

# High Tide on Main Street

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Announcer: This is Climate One, changing the conversation about energy, economy and the environment.

Rising sea levels are forcing us to reconsider how we think about our coastlines.

Will Travis: We should be looking at the immediate shoreline as a place to use with the understanding that we're going to get to use it for a limited period of time.

Announcer: Because a changing coastline means changing human behavior.

Kira Jain: When you go down to the community level and say okay when this king tide hits, how will that impact them. Commute to work, to school. I think putting in those terms makes people respond more.

Announcer: So cities around the globe need to prepare for a shoreline that's going to move inland.

John Englander: We don't have to know when it's gonna happen and we accept that with mudslides, avalanches, earthquakes and tsunamis. Yet we still design for them.

Announcer: Cities, sea level rise, and coastlines on the move. Up next on Climate One.

Announcer: How will rising seas affect the 40% of the world's population who live within an hour's drive of the ocean? Welcome to Climate One - changing the conversation about America's energy, economy and environment. I'm Devon Strolovitch. Climate One conversations - with oil companies and environmentalists, Republicans and Democrats - are recorded before a live audience, and hosted by Greg Dalton.

Since the dawn of human civilization, the coastline has basically been in the same place, with tides ebbing and flowing in predictable ranges. Recently, that started to change, and in the 20th century seas rose 7 inches, driven by humans burning fossil fuels that release heat-trapping gases, which in

turn cause glaciers to melt and oceans to warm and expand. That rate may seem slow but it has already doubled in this century, and scientists say it will probably accelerate further, threatening every major coastal city from New York to Shanghai and Rio de Janeiro.

To address the planning and design challenges posed by rising seas, Greg is joined by three guests. John Englander is author of *High Tide on Main Street: Rising Sea Level and the Coming Coastal Crisis*. Kiran Jain is Chief Operating Officer of the startup Neighborly and former Chief Resilience Officer of the city of Oakland, California. And Will Travis is former executive director of the Bay Conservation and Development Commission, the California state agency responsible for land all along San Francisco Bay.

Here's our conversation about cities, sea level rise, and coastlines on the move.

Greg Dalton: John Englander, you also were up in the Arctic in 2007 in Greenland. So tell us that story who are you with and how that set you on the path to also be a, you know, an alarmist about sea level rise.

John Englander: Sure. August 19, 2007 was my first trip to Greenland as you said. And I was there with some wealthy auto owners. I was running a group called International SeaKeepers. And we were gonna go see the big Jakobshavn Glacier one of the largest glaciers in the world the next day and it's the one that supposedly spawned the iceberg that sank the Titanic, so kind of an interesting footnote. And I was trying to think about how to get these people who are interested but a little skeptical about climate change to be focused on it and it just suddenly hit me. In college, I studied ancient sea levels, how with the ice age the sea level moved up and down 300 or 400 feet regularly. And I suddenly realized that it was simple that if the oceans are warmer which they are the ice will melt on Greenland and Antarctica, primarily. The sea will rise and if the sea is taller that the shoreline will try and move. And it suddenly occurred to me that that there was a fairly simple case to be made without the jargon without the technical science and I got the idea to write that book right then and there it happened all within a minute.

Greg Dalton: So that matters to yacht owners because their docks may move I guess, yeah. I'm gonna talk here from Reinaldo Borges who's an architect in Miami. He is on the city sea level rise committee and I wanna hear his thoughts on the potential solutions for South Florida's water problems.

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Reinaldo Borges: South Florida of course is looked at as the epicenter of the concern because we're very low. And we start to see the sunny day flooding during the king tides where we really see the water flowing into the certain parts of the city. And people sort of driving through salty water without at times knowing that it's actually salty water. I get invited to talk to developers I just spoke to 400 developers about resiliency. A lot of them already have sustainability features in their buildings like their buildings are greener they consume less energy and consume less water. But then how they may be affected by the impact of climate change we're really not thinking through how our buildings would be affected by water in the long-term and perhaps even in the short-term. So we need to look at the water flowing through our communities in a different way and the way that we navigate and move around our communities may change, you know, there may be more amphibious vehicles that could navigate both in dry conditions and wet conditions. If a ground-floor of the building gets abandoned, it's the second floor, designed so that it could become the first floor. And I don't think that there is one single solution and the South Florida continues to grow. The growth is gonna be pretty constant for now. Architects in general are optimistic about community about quality-of-life about urbanism and the things that we could design into. So I do think that

there is a future beyond, you know, where we may see doom and gloom and sort of South Florida being taken over by the Atlantic Ocean. I saw the sea a future in Waterworld we're still attracted to live on the coast.

[End Clip]

Greg Dalton: That's Miami architect Reinaldo Borges. So John Englander, you live in South Florida. There's a lot of in there sort of saying we're prepared but we're not and I'm optimistic but, you know, that things are gonna change dramatically.

John Englander: Yeah, I live in South Florida about an hour north of Miami. I'm down there a lot. I've encountered Reinaldo many times in fact working with architects is a really an important channel I think. And he's very knowledgeable and very concerned and it's hard to get the clients in the city and the building codes to respond to what's a clear and present danger frankly. And but I was in Jacksonville a few weeks ago people never think of Jacksonville up in the north end of the state. They were flooded during Hurricane Irma, there's hotels are still closed. Tampa Bay was hit, Naples. So, you know, so Florida is a big state and there are lots of different points of vulnerability the keys as well.

Greg Dalton: Kiran Jain, you were a chief resilience officer of Oakland and part of a program funded by some philanthropist to have these new offices in city halls around the country. So tell us about that program and how it looks, what's happening with other cities that are looking at these all these integrated resilience issues that are coming forward.

Kiran Jain: Sure. So this is a program funded by the Rockefeller Foundation called 100 Resilient Cities. And the idea is to see the 100 chief resilience officers in cities around the world. The realization being that the way that our government structure have been set up over the last 50 years are not equipped to handle the challenges for the next 50 years, particularly pertaining to climate change and some other kind of pressing issues around housing affordability, economic insecurity. So there's ought of one size fits all kind of description for chief resilience officer but in Oakland, you know, our baseline work was really around this fact of you can be in Oakland live 1 mile away from another Oaklander be twice as likely to be unemployed and live 15 years less. And it changes depending on race. And if you look at these vulnerable communities and you look at the sea level rise maps, the liquefaction maps, the flooding maps they overlay. And so our goal really was to focus on how can we make our people our communities more resilient so that when these slow burning crises like sea level rise or cute things like earthquakes happen how can our community better prepared.

Greg Dalton: Will Travis, give us there are some options we think about sea level rise you worked about the city as a planner thinking about shaping the life and character of cities. What are the options of sort of defend, retreat, et cetera?

Will Travis: Well those are the two options defend, retreat. What we're looking at is a new option, which is resilience. And I think the important thing to understand and why this is also difficult is that as you pointed out in your introduction for the history of civilized human beings we've live in a period of relative calm so far as our climate is concerned. So without any great amount of ice melting or water freezing the shoreline didn't go up or down. So the location of the shoreline didn't move laterally. So we came to learn that the shoreline is where the shoreline always was, and we've therefore believe that the shoreline always be where it is because that's where it's always been. And we've crafted a whole series of laws and rules and regulations that say on this side of the shoreline here are the rules and on this side of the shoreline here are different set of rules. Now as that shoreline begins to move, we're trying to do things that are innovative and that are creating

resilience but in some cases, the laws make it illegal. And the reason for that is the vast bulk of the body of law that we rely on were written before anybody was thinking about climate change. So the fact that the laws don't respond to climate change I think it's not surprising will be a miracle if they did. So what we're trying to do now is find those innovative design solutions. I like to say to every difficult public policy problem there's a clever design solution. And once we get enough of those clever design solutions then use those as examples to go change the laws so we can make it possible to build those things.

Greg Dalton: John Englander, for people to design the cities of the future that can adapt to these increasing storms sea level rise, et cetera. They have a basic question which is how fast and how high and scientist have a difficult time answering that question. Tell us the range of the science and you write about that someone, you're not a scientist but you write about it in your book.

John Englander: Sure. Well I distinguish myself from those doing the kind of fundamental granular research I'm an oceanographer. But I explain, what I'm trying to do is translate the science without jargon and using the metaphors and examples that a wider audience can understand. And sea level is the ideal example or problem in effect because we can't be too specific about sea level and that surprises people. But in San Francisco which everybody knows about and we happened to be filming this here in San Francisco recording it. We know there's gonna be another earthquake just like there was a century ago. We don't know when we don't know where and what magnitude but there will be another earthquake. Well the collapse of Antarctica and Greenland is about the same. There are ice sheets that are a mile tall on average, and together they are the size of North America. Imagine that covered by ice over 6,000 feet tall, on average. We can't predict exactly how this gonna melt. So the scientists try to and they say if the glaciers do this and Greenland does that and thermal expansion the seawater does that we add all that up and so we get to somewhere between 20 and 30 inches. The problem is there's a big uncertainty just like when the next avalanche will happen up in the Alps or something like that we can't predict those things. So science tends to say what they know will happen with a high probability. It was sea level that really fools us because the truth is we could get five or 10 feet of sea level rise this century which is stunning. Most of the estimates talk about 2 or 3 feet but they kind of leave out Antarctica because you can't quantify it any more than you can quantify the next avalanche or mudslide on Pacific highway, you know in Big Sur or something like that, which happens unpredictably. We don't think about it like that. And the scientists don't explain that very well because they're trying to get the granular information about what they know for sure. But the fact is that sea levels moved up and down 300 or 400 feet every hundred thousand years with the ice ages we didn't see that. So now we're left with this real conundrum. We have to design cities like San Francisco with the Embarcadero or Miami or Boston or Jacksonville, Florida or Seattle or Vancouver. Pick any coastal city in the world, Copenhagen, Shanghai, every most big cities are on the coast or on tidal rivers. And we have to design them for storms, king tides, heavy rainfall, runoff and the slowly rising sea level. In the next 20 years I don't think we can get more than a foot even in the worst case but that would be a problem. The promise those curves start spreading out with time because of the melting of Antarctica and Greenland where you've been. And the truth is, we're somewhere between 2 feet and 12 feet. How do you design for that, how do you build for that, do you have to jack up buildings, do you put them on skids and drag them up hill as Trav has talked about. Do you put things on wheels everything is gonna be on floats we'd figure that out, but we don't have a choice. We really have to do this.

Greg Dalton: Kiran Jain, Oakland is one of the biggest ports in the country. Think about that 2 feet is sort of the cautious case. Is Oakland and the other ports ready for 2 feet?

Kiran Jain: You know it's interesting you talk about there are these known unknowns and are we now pushing ourselves to rethink governance structures to rethink finance in a way that can help us

prepare for these types of events. So I'd like to think that, you know, right now with these government entities everybody's thinking about what are we going to do, right. So you might have at the port, you know, the logistics center being built higher up. But then the communities around say well what about us? You know your resources to be able to do that what is it mean for more vulnerable home. So I think it's a question that we have to look at, you know, community wide we like to say it, we don't know political boundaries, right. These natural hazards don't have political boundaries yet our regional planning mechanisms whether it's, you know, capital planning and budgeting happen within a political jurisdiction. So you really need to think about how do we answer this regional governance issue with challenges like climate change.

Announcer: You're listening to a Climate One conversation about cities, sea level rise, and high water everywhere. You can subscribe to our podcast at our website: [climateone.org](http://climateone.org). Greg Dalton will continue his conversation in just a moment.

Announcer: We continue now with Climate One. Greg Dalton is talking about sea level rise and sustainable development with John Englander, author of *High Tide on Main Street: Rising Sea Level and the Coming Coastal Crisis*. Kiran Jain, Chief Operating Officer of the startup Neighborly. And Will Travis, former executive director of the Bay Conservation and Development Commission.

Here's your host, Greg Dalton.

Greg Dalton: Will Travis, it's been about five or six years since superstorm Sandy, you know, closed the New York Stock Exchange for three days and devastated lower Manhattan, remember that just dark lower Manhattan. What do we learned from that time, you know, people knew that something like Sandy was possible. Many people just thought they had another decade or two before it happened it came faster and more fierce than many expected.

Will Travis: Unfortunately what we've learned is that the human spirit is such that they believe that'll never happen again. And it is surprising how many people are now moving back to the Jersey shore. They're buying out. The poor people who suffer the losses who didn't get nearly full recovery from their insurance and the folks who've always wanted to have a house at the beach can now afford to do so. It is unfortunate but we tend as human beings to we have to experience this ourselves. I have a daughter and I remember going through this actually, "Don't touch the stove, it's hot. Don't touch the stove, it's hot. The stove is hot." "Daddy, I burned my finger." And I am afraid that we're going to as species have to go through this terrible process of finding out that yes, the scientist said the water was coming up and yes it has come up and yes it has wiped out my house and will have to do it again and again before we really respond to it.

Greg Dalton: John Englander the FEMA maps, most of the country as maps not all of it and when FEMA comes up with a new map and says, oh you're in a flood zone. People get upset because they're forced to buy flood insurance because their bank will require that and then politician sometimes go to FEMA and say, hey you know, can you just let this little town out. It happened in St. Augustine, Florida, right, where some politicians said, hey, you know, we don't need to be in those map so people don't have to buy insurance. Then a flood comes and people say, oh my God, we have no insurance. And then they go to politicians and say we need a bailout. Tell us about that cycle.

John Englander: Sure. The National Flood Insurance Program as many people know is badly broken. It's \$25 billion upside down or underwater as they say in their insurance. More debts than assets and it get worse. And I think the obvious lesson of letting politicians or Congress determine the rules for a National Flood Insurance Program that's gonna basically be a monopoly, you know, what could go wrong. And we've seen that and they keep tweaking the rules to make homeowners

happy voters and we find ways to get exemptions from the rule because your 1 inch over the line and you really shouldn't have to pay that \$2,500 in insurance. That if you are just in the sideline you won't have to pay. And so there's companies now that help you get your flood rates reduced and it's crazy. It should be privatized. It is gonna be up for renewal for another five years. But the whole system needs to be rethought because it's based upon archaic maps and with lines and if you're in this side of line you don't need flood insurance. And if you're 1 inch over the line you need flood insurance and maybe thousands of dollars. That's crazy. And also people the disincentive in Texas not many of the people in the path of Hurricane Harvey had flood insurance and we stop to think about well, FEMA's gonna come and fix things, whether they had flood insurance or not. So another part of The Department of Homeland Security actually almost undermines the normal reason to have flood insurance because it's expensive and even then it subsidized. So the truth is, we really got to rethink the National Flood Insurance Program. It's gotta treat sea level differently than storms and the other kinds of flooding because those are events. Actually the place Trav and I first met in Florida six years ago. We were at a conference about sea level in Boca Raton where I happen to live. And I think one of the points that kind of brought us together was saying that sea level is not an event, storms are events, tides are events, king tides, heavy rainfall events, flash floods, those are all events but the water recedes and you can rebuild. Sea level rises like filling the bucket drip by drip, but it won't go down for a thousand years. And once I think we talked about this that the events are layered on top of sea level rise we just assume sea level wouldn't change much. So our terminology is not even right.

Greg Dalton: Is this affecting property prices yet?

John Englander: There's indication that it is. Nationwide property price had been up pretty steadily in the last few years and coastal properties aren't going up at the same rate. And there's a theory that the increase flooding and it's all over the country is starting to sink in the people that, you know, maybe this is in the permanent piece of real estate.

Greg Dalton: Kiran Jain, we've been talking a lot about the government solutions to rising seas here at Climate One. Let's talk about, you left government to go into the private sector because you think that there's a role for entrepreneurship and financing to help solve this problem. Tell us that.

Kiran Jain: Yeah, absolutely. I think my time as chief resilience officer made me really appreciate just how fast we need to move that this is definitely even though it's a slow burning crises as we say it is moving faster than the rate of bureaucracy and government. And so how can we think about more innovative solutions and that's really what brought me to Neighborly which is a public finance technology platform that has built an end to end digital platform for municipal bond originations, and then connects them to investors. And the idea is, you know, we say that public finances at \$3.8 trillion market yet we have \$2 trillion of unmet infrastructure needs in the U.S. And it is a corner of the capital markets that really hasn't benefited from the transparency and efficiency that other parts of the capital markets have benefited from. And so you have that coupled with this idea that we need to move more quickly. We need to design more creatively for this future that we are preparing for. And so how can we finance it. We know that the technology and designs are there. We know the governance structures may need to be rethought of but then the last piece is really thinking about the finance and how do we actually make these projects come alive.

Greg Dalton: And if someone is listening to this and they want to invest in green bonds, those sort of things. Where can investors go today, I mean green bonds, green infrastructure are those accessible to retail investors?

Kiran Jain: So it depends. I think, you know, there is a market for retail and institutional investors when it comes to green bonds. We have seen the market grow year over year by quite a big

percentage. There's obviously a desire by investors but also by these public agencies who really are saying, okay how can we be better stewards of the environment. And so you have, you know, the Climate Bonds Initiative. So the San Francisco Public Utilities Commission actually just issued the first CBI green bond last year. And the East Bay Municipal Utility District did a similar issuance around green bonds. And I think that for not just the cities, but for the investors this present a really great opportunity to put your values or your investments are.

Greg Dalton: If you're just joining us we're talking about rising seas at Climate One. I'm Greg Dalton. With our guests are Kiran Jain from Neighborly, John Englander, author of High Tide on Main Street and Will Travis, a former California state official and sea expert. We're gonna go to our lightning round. I'm gonna mention a person, place or thing and you're gonna tell me first thing that pops into your head without any regard for how politically correct it is and what anyone will think about it. So John Englander. Florida Governor Rick Scott.

John Englander: Denier.

Greg Dalton: John Englander. Miami Mayor Tomas Regalado.

John Englander: Proactive and will be remembered as somebody putting forth the green bond issue. So, you know, doing the right, a step in the right direction.

Greg Dalton: Kiran Jain. The bond rating company, Moody's.

Kiran Jain: I was about to say dinosaur. I just say that. Look, I think well.

Greg Dalton: Dinosaur. We got it.

Kiran Jain: We got it. Sorry. It takes me more than one word.

Greg Dalton: Will Travis. Facebook's corporate headquarters on the edge of San Francisco Bay.

Will Travis: Great place to surf.

[Laughter]

Greg Dalton: True or false. What a segue. True or false. Will Travis. Rising seas will create some epic sets of radical waves for California surfers?

Will Travis: True.

Greg Dalton: John Englander. True or false. Some people on Wall Street will make money when the risks of rising seas get priced into coastal property?

John Englander: Yes.

Greg Dalton: Kiran Jain. True or false. The Oakland Athletics baseball team made a smart move when they moved a proposed new waterfront stadium to a new location away from San Francisco Bay?

Kiran Jain: No comment.

John Englander: Oh no, come on. Can't wimp out.

Greg Dalton: Maybe this one is easier for Kiran Jain since she used to work for the mayor of

Oakland, we'll give you a San Francisco question. True or false. Kiran Jain. The Golden State Warriors new waterfront arena one day will be a good place to play water polo?

[Laughter]

Kiran Jain: True.

Greg Dalton: Easier for Oakland to punch San Francisco, okay. Will Travis. True or false. Your former agency, the Bay Conservation & Development Commission tried to hold property developers more accountable for building in flood zones and the powerful industry beat back that effort?

Will Travis: That is false.

Greg Dalton: True or false. Will Travis. Not being a scientist is an advantage?

Will Travis: Absolutely.

Greg Dalton: True or false. John Englander. President Trump's Mar-a-Lago resort could be threatened by rising seas?

John Englander: Yes, eventually.

Greg Dalton: Final one for Kiran Jain. True or false. Surging seas will cause coastal elites to find new appreciation for flyover country?

Kiran Jain: True.

Greg Dalton: Let's give them a round for getting through that.

[Applause]

John Englander let's ask about the politics of climate in Florida. Lots of deniers there and yet people who live outside the state look at Florida and say, wait, you're on the front lines you're feeling it and yet there are deniers elected statewide. And Carlos Curbelo who represents South Florida is a leader in this Noah's Ark caucus in Congress where there is now 20 or 30 members of Republicans and Democrats who on the record saying we gotta do something. So tell us about the politics of climate in Florida.

John Englander: Yeah, it's a great segue and opening because I think climate is almost too broad a term. I mean it's sometimes nice to have inclusive terms, but the truth is climate to me is a least three different issues. There's the energy part. How do we reduce greenhouse gas and slow the warming and that's entirely valid. Everything from solar energy and electric cars and the conservation and LEED certified buildings and all of that, everything to reduce energy and carbon in the atmosphere, which is all the warning very valid. There's broad effects like with higher temperature, more fires out West here different temperature, weather patterns from changing from a warmer planet really abstract and kind of moving target, but lots of different issues. And then there sea level rise which is really simple because the ice in Antarctica and Greenland is gonna melt and has to raise sea level. And so it's really unambiguous and it gets to people's feelings about place and communities and risk and investment. So I'd like to separate even though Climate One is one issue, and it's a huge issue. It sometimes helps to think of that. Sea level gets around the concerns about the energy part, you know, a lot of the resistance to look at the climate issue is because you're gonna take away our coal supplier or you're gonna make, you know, or tar sands in Canada or things like that. You're gonna tell me how to make energy and you're gonna affect reserves in the ground.



So a lot of the sensitivity has to do with that energy part which is important. Sea level and the flooding which is happening coastal communities from Marin to Miami and from Boston to Bangladesh that gets around that and I've noticed that even conservatives and people who might be politically, you know, you might think they could be categorized they're getting concerned about sea level rise. They may not want to have the government telling them energy policy, but sea level rise and flooding is getting their attention. So that's good.

Greg Dalton: All politics is local. Yeah, so we can talk about the solutions and impacts but we don't want to talk about the causes. John Englander, I read an article in Scientific American that talked about how Jim Crow restrictions in Florida basically contained African-Americans to some higher grounds. It was further away from the desirable waterfront property so it was like you people can live up on the hill. And now that hill property is suddenly desirable, and there are people worried about gentrification and kind of speculation and traditionally African-American neighborhoods in Miami. And this gets the sort, you know, the displacement because if you think about it lot of wealthy people live by the water because it's nice. And now they're figuring out, wait, it may not be so good to live here. Let's go uphill and push those, you know, let those people go live down by the water. Have you encountered that at all?

John Englander: Yeah, but it's not quite as simple as we'd like to think. You tend to think that the wealthy have those houses on the waterfront. Well that's not a rule, okay. And some of them are high up on the water like 20 or 30 feet. There's a lot of low-lying land from California if you look where the trailer parks basically, the RV homes and the mobile home communities. 50 years ago, those places were vulnerable and it wasn't smart to build right on the coast. And actually a lot of poorer communities, white and black and different minorities are in those densely packed trailer parks in effect from Southern California to Florida. And so it defies what we think and there's a lot of voters there. The wealthy people tend to have better designed houses and may be built up on pilings and things like that and they may have influence. So we have to break down some of the stereotypes I think.

Greg Dalton: Fair enough there was an overgeneralization about waterfront. There is East Palo Alto, very poor area along the coast and then there's other places, Belvedere, where there is \$30 million houses on the coast. Kiran Jain, your thoughts on the social displacement that can happen as people sort of move away from the coast into, you know, we kind of reshuffle the deck in terms of where is desirable to live.

Kiran Jain: Yeah, absolutely. You're talking about the future state, I'm thinking about the social displacement that's happening today, right. We're battling rising sea levels and rising housing prices in the Bay Area.

Greg Dalton: Yeah more immediate concern.

Kiran Jain: Exactly. So, you know, I think it's going to have to be tackling our kind of zoning laws and similarly in these decisions that we've made in terms of density where we're building, where are we defining our sea level rise vulnerabilities zone. And if it's, you know, a retreat or adapt, what is that mean for future building. And knowing, you know, the Bay Area for example is gonna increase in population by 30% by the year 2040, you know, thinking about where we can house everybody. These are issues that we need to think about today in addition to rising sea level.

Greg Dalton: Will Travis, one of the biggest solutions to reduce rising temperatures and carbon emissions is to have greater urban density. Because people who live in cities have lower carbon footprints they use fewer services they don't drive as much, et cetera, so urban density infill is a solution. How is that gonna fit with defending what John said earlier, most cities are on the coast.

They need to be more dense and they need to live with a different relationship with water. Oh and throw in autonomous cars, how's that all gonna come together?

Will Travis: Well here again I think we're gonna have to find a new way of designing that density. There are a lot of us that believe that we should be looking at the immediate shoreline, not as a place to retreat from but as a place to use with the understanding that we're going to get to use it for a limited period of time. And that then we are going to either recycle those buildings or move them or jacked them up or do something with them. There's a famous scientist at Columbia, Klaus Jacob, who says we have to come up with nomadic infrastructure because it's the infrastructure underneath all of this. And there's been, you know, a lot of work being done, Dr. Edward Church here at Berkeley, was talking about using microgrids. So instead of having a massive infrastructure, it's all decentralized, so that we can move this new type of density.

Greg Dalton: And one of the natural instincts for people who do live along the waterfront if you have private property is to defend yourself, defend your family. Put up a seawall. Will Travis, tell us what that does the impact of people who do, it's called coastal armoring. Put up a seawall and the concrete will hold Mother Nature back.

Will Travis: Well the simple answer is that along the open ocean coast the way sea level rise will manifest itself will be through more erosion. And if you stop that erosion in front of your property that is where the sand comes from that is on the beach. So if you stop that sand from going out onto the beach. You're going to end up actually making the problem worse. Not just for you, but especially for your neighbors.

Greg Dalton: Explain also Will Travis, if someone lives on a hill in Boston or San Francisco or Seattle. Because the first thing people do when they look at sea level rise maps they look for their house. I'm not on it. I'm okay. Is that true?

Will Travis: Well only if they don't drink water, flush their toilet or go to work or take their kids to school or anything like that because we realize you have a massive interrelated system. And you're absolutely right people do look at where is my ass, I'm okay and you aren't. You aren't.

Announcer: You're listening to a conversation about cities, sea level rise, and moving to higher ground. This is Climate One. You can check out our podcast at our website: [climateone.org](http://climateone.org). Greg Dalton will be back with his guests in just a moment.

Announcer: You're listening to Climate One. Greg Dalton is talking about rising seas and coastlines on the move with John Englander, author of *High Tide on Main Street: Rising Sea Level and the Coming Coastal Crisis*. Kiran Jain, Chief Operating Officer of the startup Neighborly. And Will Travis, former executive director of the Bay Conservation and Development Commission.

Here's Greg.

Greg Dalton: Kiran Jain, you know, we're talking about these things that are slow moving, far away, but in a lot of urban America, there are more immediate concerns about safety, jobs, health, that sort of thing. So how does something like this get traction in a city government or even mainstream news media? I talked to journalists like, yeah, okay seas, you know, it's not a sexy, dramatic story or it's an issue that's gonna get a mayor elected.

Kiran Jain: Right. And I think, you know, we've talked about this a lot with many community organizations during my time as CRO and putting it kind of in people terms, right. We tend to talk about the environment and kind of rising water in this abstract type of situations. But when you go down, you know, to the community level and say okay when this king tide hits, what will that look

like. When we layer on illegal dumping or some other kind of city challenge that is really facing our electorate today how would that impact them. Commute to work, to school. I think putting in those terms, you know, makes people respond more but it's a really great question because we're obviously having this conversation today in this room, yet it is not part of a kind of global conversation right now.

Greg Dalton: Will Travis, San Francisco, you know, iconic downtown, you know, part of Silicon an extension of Silicon Valley, you know, economic engine of the country, the world needs to spend \$5 billion with a B to replace a seawall that protects the headquarters of salesforce and other companies. Voters will be asked to approve that and yet no one can really say how high that seawall should be for the future. So how does that play out, that's just one example of what needs to happen to spend a lot of money to protect what we already have. We don't get anything new for that.

Will Travis: That's right. And this gets back to the question about how high the water will get. I'm gonna let you all in on a secret if you want to get rich. Get a whole bunch of experts on sea level rise together and ask all of them to tell you exactly how high the water will be at a particular date in the future. And then bet against all of them. You'll make a lot of money. Nobody knows and nobody can know. So what we need to do is find a way of designing and building so that it doesn't matter.

John Englander: But, you know, actually here in San Francisco you've got a great test tube for this. We know what an earthquake was like. You know there's going to be another one. You don't have to know when it's gonna happen and where the epicenter will be and what the magnitudes gonna be. You design for a fairly, you know, substantial earthquake. We design for hurricanes. Not for the average hurricane. We design for the worst-case hurricane. For sea level, we've really got a great opportunity. It's going to rise. The plan is already a degree and a half warmer we're trying to keep it to another degree or two warmer, but ice is gonna melt. The sea is going to rise it's not going to hit in one place, it's gonna be every place in the coast and up tidal rivers like Sacramento or Hartford, not just on the shoreline. So the truth is, once we get our heads around that we're gonna realize there's a safety margin here. If we build it 3 feet higher or 6 feet higher, 6 feet is gonna be better than 3 feet. We don't have to do all at once, but we've gotta realize this is to some degree inevitable but slow. And I think there is an opportunity there because we don't have to know when it's gonna happen and we accept that with mudslides, avalanches, earthquakes and tsunamis. Yet we still design for them.

Will Travis: But those are one-time events, John.

John Englander: That's right.

Will Travis: What we need to do is design buildings for some credible amount of sea level rise and then add water. See if the design is still resilient if you add another 5 feet. And you can incorporate those reasonable measures into building so that you can allow the first story or two to be abandoned.

John Englander: Absolutely true.

Will Travis: But that's, what does that matter if you can't get to the building because the sidewalks are 10 feet below water. So this whole cycle is something it's very challenging from a design perspective, it's very challenging from governance and the finance and in insurance perspective, but we'll get through it.

Greg Dalton: If you're just joining us we're talking about sea level rise and other issues at Climate One with Will Travis, former California state regulator. John Englander, author of High Tide on

Main Street and Kiran Jain with Neighborly, former Chief Resilience Officer of the city of Oakland, California. I'm Greg Dalton. We're gonna go to your audience questions, welcome.

Male Participant: Appreciating that, I think the number is 212 feet of ocean rise if the Antarctic and Greenland both melt on the current 30 feet and appreciating that they just discovered this last August, the largest volcanic collection of 91 volcanoes under the Antarctic right now. What can those who are in the media communicating and creating messages not just for the administrators and the politicians, but for the mass audience. What kind of messages can we give the world the wants and everybody jumping off of the cliff?

Greg Dalton: Yeah this is a real, how to do that John Englander without being a downer.

John Englander: It's a great question. And we can think about catastrophe, an asteroid hitting the planet or Yellowstone blowing up and, you know, extinguishing most life. We can think about this worst-case disaster movie scenarios. We shouldn't do that because if you take the worst-case scenarios whether be volcanoes under Antarctica which we don't know whether they're gonna last for a thousand years or not is the truth. But the fact is there's a really simple equation, that the amount of ice on land, which is 98% in Greenland and Antarctica, is if it all melts will raise sea level over 200 feet, 212 feet that's the best estimate and it's happening. And it doesn't matter what we do in the short term, we can slow it hopefully in the longer term by the better energy policies, but we need to wake up to this reality that sea level which we thought was a flat line and therefore determined the shoreline that those two lines are gonna change. And there is no question about it even if the world are 100% solar energy today, never burned another lump of coal or barrel of oil, we're still gonna get sea level rise because the oceans have already been warmed. And even adhering to the best plans from the Paris Climate Agreement we're allowing for another degree or two of warming. So the fact is we have to wake up to this new world reality after 5,000 years of sea level stability, it's changing. We don't need to discuss the super disaster case any more than an asteroid coming here or, you know, wiping us out or various other things that could be just these terrible disasters one in a thousand chances. That's not the problem. It's just the planet is a degree or two warmer and there will be less ice and higher sea level.

Greg Dalton: There was an excellent book on climate change communication called Don't Even Think About It by George Marshall, a British journalist. And he cites a researcher in there with the acronym PAIN. Getting through to people about climate needs to be personal, abrupt, immoral, and now. Personal, abrupt, immoral, and now. Sea level rise meets none of those criteria, right. It is slow, it is not immoral we don't know who's causing it. It's not abrupt. It doesn't really affect me so it's a real communication challenge.

John Englander: Well here's where it goes in between actually. And I'm glad you from the questioner to you just put things in perspective for me. We can't get 10 feet of sea level rise next week, that's not possible. Like you can get a tsunami or you can get a terrible coastal storm or something like that so totally different timescale and magnitude. But we do know from Jakobshaven Glacier in Greenland, which could add a foot and a half of sea level rise to the six, Pine Island Glaciers, very specific in Antarctic that we're monitoring. Those six glaciers are going to slide into the sea at some point and they hold 10 feet of sea level rise. We just don't know when they're gonna slide into the ocean. So most of the scientific journalists they kind of put a footnote and say well, unknown but the fact is it could make it happen 53 years or 153 years, we'll see, partly depends on how warm the climate gets. So there's where you have an abrupt, a relatively abrupt event but even in the worst-case real scenario, we're probably looking at I don't know, a couple of feet a decade maybe 5 feet which will be a disaster. But now like we imagine it like the, you know, the disaster films and the, you know, where the floodgates burst and there are suddenly 200 feet of sea level rise and, San Andreas I think was the movie or something like that.

Greg Dalton: How do you talk about this without bumming people out. Convey the urgency without bumming people out. Kiran Jain.

Kiran Jain: Use it as an opportunity to say we now can rethink our system of governance and finance around this organizing principle. We know that this unknown known is going or this known unknown is going to happen and what do we want to do about it. How do we, you know, use it as an opportunity to rethink the way we design our cities so we can live with nature and the built environment. I think that we had a slogan that our community organization came up with "how wet will you get" you know, just really bringing it down to the individual level.

Greg Dalton: It needs to be personal. What's that mean for me? Let's go to our next audience question. Welcome to Climate One.

Female Participant: Thank you. Actually this is a good segue for my question about what we can do in terms of policy. So you have an Obama administration the idea that if a disaster strikes in order to be able to rebuild, I believe it was the executive order that you have to rebuild keeping the new levels of safety and demands in mind. And then of course recently our current president whose name I will not say is of the mind that we didn't need that anymore. And I wonder a few things. Do we even care about that you hear about things like the global parliament of cities. Are really cities and local communities gonna take this on and work these things out and sort of ignore what prevails at the global or larger levels and just solve things locally. And the other thing is is that do we have a right to sue? Do we have a right to make a legal stance against arbitrary, irrational decisions like the president made?

Greg Dalton: Who'd like to tackle that? Kiran Jain.

Kiran Jain: Sure absolutely. I think cities already are taking on that this global challenge at the local level, right. And I think the COP 21 the Paris Agreement was a great kind of watermark seeing all of these mayors from around the world come together and say we're going to tackle this at the city level. And you've now seen it with the change at the federal, you know, Jerry Brown, Governor Brown and Mayor Bloomberg were at COP 23 talking about the U.S.'s --

Greg Dalton: That's the UN Climate Summit.

Kiran Jain: Exactly. Talking about how the U.S. was going to meet their climate obligations. So I think that cities have already in part of the conversation and will continue to be. And that again brings us back to 100 Resilient Cities, right. There's a scale at which I think we can make some real change and I really do believe it's at the local level.

Greg Dalton: Will Travis.

Will Travis: California isn't taking a leadership role in climate necessarily because of good politics. It's because it's good business. That's what the difference is in California. There is no executive order that the president can write that requires us to be stupid and we choose not to be. California is making an awful lot of money out of climate change. We've realized in making business decisions that you can't ignore the reality. Climate always gets the back last, it's better to have climate on our team than on the other team.

Greg Dalton: Let's go to our next question. Welcome.

Female Participant: Hi, thank you. You mentioned how government approval is part of the process to get this resilient projects made. I was wondering if you could talk a little bit about the permitting process and how it is currently really difficult to restore wetland or raise a levy because all of the

different permits that you need from state and federal agencies. And if you have any suggestions of how to streamline this permitting process to help these resilient designs actually be implemented in a timely manner.

Greg Dalton: Will Travis. Bureaucratic red tape is in the way of doing the kind of things we need to do.

Will Travis: Well, Winston Churchill said "Democracy is the worst form of government that there is, except for all the rest." A benevolent dictatorship is very efficient so long as I'm the benevolent dictator. We have a complex process because it was set up to protect the environment the way it was. And I think here again we're going to have to change all these laws in some cases, what we're trying to do is protect endangered species that are doomed by climate change, and needing a recognition that that's going to happen. How do we expedite changing and approving the sorts of things that will provide a resilient environment for those species that maybe aren't here now, but will be moving here.

Greg Dalton: We have to wrap up. I wanna ask starting with Kiran Jain, what gives you hope, you know, dealing with the sort of dark things all the time. How do you keep going and how do you talk to other people who don't like say, okay Kiran and see you coming kind of go the other way because.

[Laughter]

Kiran Jain: Bringing transparency and efficiency to a \$3.8 trillion market to help make these projects a reality.

Greg Dalton: So you're gonna fund the solutions. John Englander. What gives you hope and keep you going when you think we're facing some long odds here?

John Englander: We don't have a choice the sea is gonna rise the ice is gonna melt for quite a while. We should do the right thing to slow it, but the fact is, sooner or later we're gonna wake up to the reality that the water is around our ankles and heading higher. And this isn't an optional adaptation. We will figure this out. It's either gonna be done in chaos and catastrophic economic collapse or it's gonna be done with good planning. And I just hope that the sooner we educate people that this is separate from the energy issue and separate from the other climate impacts, the sooner we'll wake up and begin to rise with the tide.

Greg Dalton: Before we jump, I wanna ask John, you were evacuating with your family from Hurricane Irma barreling down on Florida and tell us about that road trip and who you are listening to.

John Englander: It's really funny we drove about 200 miles north because we thought the storm was gonna hit us in south sort of where I lived. And I heard Climate One on the radio. It's the first time I heard it on the radio on NPR. So that was great.

Greg Dalton: So you're racing away from this extreme weather event listening to Climate One about more climate -- yeah. Love it. Okay. Will Travis, what keeps you going and gives you hope in talking to other people?

Will Travis: The most difficult job that planners, urban planners have isn't looking at the data and figuring out what to do. That's the easy part. The hardest thing is to look at something that's a problem now and it's gonna be a crisis in the future and dragging that crisis back into the present and forcing elected officials to deal with it during their term of office. Climate change is a great story. You could drag that sucker back because it's big and flashing and we got a lot of help from

some great journalists. That's who I think we should be celebrating.

Announcer: Greg Dalton has been talking about cities, sea level rise and coastlines on the move with John Englander, author of *High Tide on Main Street: Rising Sea Level and the Coming Coastal Crisis*. Kiran Jain, Chief Operating Officer of the startup Neighborly and former Chief Resilience Officer of the city of Oakland, California. And Will Travis, former executive director of the Bay Conservation and Development Commission, the California state agency responsible for land along San Francisco Bay.

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Please join us next time for another conversation about America's energy, economy, and environment.

[Applause]

Greg Dalton: Climate One is a special project of The Commonwealth Club of California. Kelli Pennington directs our audience engagement. Carlos Manuel is the producer. The audio engineer is William Blum. Anny Celsi and Devon Strolovitch are the editors. I'm Greg Dalton the Executive Producer and Host. The Commonwealth Club CEO is Dr. Gloria Duffy.

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