Interactions between climate change and toxic chemicals

Presented by Nathalie Folkerts

WSPPN Webinar

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CARBON CAPTURE

Has climate change made it harder for people to care about conservation?

BY JONATHAN FRANZEN

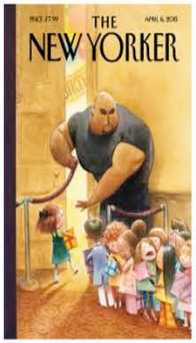


TABLE OF CONTENTS

Last September, as someone who cares more about birds than the next man, I was following the story of the new stadium that the Twin Cities are building for their football Vikings. The stadium's glass walls were

MOST POPULAR

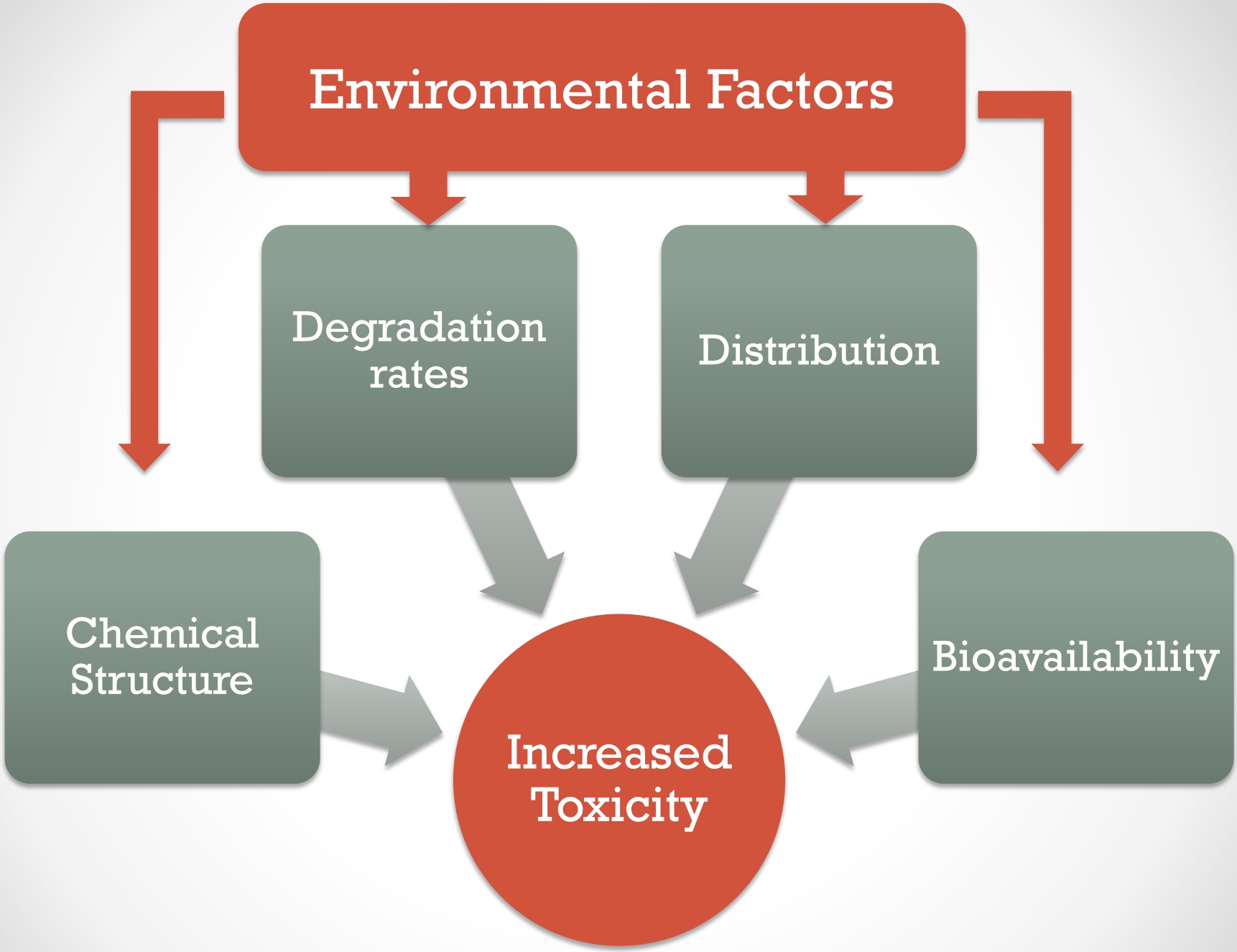
Overview of Main Points

(1) Toxic chemicals will exacerbate the effects of climate change; climate change will exacerbate the effects of toxic chemicals

(2) Toxic chemicals will likely decrease the amount of carbon sequestered in the environment

#1

Climate change will exacerbate the effects of toxic chemicals.
Toxic chemicals will exacerbate the effects of climate change.


Environmental Factors
Degradation rates
Distribution
Chemical Structure
Bioavailability
Increased Toxicity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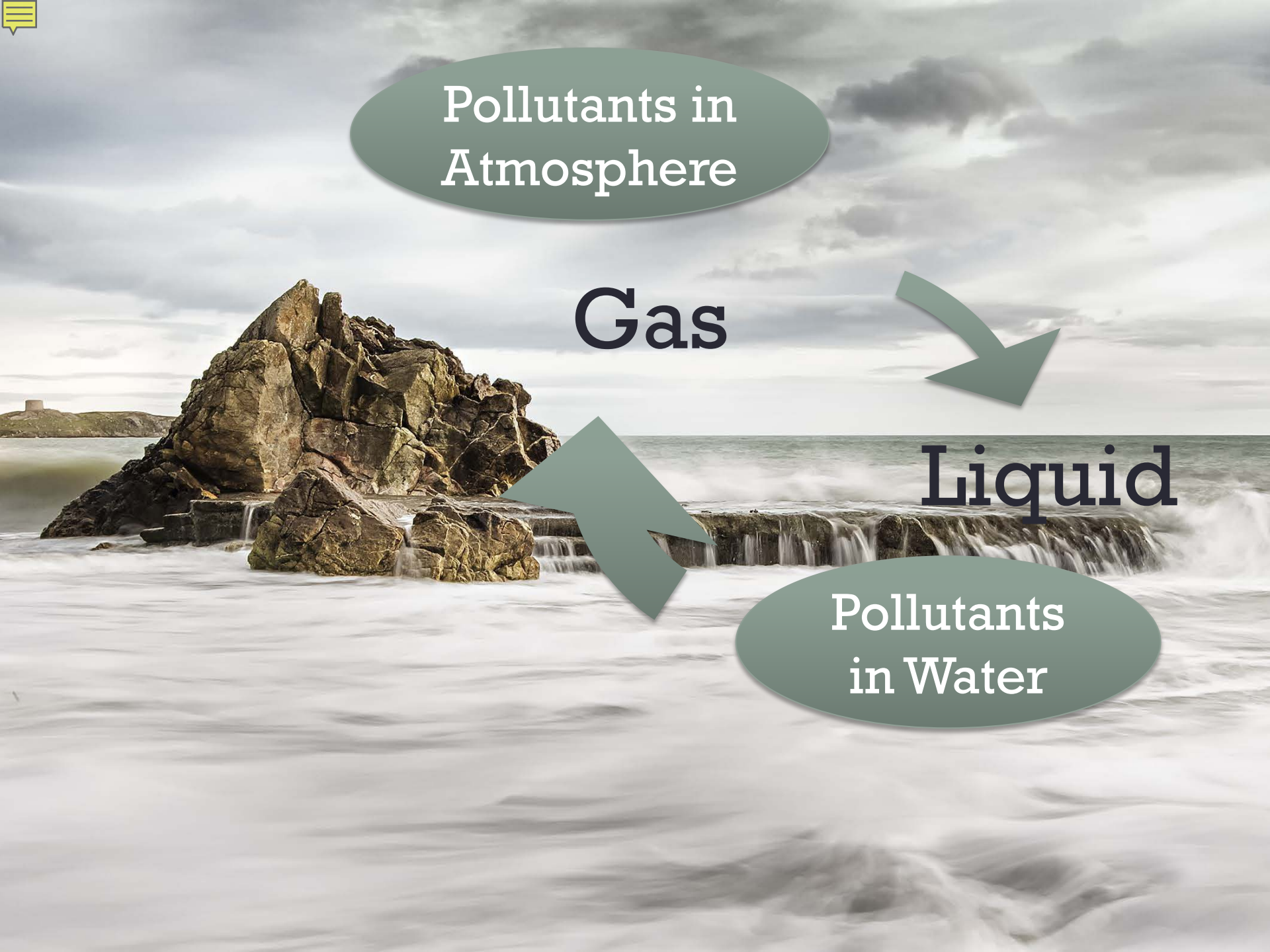
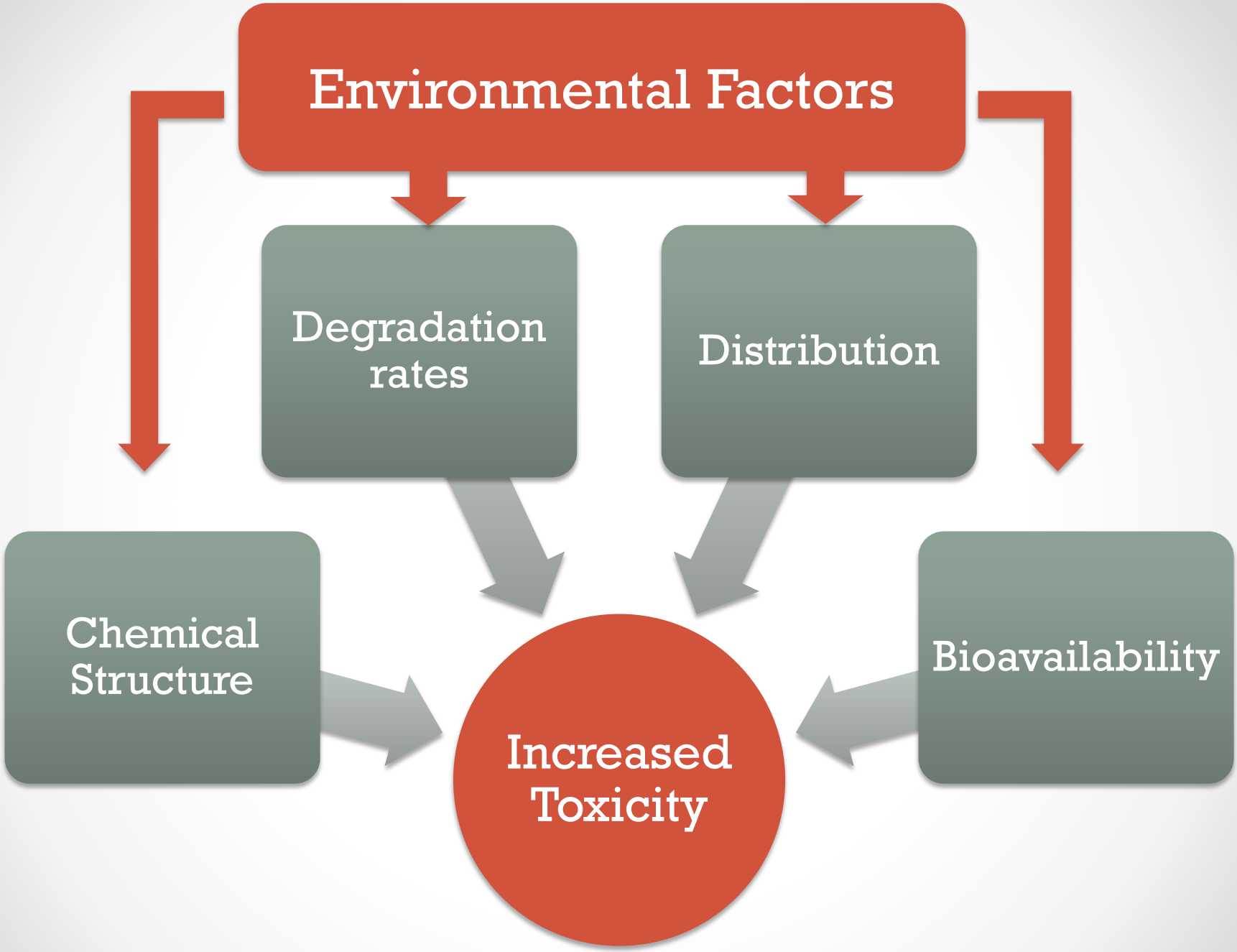

Pollutants in Atmosphere
Gas
Liquid
Pollutants in Water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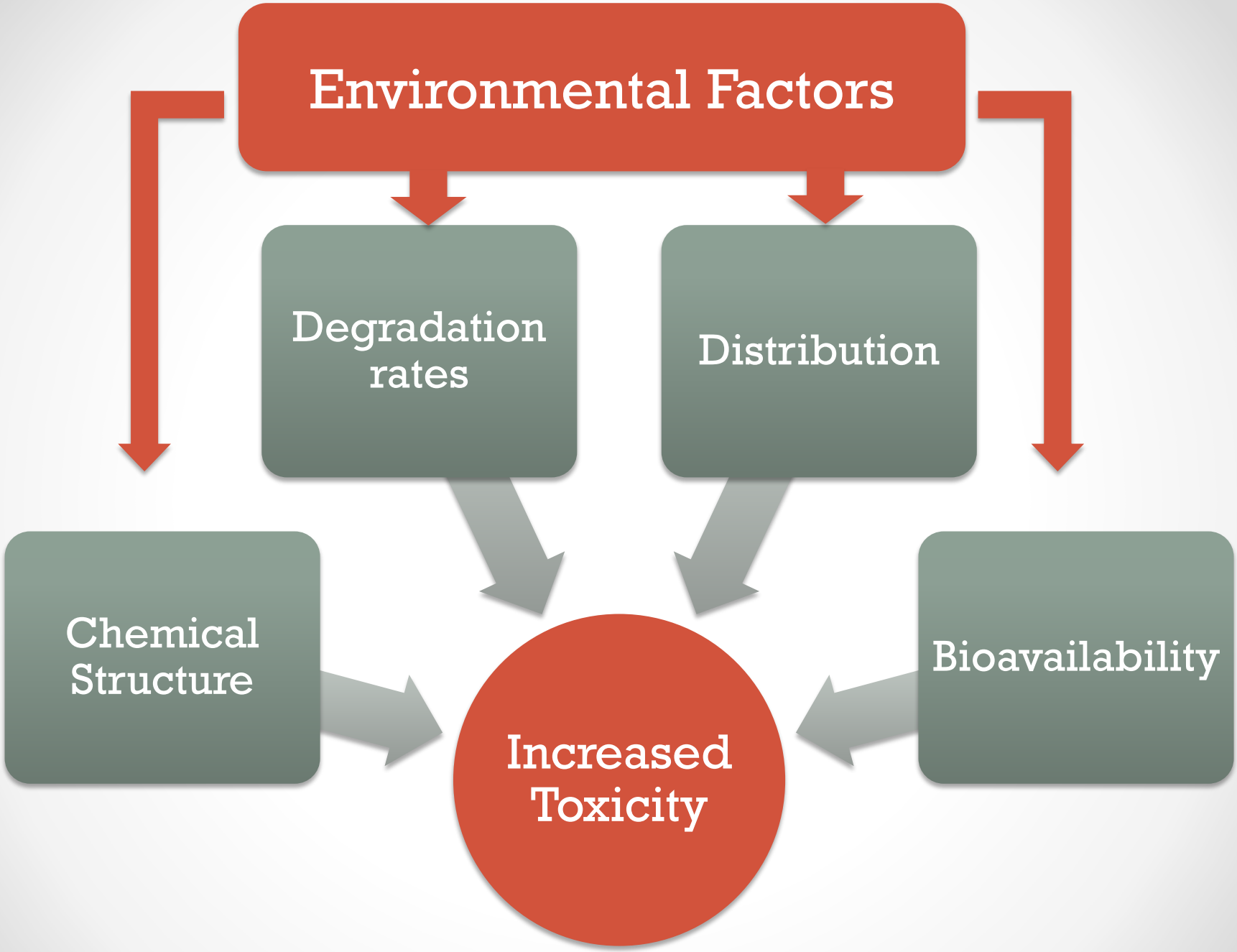
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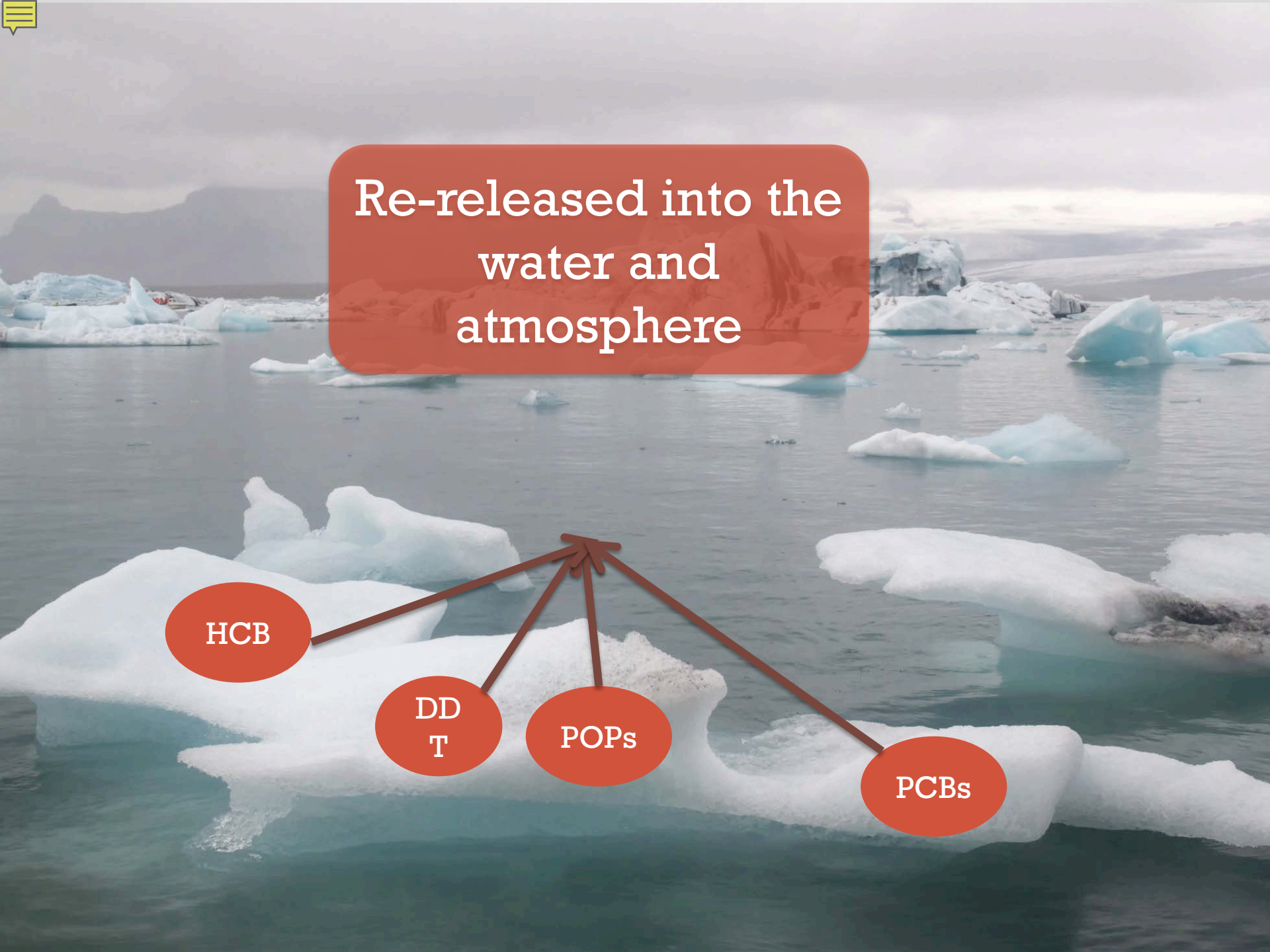
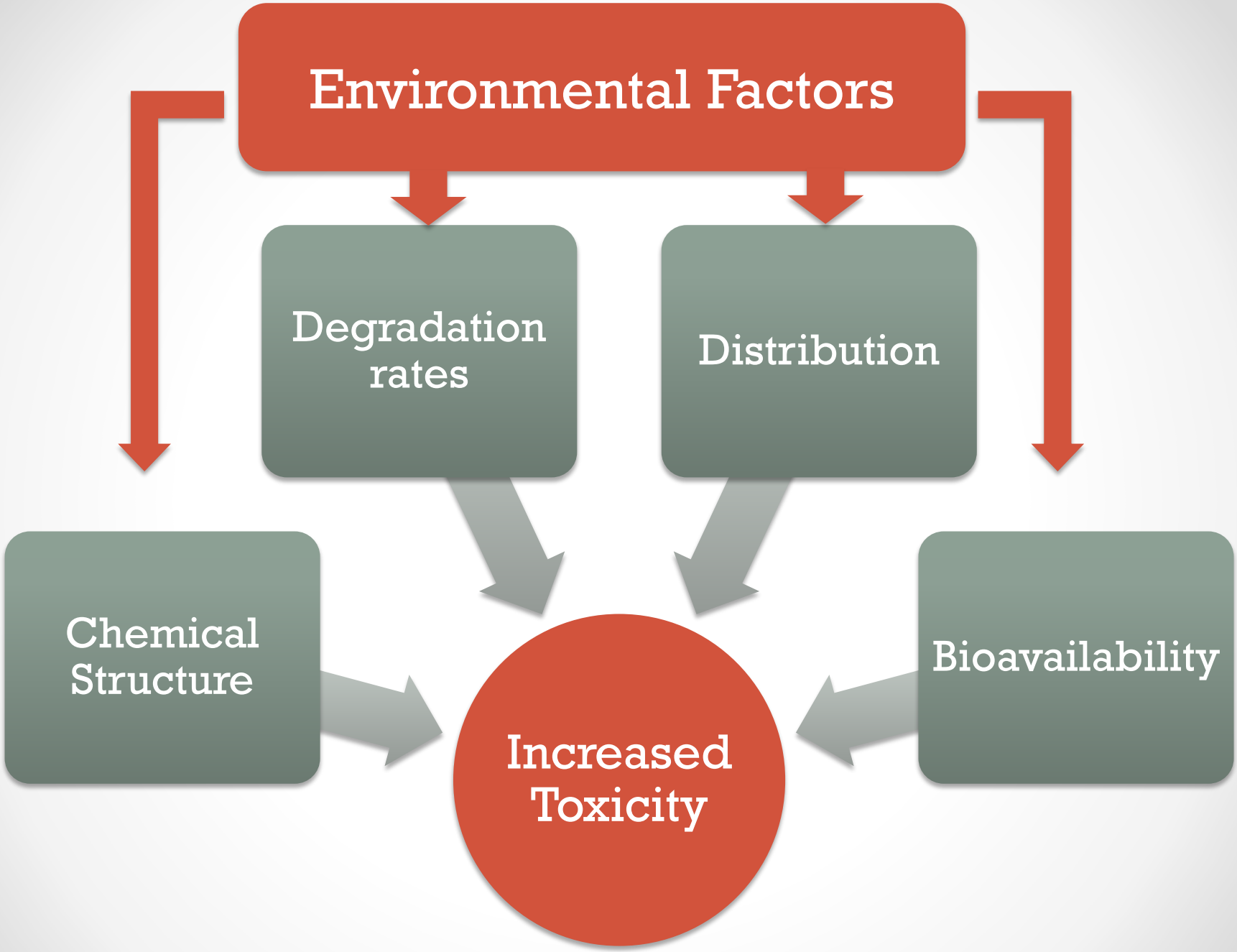

Re-released into the water and atmosphere
HCB
DD T
POPs
PCBs

Japan refuses Norway's toxic whale meat

Pesticides identified in a shipment of minke meat put the spotlight on Norwegian whaling

Minke whale at Húsavík, Iceland Photograph: Andrea Schaffer/flickr


Environmental Factors
Degradation rates
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Bioavailability
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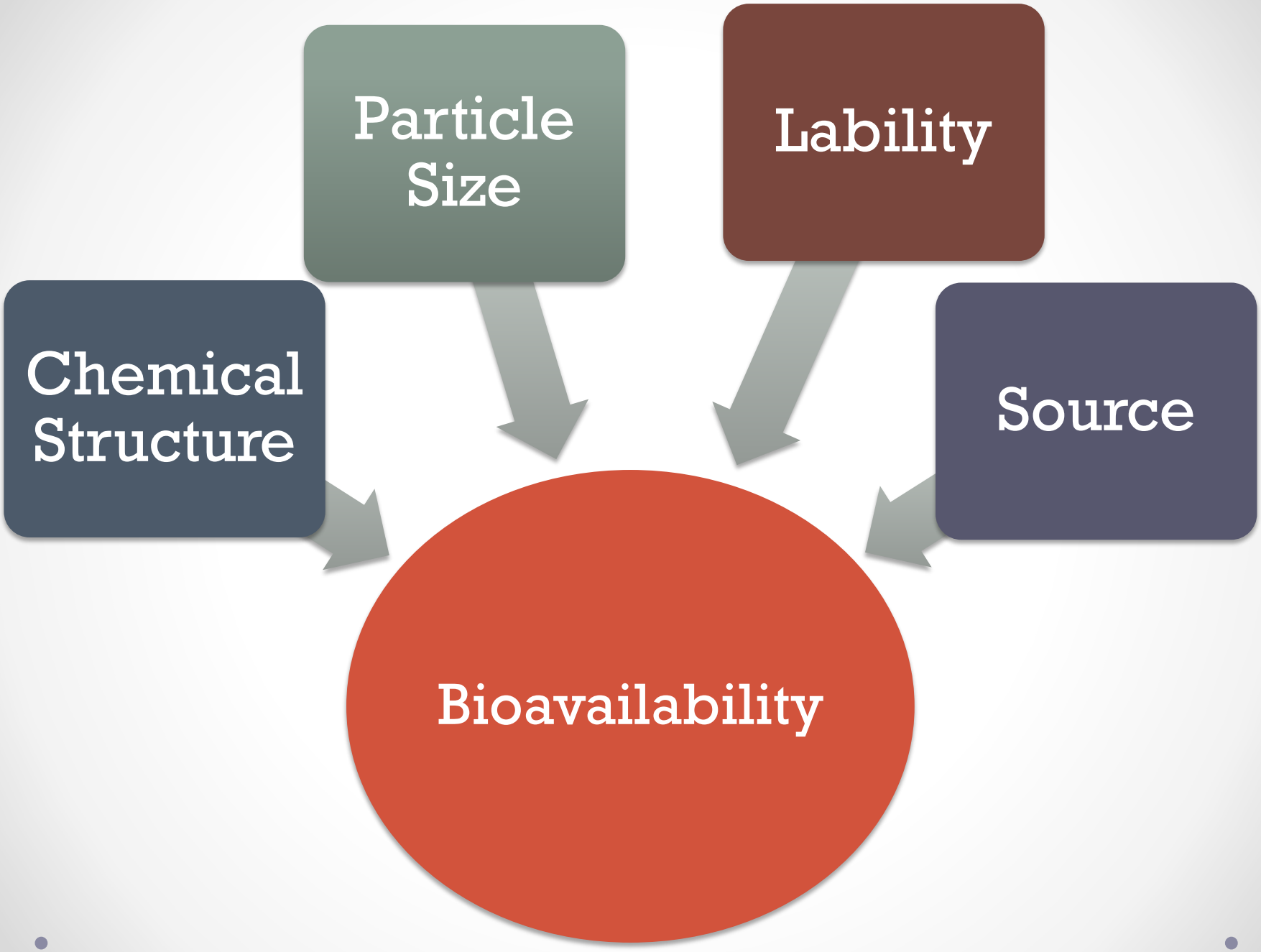

Particle Size
Lability
Chemical Structure
Source
Bioavailability

Toxic chemicals are a stress to organisms, communities, and ecosystems; so is climate change.

Climate-Induced Toxicant Sensitivity

Toxicant-Induced Climate Sensitivity

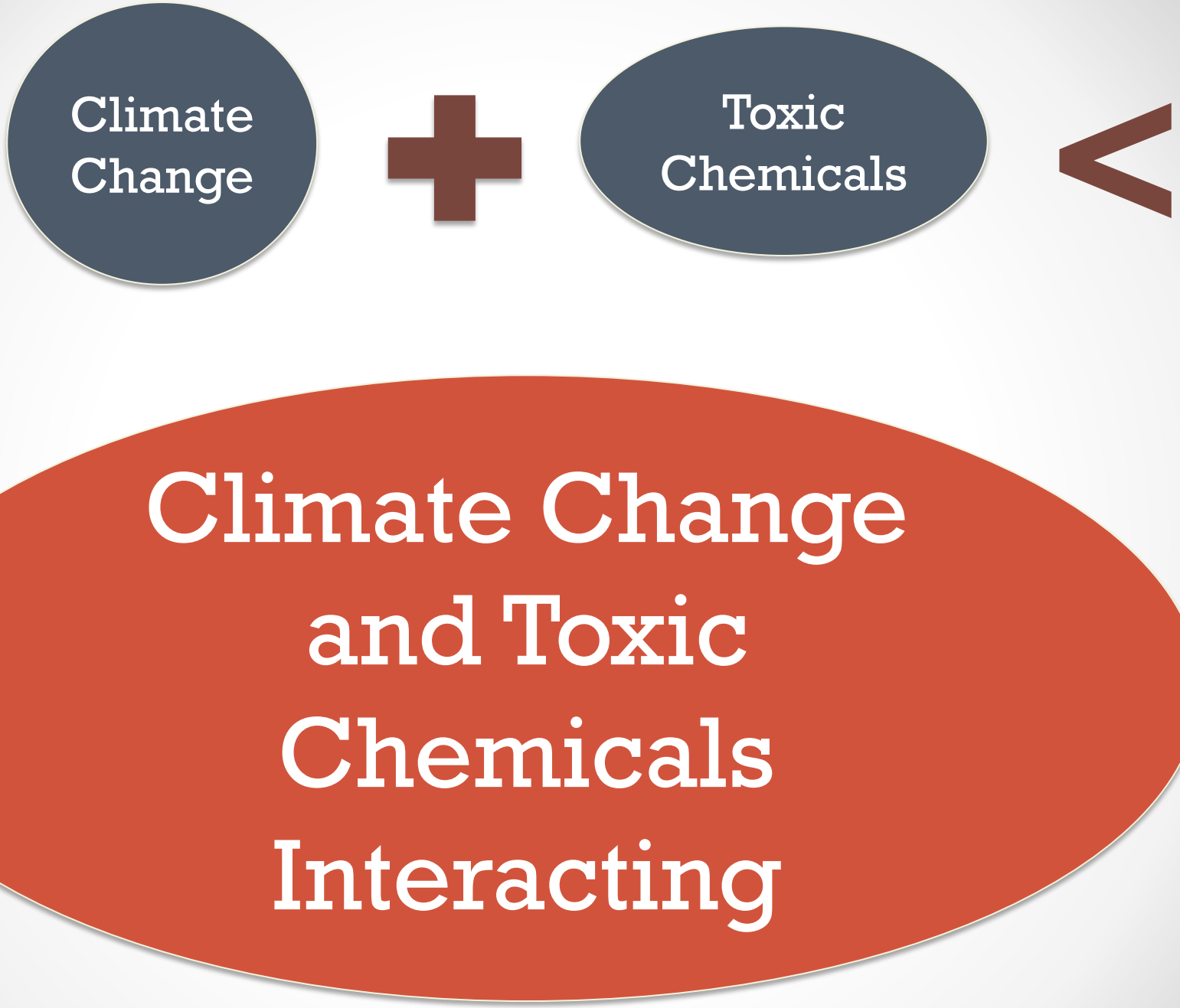
Photo by Paul Williams

Atrazine

Regulated by temperature, water availability

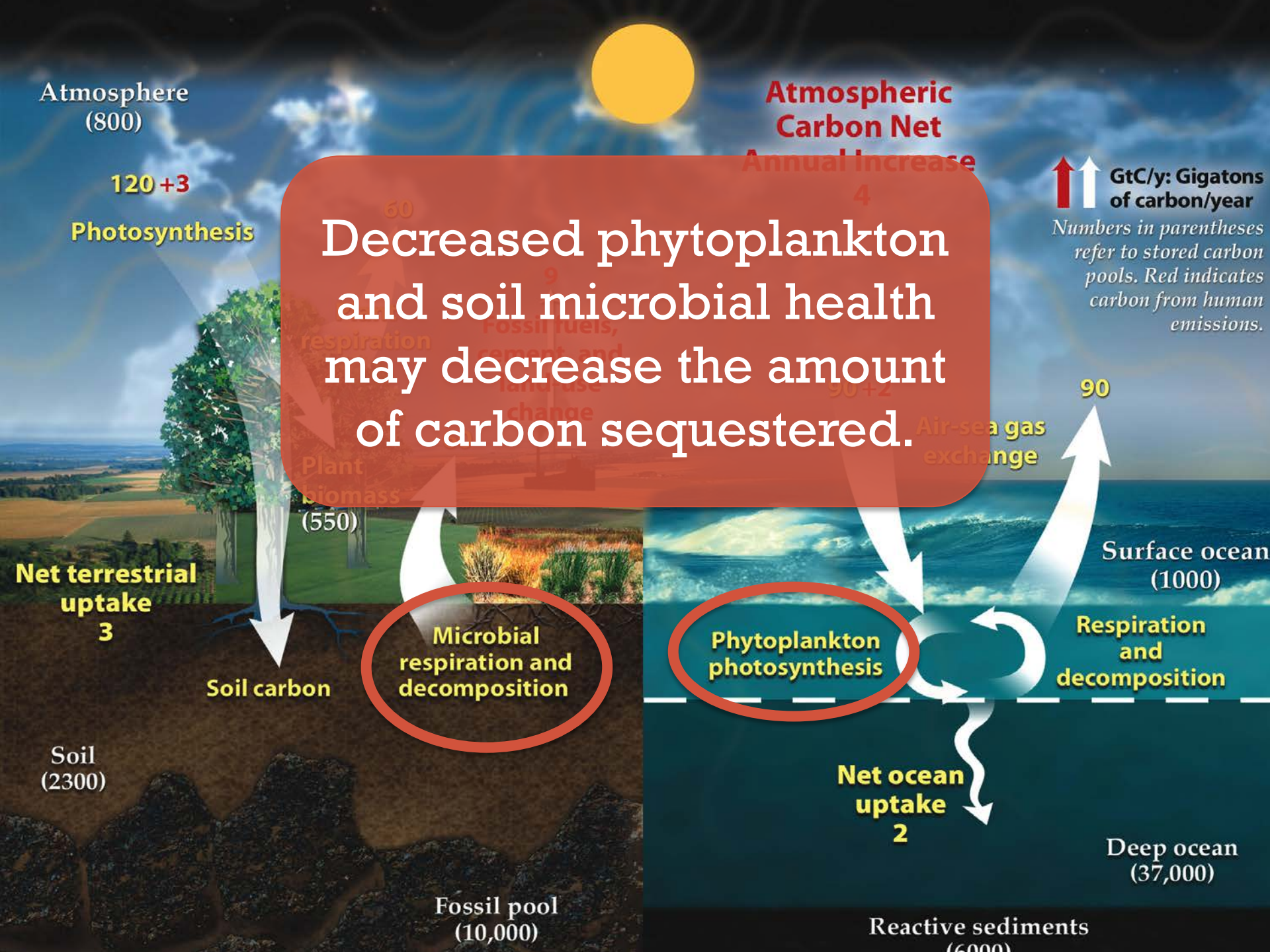
Increased weight loss, desiccation

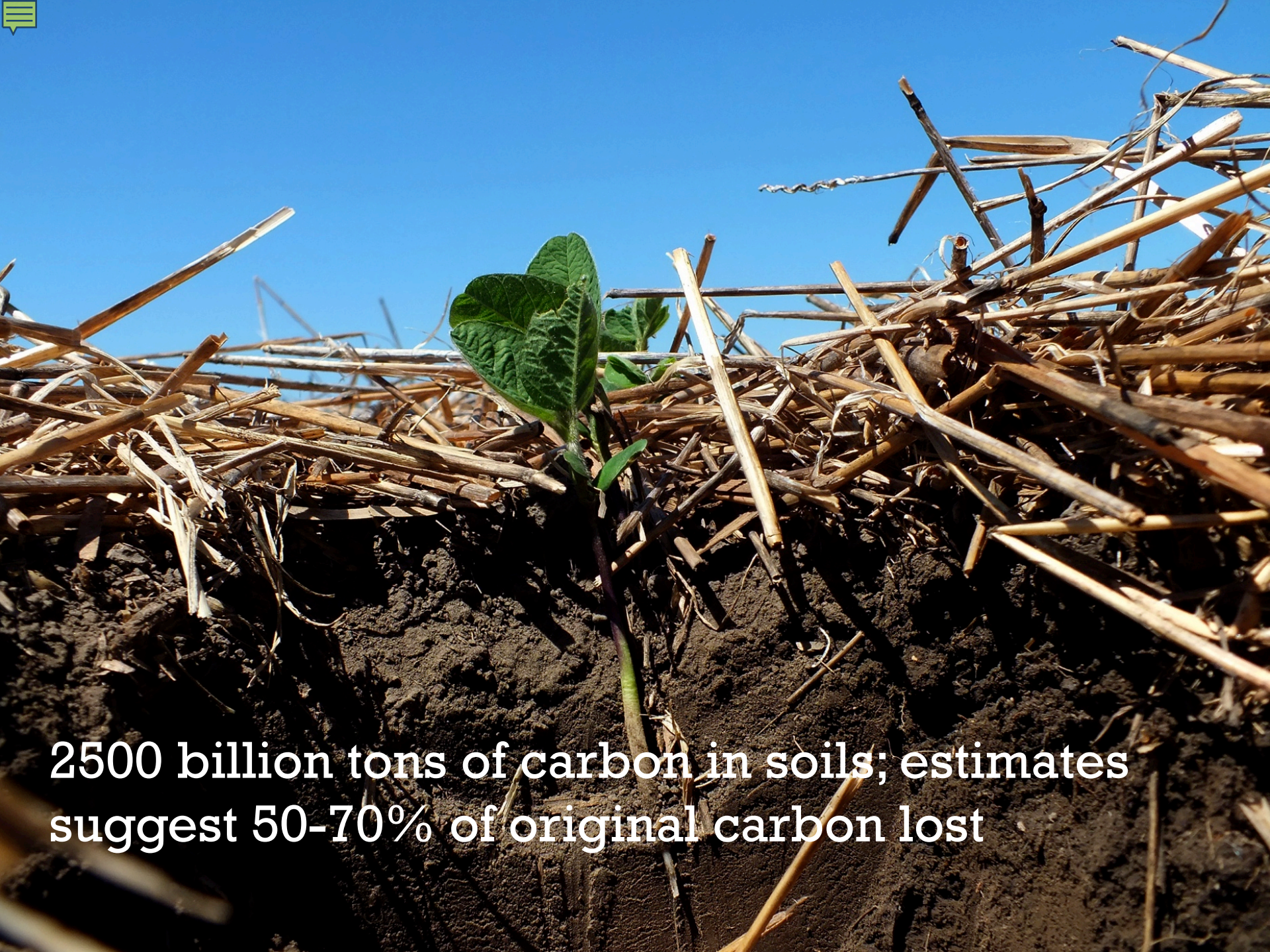
(Moe et al 2013)

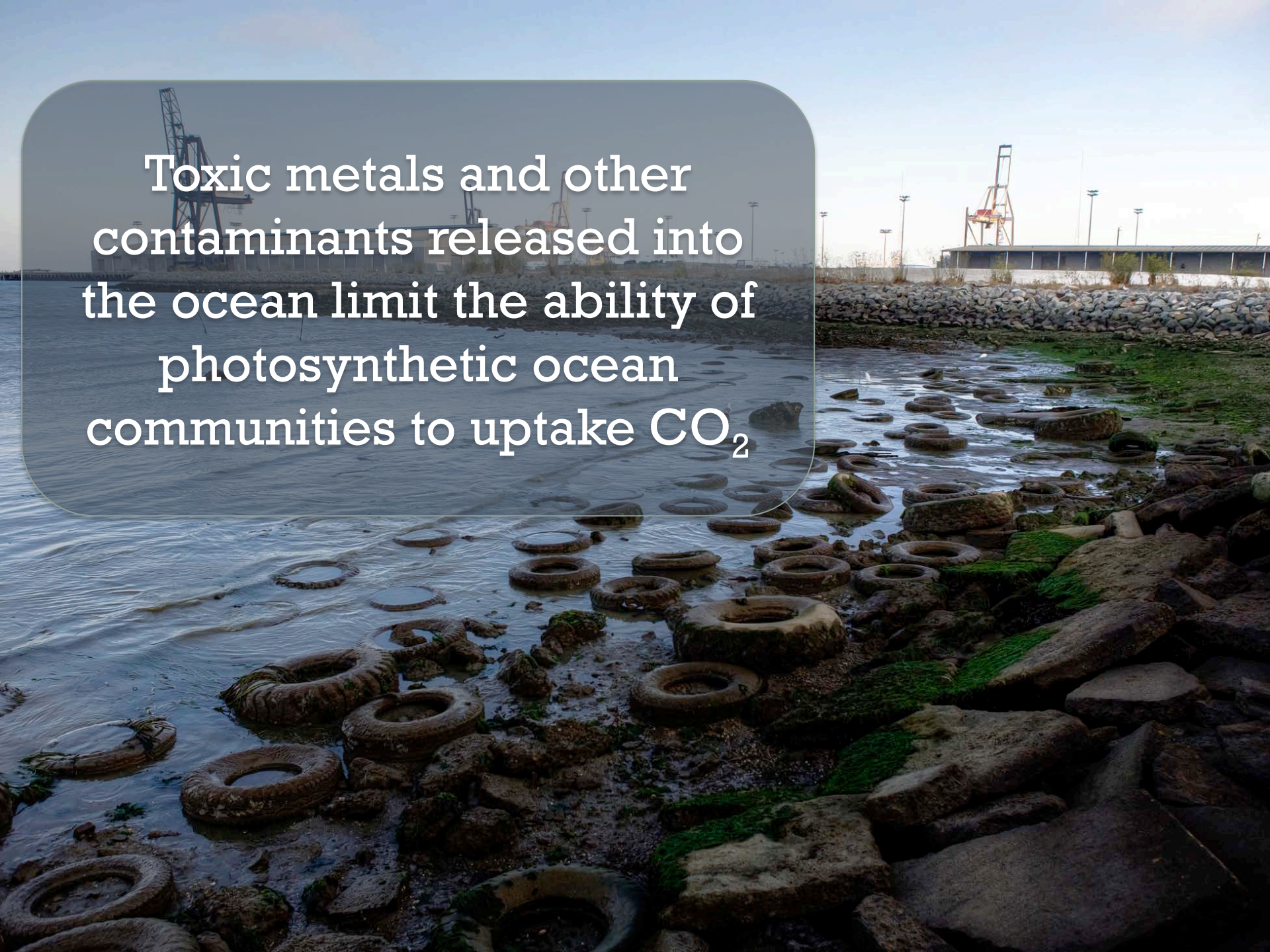

Climate Change
+
Toxic Chemicals
<
Climate Change and Toxic Chemicals Interacting

#2

Toxic chemicals will likely reduce carbon sequestration, impacting global carbon cycles


Atmosphere
(800)
120 +3
Photosynthesis
Atmospheric
Carbon Net
Annual Increase
4
GtC/y: Gigatons
of carbon/year
Numbers in parentheses
refer to stored carbon
pools. Red indicates
carbon from human
emissions.
Decreased phytoplankton and soil microbial health may decrease the amount of carbon sequestered.
Plant
biomass
(550)
90
Net terrestrial
uptake
3
Soil carbon
Microbial
respiration and
decomposition
Surface ocean
(1000)
Phytoplankton
photosynthesis
Respiration
and
decomposition
Soil
(2300)
Net ocean
uptake
2
Deep ocean
(37,000)
Fossil pool
(10,000)
Reactive sediments


2500 billion tons of carbon in soils; estimates suggest 50-70% of original carbon lost


Toxic metals and other contaminants released into the ocean limit the ability of photosynthetic ocean communities to uptake CO_2

Review

(1) Climate change will make the effects of toxic chemicals worse

(2) Toxic chemicals will make the effects of climate change worse

(3) Toxic chemicals will affect the capacity of some communities to sequester carbon

Thank you!

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