

Addressing Climate Change



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Wisconsin Initiative for
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Wisconsin Science Festival

Friday, October 12



Warming Is



Unequivocal



(IN EVERY ELECTION)



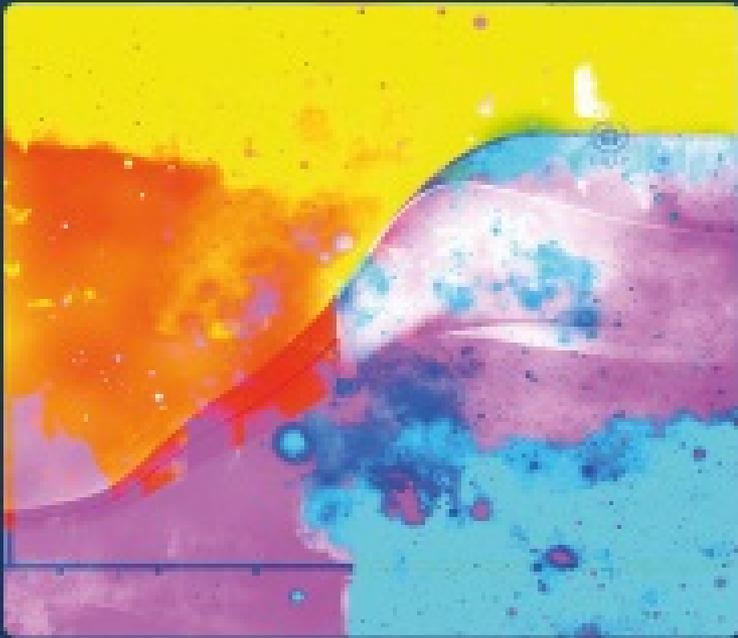
*“Public sentiment is everything.
With public sentiment,
nothing can fail;
without it nothing can succeed.”*

>> Abraham Lincoln



Global Warming of 1.5°C

An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.



An Intergovernmental Panel on Climate Change (IPCC) special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.

www.ipcc.ch/report/sr15/



Industrial Revolution

Electronic Revolution



New Discoveries

Enlightenment

Societal Progress

Societal Problems





Science is Vital to Democracy



**SCIENCE AND SOCIETY HAVE
WHAT IS ESSENTIALLY A SOCIAL CONTRACT
THAT ENABLES
GREAT INTELLECTUAL ACHIEVEMENTS
BUT COMES WITH MUTUAL EXPECTATIONS
OF BENEFITING THE HUMAN CONDITION
AND PROTECTING OUR PLANET.**



**Scientific
Competence
Scientific Expertise
Science Literacy**



“Science literacy does not imply detailed knowledge of chemistry or physics or biology, but rather a broad understanding and appreciation of what science is capable of achieving and, equally important, what science cannot accomplish.”



“Science literacy will enable the public to make informed choices and to reject shams, quackery, unproven conjecture, and to avoid being bamboozled into making foolish decisions where matters of science and technology are concerned.”

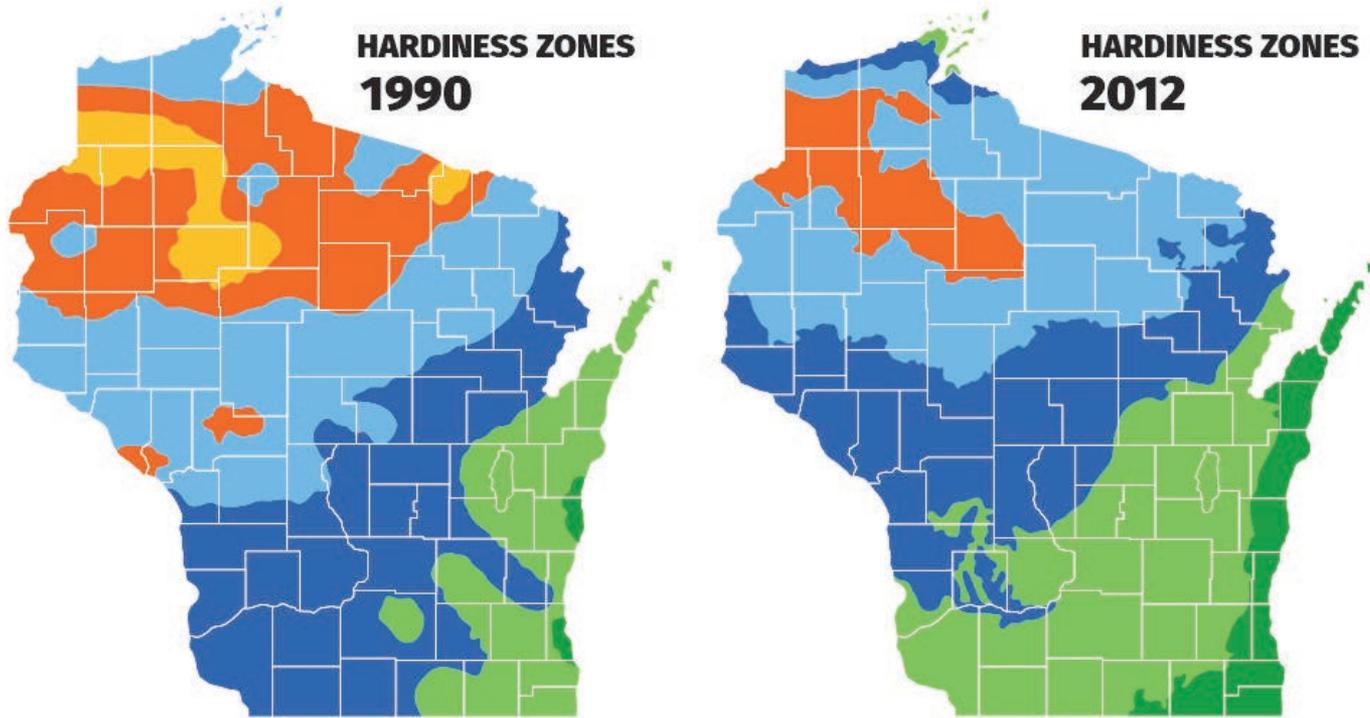


Grand Challenges to Society and to Scientists

Help sustain Earth and its people in the face of:

- Population Growth
- Finite Resources
- Malnutrition
- Spreading Disease
- Deadly Violence
- War
- Climate Change
- Denial of Basic Human Rights, *especially the right to benefit from scientific and technological progress*



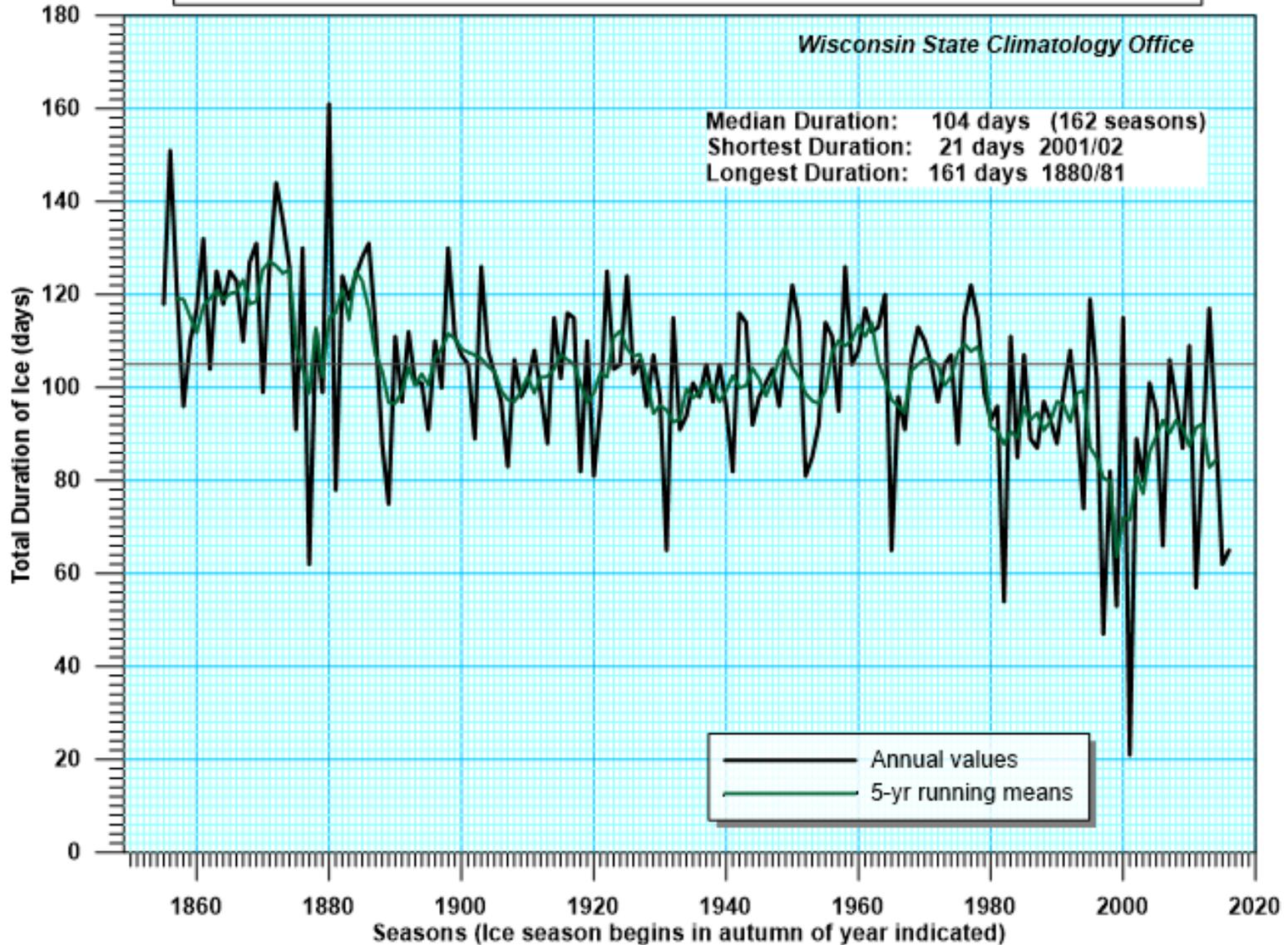


The zone color key shows the lowest observed winter temperatures in that area.

Illustration by Brandon Raygo, The Capital Times
 Data Source: U.S. Dept. of Agriculture, PRISM Climate Group, Oregon State University



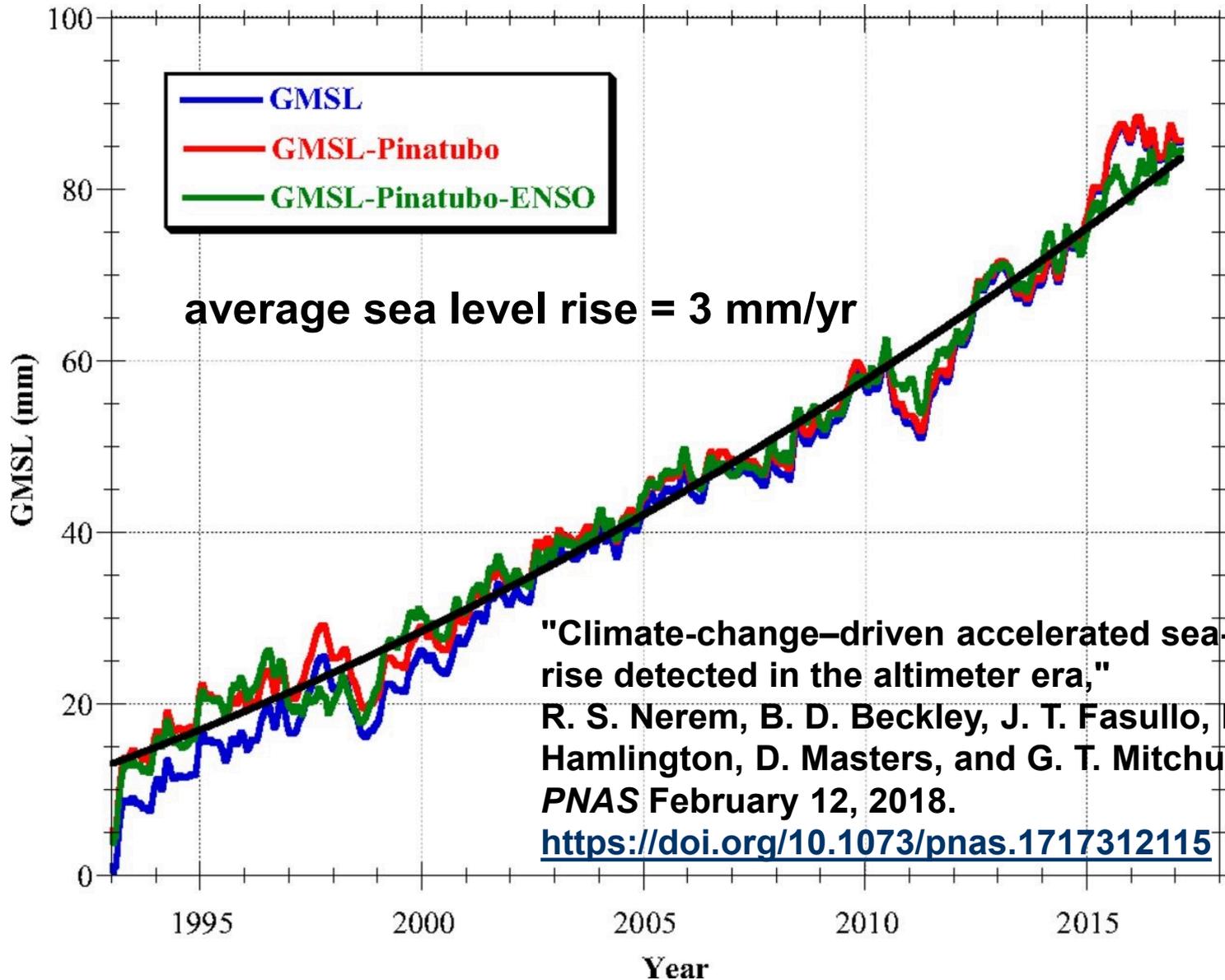
Duration of Ice on Lake Mendota (1852/53 - 2016/17 Winter Seasons)



GMSL=Global Mean Sea Level

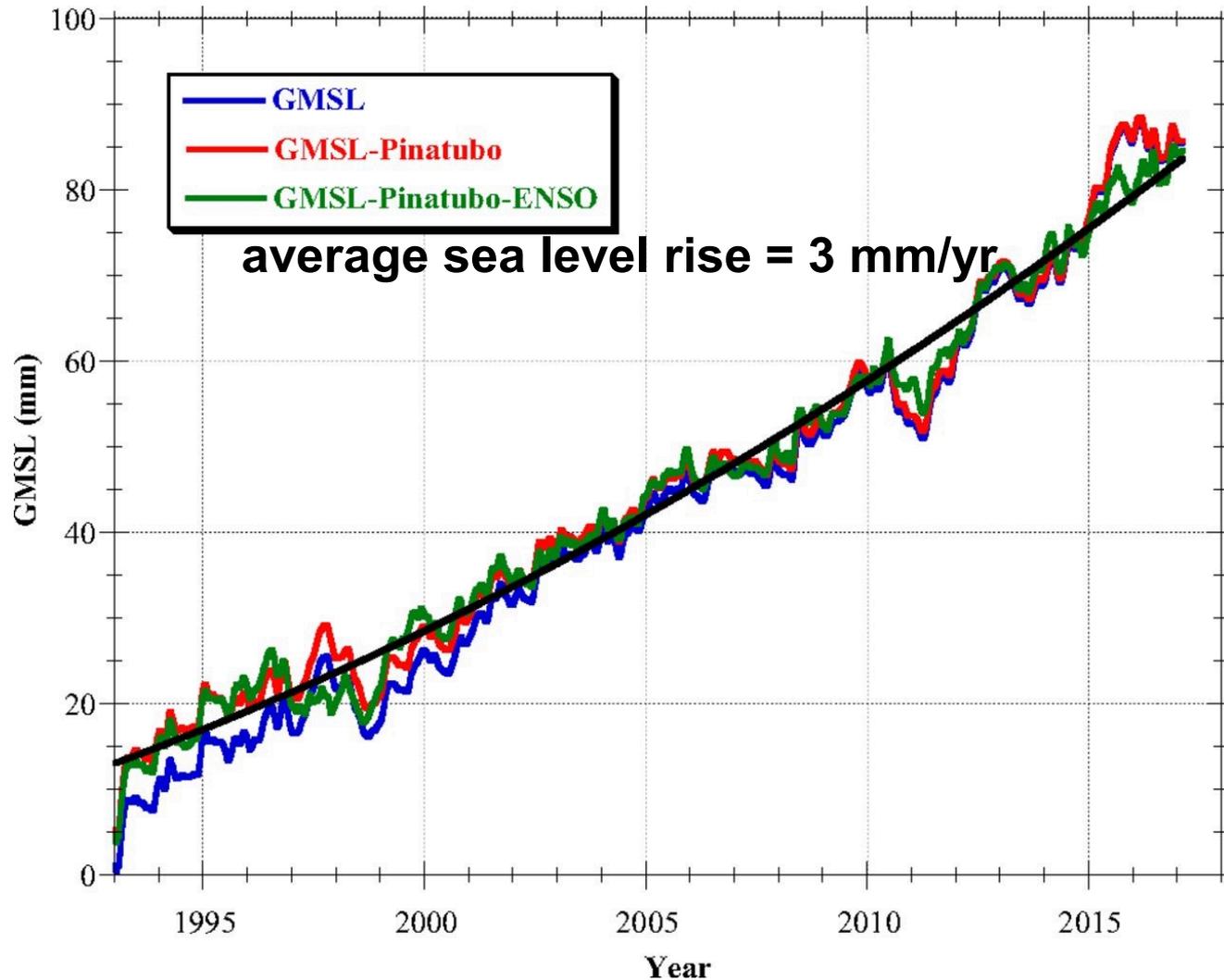
Pinatubo=Mount Pinatubo, an active stratovolcano in the Zambales Mountains (Philippines)

ENSO=El Nino-Southern Oscillation



Temperature and water volume

Accounts for about half observed sea level rise.



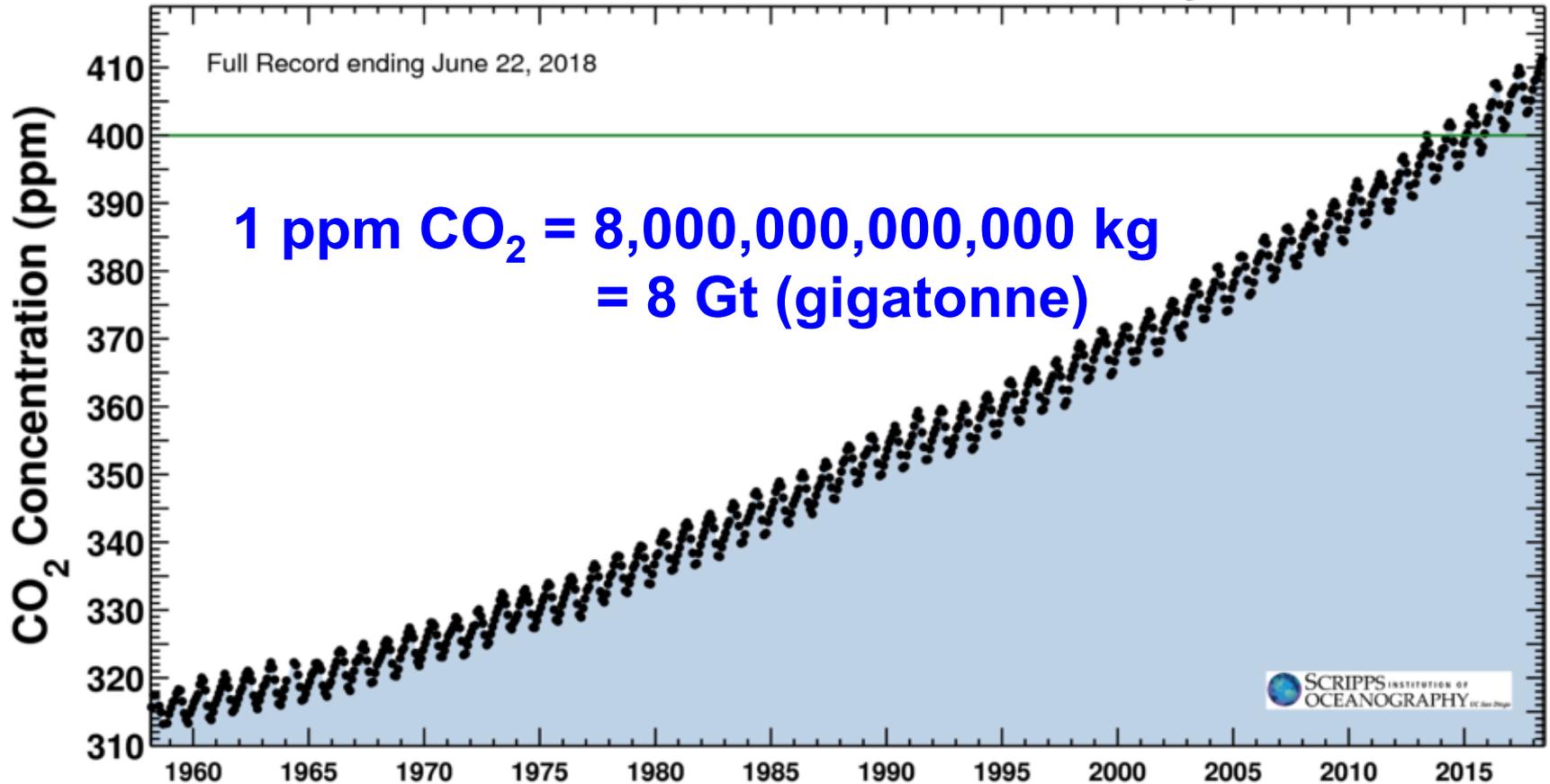
The atmospheric greenhouse effect

Latest CO₂ reading

June 22, 2018

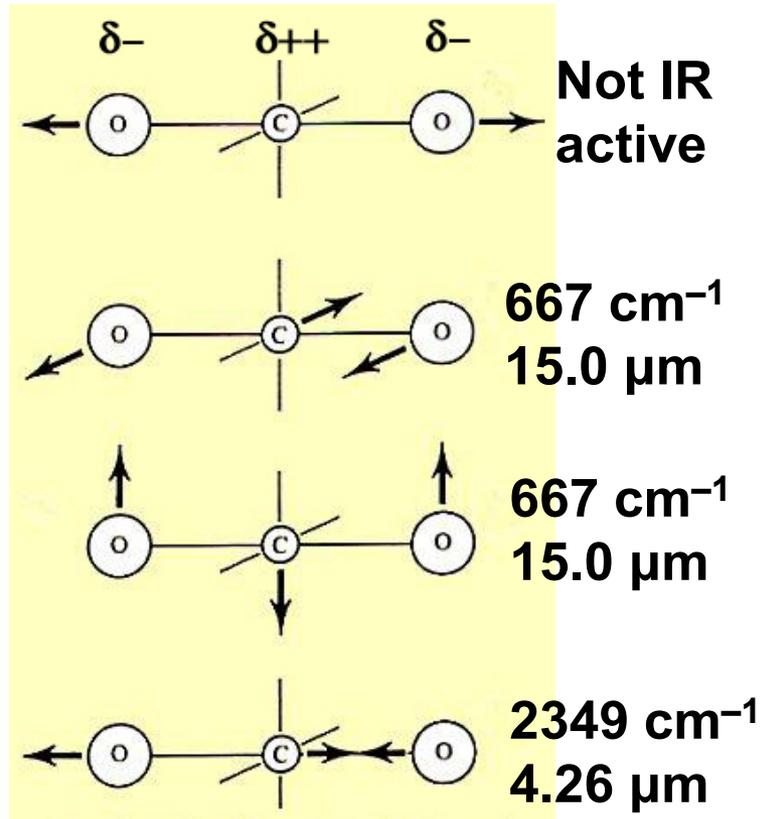
411.02 ppm

Carbon dioxide concentration at Mauna Loa Observatory



The atmospheric greenhouse effect

What makes a gas a greenhouse gas?

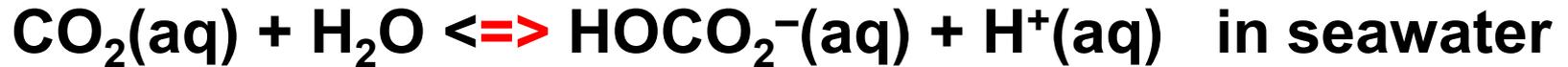
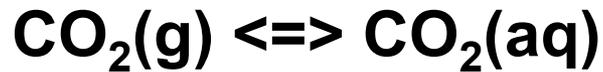


CO₂ molecular vibrations

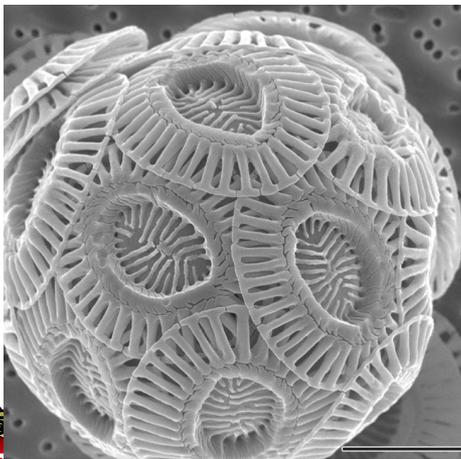


Carbon dioxide's ocean chemistry

Oceans store energy, move it around the planet in great currents, and dissolve a quarter of fossil fuel CO₂.



Interaction with other species: Ca²⁺, Mg²⁺, Na⁺, K⁺, Cl⁻,

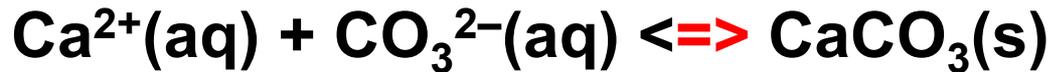


Phytoplankton are the base of the oceanic food chain.



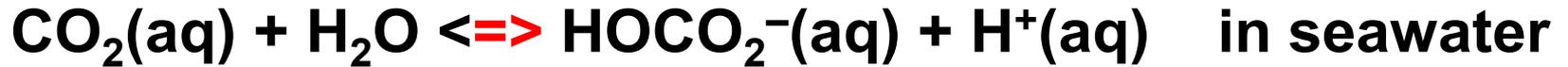
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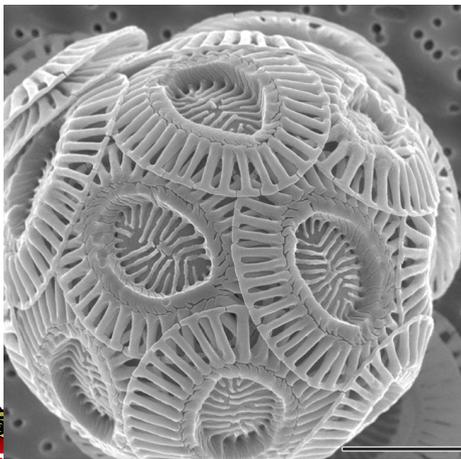
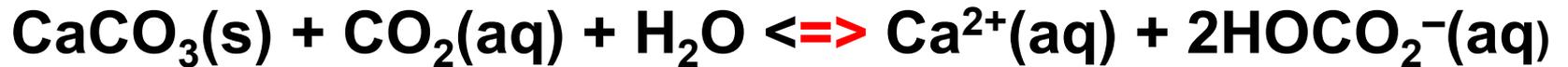


Carbon dioxide's ocean chemistry

Oceans store energy, move it around the planet in great currents, and dissolve a quarter of fossil fuel CO₂.



Net reaction:



Phytoplankton are the base of the oceanic food chain.

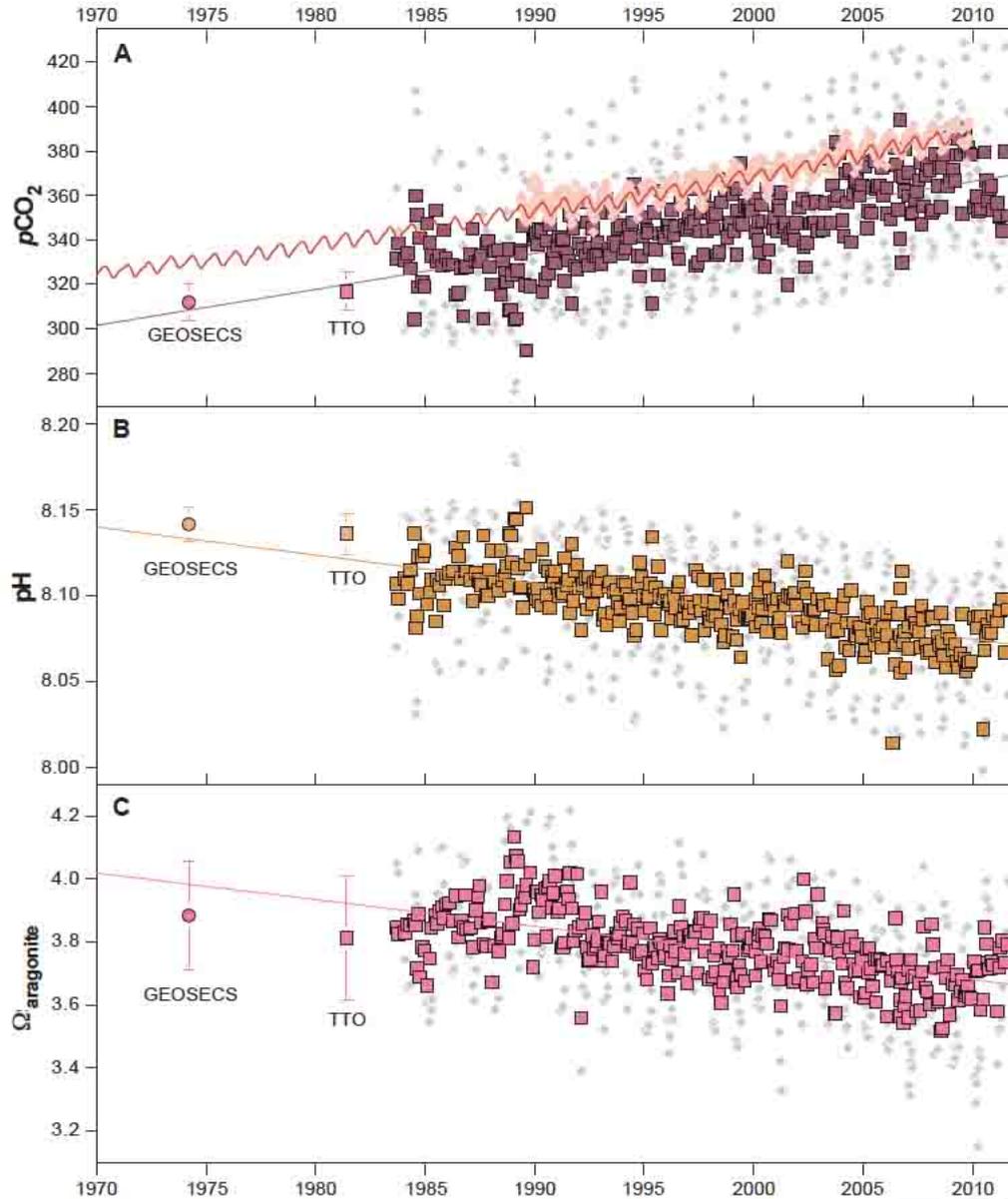
Ocean acidification



Ocean acidification

pH

supersaturation



ACTION

- Please tell us about your interest in addressing climate change?
- Please indicate what actions you might already have taken to mitigate climate change.
- Next??



**Union of
Concerned Scientists**
Science for a Healthy Planet and Safer World

www.ucsusa.org



Wisconsin Initiative for
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Citizens' Climate Lobby

www.citizensclimatelobby.org



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ACS Climate Science Toolkit

Tools to better understand and communicate climate science

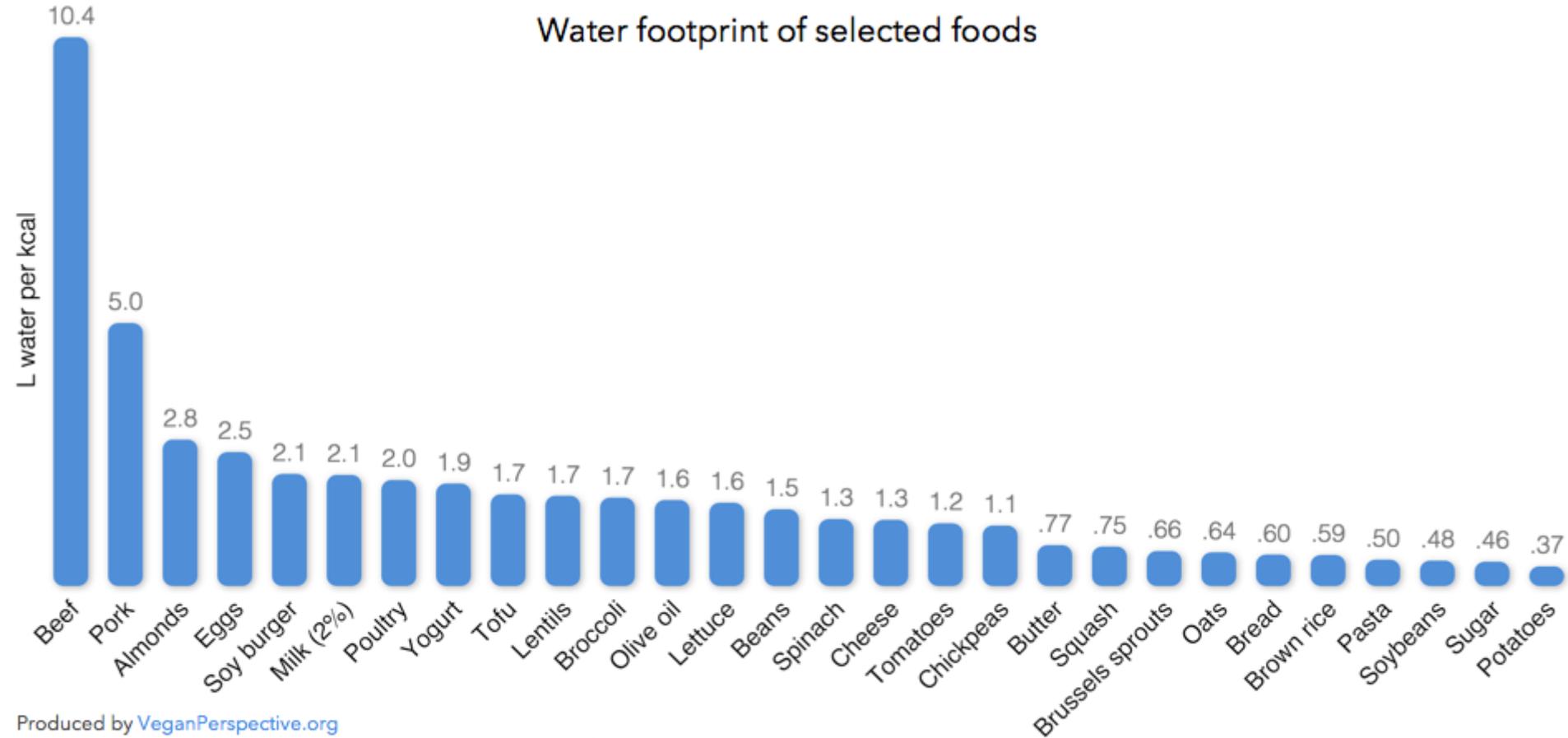


www.acs.org/climatescience



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Water footprint of selected foods



Produced by VeganPerspective.org

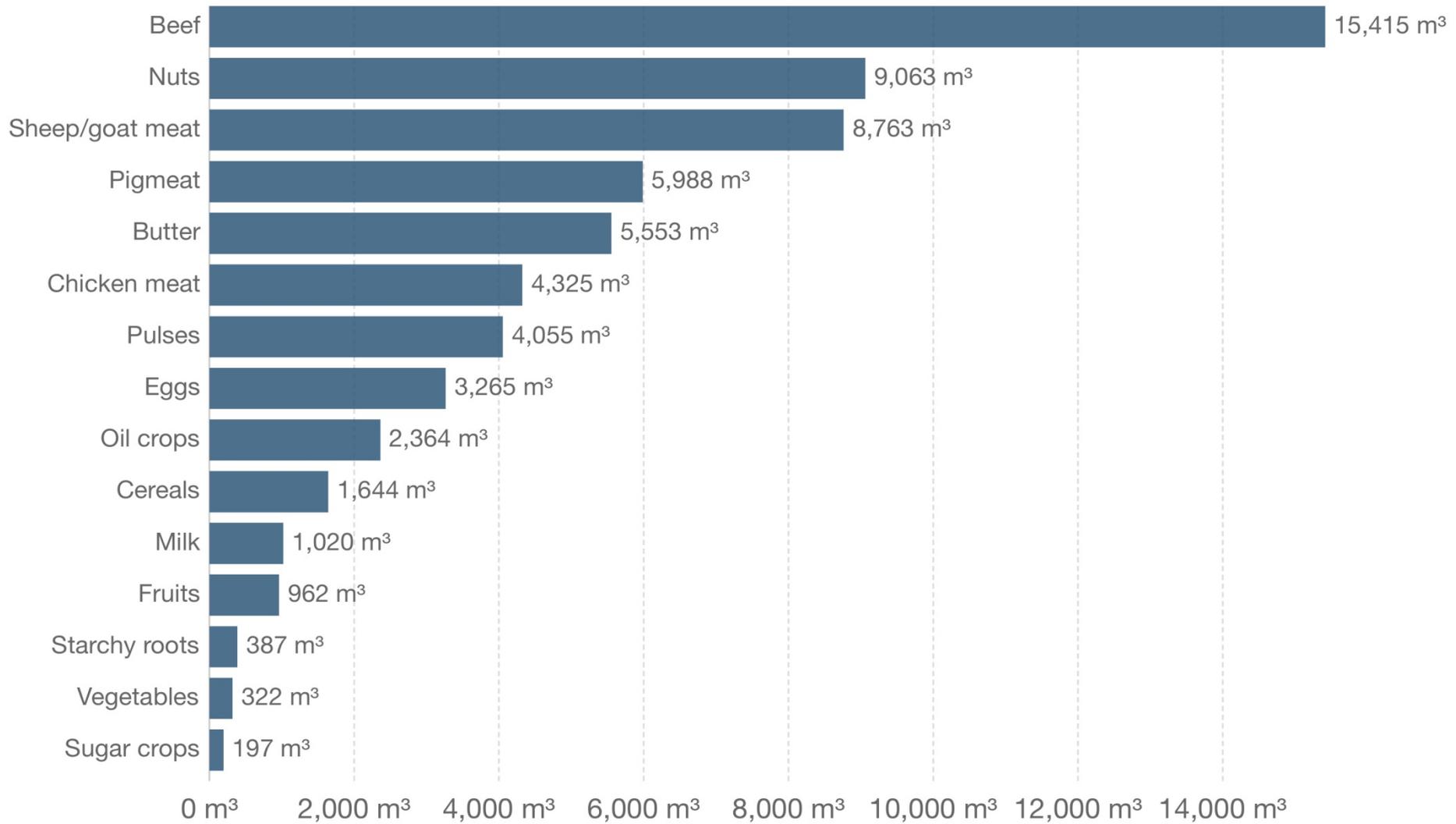
Sources: Water Footprint Network: Water Stat Database (water footprints)

USDA Nutrition Database (calorie information)



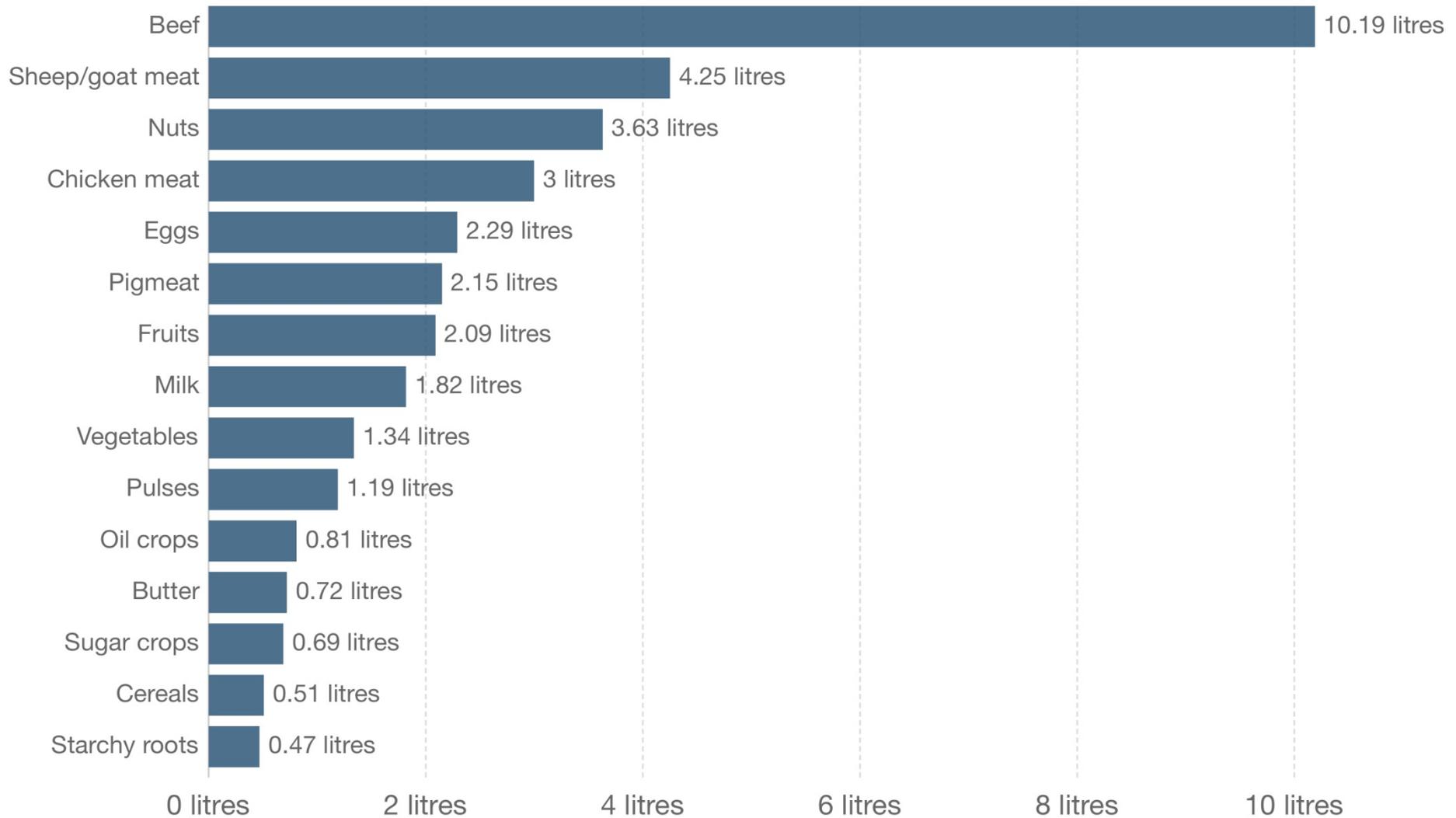
Water requirement per tonne of food product

Global average water footprint of food production, which includes water requirements across its full supply chain and the quantity of freshwater pollution as a result of production.



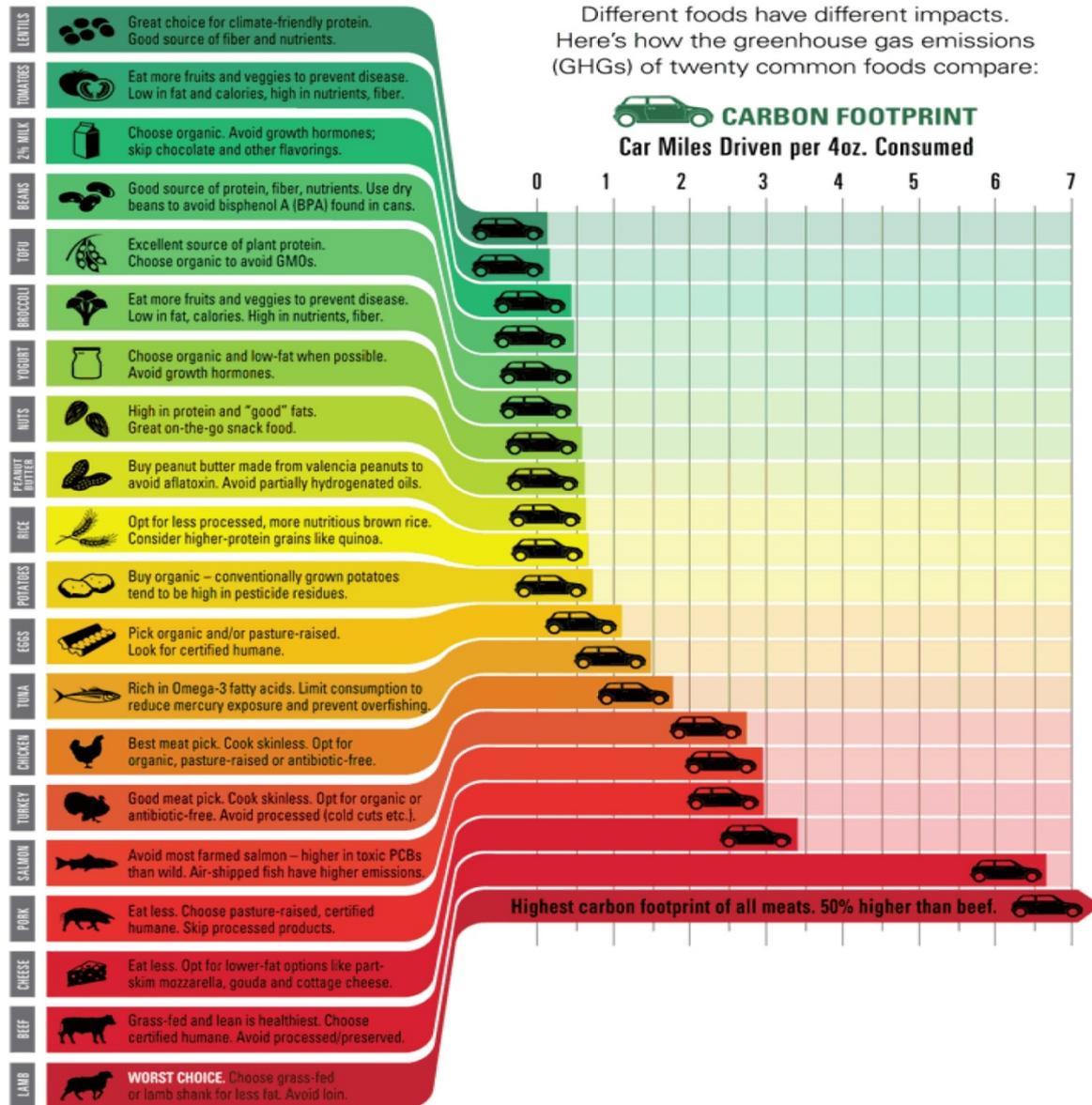
Water requirement per kilocalorie

Global average water footprint of food production per kilocalorie, which includes water requirements across its full supply chain and the quantity of freshwater pollution as a result of production.



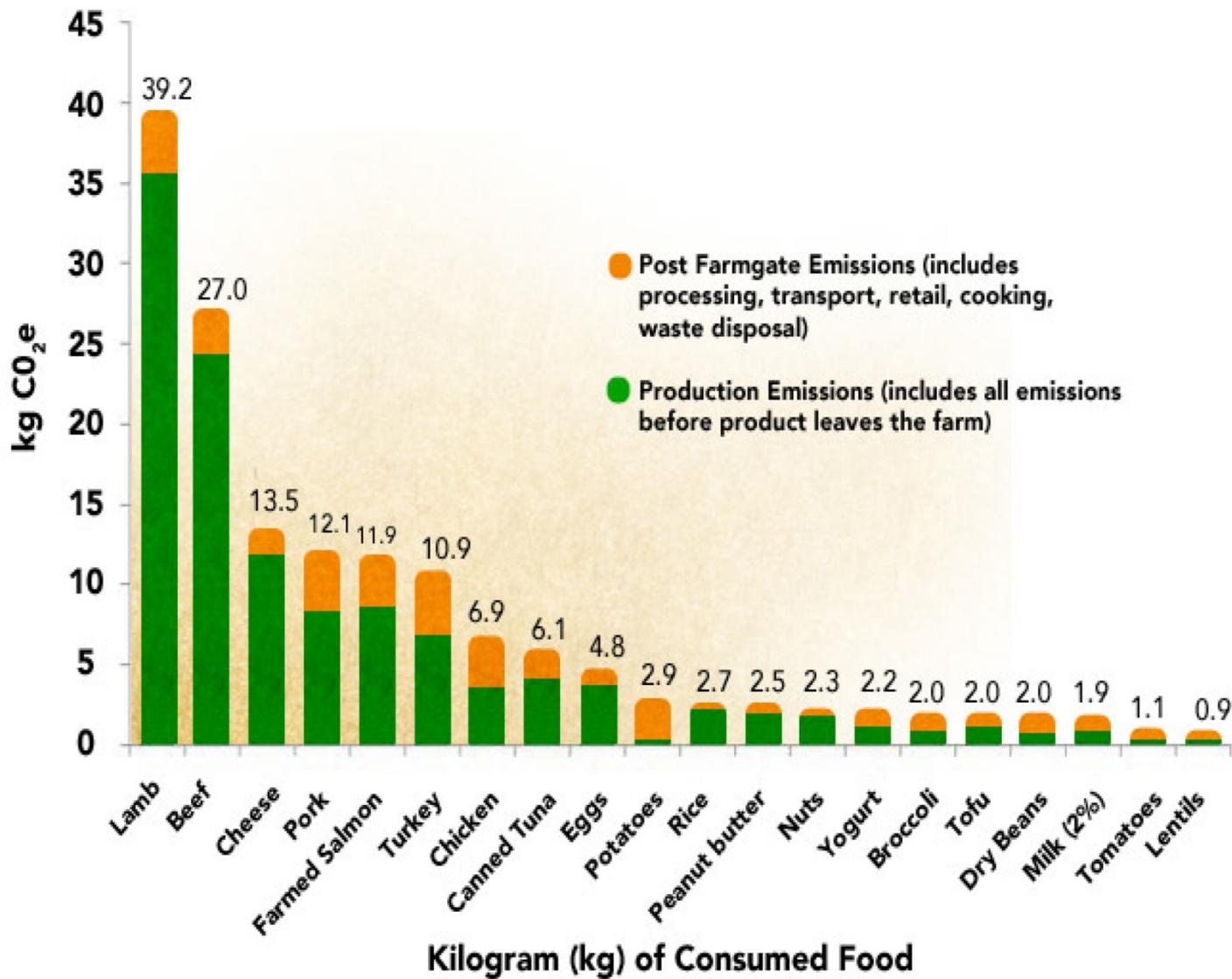
Eat Smart. Your Food Choices Affect the Climate

Different foods have different impacts. Here's how the greenhouse gas emissions (GHGs) of twenty common foods compare:



GHG data based on lifecycle assessment by CleanMetrics. cleanmetrics.com





©2011, Environmental Working Group



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Trust

Confidence



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