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The Center for the Study of Force Majeure Overview

Force Majeure

In an ecological framing, *Force Majeure* describes the forces unleashed by the continuing rise in the average temperature of Earth's climate system generated by the vast industrial processes of resource extraction and carbon dioxide production.

The overarching work of *The Center for the Study of the Force Majeure* is based on the increasingly common understanding that the pressure of human-generated climate warming on all planetary systems has accelerated dramatically over the past 100 hundred years, more so in the past 25. As the atmospheric carbon load increases, the Earth's many systems adjust accordingly. Climate does not change in isolation; it does so along with rising temperatures, shrinking icepacks and massive changes in weather patterns. Dramatic, even catastrophic changes in the environment are both inevitable and happening.

We have experienced at least 5 past mass extinctions related to environmental shock. Unless we find effective ways to mitigate the impact of greenhouse gases and industrialization, the 6th mass extinction now in evidence will resist mediation. In fact, research by Ehrlich and others indicates that species extinctions are now happening at multiple times normal.

The center brings together artists, scientists, environmentalists, engineers, planners and visionaries to design ecosystem-adaptation works in regions around the world that are nearing critical tipping points due to climate warming. Founded by Helen and Newton Harrison, internationally acclaimed artists and pioneers in the ecological-art movement, the Center for the Force is built on a hybrid model between art and science that shatters traditional boundaries between academic disciplines. The Center is a freestanding educational and research non-profit established in 2012 by the Arts Division of University of California, Santa Cruz.

GLOBAL CHALLENGE: CLIMATE FORCING IN ACTION

We believe, as do others, that we must adapt to the crisis at the scale at which it presents itself, furthermore that responses to this crisis must be both environmental and social. As glacial melt and loss of snow pack leads to erratic river flows and drought over the next 50 to 75 years, the impact even now is felt on every continent. The United Nations recently projected that up to one quarter of global food production could be lost by 2050 due to the combined impact of climate change, land degradation, and water

Climate Change is Human Change

Climate Change shrinks the distance between global ecology and human ecology. Truly effective responses to climate change will inevitably transform human society.

Global ecosystem well being can support and generate human well being

scarcity¹. The 7 major rivers that drain the Tibetan plateau and provide water for over 1.2 billion people will face even greater challenges. California's own water systems are already under unprecedented stress; water flows from the High Sierra are predicted to drop substantially with higher temperatures. At the same time, a 2-4 meter rise in sea levels will wreak havoc on the entire oceanic coastline, affecting hundreds of millions of people, including many of the major cities of the planet. In fact, the March 2014 IPCC Final Report specifically calls out food shortages as a major concern.

"Global temperature increases of ~3°C or more above late-20th-century levels, combined with increasing food demand, would pose large risks to food security globally and regionally,"²

In short, without real mitigation depending on resource reallocation, we may well be looking at a breakdown in civil society.

On the Urgency in a 50-year Moment

Like an oncoming storm front, the Force Majeure is a fluid frontier; a frontier of heat moving across the planet; a frontier of water advancing on ocean facing lands. It is a frontier from which we must retreat, yet within which we must also adapt. Choice is available in that it is a force and a situation open to human creativity leading to mediation. For instance the Ehrlich studies, earlier referred to, indicate a loss of 5 or 6 million species or 50% of those estimated to live currently in the next 50-100 years. Our work indicates that mediation is capable of reducing this rate, the greater the reduction, the greater the probability of recovery. For instance if we only lose 20-30% of our species, ecological regeneration may still be possible. We find that the rapid return of ecosystems after glacial retreat is the example in nature in need of study. For instance a glacier may denude 1 million square miles of biodiversity, but in 12,000 years nature typically generates a 70% recovery. This is in contrast to a major extinction event which requires between 11 and 50 million years for recovery.

For these reasons, we at the center believe there are solutions that can mitigate the great challenges we face in responding to the *Force Majeure*. We find solutions based on asking different kinds of questions and by listening carefully to the answers that result. We use metaphors to challenge our thinking and guide our perspective.

This is the work of the Center for the Force Majeure.

What We Do

Presently the Center is focused on 3 categories of work, each with a guiding metaphor. The metaphors are intended to re-frame issues and guide design, setting up the center's whole systems approach.

Projects and Provocations

¹ <https://www.climatecommunication.org/affects/food-production/>

Small-scale preemptive action on the ground entitled **Future Gardens**

Guiding metaphor: *Every place is the story of its own becoming*

This work is about assisting the adaptation of local landscapes to extreme stress site by site, by the people of that place. It is about taking responsibility locally. In these works we interrogate the landscape to reveal species in its history and in its present that can thrive in the face of expected temperature changes and diverse water regimes. These clusters of species are then propagated in *Future Gardens* that act as educational scientific experiments, as well as nursery beds of future plant ensembles that have the capacity to regenerate heat-stressed ecosystems far more rapidly than nature can.

Future Gardens generate **biodiversity fields**, which can self-replicate in virtuous cycles, expanding and improving a biome as they develop. We work with the laws of conservation of energy and seek to reduce entropy place by place.

Projects include 3 gardens in progress and a fourth in proposal form:

- A Future Garden for Sichuan Province at the edge of the Tibetan Plateau
 - A 10-acre site at 12,600 ft that looks at what will grow and flourish in the Sichuan Province in anticipation of a possible temperature rise of 4-5 C°. In collaboration with Sichuan University.
- A Future Garden for the University of California Santa Cruz Arboretum
 - A ¾ acre site in the University of California Santa Cruz Arboretum, utilizing three original Buckminster Fuller Domes as greenhouses. The project will test plant ensembles that could form the basis for the regeneration of future ecosystems in coastal California in collaboration with UCSC scientists
- A Future Garden for the Sagehen Watershed in the Sierra Nevada
 - A Future Garden for the 8,000 acre Sagehen Watershed (part of the UC Berkeley Sagehen Creek Field Station) see research design in: *The Time of the Force Majeure, After 45 Years, Counterforce is on the Horizon, Prestel press*. A 50-year project, the third year of operation indicates an unexpectedly successful 25% survival rate.
- A Future Garden for the Los Angeles Miracle mile
 - In pre-design sketch format

Preemptive Planning and Ecological Design at Landscape Scale

Guiding metaphor: *Only fools pick a fight with the ocean, wise folk dance with the rising waters*

This body of work is about identifying and relinquishing counter productive behavior in the face of immense environmental change and adapting at great scale. It is about withdrawal and transformation. We find ourselves in this frame asking and setting out to answer such questions as: what can we do about a million square kilometer drought in Europe? or what are appropriate responses to fire happening in 150 million acres in the American west? or how to accommodate a 3 meter ocean rise impacting the bays of San Francisco and the central valley of California?

Global Solutions: Business as Unusual

Part of this comprehensive, whole-systems design process is something we refer to as business as unusual. It addresses the business behaviors that stress the ecosystem, particularly the resistance to limiting growth. Our work is incomplete unless it includes tools to (re)imagine the kinds of social organizations and economies that provide well being for civilization while enhancing the well being of the environment in which we reside. For instance, imagine a Forest Industry of the 21st Century where the act of harvesting (forestry) preserves the system (the forest) and the act of preserving the system provides meaningful work for everyone in the community. We call these emerging socio-ecological structures *Whole Systems Sites*.

Projects include:

- ***The Bays of San Francisco become a 400,000-acre Estuarial Lagoon with a 3-meter ocean rise***

How can the Bays of San Francisco continue to be a region that supports a thriving metropolis, a productive agricultural sector, areas of remarkable beauty and productivity while elaborating the ecological processes critical to sustain civilization well into the foreseeable future?

 - Research is beginning on assisting the ecological development of a comprehensive response that leads to great biodiversity and productivity. The Bays themselves are capable of generating a 40 million pound bio-diverse harvest. From a whole systems perspective, the harvest of varying species, preserves the system. See proposal in book, *The Time of the Force Majeure*.
- ***Saving the West***

California is in a crisis of fire and water. Decades of fire suppression in the western United States created forests that have far too many small diameter trees. This puts them in constant danger of mega fires, destroying biodiversity, wildlife and water supplies topsoil, and potentially devastating whole communities. The need to restructure forested areas throughout the west by selectively removing excess trees and returning ecologically necessary fire to the ecosystem is now clear. This work is presently in competition for the MacArthur 100&Change program.

 - Content: reversing and bringing into being biologically sound, economically productive forests in the presently a fire ravaged 150 million acre forest ensemble in the American West.
See <https://vimeo.com/181541814> for a video introducing the project and background
- ***Peninsula Europe IV***

The best scientific information is that about 20-30% of the productive lands in Europe will suffer drastically reduced productivity as a consequence of global warming associated drought

 - Peninsula Europe IV addresses the question of how to confront and mediate a 1 million square kilometer drought, moving from Portugal to Mid-Europe. See *The Time of the Force Majeure* for proposal. Peninsula Europe part IV.
 - Initially supported by the EU Cultural Fund and the German Environmental Ministry as well as four museums in 3 countries.

Governance as a Transformative Force

Can we invent a new form of governance tuned to the life web that has the means to mediate the sixth mass extinction?

Guiding metaphor: *Where the shape of catastrophe becomes the shape of opportunity*

This work is focused on creating and supporting new forms of governance that operate in tune with the laws of conservation of energy and ecological exchange, tuning specifically to the life web. We begin by treating human civilization as another biome, with social governance acting as an ecotone, a transition zone mediating between biomes. Viewing societal organization in an ecological frame redefines growth and social success. Among other features, such a society becomes automatically ecologically self-adjusting. Governance of this kind would concern itself with how to design a culture fueled by free and renewable energy instead of one relying on growth and extraction. By free energy we mean human creativity coupling with the sun, winds, the waves, the mantle, in combination with the excess energies expelled by all living systems. It is the same free energy that allows the life web to evolve and grow.

A metaphorical flip occurs when the ecologically catastrophic human centered systems design now being guided by the dominant democratic metaphor governance *of the people, by the people, and for the people* (now corporations), is flipped into the new, more inclusive frame that of **governance of the whole, by the whole, and for the whole.**

This conceptual work in the center is in process of being formed and funded. The first phase will be a roundtable of ecologically literate people already concerned with how to reform governance in such a way that it tunes to the life web. Our intention is to generate a series of working papers incorporating "Uncommon Sense." The first four questions we will address are:

1. What would governance look like if energy were free, drawn from the sun, the wind, the waves and the mantle? Including the waste produced by both human and natural systems of productivity.
2. At present most manufacture, most acquisition of raw material is based on the taking of resources from most earth systems without an overarching life systems requirement that taking requires giving back. What would governance look like if the act of taking were also an act of return or giving back? Moreover what kind of reward system might be imagined when exergy is the outcome of production? That is to say, giving back more than one has taken.
3. What would governance look like if a transformation happened that halted or transformed global capitalism into local capitalism? The idea here is that capital and profit can work locally in the way that ecosystems exchange energy and grow locally utilizing the sun and the energies released by the metabolic processes of nearby systems.
4. How can we begin the discussion of reframing civilization as a biome and seeing governance in terms of an ecotone, mediating between biomes.

In conclusion, we at the Center for the Force Majeure do not think that we are some form of ultimate resolution to the problems that humankind has generated for the life web such as the emerging sixth extinction. We do think however, that the work of the center can develop

remediation and regeneration models at new but appropriate scales.

Newton Harrison and Joshua Harrison
Co-Directors: Center for the Study of the Force Majeure
Helen Harrison, Director Emerita
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Helen and Newton Harrison are
Professors Emeritus UC San Diego
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The *Center for the Study of the Force Majeure*, based at the University of California, Santa Cruz, brings together artists, scientists, engineers and planners and visionaries to design mitigation systems and policies that respond to the issues raised by global temperature rise at the scale that they present.