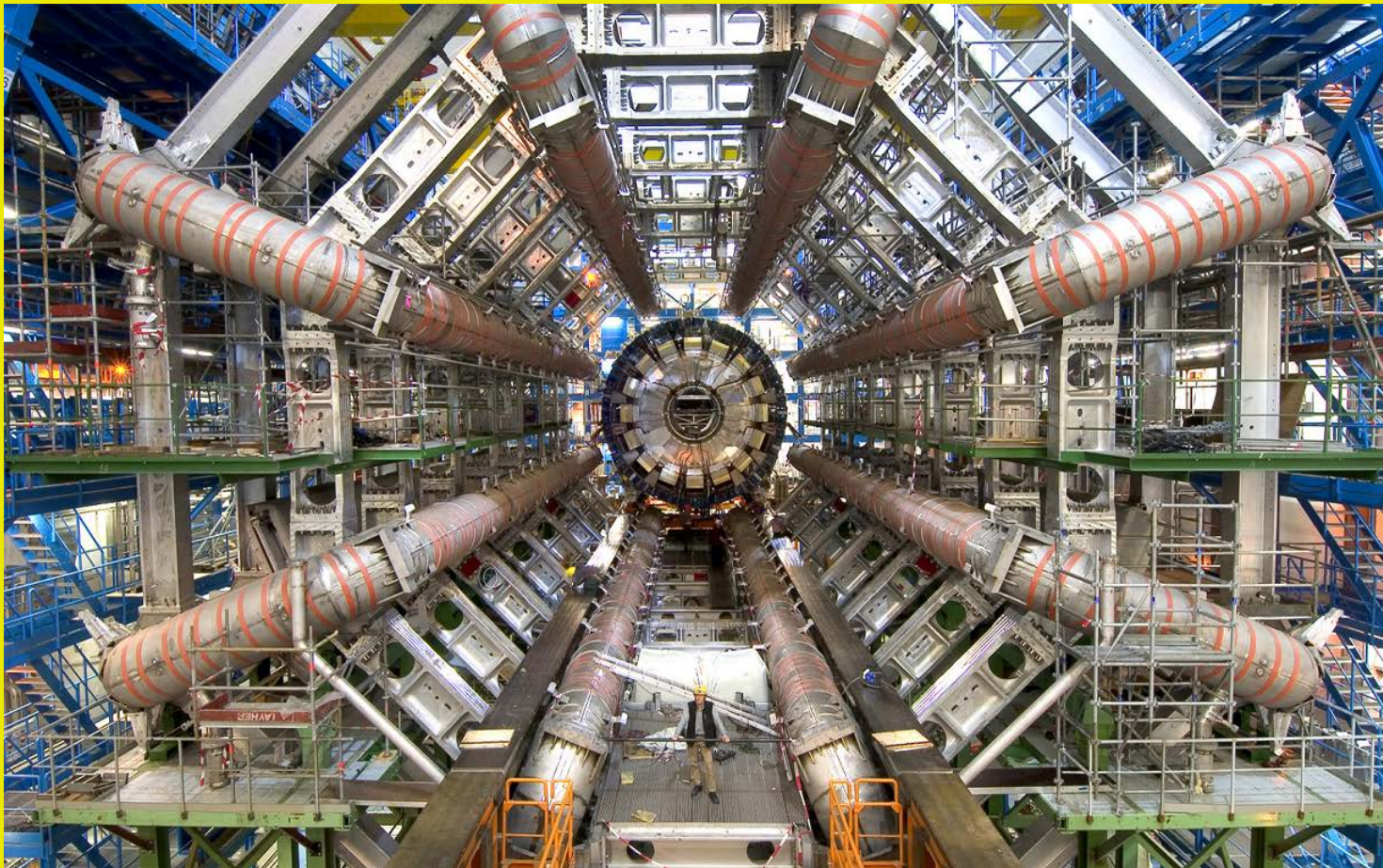
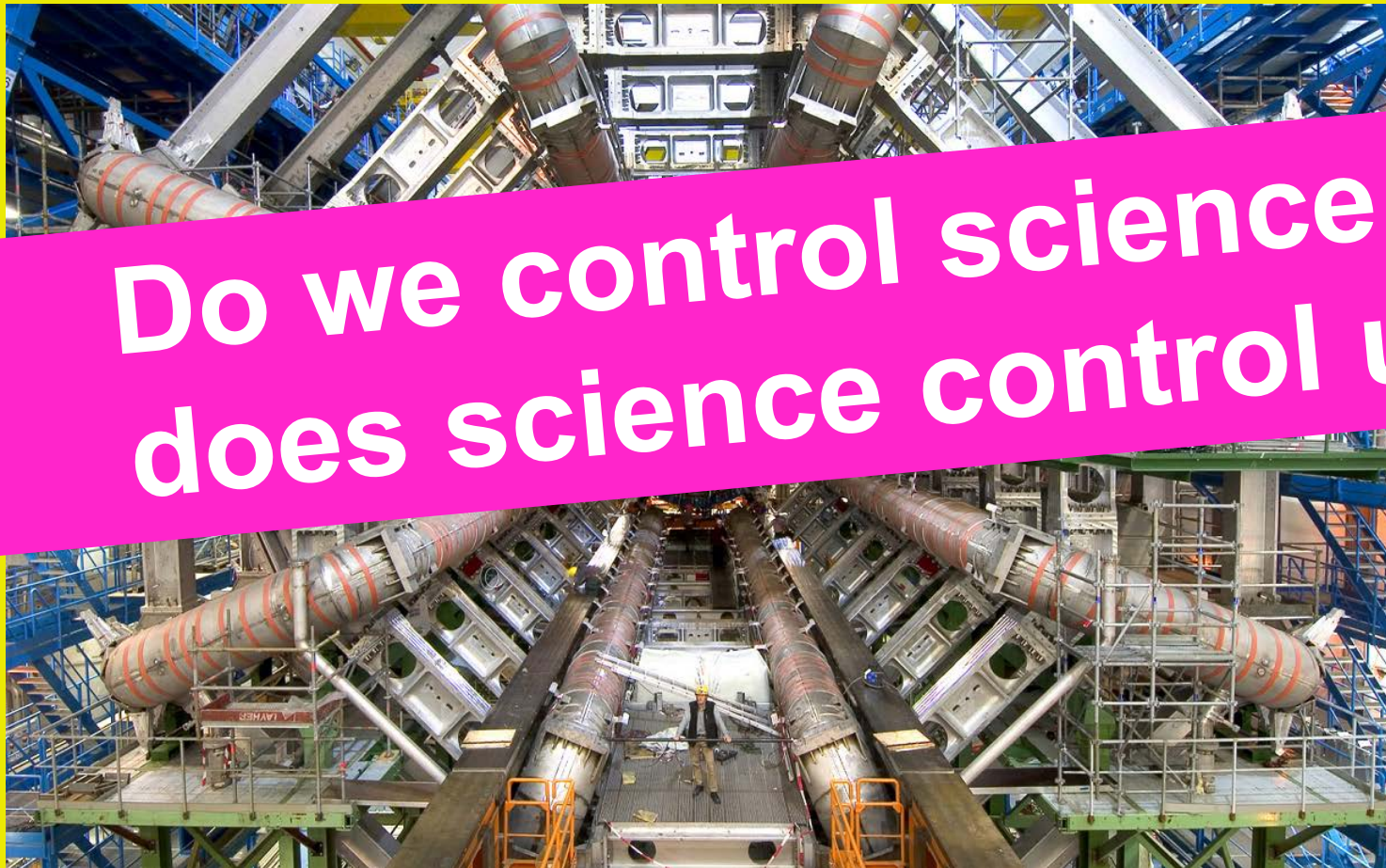


Can science save us?



Can science save us?

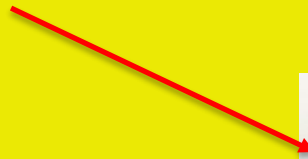


Do we control science, or
does science control us?

Can science save us?



Planning, predictions,
and universal formulas...



Can science save us?



Planning, predictions,
and universal formulas...

Do they work?



Can science save us?



- Change is unavoidable.
- We don't live in a bubble.
- Is the change of gentrifying neighborhoods unavoidable?
- Is it natural? Inevitable?





No.
Gentrifying is calculated
directional change.

Not “organic”.

Just look at the velocity
of the change.

- Change is unavoidable
- We don't live in a bubble
- Is the change of gentrifying neighborhoods unavoidable?
- Is it natural? Inevitable?



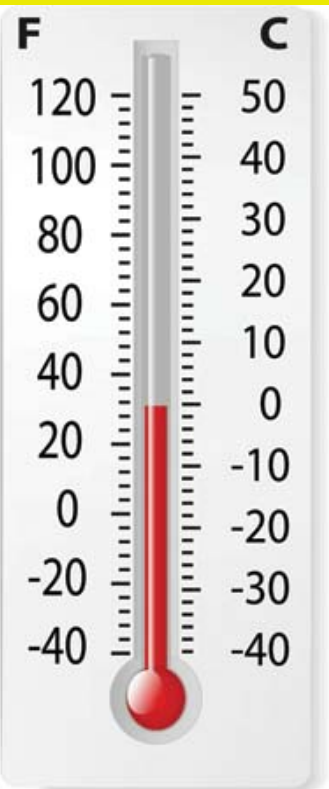


calculated

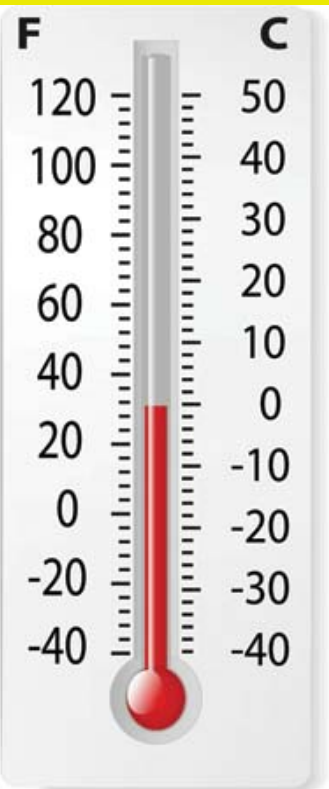
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How do we measure and quantify global changes in climate and ecology?



How do we measure and quantify global changes in climate and ecology?



←←← What is temperature anyway?

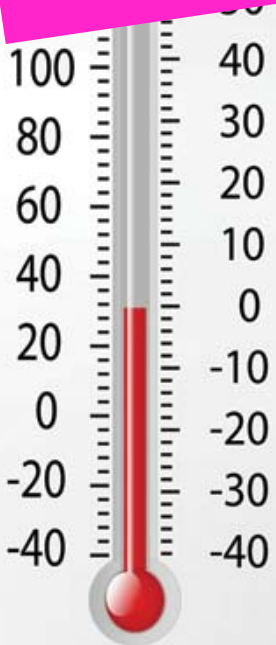
How do we measure reality?

Quantification of Reality...

Why?

Why?

←←← What is temperature anyway?



**What is a safe spectrum of
global properties for
ensuring that humans can
continue to thrive?**



Is this the right question?

What are the right questions to ask?

What do we want?

Do we get to decide the properties of the planet?

What questions should we ask?

What does human development mean?

What does it mean to *make* the world conducive to human development?

Does development mean continued growth and extraction and accumulation (of people, wealth, resources, etc.)?

What questions should we ask?

What does human development mean?

**What does it mean to measure
conduct?**

**Is this good?
Is this what we want?**

**Does it mean continued
growth and extraction and accumulation
(of people, wealth, resources, etc.)?**

What questions should we ask?

What does human development mean?

**OK, let's say we do want that.
How do we do it?**

**Is this what we mean
growth and extraction and accumulation
(of people, wealth, resources, etc.)?**

A Safe Operating Space for the Planet (Western humans)

10 boundaries we must observe:

1. climate change
2. biodiversity loss
3. nitrogen cycle
4. phosphorous cycle
5. ozone depletion
6. ocean acidification
7. fresh water availability and use
8. change in land use
9. atmospheric aerosols
10. chemical pollution

A Safe Operating Space for the Planet (Western humans)

10 boundaries we must observe:

1. climate change
2. biodiversity loss
3. nitrogen cycle

Thresholds!

4. land system change
5. ocean deoxygenation
6. ocean acidification
7. fresh water availability and use
8. change in land use
9. atmospheric aerosols
10. chemical pollution

A Safe Operating Space for the Planet (Western humans)

10 boundaries we must observe:

1. climate change
2. biodiversity loss
3. nitrogen cycle
4. phosphorous cycle
5. ozone depletion
6. ocean acidification
7. fresh water availability and use
8. change in land use
9. atmospheric aerosols
10. chemical pollution

Many subsystems shift rapidly.

They're sensitive to threshold crossing of certain key variables.

A Safe Operating Space for the Planet (Western humans)

10 boundaries we must observe:

1. climate change
2. biodiversity loss
3. nitrogen cycle
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5. ozone depletion
6. ocean acidification
7. fresh water availability and use
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9. atmospheric aerosols
10. chemical pollution

Determining safe operating space (boundaries) involves “*normative* judgments of how societies deal with risk and uncertainty.”

A Safe Operating Space for the Planet (Western humans)

Biodiversity:

Species loss background extinction rate =

- marine: 0.1-1.0 extinctions per million species per year
- mammal: 0.2 to 0.5
- 30% of mammal, bird, amphibian species threatened in coming century.
- Ecosystems that depend on few or single species for critical functions are vulnerable to disturbances such as disease and at greater risk of tipping into undesirable states...

Paris Climate Talks

1. Hold the increase in the global average temperature to well below 2 ° C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 ° C above pre-industrial levels.
2. Increase the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production.
3. Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.

Paris Climate Talks

1. Hold the increase in the global average temperature to well below 2 ° C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 ° C above pre-industrial levels.
2. Countries furthermore aim to reach "global peaking of greenhouse gas emissions as soon as possible".
2. Strengthening the global response to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production.
3. Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.

Paris Climate Talks

EU will cut its emissions by 40%, compared with 1990 levels, by 2030.

The US will cut its emissions by 26% to 28%, compared with 2005 levels, by 2025.

China will agree that its emissions will peak by 2030.

???

A Safe Operating Space for the Planet (Western humans)

Three aspects that need closer study:

- 1) Scale of human action
- 2) Understanding Earth processes
- 3) Understanding resilience and complex dynamics

A Safe Operating Space for the Planet (Western humans)

“Evidence so far suggests that, as long as the thresholds are not crossed, humanity has the freedom to pursue long-term social and economic development.”

A Safe Operating Space for the Planet

Is this good?
Is this what we want?

“Evidence so far suggests that, as long as the thresholds are not crossed, humanity has the freedom to pursue long-term social and economic development.”

A Safe Operating Space for the Planet (Western humans)

“If human flourishing involves growth, it must be growth that differs in fundamental respects from the continuous expansion of gross domestic product sought so eagerly by governments worldwide...”

A Safe Operating Space for the Planet (Western humans)

**Dealing with climate change compounds
lingering scientific uncertainties with
competing, contradictory, and unsettled
socio-political-economic interests.**

Louisiana is disappearing!



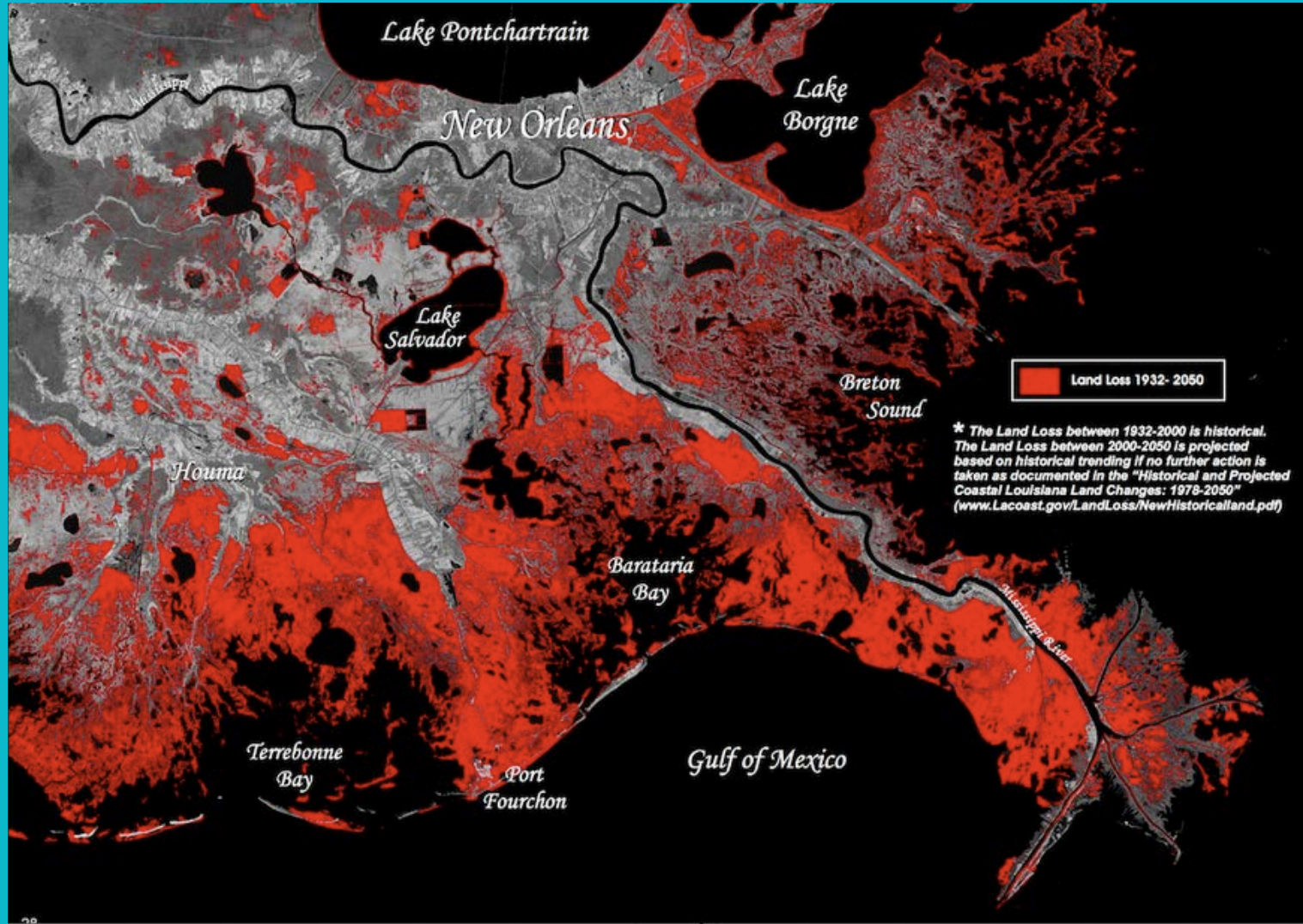
Louisiana is disappearing!

Louisiana is losing a football field worth of land per hour!

Can techno-science be used to tame this unruly earth?!



Louisiana is disappearing!



Louisiana is disappearing!

We can engineer sediment flowing along bottom of river to be redirected to disappearing coastal areas!



Louisiana is disappearing!



State supports “drawing upon the expertise of natural scientists and engineers modeling river hydrology, future wetland building scenarios, and their ecological impacts with and without sediment diversions.”

Louisiana is disappearing!

Responsibility?

No humans are responsible, the science is responsible, if the science is wrong, no humans need be blamed.



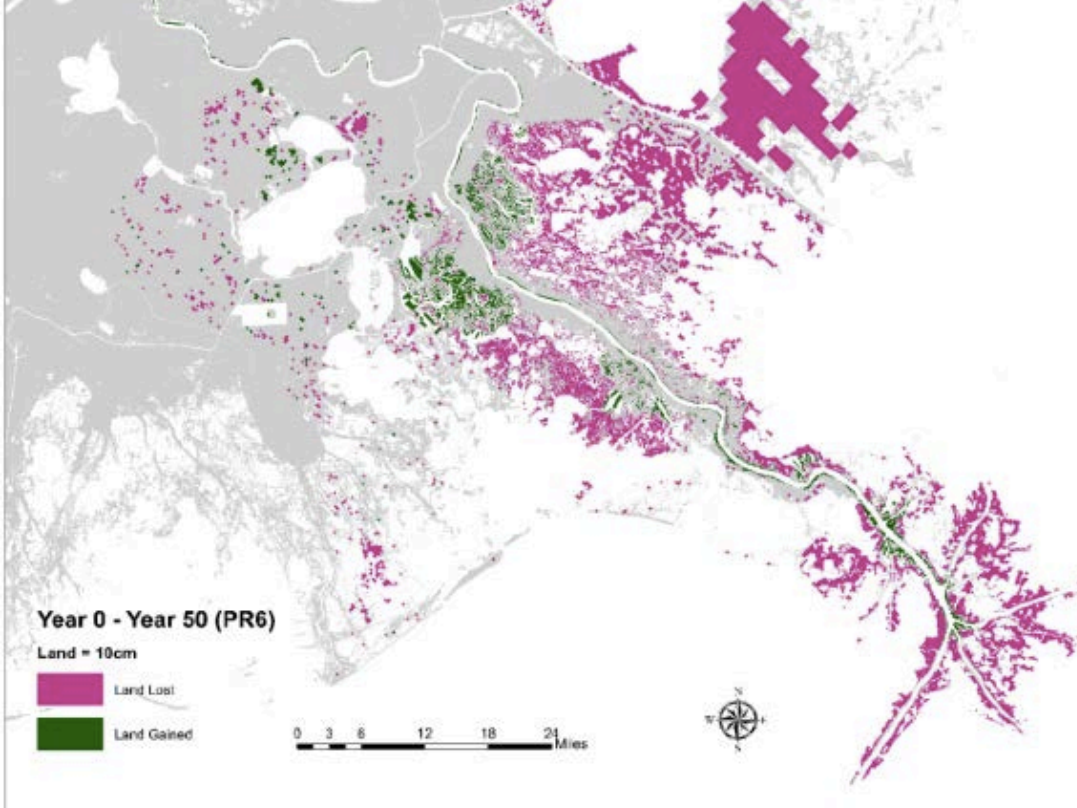
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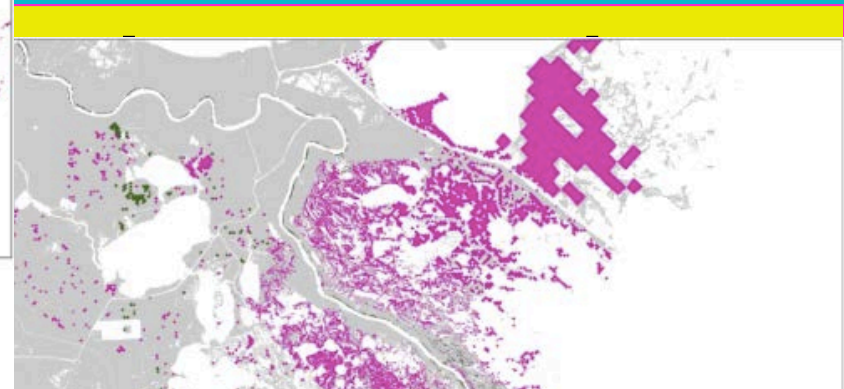
There is a persistent emphasis on narratives of 'overcoming' and 'conquering' nature.

What if we didn't pose this as a problem to be overcome?

appearing!



Future with 4 Diversions
(Year 50)



Future Without Project
(Year 50)

What if we didn't have a project to overcome?

Louisiana is disappearing!

Maybe we could integrate with ecological changes?

Instead of trying to design the planet for what seems like it might be suitable for a given population at a certain time, could we try to adjust our way of life to evolving ecosystems?

Louisiana is disappearing!

Who are the stakeholders here:

- **Fisherpeople**
- **Residents**
- **Scientists**
- **Politicians**
- **Business owners**

Louisiana is disappearing!

Who are

What about non-human stakeholders:

- **Fish - Fish**
- **Re - Birds**
- **Sc - Plants**
- **Po - Marine life**
- **Bu**

Louisiana is disappearing!

Who are

**What
stake**

- **Fis - Fis**
- **Re - Bir**
- **Sc - Pla**
- **Po - Ma**
- **Bu**

What role do/should non-human actors play in human plans and engineering?

Do they have their own agency, or can all of their properties be deterministically mapped by our scientists?

Louisiana is disappearing!

Who's the expert here:

- A) The person who's lived in the wetlands all their life, fished in them observed first hand the behavior of different organisms?
- B) Or the technoscientist who enters variables into a computer and produces a hypothetical model of how organisms are probabilistically supposed to behave?

Okay. Let's be less cynical.

If systemic change is not possible (ugh) how can we improve lives, reduce poverty, bring population under control to environmentally *sustainable* levels within the framework of the current economic system?

Okay. Let's be less cynical.

If systemic change is not possible (ugh) how can we improve lives, reduce poverty, bring population under control to environmentally *sustainable* levels within the framework of the current economic system?

World Bank official:
“Whatever you propose in the way of aid for Malawi, don't talk about it being sustainable, it isn't.”

Okay. Let's be less cynical.

If systemic change is not possible (ugh) how can we improve lives, reduce poverty, bring population under control to environmentally *sustainable* levels within the framework of the current economic system?

“We must achieve zero population growth within the lifetime of our children.”

Okay. Let's be less cynical.

If systemic change is not possible (ugh) how can we improve lives, reduce poverty, bring population under control to environmentally *sustainable* levels within the framework of the current economic system?

- Primary solution: education!
- Specifically women and specifically on reproductive health.
- “Children by choice not chance!”



Okay. Let's be less cynical.

If systemic change is not possible (ugh) how can we improve lives, reduce poverty, bring population under control to environmentally *sustainable* levels within the framework of the current economic system?

- Primary solution:
education

This is a great idea!

- Specifically women and specifically on reproductive health.
- “Children by choice not chance!”



Okay. Let's be less cynical.

If systemic change is not possible (ugh) how can we improve lives, reduce poverty, bring population under control to environmentally *sustainable* levels within the framework of the current economic system?

- Nearly any statistic or survey suggests a correlation between high education and low birth-rate.
- Education is empowering.
- Should we be at all concerned about the homogenization of knowledge? Maybe not.

