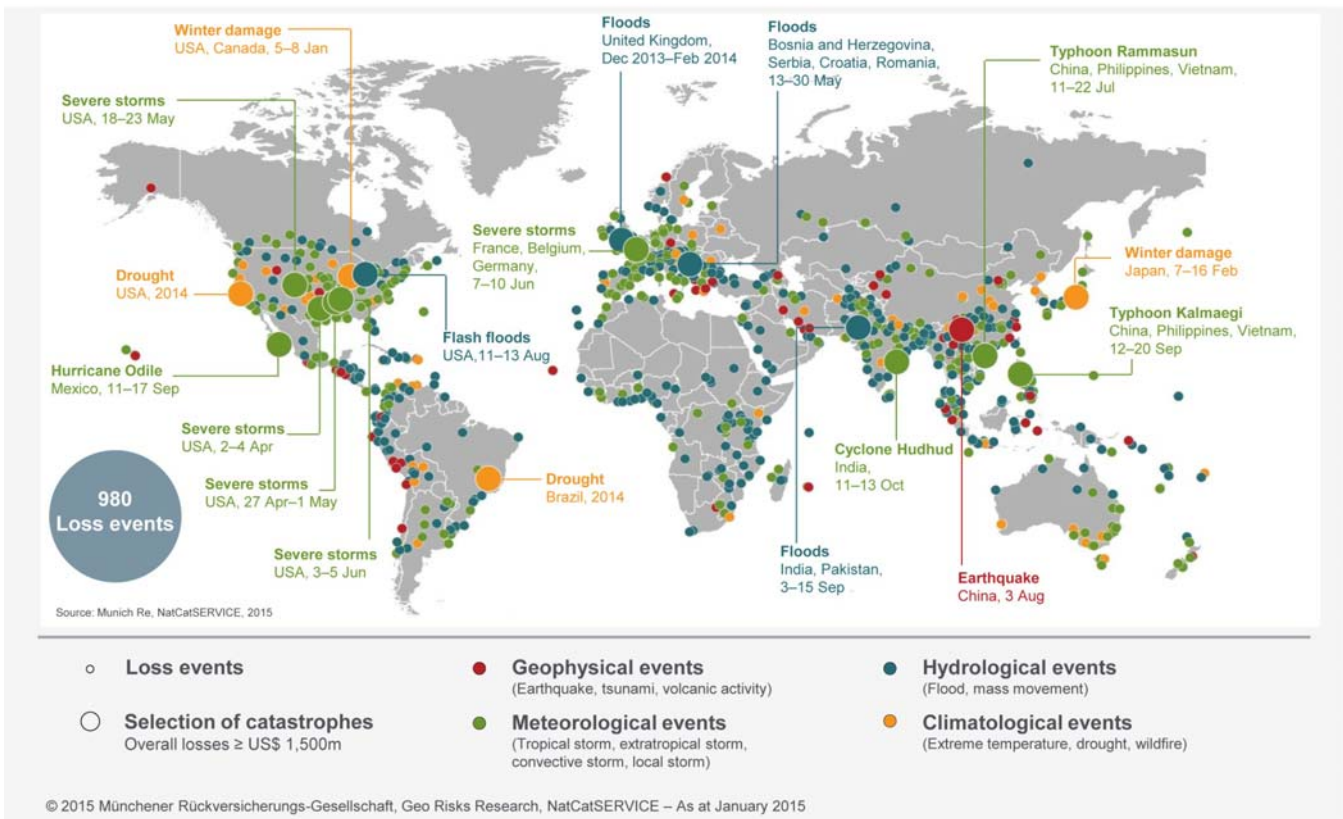
- California Coastal Commission Draft Sea-Level Rise Policy Guidance 2014
- Climate Action Planning Progress in the San Diego Region
- Nation Resources Agency, Safeguarding California: Reducing Climate Risk, An update to the 2009 California Climate Adaption Strategy
- City of San Diego Climate Action Plan Draft March 2015

Many of the San Diego public-sector entities are doing work related to climate change adaptation, but aren't necessarily approaching it with a clear vision or a comprehensive approach – with some notable exceptions.

NatCatSERVICE

Loss events worldwide 2014 Geographical overview

Munich RE 



Chula Vista

The City of Chula Vista has been working on resilience efforts since the 1990s and is ahead of the game with both planning and taking action. Its two main issues are an increasingly hot/dry climate and sea-level rise with primary concerns of wildfire, flooding and overall effects on ecology.

Chula Vista's success stems from collaboration between networks of agencies:

- Fire Departments
- Parks and Recreations
- Ecology Studies
- Existing Buildings
- Medical Facilities
- Energy and Water

Cities are systemically intertwined; therefore, in order to be successful, climate action planning needs to touch everyone. This must also go hand-in-hand with adaptation planning, which means re-thinking the development framework.

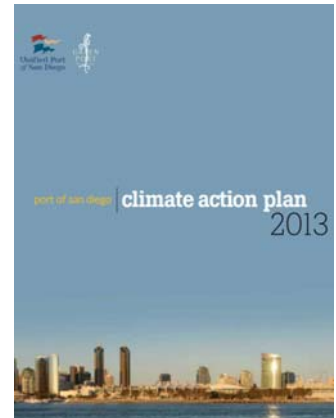
When Chula Vista institutionalized adaptation planning, it made it a lot easier for other organizations (such as the Port of San Diego) to use them as a good example and adopt their own process for adaptation.

Port of San Diego

The Port of San Diego is a separate State Special District that acts as both landlord and land use regulator for on-shore and off-shore lands covered by the port. Their main issues are event-related (storms) flooding and sea-level rise.

A lack of leadership and political will have been some of the major roadblocks that they have encountered along the way. Political controversy and opposition have come into play, for example, when ICLEI (Local Governments for Sustainability) did a study with an inundation map showing large portions of San Diego coastline underwater due to sea level rise. This created a lot of political controversy and debate over the effects on property value over time. These studies are perceived as a block to development--who would want to build in an area that will be underwater in 50 years.

Regardless of these roadblocks, the Port of San Diego is still making good progress. They are currently in the third year of a five-year visionary session to create a 50-year land use plan. This plan will use Pond 20 as a restoration/mitigation bank, and Harbor Island East will be converted from rental car lots to help with adaptation. Additionally, Newport Harbor is being used as a case study to evaluate impacts of water movement during storms.



Climate risks on the rise

Extreme events are occurring with increased frequency. Building owners who take steps now to mitigate risks can gain immediate value and position their businesses for success under a wide range of future scenarios.

2013

The first year the U.S. spent more on disaster recovery than education. In 2013 and 2014 alone, the U.S. experienced 15 floods, droughts, storms, heat waves, and tornadoes that caused at least \$1 billion in damages each.

\$1 trillion

The value of property in the U.S. at risk if sea levels rise by just two feet. Current projections anticipate sea levels will rise 6 to 10 feet by 2100.

68%

The portion of climate change risks that studies suggest could be avoided by climate adaptation/resiliency measures.



The frequency of extremely hot days (at or above 90 degrees F) is expected to increase by 300 to 1200% in the U.S. by 2100.

\$70 billion

The estimated cost of damages caused by Hurricane Sandy.

Wildfires are expected to increase 30 to 50% in the Western U.S. by 2100.



Adaptation Elsewhere

Compared to other cities worldwide, San Diego has not yet been successful in attracting broad external resources to support regional resilience efforts. This section describes a few examples of cities that are making a difference.



100 Resilient Cities

“100 Resilient Cities - Pioneered by the Rockefeller Foundation (100RC) is dedicated to helping cities around the world become more resilient. 100RC supports the adoption and incorporation of a view of resilience that includes not just the shocks – earthquakes, fires, floods, etc. – but also the stresses that weaken the fabric of a city on a day to day or cyclical basis. Examples of these stresses include high unemployment; an overtaxed or inefficient public transportation system; endemic violence; or chronic food and water shortages.”¹

Helping **cities** around the world become more resilient to the physical, social, and economic **challenges** that are a growing part of the 21st century.

¹ 100 Resilient Cities; www.100resilientcities.org

US Adaptation Market Report

A recent DNV GL study found 89 adaptation plans completed to date. Several common impact categories were identified throughout the review of these plans, and it recorded whenever a plan emphasized a particular impact category in vulnerability assessment. The typical format of discussion of each of these impact categories was a review of the risk potential, an assessment of available information, and adaptation and/or mitigation strategies in order of priority to the community. Many were followed by a review of information gaps and research opportunities. An overview of the most commonly reviewed impact categories is outlined in the following table.

Out of the 12 impact categories reviewed, the two most often referenced were issues related to water and land use. Sea-level rise was another often reviewed impact category, especially among coastal communities. These three impact categories, along with Energy/Utility, were reviewed with attention to their specific areas of vulnerability and implementation strategies.

Impact Category	City	County	Region	State	Total
Drought/Flooding/Water Quality	21	17	10	17	65
Land Use/Infrastructure	19	13	9	20	61
Biodiversity/Environment	10	13	7	20	50
Public Health/Safety	12	11	3	20	46
Coast/Sea Level Rise	16	7	7	16	46
Other	13	9	9	12	43
Forestry/Wildfire	11	14	5	13	43
Tourism/Economy	7	12	5	11	35
Heat/UHIE	12	8	4	7	31
Agriculture	2	11	2	13	28
Transportation	8	6	3	10	27
Energy/Utility	9	4	3	5	21

Adaptation plans from urban areas, such as Boston, MA, New York, NY and Oakland, CA, tend to exhibit more of a human focus on local food supply, water quality, energy supplies, infrastructure and the public health system. They do not focus as heavily on issues of biodiversity in comparison to the more rural and county-level adaptation plans, such as Delta County, MI, Shasta County, CA and Lee County, FL. Plans from these larger geographic areas tend to focus beyond primarily human concerns to account for how various hazards, such as drought, will impact specific species and ecological systems.

Drought and Flooding

For areas prone to drought:

- Inadequate irrigation water supply
- Decreased ability to rely on water for cooling systems
- Potential water restrictions or rationing

For areas prone to storms:

- Increased risk of water damage
- Increased stress on storm-water systems
- Higher flood insurance rates
- Increased risk of water contamination

Ambient Air Quality

- Decreased capacity for natural ventilation
- Increased need for filtration
- Increase incidence of health impacts

Extreme Temperatures

Compromised ability to maintain thermal comfort

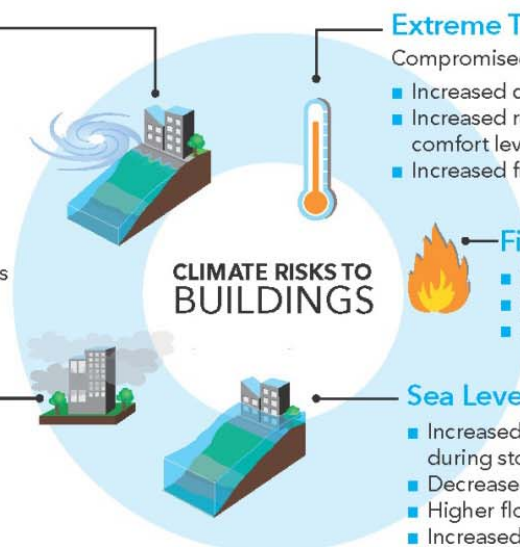
- Increased cooling loads in summer
- Increased refrigerant tonnage needed to achieve comfort levels
- Increased frequency of brownouts and blackouts

Fires

- More wildfire damage in forested areas
- Higher fire insurance rates
- Increased road closure

Sea Level Rise and Storm Surge

- Increased risk of flooding and property damage during storms
- Decreased property value
- Higher flood insurance premiums
- Increased erosion of site and infrastructure



The Need for Collaboration

As seen with Chula Vista, collaboration is the key to success with climate change adaptation. Collaboration is required between departments, agencies, and jurisdictions – such as energy, water, fire departments, parks and recreation, medical crisis centers, information and communications technology (ICT), transportation, waste, etc. Leadership is needed from multi-agency jurisdictions and the non-profit sector to support the efforts of the agencies and municipalities.



Through the roundtable discussion, it was also noted that the nonprofit sector desires to support public-sector efforts for building resilience and has played a significant role in establishing regional leadership in understanding risk, and identifying climate change mitigation opportunities. Recognizing that political will is driven by constituents, the nonprofit sector has an opportunity in keeping this front and center in the minds of the San Diego community.

External Resources and Tools

There are many resources and tools to help manage climate change adaptation measures, such as Cal-Adapt², Eco-Districts³, Infrastructure Resilience Simulation, LEED Climate Resilience Screening Tool⁴, Climate Collaborative⁵, etc.



Social Networking can also be a powerful tool to help develop conversations and encourage the movement. This will allow the conversation to reach a broader audience. Additionally, healthy competition between communities can be encouraged by framing climate change adaptation challenges appropriately.

² Cal-Adapt; cal-adapt.org

³ Eco-Districts; ecodistricts.org

⁴ LEED Climate Resilience Screening Tool;

<http://www.usgbc.org/resources/leed-climate-resilience-screening-tool>

⁵ Climate Collaborative; sdclimatecollaborative.org

ADAPTATION BARRIERS AND OPPORTUNITIES

Throughout the roundtable discussion, the topic of obstacles and opportunities were often brought up. This next section covers the main barriers to overcome.

Leadership and Vision

Leadership in climate change adaptation efforts needs to come from many different sources to be effective. For example, employees need to push organizations from the inside, which validates the comments from people on the outside. As for political leadership, efforts need to come from both the top-down AND from the bottom-up. Although support from the federal government is important, climate change adaptation needs to be addressed at the state-level to be effective (for example, using tools like Cal-Adapt).

Moreover, media matters. The voice of climate change adaptation needs to be heard from media sources, politicians, NGOs, communities, social media, etc. Likewise it needs to be a large enough conversation to encourage collaboration between department, agencies, and jurisdictions.

Political Will

One issue with political will is a lack of understanding of climate change issues. Therefore, it is important to have a “champion” in the public sector which is supported by the private sector.

Unfortunately, many executives already have their own agendas that serve their personal self-interest, and it all comes down to prioritization when allocating funds. Therefore, when it is easier to get federal disaster relief funds, governments are less willing to spend state budget on emergency response

and mitigation programs that can reduce disaster costs.⁶

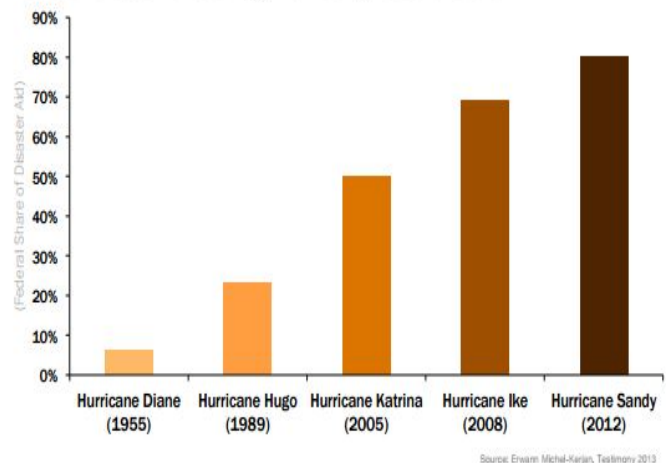
Champions

Having knowledgeable “champions” on the board gives an educated voice to the adaptation issues at hand, which are often otherwise ignored, misunderstood or under prioritized.

Clarity of Message

Although media can have a powerful influence, attention needs to be made to the language and terminology used to ensure the right message is being sent. Branding of the climate change adaptation planning needs to be done carefully – it cannot be wrapped up with “Global Warming.” Certain buzz words can incite unnecessary opposition due to preconceived associations (e.g. terminology clashes such as sea-level rise vs. coastal flooding). On the other hand, sometimes the names on a policy or associated with it can be powerful in garnering support (e.g. The San Diego Foundation). Communication matters when trying to properly framing issues.

Disaster Costs Increasingly Borne By Federal Govt



⁶ Big Insurance Companies Are Warning The U.S. To Prepare For Climate Change; thinkprogress.org

Knowledge and Collaboration

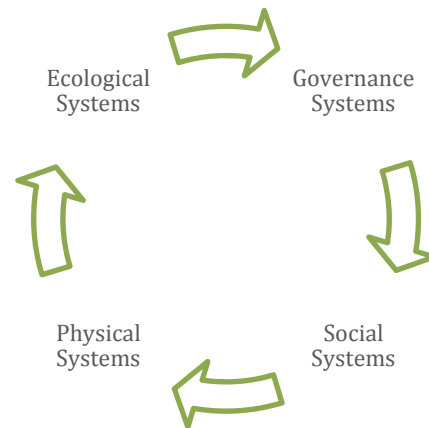
Analysis paralysis is common with climate change adaptation, because it is hard to predict future climactic events with precision. Additionally, the complexity of models, the associated risk assessments, and the science behind climate change can be difficult to understand. Instead of debating exact degree of temperature change or the exact inches of sea level rise, engineers and managers should pick an educated average value and move forward with planning to the best of their ability.

Departments and Jurisdictions

It is imperative to think about a city as an interdependent system—one component fails and it affects others. For example, without proper climate change adaptation planning, if there is a power failure due to flooding at the **power plant**:

- then the **potable water supply** shuts down because there is nothing to power the water pumps;
- traffic lights turn off interfering with **transportation**;
- sewage water pollutes the ocean due to overflow at the **water treatment facilities**;
- **law enforcement and first responders** are inundated with events related to traffic accidents, looting, and overall unrest; and
- after all the damage has been done, the **insurance companies and federal government** have to pay for most of it, which results in higher rates and taxes.

Moreover, one must keep in mind that local problems can also affect neighboring cities. For example, putting up a breakwall to deal with flooding will just divert the water downstream to the next city, causing flooding there. Whereas, developing retention ponds could better solve the problem for both cities. Adaptation and resilience are regional issues best solved with a regional plan.



Continuity

Unfortunately the voice of the “champion” can often be too short-lived to make an impact; therefore, missing out on continuity of culture from one political administration to another. There needs to be a continuity of staff to keep initiatives going strong over the years. Therefore, it is equally important to have a continuity of policy and people, along with the “champions.” There is also a need to have NGOs and communities attend public meetings and speak up, and the media needs to be covering these meetings to maximize the impact.

Ease of Integration

Opposition arises with large in-depth (even daunting) adaptation plans. Progress can often be made with smaller adaptation protocols that can be integrated quickly and easily.

Adaptation needs to become an integrated part of the political and business culture. If staff thinks that they are going to be asked about it, they will do the research and be prepared.

Assessment of Costs/Risks

A common argument is that there is no funding for adaptation, often paired with a lack of knowledge of the risks and their associated costs. Risk assessments can be performed to explain why it makes sense to fund these improvements; however, there is no guarantee that the money invested will have a certain payback period (as typically seen in energy efficiency projects). These investments need to be structured for co-benefits with a No-Regrets Strategy. Federal disaster relief funding can be obtained through FEMA; however, hazard mitigation plans are essential to get the funds.

LOOKING AHEAD

We know where we are vulnerable; now we need to work on framing the issues so that they will be addressed without too much political, commercial or community resistance. Part of the strategy might include working with NGOs and community organizations, as well as individuals within an organization. Additionally, pilot projects are very helpful to demonstrate success and thus garner support from the community. Other organizations that need to be brought to the table include:

- Additional agencies and jurisdictions
- Businesses
- Community stakeholders
- Insurance Companies

Current events, like the drought, can be used to develop policies that will address climate change, such as water efficiency mandates. The climate change adaptation discussion should be framed not as an impending disaster, but instead treated with a more positive approach building on good practice. The conversation needs to branch out beyond city and country borders, and look at systems within systems, understand the interdependencies.

To learn more about DNV GL's approach to climate change adaptation and regional resilience please contact: Douglas Kot, douglas.kot@dnvgl.com, Head of Section, [Sustainable Buildings and Communities](#)

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