Avoiding Collapse

JANUARY 12, 2022


visit
California

California Is An Established Environmental Leader, But Must Do Better

- Maintaining the state's environment won't be easy while population, consumption, pollution and demands on limited resources increase
- The Newsom Administration recognizes the dangers posed by these perilous issues and the need to act urgently
- To begin addressing them, a record 21.7B was included in the state's 2021-22 budget for environmental programs
- These existential threats must be addressed expeditiously to avoid the worst possible societal outcomes

California faces many threats:

- climate change impacts
- sea-level rise
- biodiversity loss
- species extinction
- droughts
- increased pollution
- extreme wildfire
- invasive species
- infectious diseases
- and threats to our food and water supply
- among others

The United Nations and Leading World Scientists Are Sounding the Alarm and Urging Governments Around the World to Act Immediately

Avoiding Collapse: Grand Challenges for Science and Society to solve by 2050, published by: Anthony D. Barnosky, Paul Ehrlich, and Elizabeth A. Hadly

"*We maintain that humanity's grand challenge is solving the intertwined problems of human population growth and overconsumption, climate change, pollution, ecosystem destruction, disease spillovers, and extinction, in order to avoid environmental tipping points that would make human life more difficult and would irrevocably damage planetary life support systems.*"

2013 Scientific Consensus on Maintaining Humanity's Life Support Systems in the 21st Century (Barnosky et al. 2014)

A large body of science now documents that if these problems continue to grow as they have over the past half-century, the result will be substantial harm to human wellbeing by 2050, even the possible collapse of civilization as we know it.

Prepared at the urging of former California Governor Jerry Brown and endorsed by more than 1500 scientists from around the world.

Environmental Issues of Key Concern

Issue	Description
Climate Disruption	More, faster climate change has occurred than since humans first became a species.
Extinctions	Not since the dinosaurs went extinct have so many species and populations died out so fast, both on land and in the oceans.
Wholesale loss of diverse ecosystems	We have plowed, paved, or otherwise transformed more than 50% of the Earth's ice-free land, and no place on land or in the sea is free of our direct or indirect influences.
Pollution	Environmental contaminants in the air, water and land are at record levels and increasing, seriously harming people and wildlife in unforeseen ways.
Human population growth and consumption patterns	More than seven billion people alive today will likely grow to 9.5 billion by 2050, and the pressures of heavy material consumption of the middle class and wealthy may well intensify.
Disease	More contact through destruction of intact ecosystems combined with dramatically changed environments are leading to increases in the rates and types of sicknesses that harm humans, other animals and plants.

Humans Are Having An Outsized Impact On The Planet

Issue	Description
Climate Disruption	More, faster climate change has occurred than since humans first became a species.

United Nations Warnings More Frequent and Dire

- U.N. climate change report sounds "code red for humanity"
- We have 12 years to limit climate change catastrophe, warns UN
- U.N. science report delivers 'final warning' on climate change

The recent Intergovernmental Panel on Climate Change (IPCC) report underscored the dire state of the climate crisis, concluding that “immediate, rapid and large-scale reductions in greenhouse gas emissions” are needed to limit global warming even to 1.5°C or 2°C

To stay below 2°C during this century, emissions would have to reach net zero by 2050. To stay at 1.5°C of global warming, global emissions must peak by 2025

The carbon budgets for limiting warming to 1.5°C with a 50% chance, the world can emit around 460 GtCO2 or just 11.5 years of 2020 emissions - after January 1, 2021 before being committed to 1.5°C

For a 66% chance of limiting warming to 1.5°C, the remaining carbon budget is 360 GtCO2 or nine years of 2020 emissions

Climate Disruption

- Human influence is warming the planet, causing widespread and severe impacts
- Sea Level Rise - Warming to date has triggered ice sheet melting that will drive sea level rise for centuries. Globally, coastal flooding events that occurred once per century in the recent past will occur at least annually at more than half of locations globally
- Heat Waves - Globally, extreme heat waves occur five times as often as before, and they will hit 14 times as often if warming reaches 2°C. The frequency of heatwaves that are currently even more rare and extreme are increasing even faster. Even warming of just 1.5°C will deliver an increasing number of unprecedented extreme heat events
- Drought – Globally, droughts that used to occur once ever 10 years now occur 70% more frequently
- Fire - Fire season is hotter, drier, and longer. Fire weather will increase as we warm to 1.5°C and grow even further at 2°C
- Tropical Cyclones – Warming makes tropical cyclones and extratropical storms stronger and loads them with more rainfall. Further warming will only supercharge these storms even more
- Extreme Rainfall and Flooding - Heavy downpours that used to occur once ever 10 years now occur 30% more frequently. Extreme precipitation events will arrive 70% more frequently if warming hits 2°C. Downpours that are more rare and extreme will increase in frequency faster
- Compound events - At 2°C, compound events – such as concurrent heatwaves and droughts, or storm surge in combination with extreme rainfall – will occur more frequently
- Intensified Water Cycle - Climate change is causing increased variability of the global water cycle, meaning regions will experience more severe swings between wet and dry events

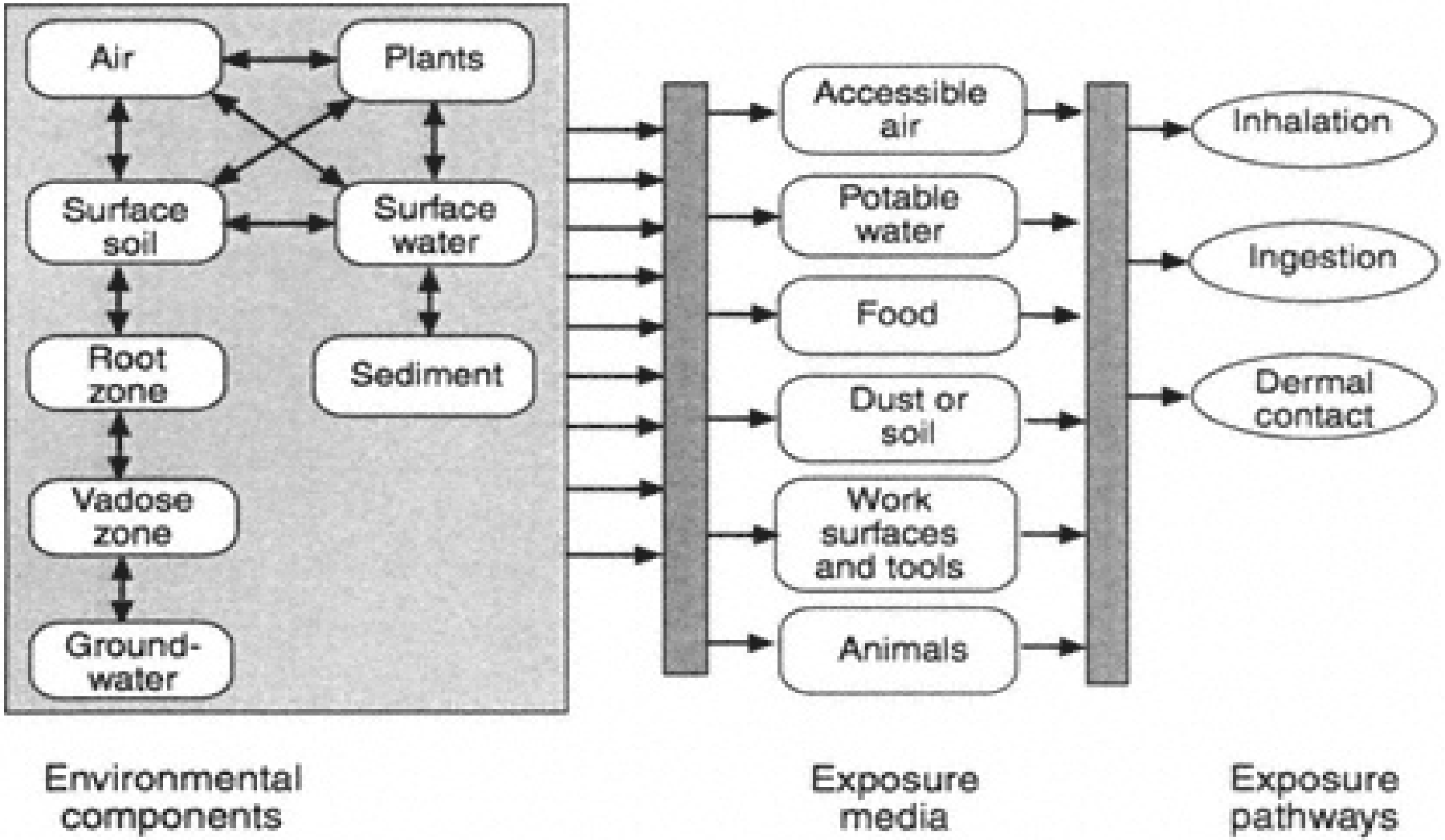
Issue	Description
Extinctions	Not since the dinosaurs went extinct have so many species and populations died out so fast, both on land and in the oceans.

- Earth's biota has entered a sixth "mass extinction" - only 5 previous extinctions in the last 4.5 billion years
- At least 680 animal species have gone extinct due to human activities since the 16th century, most since 1900
- Humans have significantly altered three-quarters of the Earth's land area, leaving more than a million species without enough habitat to survive
- Amphibian species are the most rapidly declining vertebrates, 41% are threatened
- Life in the oceans isn't any better. A third of marine mammals, reef-forming corals, sharks, and shark relatives are on the brink
- 28%: the average proportion of species threatened with extinction across terrestrial, freshwater and marine vertebrate, invertebrate and plant groups studied in sufficient detail
- Vertebrate populations have declined 68% in the last 50 years
- 1 million animal and plant species are threatened with extinction, many in the coming decades
- Every time a species or population vanishes, Earth's capability to maintain ecosystem services is eroded

Issue	Description
Wholesale loss of diverse ecosystems	We have plowed, paved, or otherwise transformed more than 50% of the Earth's ice-free land, and no place on land or in the sea is free of our direct or indirect influences.

- 75% of land-based environments and 66% of marine environments have been significantly altered by human action
- 85% of wetlands have been lost
- Oceans are running empty as we're overfishing our fish stocks and ocean acidification is killing off the bottom of the food chain
- The planet's "lungs" are being decimated as we've already destroyed a third of the planet's forest cover
- Increased risk of floods and hurricanes due to lost of coastal habitats and protection
- Collapse of Northern California Kelp Forest and loss of ecosystem function from large-scale fires
- We need pollinators to grow food, streams and wetlands to supply and filter drinking water, fertile soils for agriculture, etc. and yet we're destroying all of these resources we rely on for our survival

Issue	Description
Pollution	Environmental contaminants in the air, water and land are at record levels and increasing, seriously harming people and wildlife in unforeseen ways.



Pollution

- The United States produces 30% of the world’s waste and uses 25 % of the world's natural resources
- Americans annually generate 1,800 pounds of trash per person
- Approximately 8 million metric tons of garbage is dumped in the world's oceans annually. Plastic is the major constituent
- Every year, around one trillion gallons of untreated sewage and industrial waste is dumped in U.S waters
- Pollution is one of the biggest killers, affecting more than 100 million worldwide
- Approximately 46% of the lakes in America are extremely polluted presenting a risk for swimming, fishing, and aquatic life
- Pollution kills more than 1 million seabirds and 100 million mammals every year
- By 2050, ocean plastic will outweigh all the ocean’s fish
- Plastic production, and associated pollution, is projected to increase four-fold by 2050

Pollution

- More than 100 pesticides in any medium – air, water or soil can cause birth defects, gene mutations, and cancer
- There are more than 73 types of pesticides in groundwater, which is used as drinking water
- More than 3 million children under the age of 5 years die every year due to environmental factors such as pollution
- Babies are born "pre-polluted" with synthetic chemicals passed on from their mothers
- 300 synthetic chemicals are found in every one of our bodies
- Since 1901, cancer rates have increased from only 1 in 8,000 Americans, to 1 in 3 today

Issue	Description
Human population growth and consumption patterns	More than seven billion people alive today will likely grow to 9.5 billion by 2050, and the pressures of heavy material consumption of the middle class and wealthy may well intensify.

- In the last 50 years, the human population has grown from 3.8 billion to 7.9 billion
- The global amount of arable and productive land for growing food per person in 2050 will be only a quarter of the level it was in 1960, due to growing populations and soil degradation caused by intensive farming (FAO, 2014)
- Every year, for every American alive, three pounds of toxic chemicals are sprayed onto the food grown on American farms, which goes into our soil, our water, and into our bodies
- More than 90 percent of Americans have pesticides or their byproducts in their bodies (NCBI, 2017)
- More than 75 percent of Earth's land area is already degraded and more than 90 percent could become degraded by 2050 (European Commission's World Atlas of Desertification, 2018)
  - If current rates of degradation continue all of the world's top soil could be gone within 60 years (UN, 2014)
- One in nine people in the world go hungry each day, about a third are malnourished, and more than one in seven get by on a bare minimum of water

Human population growth and consumption patterns

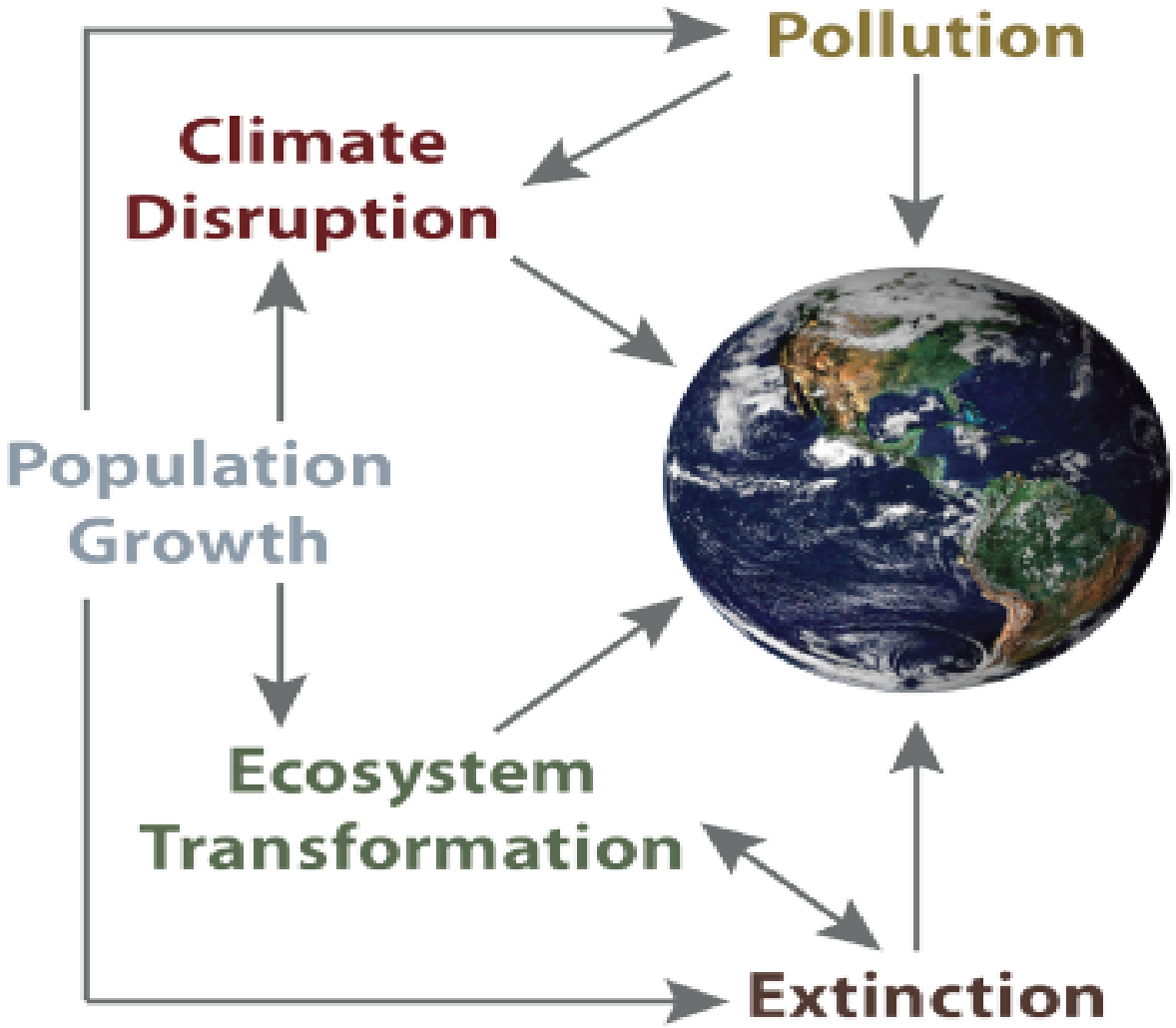
- A single person in the United States produces 4.9 pounds of garbage every day, with only 1.6 pounds recovered for recycling or composting
- In 2019, U.S. GHG emissions were 20 metric tons CO_2-equivalent per person, the highest in the world (U.N. 2020)
- Since the 1970's, average residential living trends in the U.S. have been towards bigger houses with fewer occupants – home sizes increased by 40%
- Congestion is a worsening urban problem, causing an additional 68.6 billion pounds of CO_2 emissions by urban Americans in 2019
- More U.S energy comes from petroleum than any other source, comprising nearly 35% of consumption
- More than half of the U.S. population now lives in car-dependent suburbs. Cumulatively, we drive 3 trillion miles each year
- Consumption/growth patterns affect all other issues

Issue	Description
Disease	More contact through destruction of intact ecosystems combined with dramatically changed environments are leading to increases in the rates and types of sicknesses that harm humans, other animals and plants.

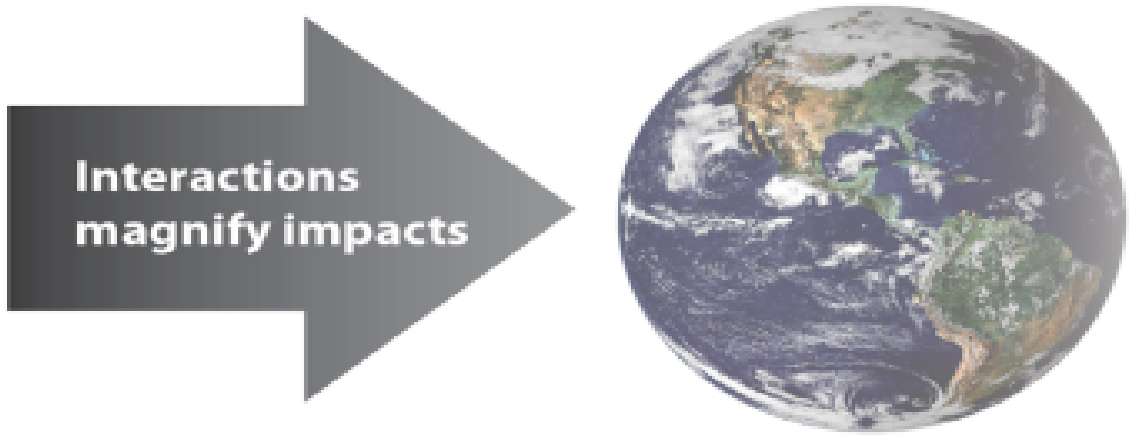
- We know that animals, humans and the environment all interact: this is the foundation of the One Health concept
- Recent zoonoses (diseases passed between animals and humans)
  - Nipah Virus
  - Hendra Virus
  - SARS

Disease

- Most of the global outbreaks of infectious illnesses that have happened in recent history are thought to have been caused by viruses previously only found in animals
- “The world is getting closer”
- Climate change forces animals to migrate into areas occupied by humans
- What will be the next pandemic? It’s only a matter of time. We need to be better prepared



Harmful Global Change



A World Poorer in

ecosystem services, biodiversity, food, water, health, economic opportunities, societal stability, recreation and asthetics, quality of life

California is becoming energy-efficient faster than other states

Why has California moved faster?

The answer traces back to the **1970s energy crisis**, which hit the state particularly hard. During Gov. Ronald Re
study of how to deal w
large power plants. An
turn created the Califo
standards for equipm

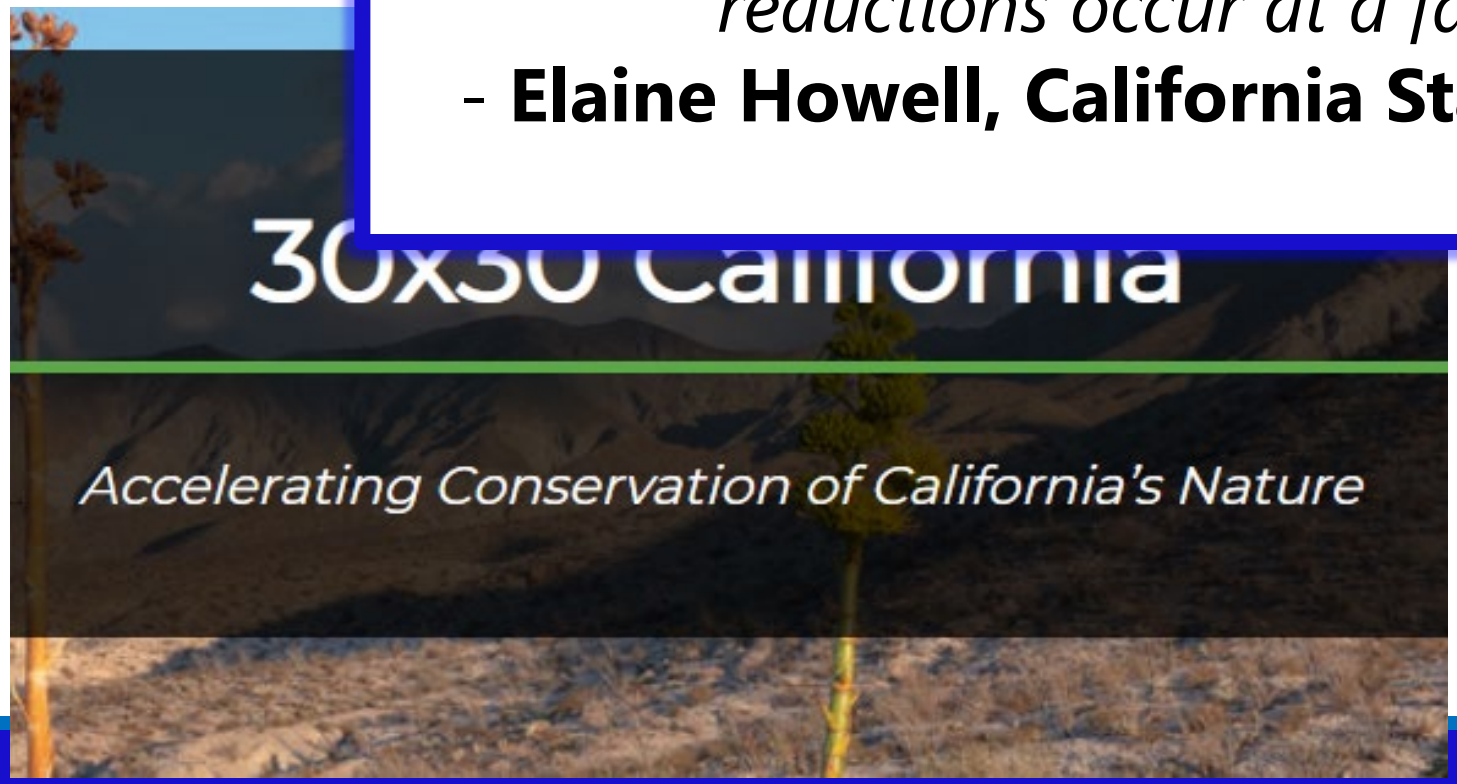
EXPERT BLOG › VICTORIA ROME

Ten New Environmental Laws in California

November 30, 2021 | Victoria Rome

"California is currently not meeting its climate reduction goals and will fall far short unless emissions reductions occur at a faster pace"

- Elaine Howell, California State Auditor 2021



David Jiang via Wikimedia Commons, CC BY-SA 4.0

The environmental community continued to chalk up wins in the state legislature despite another unusual year due to the COVID-19 pandemic and a gubernatorial recall election. We successfully navigated video meetings and remote testimony to advance climate and health policies with the help of coalition partners, environmental

Are Current Efforts Enough to Prevent Disaster?

What must be done to avoid collapse?

Acknowledge	Acknowledge the need to act urgently and in a sustained manner similar to "wartime mobilization."
Develop/Implement	Develop/Implement a comprehensive plan to build climate resilience in communities, educate the public, promote sustainable agriculture, and address the six major issues threating societies' life support system.
Gain support	Gain the support/commitment of Californians to change behavior/habits to significantly reduce resource consumption across all market sectors.
Collaborate	Establish partnerships/agreements with other states and countries to support adoption of California's model for avoiding collapse.
Attract and retain	Attract and retain a 21st Century Scientific Workforce that is innovative, motivated, and capable of addressing the existential threats to our continued existence.

The Grand Challenge for California and State Scientists

*"To implement knowledge that arises from basic research, it is necessary to establish dialogues and collaborations that transcend narrow academic specialties, and bridge between academia, industry, the policy community and society in general…**now is the time to rise to these scientific and communication challenges.**"*

Will California Continue To Be A Leader And Take Action Now To Avoid Collapse?

- California leads the country economically, socially, legally – and scientifically
- Our state leads the nation, and our nation leads the world
- California is the first domino, that's why the fate of 3,500 state scientists impacts these global issues
- If the California nation-state doesn't set the example, who will?
- California has acted decisively in the past, now is the time to do so again and set a course to a sustainable future

Gavin Newsom
@GavinNewsom

NEW: With a surplus of over $45.7 BILLION -- California is a model for the nation on how we can confront our greatest existential threats and make historic investments in our future.

We can lead with science and still have a successful economy.

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