# The Architect's Role in Mitigating Climate Change: Design in the Era of Risk and the Post-Sandy Environment

Questions from the Webinar + Answers

**\****Questions and comments with an asterisk were not able to be answered during the time of the webinar Q&A period.*

**Where is the NYC study? (http://www.nyc.gov/html/dcp/)**

There are many studies related to NYC and Climate change. I suggest looking at the appendices of the recent mayoral report ONE CITY BUILT TO LAST, page 101.

The city has the NYC Special Initiative for Rebuilding and Resiliency (SIRR) report: <http://www.nyc.gov/html/sirr/html/home/home.shtml>

For the DfRR Post sandy initiative see <http://www.designforrisk.com>. For a basic initiative see PLANYC 2013. It can be found at: <http://www.nyc.gov/html/planyc/html/home/home.shtml>

**What are governments doing to prevent coastal flood damage to existing oceanfront resorts and homes, and to regulate future vulnerable developments?**

Governments around the world, from Bangladesh to Britain are developing strategies to suit their individual contexts. One example can be found at the Netherlands site: <http://www.government.nl/issues/water-management>

For a reasonable, brief update on where we are in the U.S. see: <http://www.nytimes.com/2014/04/13/magazine/how-to-think-like-the-dutch-in-a-post-sandy-world.html?_r=0>

For more specific information on a specific location see the website of the local planning department and reference *sea level rise or coastal flooding.*

For New York City see searches related to coastal flooding DCP NYC

* [Department of City Planning](http://search.tb.ask.com/search/GGmain.jhtml?pn=1&ct=ARS&cb=BNH&pg=GGmain&p2=%5EBNH%5Exdm250%5EYYA%5Eus&n=781acbbc&qid=cd66acd2282f43bfa0a822216cf9d085&ss=sub&st=sb&ptb=792F5503-CC8D-460D-8655-A117D35D70E9&si=CD15543_910-&searchfor=Department+of+City+Planning&ord=1&feedurl=ars%252Ffeedback%253ForiginalQuery%253Dcoastal%252Bflooding%252Bdcp%252B%252Bnyc%2526relatedQuery%253Ddepartment%252Bof%252Bcity%252Bplanning&tpr=jre10)
* [Retrofitting Buildings for Flood Risk](http://search.tb.ask.com/search/GGmain.jhtml?pn=1&ct=ARS&cb=BNH&pg=GGmain&p2=%5EBNH%5Exdm250%5EYYA%5Eus&n=781acbbc&qid=cd66acd2282f43bfa0a822216cf9d085&ss=sub&st=sb&ptb=792F5503-CC8D-460D-8655-A117D35D70E9&si=CD15543_910-&searchfor=Retrofitting+Buildings+for+Flood+Risk&ord=3&feedurl=ars%252Ffeedback%253ForiginalQuery%253Dcoastal%252Bflooding%252Bdcp%252B%252Bnyc%2526relatedQuery%253Dretrofitting%252Bbuildings%252Bfor%252Bflood%252Brisk&tpr=jre10)
* [Coastal Climate Resilience](http://search.tb.ask.com/search/GGmain.jhtml?pn=1&ct=ARS&cb=BNH&pg=GGmain&p2=%5EBNH%5Exdm250%5EYYA%5Eus&n=781acbbc&qid=cd66acd2282f43bfa0a822216cf9d085&ss=sub&st=sb&ptb=792F5503-CC8D-460D-8655-A117D35D70E9&si=CD15543_910-&searchfor=Coastal+Climate+Resilience&ord=5&feedurl=ars%252Ffeedback%253ForiginalQuery%253Dcoastal%252Bflooding%252Bdcp%252B%252Bnyc%2526relatedQuery%253Dcoastal%252Bclimate%252Bresilience&tpr=jre10)
* [Flood Resilience Zoning Text Amendment](http://search.tb.ask.com/search/GGmain.jhtml?pn=1&ct=ARS&cb=BNH&pg=GGmain&p2=%5EBNH%5Exdm250%5EYYA%5Eus&n=781acbbc&qid=cd66acd2282f43bfa0a822216cf9d085&ss=sub&st=sb&ptb=792F5503-CC8D-460D-8655-A117D35D70E9&si=CD15543_910-&searchfor=Flood+Resilience+Zoning+Text+Amendment&ord=7&feedurl=ars%252Ffeedback%253ForiginalQuery%253Dcoastal%252Bflooding%252Bdcp%252B%252Bnyc%2526relatedQuery%253Dflood%252Bresilience%252Bzoning%252Btext%252Bamendment&tpr=jre10)
* [NYC.gov](http://search.tb.ask.com/search/GGmain.jhtml?pn=1&ct=ARS&cb=BNH&pg=GGmain&p2=%5EBNH%5Exdm250%5EYYA%5Eus&n=781acbbc&qid=cd66acd2282f43bfa0a822216cf9d085&ss=sub&st=sb&ptb=792F5503-CC8D-460D-8655-A117D35D70E9&si=CD15543_910-&searchfor=NYC.gov&ord=2&feedurl=ars%252Ffeedback%253ForiginalQuery%253Dcoastal%252Bflooding%252Bdcp%252B%252Bnyc%2526relatedQuery%253Dnyc.gov&tpr=jre10)
* [New York City Department of City Planning](http://search.tb.ask.com/search/GGmain.jhtml?pn=1&ct=ARS&cb=BNH&pg=GGmain&p2=%5EBNH%5Exdm250%5EYYA%5Eus&n=781acbbc&qid=cd66acd2282f43bfa0a822216cf9d085&ss=sub&st=sb&ptb=792F5503-CC8D-460D-8655-A117D35D70E9&si=CD15543_910-&searchfor=New+York+City+Department+of+City+Planning&ord=4&feedurl=ars%252Ffeedback%253ForiginalQuery%253Dcoastal%252Bflooding%252Bdcp%252B%252Bnyc%2526relatedQuery%253Dnew%252Byork%252Bcity%252Bdepartment%252Bof%252Bcity%252Bplanning&tpr=jre10)
* [Designing for Flood Risk](http://search.tb.ask.com/search/GGmain.jhtml?pn=1&ct=ARS&cb=BNH&pg=GGmain&p2=%5EBNH%5Exdm250%5EYYA%5Eus&n=781acbbc&qid=cd66acd2282f43bfa0a822216cf9d085&ss=sub&st=sb&ptb=792F5503-CC8D-460D-8655-A117D35D70E9&si=CD15543_910-&searchfor=Designing+for+Flood+Risk&ord=6&feedurl=ars%252Ffeedback%253ForiginalQuery%253Dcoastal%252Bflooding%252Bdcp%252B%252Bnyc%2526relatedQuery%253Ddesigning%252Bfor%252Bflood%252Brisk&tpr=jre10)
* [Flood-resilient waterfront development in New York City](http://search.tb.ask.com/search/GGmain.jhtml?pn=1&ct=ARS&cb=BNH&pg=GGmain&p2=%5EBNH%5Exdm250%5EYYA%5Eus&n=781acbbc&qid=cd66acd2282f43bfa0a822216cf9d085&ss=sub&st=sb&ptb=792F5503-CC8D-460D-8655-A117D35D70E9&si=CD15543_910-&searchfor=Flood-resilient+waterfront+development+in+New+York+City&ord=8&feedurl=ars%252Ffeedback%253ForiginalQuery%253Dcoastal%252Bflooding%252Bdcp%252B%252Bnyc%2526relatedQuery%253Dflood-resilient%252Bwaterfront%252Bdevelopment%252Bin%252Bnew%252Byork%252Bcity&tpr=jre10)

Web Results

1. [Climate Resilience - Department of City **Planning** - **NYC**.gov](http://www.nyc.gov/html/dcp/html/climate_resilience/index.shtml)

http://www.nyc.gov/html/dcp/html/climate\_resilience/index.shtml - As a coastal city, **New York** City has always faced risks from severe storms and **coastal flooding**. Hurricane Sandy was as a stark reminder that these ...

1. [Retrofitting Buildings for **Flood** Risk - **New York** City Department of **...**](http://www.nyc.gov/retrofitting)

http://www.nyc.gov/retrofitting - On October 8th, 2014, the Department of City **Planning** released Retrofitting Buildings ... face significant challenges in adapting to increased **coastal flood** risks.

1. [Press Release - **New York** City Department of City **Planning** - **NYC**.gov](http://www.nyc.gov/html/dcp/html/about/pr100814.shtml)

http://www.nyc.gov/html/dcp/html/about/pr100814.shtml - Oct 8, 2014 **...** Carl Weisbrod, Director of the Department of City **Planning**, ... "Higher **flood** insurance rates are posing challenges in our **coastal** communities.

1. [**Coastal** Climate Resilience, Designing for **Flood** Risk - **NYC**.gov](http://www.nyc.gov/html/dcp/pdf/sustainable_communities/designing_flood_risk.pdf)

http://www.nyc.gov/html/dcp/pdf/sustainable\_communities/designing\_flood\_risk.pdf - Focuses on preparing buildings to withstand the threat of **coastal flooding**, while ... Department of City **Planning** for the publication of Designing for Flood Risk.

1. [**Flood** Resilience Zoning Text Amendment - Department **...** - **NYC**.gov](http://www.nyc.gov/html/dcp/html/flood_resiliency/index.shtml)

http://www.nyc.gov/html/dcp/html/flood\_resiliency/index.shtml - The Department of City **Planning** is proposing a zoning text amendment to ... the city's resilience to climate-related events, including **coastal flooding** and storm ...

1. [Waterfront Revitalization Program (WRP) - **Coastal** Zone **...** - **NYC**.gov](http://www.nyc.gov/html/dcp/html/wrp/wrpcoastalmaps.shtml)

http://www.nyc.gov/html/dcp/html/wrp/wrpcoastalmaps.shtml - DEPARTMENT OF CITY **PLANNING'S** WATERFRONT REVITALIZATION ... Tidal and Freshwater Wetlands; **Coastal** Floodplains and **Flood** Hazard Areas ...

1. [Resilient Neighborhoods - Department of City **Planning** - **NYC**.gov](http://www.nyc.gov/resilientneighborhoods)

http://www.nyc.gov/resilientneighborhoods - Resilient Neighborhoods is a place-based **planning** initiative to identify locally specific strategies, including zoning and land use changes, to support the vitality  ...

1. [Climate Resilience - Urban Waterfront Adaptive Strategies - **NYC**.gov](http://www.nyc.gov/html/dcp/pdf/sustainable_communities/urban_waterfront_print.pdf)

http://www.nyc.gov/html/dcp/pdf/sustainable\_communities/urban\_waterfront\_print.pdf - Regional **Planning** Grant to the **New York**-Connecticut. Sustainable ... resilience of waterfront communities to **coastal flooding** and sea level rise. COASTAL ...

1. [BYTES of the BIG APPLE - **New York** City Department of City **Planning**](http://www.nyc.gov/html/dcp/html/bytes/applbyte.shtml)

http://www.nyc.gov/html/dcp/html/bytes/applbyte.shtml - The Department of City **Planning** offers these data sets and application for ..... and represent varying threat levels of **coastal flooding** resulting from storm surge.

1. [**Flood**-resilient waterfront development in **New York** City](http://research.fit.edu/sealevelriselibrary/documents/doc_mgr/443/NYC_Flood-resilient_Waterfront_Developmnet_-_Aerts_&_Botzen_2011.pdf)

http://research.fit.edu/sealevelriselibrary/documents/doc\_mgr/443/NYC\_Flood-resilient\_Waterfront\_Developmnet\_-\_Aerts\_%26\_Botzen\_2011.pdf - The **NYC** waterfront plays a crucial role as a first line of **flood** defense and in ... waterfront plan; CZM, **Coastal** Zone Management Act; **DCP**, **New York** City ...

**Net Zero Energy Design is an essential component of resilience. Can the building continue to function when the power grid is down? E.g. operable windows and local power generation for ventilation and pumping of water**

The question is very good, and what you need to add to your lexicon is *passive survivability*. A net zero house is a good start and has, at best, passive strategies incorporated into the design from the beginning. Resilience and passive survivability key in on redundant systems and multiple layers of operation. In the case of a net zero house or building, the passive strategies are the first continuous layer with perhaps even fossil fuel generators as a layer further down the line. It is also function or building classification specific. Housing vs. hospital, for example. For critical systems it is good practice to have redundancy and over-built capacity in many areas of the project. Backups to the backups if you will.

Full spectrum resilient design should ensure full function backup when the grid is down. Instituting micro-grid technology will help and developing energy storage with greater capacity. Tesla lithium battery wall storage for instance. Alternative energy generation, wind and PV are also good backups. There should always be the option of natural ventilation and I for one see no reason not to have backup generators and even hand pumps for water.

**Regarding both climate change and risk, what are your thoughts on the Indian Point Nuclear Power Station?**

According to Entergy, the operator: “Indian Point generates about a quarter of New York City and Westchester's power, at lower cost than other power plants in the region. Replacing the electricity Indian Point provides would require building a fleet of new generating facilities that burn fossil fuel, adding new high voltage transmission lines and laying costly new gas pipelines. - See more at: <http://www.safesecurevital.com/faq.html#sthash.rD7ngTaZ.dpuf> I urge you to research this further.

A change in culture and use pattern along with how the common person thinks about energy generation is needed for this and other facilities like it to go off line. Every building, block, neighborhood and community can, at each of those scales, be an energy producer. As that becomes the normative approach to building and living, then and only then will these facilities become redundant.

The DfRR has had a number of programs that address this issue. I think most agree that as soon as we can reduce the need for and/or replace the energy with safe sources, including the use of alternative renewable energy and micro grid technology, we should. The DfRR has also held programs on the region’s seismology and has tried to raise awareness about the risks involved with the Indian Point plant location and the need to address that risk sooner than later.

**Were there any weather dynamics professionals involved in addressing the impacts of weather dynamics and responses during an event?**

Always, the national weather service and early alert systems are part of forecasting and planning before, during and after an event. Having worked with The Office of Emergency Management, and in our presentation, we discuss the science of storms and geographies at play. It is essential to have climate scientists & meteorologists, involved to better understand the risks as well as where mitigation in terms of land use, physical infrastructure and evacuation planning can be implemented effectively.

Climate science also looks at the historic record and the frequency and repeat of events helping us all gain a grasp of the changes we are experiencing as well as what is ahead.

Lastly community-based hurricane preparedness trainings delivered through FEMA and NDPTC include climate scientists in the team workshops.

**What programs are in the pipeline going forward? What is a good example of urban resilience planning and design?**

One of the next DfRR programs is a full day symposium on Extreme Heat at the New York City College of Technology (CUNY) campus in Brooklyn. It will be lived-streamed elsewhere. See the AIANY calendar for November 12, 2015 as details develop.

The US Department of Housing and Urban Development (HUD) ran a series of Post-Sandy New York region competitions under the title *Rebuild By Design* and they are following up with a national competition of similar nature. Each of the winning venues involved is undertaking a good example of urban resilience planning and design. The City of Hoboken New Jersey just won an award for its good work. See the following for details: <http://www.hobokennj.org/2015/03/un-recognizes-hoboken-as-a-role-model-for-resilience/>

The Rockefeller foundation and the 100 Resilient Cities program have many programs underway that may be in your own area: [www.100resilientcities.org](http://www.100resilientcities.org)

National Institute for Science and Technology (NIST: <http://www.nist.gov/disaster-resilience/index.cfm>) has been running regional workshops that have good recommendations and examples as well.

**Are there any suggestions for kick-starting this process with jurisdictions which are disinterested or in denial about these issues?**

Excellent question! I can immediately think of one case study so my best advice would be to find/identify and actively support a local candidate who understands the issue. Follow that with public screenings of Al Gore’s updated film “An Inconvenient Truth” with a discussion period following. Do this in the schools first so that the children can explain this to their parents. Kids get it. Get the person elected, change the composition or the attitude of the city council, and move forward.

The case study is that of Greensburg, Kansas. After being obliterated by a tornado some council members wanted to replicate the past. Others wanted the greenest town in the state. It was a political battle. Green won. This is all very well documented. Start with: <https://www.youtube.com/watch?v=zxjn4i9PRhI>.

There is an enormous amount of information on public policy and advocacy that can be used by any group interested in influencing community design. All strategies do require an advocate hence my first suggestion.

Additionally, contact your FEMA region officer and ask about the National Resilience Framework funding or similar programs for your area. There are many programs waiting for local leaders and advocates to take up with federal funding already in place. This will be an ongoing, long term effort. But as I said there is a great deal of funding set aside for action. The program plays into a larger framework.

**[This is a] valuable case study that we can use as a model. Unfortunate that it took such a devastating disaster to attract resources to address resiliency planning. How do we encourage policy makers to allocate pre-disaster planning resources?**

Excellent question. We in the United States do tend to be crisis-reactive. Perhaps most are, except that a long history of threat, risk, and destruction probably helps explain why the Netherlands works so hard, and spends so much, to stay ahead of the game. I should say, for the record, that Mayor Bloomberg’s PLANYC 2030 did jump start NYC’s preparedness and the “beta test” for Hurricane Irene the year before was very useful.

An MIT study suggests that the US has been catching up on climate change risk awareness but not as far along as others on all the issues including preparedness. As noted above, it is important to elect people that understand the issues and that can bring them to the floor for action. It is equally important to educate the young, starting with the youngest, so that their behavior reflects an understanding of the issues, obligations, and opportunities that await them.

Pre-disaster planning is an important step that can be a whole community engagement. Contact your OEM to see if there are already planning that needs action. In addition there is a lot underway with FEMA mitigation grants that can economically support any conversation you start in your community. The DOE is similarly funding Micro Grid and CHP retrofits. All of these take someone or some group with initiative and leadership.

**I don't understand how any defensive strategy that is not a hard barrier can withstand 10'-15' storm surges. I don't see how floating vegetation and an archipelago of islands and reefs can handle these higher sea levels?**

This is a perfectly reasonable question with much information available in response. The situation you refer to is, as with other questions above, contextual. Soft defenses may not be possible in all areas, especially along rivers. The studies and science of this approach is becoming increasingly available and I have grabbed from the web a number of useful sites that were prepared very much in response for your question. I hope you find them helpful.

1. [**Storm surge reduction by wetlands** | Weather Underground](http://www.wunderground.com/hurricane/surge_wetlands.asp)

http://www.wunderground.com/hurricane/surge\_wetlands.asp - Coastal **wetlands** can provide critical protection against incoming hurricane **storm** **surges**. A 2012 study by Sheng et al. found that "a sufficiently wide and tall ...

1. [The Value of **Wetlands** in Protecting Southeast Louisiana from **...**](http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0058715)

http://journals.plos.org/plosone/article%3Fid%3D10.1371/journal.pone.0058715 - Mar 11, 2013 **...** Evidence that coastal **wetlands reduce storm surge** and attenuate waves is often cited in support of restoring Gulf Coast **wetlands** to protect ...

1. [**Wetlands** and **Storm Surge** Fact Sheet\_2009 03 24 - National **...**](https://www.nwf.org/pdf/South-Central/Wetlands_and_Storm_Surge_Fact_Sheet_2009_03_24.pdf)

https://www.nwf.org/pdf/South-Central/Wetlands\_and\_Storm\_Surge\_Fact\_Sheet\_2009\_03\_24.pdf - Mar 24, 2009 **...** **Wetlands** and Barrier Islands: Our Communities' First Line of Defense ... restored **wetlands** will **reduce storm surge** and protect communities ...

1. [**Wetlands**: Protecting Life and Property from Flooding - Office of **...**](http://water.epa.gov/type/wetlands/outreach/upload/Flooding.pdf)

http://water.epa.gov/type/wetlands/outreach/upload/Flooding.pdf - How Do **Wetlands** Help **Reduce** ... heights and **reduce** the water's destructive potential. .... action and **storm surge** generated by tropical storms and hurri- canes.

1. [The Value of Coastal **Wetlands** for Hurricane Protection](http://seagrant.noaa.gov/portals/0/documents/what_we_do/social_science/ss_tools_reports/value_hurricane_protection.pdf)

http://seagrant.noaa.gov/portals/0/documents/what\_we\_do/social\_science/ss\_tools\_reports/value\_hurricane\_protection.pdf - Coastal **wetlands reduce** the damaging effects of hurricanes on coastal ... and hence the amplitude of a **storm surge**, reducing direct wind effect on the water ...

1. [**Storm Surge Reduction** by Mangroves - Conservation Gateway](https://www.conservationgateway.org/ConservationPractices/Marine/crr/library/Documents/storm-surge-reduction-by-mangroves-report.pdf)

https://www.conservationgateway.org/ConservationPractices/Marine/crr/library/Documents/storm-surge-reduction-by-mangroves-report.pdf Dec 12, 2012 **...** - Published by The Nature Conservancy and **Wetlands** International in ... Measured rates of **storm surge reduction** through mangroves range ...

1. [The potential of **wetlands** in reducing **storm surge** - CIRP - U.S. Army](http://cirp.usace.army.mil/Downloads/PDF/JP-OE-Rosati-2010a.pdf)

http://cirp.usace.army.mil/Downloads/PDF/JP-OE-Rosati-2010a.pdf - Results suggest that **wetlands** do have the potential to **reduce** surges but the magnitude of ... The potential of **wetlands** to **reduce storm surge** has typically.

1. [**Storm Surge Reduction** by Mangroves - **Wetlands** International](http://www.wetlands.org/WatchRead/Currentpublications/tabid/56/mod/1570/articleType/ArticleView/articleId/3406/Storm-Surge-Reduction-by-Mangroves.aspx)

http://www.wetlands.org/WatchRead/Currentpublications/tabid/56/mod/1570/articleType/ArticleView/articleId/3406/Storm-Surge-Reduction-by-Mangroves.aspx - Mangroves can **reduce storm surge** water levels by slowing the flow of water and reducing surface waves. Therefore mangroves can potentially play a role in ...

1. [](http://www.youtube.com/watch?v=FXCa1C65mJs)[**Wetlands Reduce Storm Surge** - YouTube](http://www.youtube.com/watch?v=FXCa1C65mJs)

http://www.youtube.com/watch%3Fv%3DFXCa1C65mJs - Nov 23, 2010 **...** EDF staff visit the new "Living with Hurricanes: Katrina and Beyond" exhibit at the Louisiana State Museum in New Orleans. In this clip, Brian ...

1. [The Value of **Wetlands** in Protecting Southeast Louisiana from **...**](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3594144/)

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3594144/ - Mar 11, 2013 **...** Evidence that coastal **wetlands reduce storm surge** and attenuate waves is often cited in support of restoring Gulf Coast **wetlands** to protect...

**To what do you attribute Galveston and New Orleans never recovering, and can it happen to other ocean-side communities?**

It is not as if Galveston and New Orleans never recovered and it should be noted that their histories are quite different. Galveston is an island. It was severely damaged in 1900 by what remains the nation’s deadliest storm, 6,000 died. Only seven died in Hurricane Ike. After decades of having successfully rebuilt their famous Strand they witnessed it destroyed again by Hurricane Ike, along with major employers like UT’s medical School. Never recovering is usually a combination of insufficient funds to rebuild combined with a damaged economy that may never fully recover. Galveston was nicely on its way back before Ike slammed it.

New Orleans is another story, too long to explain here but well documented. It was a city in trouble economically before Katrina and the city is still working on how to create a long term plan with a symbiotic relationship to nature and a workable economic future.

And of course you must really define what recovery looks like as well as how long does recovery take. Here is a real article that covers some of the issues: <http://www.archnewsnow.com/features/Feature457.htm>. In brief, "recovery" takes a decade or fifteen years+ after a Sandy event. And, the big AND, the place that has recovered will not look like it did before. Communicating that timeline and future reality of "place" is key to diffusing your question into the real issues.

In our climate change era being in harm’s way the way such coastal cities are will always represent a threat. Of course other coastal communities face similar threats. Some will not survive. Some whole cultures have or will succumb to sea level rise. Kiribati, Tuvalu, Fiji, Maldives, among others. And some New Jersey coastal towns remain at great risk even after Post-Sandy reconstruction.

**Our community in San Antonio has most of its commercial district in a flood plain. What references can you offer for mitigating/adapting existing buildings and the public domain that are in the 100 year flood plain?**

There are many resources for you as well as case studies in your part of the country. FEMA best practices library and the technical bulletins put out by NFIP and FEMA are where you should start. You are in FEMA region VI, so look in that set of documents first.

FEMA P-499 (December 2010) Hurricane Ike in Texas and Louisiana: Mitigation Assessment Team Report, Building performance Observations, Recommendations, and Technical Guidance. [www.fema.gov/rebuild/mat/mat\_fema499.shtm](http://www.fema.gov/rebuild/mat/mat_fema499.shtm)

FEMA P-757 (April 2009) Hurricane Ike in Texas and Louisiana: Building Performance, Observations, Recommendations and Technical Guidance. <http://www.fema.gov/library/viewRecord.do?id=3577>

Perkes, David. (2011) Floodproof Construction: Working for Coastal Communities. Southeast Region Research Initiative SERRI Report 80024-01 Oak Ridge: Oak Ridge National Laboratory. <http://gccds.org/research-1/#/floodproof-construction/> *In particular look at East Biloxi, MS in this manual for specific designs to answer your question*

Watson, Donald and Michelle Adams. (2011). Design for Flooding: Architecture, Landscape and Urban Design for Resilience to Climate Change. John Wiley.

You should also engage your local flood plain manager and see if the city has a master plan in place that incorporates all of the data on flooding.

Resilient designs that are regionally specific are based on soils, weather, topography and existing conditions in the system larger than the project area. For example, Texas is in the worst drought in 500 years (even with the recent flooding). Our approach in Florida was to create urban and regional patterns that were designed to store flood waters in huge “hydric parks” used to recharge aquifers and surface water storages and contributing to estuary health and the beginning of the food chain to bays and ocean. There are several case studies cited in Chapter 3: Regional Design and Chapter 4: Sustainable Urban and Community Design in my book Sustainable Design: Ecology, Architecture and Planning (Daniel Williams) that are based on ecosystem services and ecological economics. Also see D. Watson’s book on flooding.

FYI – Many cities are located in flood plains. Some have adapted and adopted to the challenge, many spend billions trying to deny the inevitable: moving.

**With many natural disasters occurring locally and globally, where can design best become proactive within policy, planning and international conversation?**

Good question. How do you get involved and how do you fit in? From our slides we gave you a template that covers setting up a network or seeking out those who may have a network in place. At the very least you will recognize city agencies that must engage in these topics as part of their final business of the day.

The world is wide open, in that you can be the leader that brings the best practices of the rest of the world to your community. There are great examples, best practices and great sites to gain a foothold into this vast set of resources. The FEMA library offers the MAT reports or Mitigation Assessment Team reports, best practices library that may fit your community as well as technical bulletins that have detailed construction material and methods for implementing resilient measures in projects. <http://www.fema.gov/fema-mitigation-assessment-team-mat-reports> all materials are free.

Look out for global conferences, workshops and resources that are now becoming more common throughout the U.S. Take a look at the NDPTC website for courses offered to you and your community. <https://ndptc.hawaii.edu>

**In the absence of independent City Planning offices in cities such as Boston, who should take the lead in ensuring that social needs are met with waterfront access maintained – not just those of developers gaining new zoning heights – in planning for the future?**

If you live in a small coastal community, or a community that does not have a dedicated planning department then you should seek out your flood plain manager, that person may be local or serves an entire area. To conduct master planning he or she is needed to move any planning forward. The flood plain manager may also begin to unlock other resources the state or territory may have to start planning.

The AIA also has SDAT programs that you can apply to: <http://www.aia.org/about/initiatives/AIAS075425> if your community is selected a team will come and work with the community to put planning in place. Contacting the APA or the RPA may be good avenues as well.

**How can/will design professions influence the elected officials, energy industry, corporations and financial institutions to mitigate the climate change?**

This is already underway. President Obama has issued several executive orders on climate change and the risks to the US, the economy, and our overall security. All city and state agencies must now update building codes to account for climate change and resilience. All US government planning must account for climate change as well. A good example is that the Army Corp of Engineers must now project into the future the effects of climate change on projects currently being built.

That being said, the devil is in the details of how and when codes and zoning changes are adopted at the local level, how attuned your elected officials are to these executive orders and the resources at hand in your community to answer these challenges.

What this all needs is the advocacy and leadership that you or your local component can provide. Engage the Department of state and code compliance office to start the process in writing new codes. Petition your city council for a statement on where the town or city is on these issues of resilience as required by the federal government.

### Non-Questions also addressed:

**I'm in the San Francisco Bay Area. Recently the state regulatory agency for the Bay has suggested the need to fill portion of the bay to mitigate sea level rise. I'm interested in resources that address eco-system based adaptation.**

This is a political challenge as the ecological/economic data is clear. The value of a flood plain in terms of its contribution to the ecological health and the economic health has been measured and is clear (see H. T. Odum’s work in ecological economics and wetlands value, a Rockefeller-Rand grant in the 70’s)

**In February of this year: New York Locates New Affordable Housing in Low-Lying Flood Zones per** [**http://smartershift.com/energymix/2015/02/11/new-york-locates-new-affordable-housing-in-low-lying-flood-zones**](http://smartershift.com/energymix/2015/02/11/new-york-locates-new-affordable-housing-in-low-lying-flood-zones)

Yes that is the unfortunate fact. And within the article our friend and colleague Klaus Jacob illuminates the risk that remains with these communities. In the relative short term these will be resilient communities with good building practice, but in the future these, these established communities will be facing the same questions again.

**This question needs to consider U.S. insurance industry and FEMA flood insurance. For federal properties take a look at Executive Order 13690 - Federal Flood Risk Management Standard.**

After Hurricane Andrew 1992 I participated in a FEMA forum at Windspread. The mission of the forum was to specifically look at rebuilding in “harm’s way”. The resolution was titled “Operation Impact” and sent language to the US Congress to fund only the first rebuild in a flood plain, the next rebuild being the owner’s funds. It has not been followed, but several communities have chosen to leave flood plains – see B. Berklebile’s work.

**As an Environmental Planner, I would be skeptical regarding the importance of FEMA forms and funding. The number and magnitude of climate change starting in 2030 will simply overwhelm Federal Governments.**

Agreed, the potential cost of the physical and economic damage due to climate events will be quite formidable. So acting now, spending $1 in mitigation today saves $3.65 in the future regarding physical damage. When factoring in economic losses the ratio is $1 today will save $8 in the future. That is why we are having this and other programs to highlight the need for this work with architects taking the lead.

**Regarding the slide on Good Samaritan. I suggest that you provide more info regarding post event assessment by trained and qualified professionals (ATC-45 Wind Storms and Floods and ATC-20 Post Earthquake Evaluation).**

You can find all of the information you need through this web portal: <http://www.caloes.ca.gov/cal-oes-divisions/recovery/disaster-mitigation-technical-support/technical-assistance/safety-assessment-program>

The Safety Assessment Program (SAP) utilizes volunteers and mutual aid resources to provide professional engineers and architects and certified building inspectors to assist local governments in safety evaluation of their built environment in the aftermath of a disaster. The program is managed by Cal OES, with cooperation from professional organizations. SAP produces two resources: SAP Evaluators, described above, and SAP Coordinators, which are local government representatives that coordinate the program. Cal OES issues registration ID cards to all SAP Evaluators that have successfully completed the program requirements. Training for this program is now eligible for Homeland Security Grant Program funding.

**Please share the percentage of people that inhabit areas within 10 miles of the US coast.**

According to the U.S. National Oceanic and Atmospheric Administration, Department of Commerce, in 2010, 123.3 million people, or 39% of the nation’s population lived in counties directly on the shoreline. This population is expected to increase by 8% from 2010 to 2020.



In the United States, counties directly on the shoreline constitute less than 10 percent of the total land area (not including Alaska), but account for 39 percent of the total population. From 1970 to 2010, the population of these counties increased by almost 40% and are projected to increase by an additional 10 million people or 8% by 2020. Coastal areas are substantially more crowded than the U.S. as a whole, and population density in coastal areas will continue to increase in the future. In fact, the population density of coastal shoreline counties is over six times greater than the corresponding inland counties.

This website infographic shows the location of the counties. No mileage is included but, anecdotally, I did find a site suggesting 139 million lived within 60 miles of the coast. <http://www.livescience.com/18997-population-coastal-areas-infographic.html>

For more information: [National Coastal Population Report: Population Trends from 1970 to 2020](http://stateofthecoast.noaa.gov/features/coastal-population-report.pdf) (<http://stateofthecoast.noaa.gov/features/coastal-population-report.pdf>)

Also your question of "10 miles" does not adequately cover those who are at risk. For example Hurricane Irene hit Vermont and other in-land states harder that the coastal communities it passed over in the Northeast. Inland flooding due to upland rainfall causes significant risk and subsequent damage.