

4 MR. KIRSHEN: THANK YOU VERY MUCH. IT IS A
5 PLEASURE TO BE HERE TODAY.

6 MOST OF YOU WORK IN CLIMATE SCIENCE AND
7 MITIGATION, AND I WORK PRIMARILY IN IMPACTS AND
8 ADAPTATION, BUT IT IS REALLY GREAT TO HEAR FIRSTHAND
9 ALL OF THE WORK YOU'VE DONE. AND AS CHRIS JUST
10 MENTIONED, I MEAN, WE KNOW ENOUGH TO TAKE ACTION IN
11 TERMS OF MITIGATION. AND THAT GOES HAND IN HAND WITH
12 ACTION IN TERMS OF ADAPTATION.

13 WHAT I'M GOING TO TALK ABOUT THIS MORNING
14 IS THE IMPACT OF CLIMATE-CHANGE-INDUCED SEA LEVEL
15 RISE AND COASTAL FLOODING IN URBAN AREAS. URBAN
16 AREAS ARE CERTAINLY PART OF THE HUMAN PART OF THE
17 ECOSYSTEM. AND WHAT I'M GOING TO DO IS FIRST TALK
18 ABOUT SOME GLOBAL ISSUES ABOUT SEA LEVEL RISE AND
19 COASTAL FLOODING AND ZERO IN ON THE NORTHEASTERN
20 UNITED STATES, AND THEN TALK ABOUT SOME OF MY WORK IN
21 METROPOLITAN BOSTON.

22 SO JUST A QUICK REVIEW, AS MOST OF YOU
23 KNOW, I'M SURE, SEA LEVEL RISE IS OCCURRING BECAUSE
24 AS THE OCEAN'S GETTING WARMER, THEY'RE EXPANDING, AND
25 ALSO WE'RE GETTING MELTING OF ICE ON LAND.

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1 AND THEN THERE'S ANOTHER PROCESS, WHICH IS
2 ALSO CAUSING SEA LEVELS TO RISE RELATIVE TO SHORES,
3 AND THAT'S THE PROCESS OF GEOLOGICAL SUBSIDENCE,
4 WHICH IS OBVIOUSLY UNRELATED TO CLIMATE CHANGE.

5 AND JUST FOR EXAMPLE, IN THE BOSTON
6 METROPOLITAN AREA, THE LAST HUNDRED YEARS, WE HAVE
7 SEEN A SEA LEVEL RISE OF ABOUT 1 FOOT; 6 INCHES OF
8 THAT IS BECAUSE OF THE CLIMATE CHANGE, AND 6 INCHES
9 OF THAT IS BECAUSE THERE IS NATIONAL SUBSIDENCE, SO
10 YOU CONSIDER BOTH OF THEM WHEN YOU LOOK AT THE
11 IMPACTS OF SEA LEVEL RISE ON COASTAL FLOODING.

12 OKAY, JUST SOME QUICK DEFINITIONS:
13 EUSTATIC SEA LEVEL RISE IS A SEA LEVEL RISE
14 WE SEE BECAUSE OF CLIMATE CHANGE.

15 SUBSIDENCE IS LOCAL RATE OF SETTLING
16 UNRELATED TO CLIMATE CHANGE.

17 RELATIVE SEA LEVEL RISE IS THE SUM OF
18 EUSTATIC AND LOCAL.

19 THE GLOBAL RATE OF EUSTATIC SEA LEVEL RISE
20 IN THE LAST 100 YEARS HAS BEEN ABOUT 1.8 MILLIMETERS
21 PER YEAR. THERE'S SOME EVIDENCE THAT THAT'S BEEN
22 ACCELERATING IN THE LESS DECADE OR SO.

23 I'M ALSO GOING TO TALK A LITTLE BIT ABOUT
24 N-YEAR FLOODS. THIS IS THE LAND AREA THAT HAS
25 FLOODED ON THE AVERAGE ONCE EVERY N YEARS OR HAS THE

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1 PROBABILITY OF BEING FLOODED EVERY YEAR OF $1/N$.

2 MY BACKGROUND IS, ACTUALLY, CIVIL
3 ENGINEERING. SO IF WE TALK ABOUT 100-YEAR FLOOD,
4 WHICH IS AN AREA THAT'S VERY HIGHLY REGULATED BY
5 FEMA, WE'RE TALKING ABOUT AN AREA THAT GETS FLOODED
6 ON THE AVERAGE ONCE EVERY 100 YEARS; BUT MORE
7 IMPORTANTLY, IT HAS A PROBABILITY OF BEING FLOODED IN
8 1 YEAR OF 1 PERCENT. JUST A QUICK NOTE, THE 100-YEAR

9 FLOOD HAS A PROBABILITY OF 22 PERCENT OF BEING
10 EQUALED OR EXCEEDED IN A 25-YEAR PERIOD. OKAY, I'M
11 SURE YOU'RE AWARE OF THIS, BUT MANY PEOPLE THINK THAT
12 A 100-YEAR FLOOD JUST OCCURS ONCE EVERY 100 YEARS.
13 THERE'S A VERY STRONG PROBABILITY THAT IT CAN OCCUR A
14 LOT MORE FREQUENTLY THAN THAT.

15 AND, ALSO AS POINTED OUT MANY TIMES, THERE
16 IS INFORMATION ABOUT LONG-TERM GLOBAL SEA LEVEL RISE.
17 THIS JUST SHOWS THE LONG-TERM RECORDS IN THE
18 NETHERLANDS.

19 THE AMOUNT THAT WE'RE GOING TO SEE IN THE
20 FUTURE, OBVIOUSLY, DEPENDS UPON GREENHOUSE GAS
21 EMISSIONS; AND THIS JUST SHOWS -- THESE ARE SOME OF
22 THE RESULTS FROM THE IPCC WORKING GROUP I. THESE ARE
23 IN INCHES. SO THIS IS OVER 100 YEARS. SO IF WE HAVE
24 NO CLIMATE CHANGE -- IF WE HAVE -- THE RECENT TREND
25 IS ABOUT 5.5 INCHES OVER THE NEXT 100 YEARS. THIS IS

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1 SORT OF THE MEDIAN VALUE, THE AVERAGE VALUE FOR B1
2 SCENARIO, ABOUT 10 INCHES. AND THEN A1F1 FROM IPCC
3 IS ABOUT 16 INCHES OF A SEA LEVEL RISE OVER THE NEXT
4 100 YEARS. THESE ARE OFTEN CONSIDERED SOMEWHAT
5 CONSERVATIVE SCENARIOS. STEFAN RAHMSTORF THOUGHT WE
6 COULD HAVE AS MUCH AS OVER A METER IN THE NEXT 100
7 YEARS.

8 THESE NUMBERS ARE VERY SENSITIVE TO THE
9 AMOUNT OF ICE MELT WE MAY HAVE IN GREENLAND AND IN
10 ANTARCTICA. I'M SURE YOU KNOW THAT IF ALL THAT ICE
11 MELTED, WE WOULD HAVE 10 FEET OF SEA LEVEL RISE,
12 WHICH, OF COURSE, IS VERY UNLIKELY IN THIS CENTURY.

13 AND, YOU KNOW, WHAT'S GOING TO HAPPEN WITH
14 COASTAL FLOODING BECAUSE OF SEA LEVEL RISE? WE'RE
15 GOING TO SEE HIGHER SEA LEVELS. WE'RE GOING TO HAVE
16 MORE INTENSE STORMS. WE WILL HAVE CHANGING
17 SHORELINES. AND, OF COURSE, THE OTHER THING IS
18 PEOPLE ARE MOVING TOWARDS THE COAST, NOT ONLY IN THIS
19 COUNTRY BUT ALSO THROUGHOUT THE WORLD.

20 I ALSO WANT TO POINT OUT THAT ONE OF MY
21 AREAS OF RESEARCH IS ON CLIMATE CHANGE IN CITIES, AND
22 YOU KNOW MOST OF THE WORLD IS URBANIZING, AND IT'S
23 GOING TO BE PARTICULARLY A PROBLEM IN THE DEVELOPING
24 WORLD.

25 AND THIS JUST SHOWS THE EXTENT OF SOME OF

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1 THE PEOPLE THAT MIGHT BE VULNERABLE TO COASTAL
2 FLOODING OVER THE NEXT 100 YEARS. THIS IS FROM
3 NICHOLLS. THIS WAS IN WORKING GROUP II OF THE RECENT
4 IPCC REPORT. AND YOU CAN SEE THIS IS THE PEOPLE IN
5 THE SO-CALLED 1,000-YEAR FLOODPLAIN. SO RIGHT NOW
6 MAYBE AROUND 197 MILLION PEOPLE MIGHT RESULT IN
7 COASTAL FLOODING, BUT IT CERTAINLY GOES UP DEPENDING
8 ON THE POPULATION SCENARIO AND THE DEVELOPMENT
9 SCENARIOS OVER THE NEXT HUNDRED YEARS.

10 NORTH AMERICA, YOU KNOW, IS NOT DRAMATIC,
11 BUT ASIA IS A FAIRLY DRAMATIC INCREASE, AND AFRICA IS
12 A FAIRLY DRAMATIC INCREASE. SO IT IS CERTAINLY A
13 GLOBAL PROBLEM, THIS COASTAL FLOODING, BOTH NOW AND

14 IT IS GOING TO GET WORSE IN THE FUTURE.
15 NOW I'M GOING TO ZERO IN ON THE NORTHEAST
16 UNITED STATES. I WAS INVOLVED IN A STUDY THAT
17 CONCERNED SCIENTISTS LOOKING AT THE IMPACT OF CLIMATE
18 CHANGE IN THE NORTHEASTERN UNITED STATES, WHICH IS
19 THIS REGION: IT WENT DOWN LIKE FROM MAINE DOWN TO
20 NEW JERSEY, THIS AREA HERE. AND ONE OF THE THINGS
21 THAT WE DID WAS LOOKED AT THE IMPACTS OF SEA LEVEL
22 RISE ON THE CHANGE OF RECURRENCE INTERVALS OF COASTAL
23 FLOODING IN MAJOR CITIES IN THE NORTHEASTERN UNITED
24 STATES. AND WHAT THIS SHOWS IS, FOR EXAMPLE, IN
25 BOSTON, OKAY, IN THE B1 SCENARIO, BY 2050, WE WOULD

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1 EXPECT THE PRESENT 100-YEAR FLOOD TO OCCUR ONCE ON
2 THE AVERAGE EVERY THREE YEARS. OKAY. SO AN AREA
3 THAT GETS FLOODED NOW ONCE ON THE AVERAGE EVERY 100
4 YEARS, BY 2050 UNDER THE B1 SCENARIO, WITH LESS THAN
5 A FOOT OF SEA LEVEL RISE COULD BE FLOODED ONCE EVERY
6 THREE YEARS OR SO.

7 AND IF YOU JUST GO DOWN THIS COLUMN --
8 THESE ARE THE MAJOR CITIES -- JUST GO DOWN THE
9 COLUMNS HERE, OKAY. SO NO MATTER WHAT THE SCENARIO
10 IS, YOU WILL SEE DRAMATIC INCREASE IN THE FREQUENCY
11 OF FLOODING IN THESE AREAS. AND, OF COURSE, UNDER
12 2100, YOU SEE EVEN MORE FLOODING PROBLEMS IN THIS
13 REGION.

14 AND THEN IN TERMS OF METROPOLITAN BOSTON,
15 THIS IS PART OF DOWNTOWN BOSTON. THIS IS THE AREA
16 ALONG ATLANTIC AVENUE. HERE IS LOGAN AIRPORT OUT
17 HERE. THE BLUE CROSSHATCHED AREA, THIS RIGHT NOW IS
18 THE PRESENT 100-YEAR FLOODPLAIN. OKAY. THIS GETS
19 FLOODED ON THE AVERAGE ONCE EVERY 100 YEARS NOW.
20 WITH THE CLIMATE CHANGE, IT WILL GET FLOODED ON THE
21 AVERAGE OF ONCE EVERY THREE TO FIVE YEARS.

22 IN BLUE HERE IS WHAT THE EXTENT OF THE
23 100-YEAR FLOODPLAIN WOULD BE UNDER THE HIGH EMISSION
24 SCENARIO IN 2100, OKAY. SO YOU SEE MASSIVE FLOODING
25 ALL ALONG THIS AREA HERE. AND THIS IS ANOTHER PART

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1 OF BOSTON. THIS IS THE BACK BAY. AGAIN, IN THIS
2 COLOR BLUE, THIS IS THE AREA FLOODED IN 100 YEARS BY
3 THE CLIMATE CHANGE OCCURRING IN 2100 UNDER THE
4 HIGHER-EMISSIONS SCENARIO.

5 AND THIS IS ANOTHER REGION OF BOSTON.
6 AGAIN, YOU KNOW, A LOT OF FLOODING GOING ON.

7 THIS IS NEW YORK. IN NEW YORK HERE, WE
8 JUST SHOW IN BLUE, THIS IS THE PRESENT, THIS IS
9 MANHATTAN, RIGHT, THIS IS THE FINANCIAL DISTRICT. IN
10 BLUE HERE IS THE PRESENT 100-YEAR FLOODPLAIN. AGAIN,
11 UNDER CLIMATE CHANGE, THIS WOULD BE FLOODED A LOT
12 MORE FREQUENTLY THAN IT IS NOW.

13 I ALSO WANT TO POINT OUT, YOU KNOW, ONE OF
14 THE MAJOR ISSUES IS EQUITY; AND THE AREA HERE IN
15 BLUE, OKAY, IS AREAS THAT ARE GOING TO GET FLOODED
16 WITH 100-YEAR FLOOD IN 2100 THAT ARE RIGHT NOW
17 SO-CALLED ENVIRONMENTAL JUSTICE COMMUNITIES. THESE
18 ARE COMMUNITIES GENERALLY OF LOW INCOME THAT HAVE LOW

19 CAPACITY TO ADAPT TO OUR PRESENT ENVIRONMENTAL
20 CONDITIONS, AND THEY'RE GOING TO BE BURDENED WITH
21 FLOODING OVER THE NEXT CENTURY, AS WELL.

22 NOW, IN TERMS OF THE BOSTON WORK, AGAIN, I
23 HAD THE PRIVILEGE TO BE A PRINCIPAL INVESTIGATOR IN
24 THE STUDY OF CLIMATE'S LONG-TERM IMPACTS ON
25 METROPOLITAN BOSTON. IT IS A JOINT EFFORT OF TUFTS,

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1 BOSTON UNIVERSITY, UNIVERSITY OF MARYLAND, AND A
2 WORLD PLANNING ORGANIZATION CALLED THE METROPOLITAN
3 PLANNING COMMISSION. THIS IS ONE OF THE FIRST
4 STUDIES AT THAT TIME IN THE WORLD TO LOOK AT THE
5 IMPACTS OF CLIMATE CHANGE ON CITIES, AND WE ACTUALLY
6 LOOKED AT THE IMPACT OF CLIMATE CHANGE ON
7 INFRASTRUCTURE IN THE CITY.

8 YOU KNOW, CITIES ARE, OBVIOUSLY, VERY
9 DEPENDENT UPON THE SERVICES, THE INFRASTRUCTURE. WE
10 NEED WATER SUPPLY, WE NEED WASTEWATER MANAGEMENT, WE
11 NEED ENERGY, WE HAVE TO WORRY ABOUT FLOODING, WE HAVE
12 TO WORRY ABOUT DRAINAGE, WE HAVE TO WORRY ABOUT
13 ENERGY.

14 SO IN THIS RESEARCH EFFORT, WE LOOKED AT
15 THE IMPACT OF CLIMATE CHANGE ON ALL THESE SECTORS,
16 AND WE WENT ONE STEP FURTHER AND LOOKED AT HOW THE
17 IMPACT IN ALL THESE SECTORS ARE RELATED. AND SO I'M
18 GOING TO -- SO THIS IS THE STUDY AREA HERE. THIS IS
19 BOSTON. THIS IS THE METROPOLITAN AREA. IT'S 101
20 CITIES AND TOWNS. PRESENT POPULATION IS ABOUT 3.2
21 MILLION. IT MIGHT GROW TO ABOUT 4 MILLION BY 2050,
22 WHICH OF COURSE, LIKE CLIMATE CHANGE, PUTS STRESS ON
23 INFRASTRUCTURE. IT'S A NICE AREA TO STUDY BECAUSE
24 IT'S GOT NICE COASTLINES, WE HAVE COASTAL IMPACTS,
25 AND THEN IT HAS LIKE SUBURBS HERE AND THEN SORT OF

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1 SEMI-RURAL OUT HERE, SOME RURAL AREAS OUT THERE.

2 I'M GOING TO JUST TALK ABOUT COASTAL
3 FLOODING. RIGHT NOW ALONG THE COASTLINE THERE WERE
4 ABOUT A MILLION PEOPLE, A THIRD OF THE POPULATION.
5 THE LAND USE IS PRIMARILY RESIDENTIAL. THIS JUST
6 SHOWS THE STUDY AREA. AND SO THE
7 PURPLISH-GRAYISH-LIGHTISH COLOR IS RESIDENTIAL. SO
8 IT'S MAINLY RESIDENTIAL HERE AND HERE. THERE'S THE
9 BOSTON METROPOLITAN AREA WHERE THERE IS SOME
10 COMMERCIAL/INDUSTRIAL ACTIVITY.

11 THIS JUST SHOWS, IN THE DARK BLUE, IS THE
12 MAXIMUM ELEVATION OF SEA LEVEL RECORDED EVERY YEAR
13 FROM 1920 TO AROUND 2000. SO YOU SEE DEFINITE
14 INCREASE IN SORT OF THE PURPLE, WITH THE NEXT HIGHEST
15 ELEVATION OCCURRING IN ANY ONE YEAR. THE YELLOW IS
16 THE THIRD HIGHEST. AND, ALSO, YOU SORT OF SEE HERE
17 THE HIGHER EVENTS ARE GETTING HIGHER IN TIME.

18 AND UP HERE, THIS IS THE BLIZZARD OF 1978,
19 WHICH IS THE HIGHEST AMOUNT OF FLOODING THE BOSTON
20 AREA HAS HAD. I'LL TALK ABOUT THAT IN A COUPLE OF
21 MINUTES.

22 AND THE REGION THAT ALREADY HAS COASTAL
23 PROTECTION IS IN BLUE, THE AREA WHERE THERE IS SOME

24 SORT OF SEAWALL OR ARMORY OF THE COAST. IT LOOKS
25 LIKE THIS.

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1 IN PINK HERE IS THE -- FEMA CLAIMS THEY
2 WERE MADE AFTER THE BLIZZARD OF 1978. OKAY. THIS
3 STORM WAS A NORTHEASTERN EX-TROPICAL STORM. IT
4 OCCURRED IN FEBRUARY. IT CAUSED ABOUT HALF A MILLION
5 DOLLARS IN DAMAGE TO THE INFRASTRUCTURE OF THE REGION
6 IN BUILDINGS, BUILDING CONTENTS, AND EMERGENCY COSTS.
7 AND THE SURGE ASSOCIATED WITH THE STORM IN 1978 WAS
8 ONLY A 20-YEAR EVENT. OKAY. AND IT CAUSED SO MUCH
9 DAMAGE BECAUSE IT STRUCK AT HIGH TIDE. SO YOU CAN
10 IMAGINE IF WE HAD THE 100-YEAR EVENT, 100-YEAR
11 ANOMALY THAT STRUCK AT THAT TIME, THE DAMAGE WOULD
12 HAVE BEEN A LOT MORE SEVERE. AND IT JUST SHOWS SOME
13 OF THE DAMAGE.

14 IF ANY OF YOU GET A CALENDAR FROM NEW
15 ENGLAND, THEY ALWAYS HAVE THIS PICTURE OF THIS
16 LOBSTER HOUSE UP IN THE NORTH SHORE OF MASSACHUSETTS.
17 IT GOT FLATTENED BY THE STORM. IT'S BEEN REBUILT.
18 HERE IS SOME DAMAGE TO SOME WHARF, SO YOU CAN GET A
19 SENSE OF HOW HIGH THE SURGE WAS.

20 THIS DIAGRAM HERE JUST SHOWS THE MAXIMUM
21 ELEVATION THAT OCCURRED EVERY YEAR SINCE 1920 TO THE
22 YEAR 2000, UNDER ABOUT A FOOT AND A HALF SEA LEVEL
23 RISE OVER THE NEXT CENTURY. THESE ARE TIME SERIES OF
24 POSSIBLE STORM SURGES THAT MIGHT OCCUR OVER THE NEXT
25 HUNDRED YEARS. ALL OF THEM ARE EQUALLY LIKELY. IF

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1 YOU FOLLOW ANY OF THEM, LIKE ANY ONE OF THESE COLORS
2 HERE, AND YOU SEE, YOU KNOW, ABOUT 2050, YOU'RE
3 HAVING FLOODING -- THIS IS THE FLOODING THAT OCCURRED
4 IN 1978, THIS ELEVATION HERE. SO YOU CAN SEE AFTER
5 ABOUT 2050, UNDER THE SEA LEVEL RISE SCENARIO, EVERY
6 COUPLE OF YEARS WE'RE EXCEEDING THE FLOODING THAT
7 OCCURRED IN 1978.

8 AND SO HUMAN SOCIETY IS GOING TO ADAPT TO
9 CLIMATE CHANGE. AND IN TERMS OF COASTAL MANAGEMENT,
10 THERE ARE SORT OF FOUR THINGS THAT MIGHT HAPPEN:

11 ONE IS WE DO NOTHING, OKAY. AND IN OUR
12 WORK IN THE BOSTON METROPOLITAN AREA, WE CALL THIS
13 "RIDE IT OUT." IT WAS CALLED "RIDE IT OUT" BECAUSE
14 WE WENT TO SPEAK TO THE MANAGER OF A LOCAL AIRPORT
15 ABOUT WHAT TO DO ABOUT
16 CLIMATE CHANGE. AND THIS PERSON SAID, "OH, JUST RIDE
17 IT OUT, LET'S SEE WHAT HAPPENS." SO WE CALL "RIDE IT
18 OUT," ACTUALLY DOING NOTHING. KEEP ON DOING WHAT
19 YOU'RE DOING, REPAIR THE DAMAGE, AND TRY TO GO
20 FORWARD.

21 THE NEXT ONE IS PROTECTION, AND THIS IS
22 ESSENTIALLY TRYING TO BUILD YOUR WAY OUT OF CLIMATE
23 CHANGE.

24 THE NEXT ONE IS ACCOMMODATION, WHICH IS
25 ESSENTIALLY ALLOWING HUMAN ACTIVITIES AND HAZARD TO

0338

1 COEXIST IN THE FLOODPLAIN, ESSENTIALLY
2 FLOOD-PROOFING.

3 AND THE FOURTH IS RETREAT, ESSENTIALLY
4 REMOVING HUMAN ACTIVITY FROM THE HAZARD ZONE.

5 AND WE TRIED TO ESTIMATE THE TOTAL DAMAGES
6 IN TERMS OF BUILDINGS, CONTENTS DAMAGE, EMERGENCY
7 COSTS THAT WOULD HAPPEN TO THE BOSTON METROPOLITAN
8 AREA UNDER ALL OF THESE POSSIBLE IMPACT AND
9 ADAPTATION SCENARIOS. AND SO THERE'S A LOT OF
10 INFORMATION HERE. IF THERE IS NO CLIMATE CHANGE, AND
11 THIS IS THE TOTAL CUMULATIVE DAMAGE OVER THE NEXT
12 HUNDRED YEARS WITH NO DISCOUNTING, OKAY, TO BUILDINGS
13 AND CONTENTS AND AT THE COST OF TAKING THE ADAPTATION
14 ACTION AND ALSO EMERGENCY COST. SO IF THERE IS NO
15 CLIMATE CHANGE AND WE KEEP DOING THE PRESENT POLICY
16 OF SORT OF DOING NOTHING BUT REBUILD AFTER FLOODING,
17 THE TOTAL COST OVER THE NEXT 100 YEARS WOULD BE, YOU
18 KNOW, \$6.4 BILLION. IF YOU RIDE IT OUT, IT MIGHT BE
19 \$20 BILLION, OKAY. IF WE TRY TO BUILD YOUR WAY OUT,
20 IT MIGHT BE \$9.4 BILLION. THIS IS SORT OF THE
21 ACCOMMODATION, FLOOD-PROOFING SCENARIO, IT'S ABOUT
22 \$5 BILLION. THEN, IF WE RETREAT, IT'S ABOUT
23 \$17 BILLION. RETREAT IS REALLY EXPENSIVE BECAUSE YOU
24 PAY PEOPLE TO MOVE OUT OF THE FLOODPLAIN AND BUY
25 THEIR PROPERTY.

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1 THIS IS INTERESTING HERE, AND THIS IS OFTEN
2 THE CASE IN ADAPTATION RESEARCH, OTHER PEOPLE HAVE
3 OBVIOUSLY FOUND THIS, IS THAT THE CASE HERE OF THIS
4 GREEN SCENARIO HERE, WHICH IS ACCOMMODATION AND
5 FLOOD-PROOFING, THE TOTAL COST OF THAT OVER THE NEXT
6 100 YEARS IS LESS THAN THE COST RIGHT NOW OF
7 MAINTAINING PRESENT POLICIES. SO EVEN IF CLIMATE
8 CHANGE WAS NOT TO OCCUR, IT WOULD STILL MAKE SENSE TO
9 TAKE ADAPTATION ACTION.

10 AND THIS JUST SHOWS IT A LITTLE MORE
11 DRAMATICALLY. THIS IS THE COST. THIS IS TIME. THIS
12 IS THE COST OF RIDE IT OUT, ESSENTIALLY DOING
13 NOTHING, OKAY. SO IT INCREASES OVER TIME. THIS IS
14 THE COST OF IMPROVED ZONING. AND THIS IS THE DAMAGE
15 COST. OKAY. SO YOU CAN SEE IT MAKES A LOT MORE
16 SENSE TO TAKE ADAPTATION ACTION EARLY AS OPPOSED TO
17 WAITING FOR THE FULL DAMAGES TO OCCUR. AND AGAIN,
18 OTHER PEOPLE THAT WORK IN ADAPTATION HAVE FOUND
19 SIMILAR FINDINGS.

20 BUT THERE IS HOPE. SOME STATES ARE TAKING
21 ACTION TO RESPOND TO THE COASTAL IMPACTS OF CLIMATE
22 CHANGE. FOR EXAMPLE, MAINE RIGHT NOW, IF A BUILDING
23 IS DAMAGED IN MAINE BY COASTAL FLOODING, IT CAN'T BE
24 REBUILT UNLESS IT CAN STAND THREE FEET OF SEA LEVEL
25 RISE.

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1 AND THEN, ALSO, THERE IS A RECENT BILL
2 PROPOSED IN CONGRESS THAT IS UP FOR REVIEW RIGHT NOW
3 ORDERING FEMA TO TAKE SEA LEVEL RISE INTO ACCOUNT IN
4 ITS FLOODPLAIN MAPPING.

5 SO THAT'S ABOUT IT.

6 SO I WANT TO THANK YOU VERY MUCH FOR YOUR
7 TIME AND ATTENTION.