Mitigation and Adaptation Studies

Class 22: Developing Options: Avoiding Adaptation or Changing Paradigms

Contents

- Sustainability and Policy Making
- Making Choices between Options
- Adaptation to Sea Level Rise
- Accounting for Extremes
- Accounting for Slow Changes
- Copying with Risk and Uncertainty - Systemic changes versus system improvements Change by design









Ethics:

- Normative: discover truth about morality what rules should be promoted?
- Descriptive: describe the ethical and moral rules what does motivate people?

Norms can deviate from what ethics considers as normative:

- slavery was a norm but unethical
- voting rights restrictions for women were a norm but are now considered unethical
- Virginia Sterilization Act of 1924 reflected a social norm at that time but was highly unethical

What of today's norms will be considered unethical tomorrow?

Ethics requires:

 \bullet careful thinking about what is morally justified (normative reasoning), • consideration of how relevant culture/customs/norms might be changed (descriptive/empirical ethics).

Moral obligations (normative):

- small families
- change in development goals and economy in all parts of the world

How can we change the existing norms to be consistent with these moral obligations?

How do humans make decisions?



Foreseeability and Foresight:





POLICY MAKER











































"Wizard Clairvoyant" Scientific knowledge Exploring the Future with Simulations NATURAL SCIENTIST ENGINEER **ECONOMIST** SOCIAL SCIENTIST











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Food Preferences versus Food Security

Octopus farming will soon be the norm. Marine scientists say this isn't a good thing

By Olivia Goldhill · April 6, 2019



Should they be farmed?



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Should they be farmed?

Ethics:

- Is it acceptable to keep the very intelligent and definitely conscious invertebrates in small cages?
- If it is not acceptable, why is other farming os animals acceptable?







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Food security and sustainability:

- Octopus farming "would increase, not alleviate, pressure on wild aquatic animals," they write.
- "Octopuses have a food conversion rate of at least 3:1, meaning that the weight of feed necessary to sustain them is about three times the weight of the animal."









Misinformation and Misconceptions



[BLOG] UNION OF CONCERNED SCIENTISTS



5 Wind Power Facts (From Better Sources Than President Trump)

JOHN ROGERS, SENIOR ENERGY ANALYST | APRIL 5, 2019, 9:32 AM EDT

🖬 Like 129 💙 Tweet 📮 SHARE

It may be hard to believe, but our president is getting even more outrageous in his claims about wind power-whether it's ignoring the reality of how our electricity system actually works or fabricating lies about non-existent health risks. Turns out there are more credible resources than him for good information about wind.

SEARCH



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JOHN ROGERS is a senior energy analyst with expertise in renewable energy and energy efficiency technologies and policies. SEE JOHN'S FULL BIO.

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[TOPICS] Biofuel Energy Food and Agriculture







https://blog.ucsusa.org/john-rogers/5-wind-power-facts-from-better-sources-than-president-trump



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> >

- 1. Wind power doesn't hurt the reliability of our electricity system
- 2. The real threat to birds is climate change
- 3. Wind power is good for your health
- 4. Wind turbines don't hurt property values
- 5. Wind power is serious energy

https://blog.ucsusa.org/john-rogers/5-wind-power-facts-from-better-sources-than-president-trump







Misinformation and Misconceptions

Skyscrapers are killing up to 1bn birds a Birds year in US, scientists estimate

New report ranks deadliest cities for feathered travelers, who often collide with glass-covered or illuminated buildings



Skyscrapers in New York City. Conservationists want buildings adopt more 'bird-friendly' designs. Photograph: Michael Nagle/Bloomberg

Scientists estimate that at least 100 million and maybe as many as a billion birds die each year in the US when they collide with buildings, especially glasscovered or illuminated skyscrapers. And, in a new report, conservationists now have a better idea which American cities are the deadliest for those on the wing.

Lauren Aratani in New York

Sun 7 Apr 2019 01.00 EDT



≪ 5,822

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Volume 116, Issue 1 1 February 2014

Article Contents

Bird-building collisions in the United States: Estimates of annual mortality and species vulnerability 🕮

Scott R. Loss 🖾, Tom Will, Sara S. Loss, Peter P. Marra

The Condor: Ornithological Applications, Volume 116, Issue 1, 1 February 2014, Pages 8-23, https://doi.org/10.1650/CONDOR-13-090.1 Published: 02 January 2014 Article history v

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Misinformation and Misconceptions



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One community loves wind turbines; another resents single turbine. It stands near the them. What Germany gleans from two seaside district—all six evoke disdain. communities may determine its carbon future. https://www.hakaimagazine.com/features/germanys-winds-of-change/

Reussenköge hosts one of Germany's largest and densest wind power parks: Bürgerwindpark Reussenköge. It boasts 86 turbines, each one substantially taller than the Statue of Liberty and her pedestal, many of them spaced less than half a

In Waabs, on the other hand, though nearly as blustery a station, there's just a community's border, beside five others planted within the boundaries of the next











Societal goals determine choice of options. Example: Public Energy Service





Plag and Jules-Plag, 2018





Group interests bias option choices



<



US World Environment Soccer US Politics Business Tech Science

Trump administration sabotages major conservation effort, defying Congress

Revealed: federal support to research centers cut off as scientists fear years of successful work will go 'down the drain'



Work by one Landscape Conservation Cooperative helped the i'iwi, an endemic Hawaiian honeycreeper, listed as 'threatened' under the federal Endangered Species Act. Photograph: Jack Jeffrey/AP



Paradigms limit options that are considered





The natural world can help save us from climate catastrophe George Monbiot



Ecological restoration can be a powerful means of protecting the atmosphere - we need to rewild on a massive scale • Letter: A natural solution to the climate disaster



into collapse. We are writing to champion a thrilling but neglected approach to averting climate chaos while defending the living world: natural climate solutions. This means drawing carbon dioxide out of the air by protecting



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✓ @GeorgeMonbiot Ved 3 Apr 2019 01.00 EDT 3,360 498

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Ecological restoration can be a powerful means of the atmosphere - we need to rewile Letter: A natural solu

The world faces two existential crises, developing with terrifying speed: climate breakdown and ecological breakdown. Neither is being addressed with the urgency needed to prevent our life-support systems from spiralling into collapse. We are writing to champion a thrilling but neglected approach to averting climate chaos while defending the living world: natural climate solutions. This means drawing carbon dioxide out of the air by protecting and restoring ecosystems.





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Regions Vulnerable to Sea Level Rise











How to develop foresight?



Contribution to Global Sea Level

Example of Sea Level Rise

Accepted knowledge in 2000:

- Greenland: no significant contribution to sea level rise
- Antarctica: minor contribution Main contribution: steric changes

Knowledge in 2016:

Greenland: is contributing, is accelerating; increasing potential for a large contribution to sea level rise due to deep warm water around Greenland and impact of changes in atmospheric circulation.

Antarctica: West Antarctic ice sheet (WAIS) will contribute 4.5 m









How to develop foresight?



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Plag and Jules-Plag, 2013





London: Trusting the Protection









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More than 300,000 homes in London are at risk of flooding from the Thames and the capital's numerous other rivers, according to a new report.

Groundsure, an environmental risk consultancy, used Environment Agency and census data to calculate the places most in danger of damage.

Hammersmith and Fulham was found to be the worst borough for potential flooding, with almost 60,000 homes – 60 per cent of the borough – at risk.









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Winter storms in December 2013-January 2014 almost reached the top of the barrier.





Maldives: Preparing for migration

MTCC Villingili Ferry Terminal

AAFANNU Majeedhee MadMale

Indira Gandh Memorial Hospital

Villingili Ferry Terminal





Maldives: Preparing for migration



MTCC Villingili Ferry Terminal

Indira Gandh

Villingili Ferry Terminal

Memorial Hospital

AAFANNU





Maldives: Preparing for migration





Venice: Protection and Retreat




Venice: Protection and Retreat





Venice: Protection and Retreat





Venice: Protection and Retreat





Hamburg: Warft solution

Flood-secure bases instead of dikes: safe from high water in HafenCity

HafenCity lies to the south of the main Hamburg dike, which runs along Zollkanal - as indeed does the Speicherstadt in this means that the existing dike offers the new district no protection.



Batten down the hatches! To conserve the historic Speicherstadt (right), Am Strandtorkai has not bee elevated - unlike most streets in the district. But all new buildings (left) have been elevated on floodsecure plinths (© ELBE&FLUT)





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A special solution therefore had to be worked out to defend this new part of town against occasional storm surges. Surrounding HafenCity by dikes 👔 would have created a series of distinct disadvantages. Proximity to large expanses of water is what gives the new district much of its charm; dikes would have deprived it of the many exciting sight lines down to the water particularly in the public built environment. Another point is that complete enclosure of the 127 hectare site by dikes would have had to have been completed before any construction of buildings began; a technical and economic 22 tour de force of that kind would also have put the successive development of the district in question.



secure plinths (© ELBE&FLUT)

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A broad strip up to 15 meters wide along the edges of the lovingly restored historic quays is down at the existing 4,5 to 5.5 meter level of the HafenCity area and provides 10.5 kilometers of waterside walks. This adds up to a lot of public urban space right next to the water. In the western part of HafenCity many of these squares and promenades are already in constant use. Thus the "Warft" solution also has the side-effect of allowing a totally new topography 2 to take shape - which will put its own stamp on the character and quality of the district.

Batten down the hatches! To conserve the historic Speicherstadt (right), Am Strandtorkai has not been elevated - unlike most streets in the district. But all new buildings (left) have been elevated on floodsecure plinths (© ELBE&FLUT)







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The district can continue to function virtually without restriction even during flooding and despite its "island" situation. In cases of high water, a few underground parking garage entrances along Am Sandtorkai and Brooktorkai (directly opposite the Speicherstadt) do have to close their flood gates 👔 . This is because, if the roadways (Am Strandkai and western Brooktorkai) passing directly adjacent to the historic warehouses had been retrospectively elevated, the identity and function of the whole Speicherstadt ensemble would have been affected. Planners of the listed Speicherstadt had worked on the assumption that their area could be flooded in cases of extreme high water.



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But by elevating the buildings on plinths 👔 made of mounds of compacted fill ("Warften" in German), it has been possible to connect HafenCity with the existing city area and develop it step by step from west to east, and from north to south. All new buildings stand on artificial bases eight meters above sea level - out of reach of the most extreme flooding. On the exposed windward sides, such as the southern sides of Strandkai and Überseequartier, the external perimeter will actually lie at 8 to 9 meters above sea level. It is the responsibility of the private developers of buildings to put these artificial compacted bases in place, so their number is growing as the number of buildings increases. This has dispensed with any need for premature financing of flood-protection measures years - or even decades – ahead of the sale and deployment of the sites concerned.



uildings (left) have been elevated on flood-























New Orleans: Rebuilding

New Urbanism and Hazard Mitigation: Mississippi Renewal Forum

New Orleans: Rebuilding

New Urbanism and Hazard Mitigation: Mississippi Renewal Forum

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NEWS SPORTS BUSINESS REAL ESTATE

Q

The annual king tides are rising in South Florida, causing some flooding in coastal areas. Joey Flechas jflechas@miamiherald.com

MIAMI-DADE COUNTY

JUNE 09, 2017 7:45 AM

Mainland Miami ponders returning neighborhoods to nature in order to survive rising seas

BY DAVID SMILEY

dsmiley@miamiherald.com

On mainland Miami, miles away from the pumps that keep Biscayne Bay from slowly swallowing South Beach, the neighborhood around Ray Chasser's riverfront house sometimes seems like it's drowning one high tide at a time.

When the moon is full and the bay bloated, a salty soup comes seeping forth from French drains and onto the streets, turning the low-lying peninsula where the southeast corner of Shorecrest meets the mouth of the Little River into a temporary tide pool. During the annual King Tide, when the water level is at its peak, the coastal community floods for days, something Chasser says didn't happen when he first acquired his property 30 years ago.

"As soon as the tide starts coming up, you can see it coming from the drains. And then the streets are covered," he said. "And it's going to get worse."

New York City: Protecting

John Blackford

"But there will come a moment when no matter what you do, even a rich city like New York won't be able to protect itself."

> Guy Nordenson, professor of structural engineering and architecture at Princeton University

HOME > ABOUT > PROJECTS > NORFOLK COASTAL STORM RISK MANAGEMENT

Background

As a result of Hurricane Sandy in October 2012, Congress passed P.L. 113-2, a portion of which directed actions USACE was to take, including preparation of two interim reports to Congress, a project performance evaluation report, and a comprehensive study to address the flood risks of vulnerable coastal populations in areas affected by Hurricane Sandy within the boundaries of the North Atlantic Division of the U.S. Army Corps of Engineers.

Search Norfolk District

CAREERS MISSIONS MEDIA LIBRARY CONTACT LOCATIONS

Project News

Public Meeting at Lambert's Point Community Center 1251 W 42nd St. Norfolk, VA 23508

6-8 p.m. June 8, 2017

The Norfolk District and the City of Norfolk will present preliminary project measures and gather feedback from the public on those potential structural and nonstructural features.

Norfolk District officials presented details of the Norfolk Coastal Storm Risk

Q

POTENTIAL NONSTRUCTURAL MEASURES

Vonresiden

Norfolk:Fingers of high ground

Norfolk: Fingers of high ground

Hampton Roads Area

With Start was the WUSSENDER WISHER Creek

FHG at multiple scales in tidewater virginia

FHG: A DESIGN FEATURE

FHG are natural features that result from the way land fractures toward the sea In Tidewater Virginia, but they can also be engineered landforms and structures. In the short term, FHG serve as Islands of refuge for coastal communities, holding areas of rain that reduce inland flooding, protective barriers, and exit routes. In the long term, they are new grounds of settlement designed with ecologically sensitive and economically productive infrastructures and practices, wave attenuators, and habitats for migrating ecologies.

FINGERS OF HIGH ROUND A STRUCTURE FOR COASTAL RESILIENCE

NORFOLK AND HAMPTON ROADS, VIRGINIA

Making room for the water

PENNDESIGN TEAM

Anuradha Mathur / mathur2@design.upenn.edu Dilip da Cunha / dilip@design.upenn.edu

Norfolk: Fingers of high ground

Roads Area

With the the substand WUSSENDER WILLING Creek

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NORFOLK AND HAMPTON ROADS, VIRGINIA

Making room for the water

Fingers of High Ground (FHG) Learning to live with the water

PENNDESIGN TEAM

Anuradha Mathur / mathur2@design.upenn.edu Dilip da Cunha / dilip@design.upenn.edu

in a

Indian River

Sea Level Rise







Sea Level Rise



Indian River Lagoon

156







Orchid

Adaptation to Sea Level Rise

Hampton Roads, Outer Banks: Individual, diverse options













Adaptation to Sea Level Rise





• To cope with a moving coast line, we need, for example: Adaptive infrastructure moving with the coast line; Redefine/manage real estate property in the coastal zone; Redistribute risk between individuals, communities, states and the country; Learn to utilize the benefits of the coastal zone while reduce the risks.







Adaptation to Sea Level Rise





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