COLORADO™

Colorado Climate Change and Potential Health Vulnerabilities

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COLORADO
Department of Natural Resources

HB 13-1293

"The general assembly hereby declares that climate change presents serious, diverse, and ongoing issues for the state's people, economy, and environment…ensure that the state is apprised of the threats that climate change poses to Colorado and the progress made to mitigate and address those threats…"

- Development of a Plan
- Collaboration with other entities regarding climate change preparedness studies.
- Annual Report to legislature
  - Efforts to reduce emissions of gasses and to reform practices known to exacerbate climate change
  - Efforts (proposals) to prepare the state for the effects of climate change

2050 Temperature Projections in Context

2°F: Denver's seasonal temperature cycle will become more like **Pueblo** today

4°F: Denver's seasonal temperature cycle will become more like **Lamar** today

6°F: Denver's seasonal temperature cycle will become more like **Albuquerque** today

Public Health

Vulnerabilities: decreased air quality, water quality, increased vector-borne disease, and frequency/intensity of extreme weather events

	Climate Driver	Exposure	Health Outcome	Impact
Extreme Heat	More frequent, severe, prolonged heat events	Elevated temperatures	Heat-related death and illness	Rising temperatures will lead to an increase in heat-related deaths and illnesses.
Outdoor Air Quality	Increasing temperatures and changing precipitation patterns	Worsened air quality (ozone, particulate matter, and higher pollen counts)	Premature death, acute and chronic cardiovascular and respiratory illnesses	Rising temperatures and wildfires and decreasing precipitation will lead to increases in ozone and particulate matter, elevating the risks of cardiovascular and respiratory illnesses and death.
Flooding	Rising sea level and more frequent or intense extreme precipitation, hurricanes, and storm surge events	Contaminated water, debris, and disruptions to essential infrastructure	Drowning, injuries, mental health consequences, gastrointestinal and other illness	Increased coastal and inland flooding exposes populations to a range of negative health impacts before, during, and after events.
Vector-Borne Infection (Lyme Disease)	Changes in temperature extremes and seasonal weather patterns	Earlier and geographically expanded tick activity	Lyme disease	Ticks will show earlier seasonal activity and a generally northward range expansion, increasing risk of human exposure to Lyme disease-causing bacteria.
Water-Related Infection (*Vibrio vulnificus*)	Rising sea surface temperature, changes in precipitation and runoff affecting coastal salinity	Recreational water or shellfish contaminated with *Vibrio vulnificus*	*Vibrio vulnificus* induced diarrhea & intestinal illness, wound and bloodstream infections, death	Increases in water temperatures will alter timing and location of *Vibrio vulnificus* growth, increasing exposure and risk of waterborne illness.
Food-Related Infection (*Salmonella*)	Increases in temperature, humidity, and season length	Increased growth of pathogens, seasonal shifts in incidence of *Salmonella* exposure	*Salmonella* infection, gastrointestinal outbreaks	Rising temperatures increase *Salmonella* prevalence in food; longer seasons and warming winters increase risk of exposure and infection.
Mental Health and Well-Being	Climate change impacts, especially extreme weather	Level of exposure to traumatic events, like disasters	Distress, grief, behavioral health disorders, social impacts, resilience	Changes in exposure to climate- or weather-related disasters cause or exacerbate stress and mental health consequences, with greater risk for certain populations.

Extreme Heat

2000–2013 saw an average of 8.8 days per year of 95°F or higher in Fort Collins.

Heat-related illnesses include:

- Heat cramps which result from the loss of body salts and fluid due to sweating.
- Heat rash from sweat not evaporating from skin
- Heat exhaustion (headache, nausea, dizziness, weakness) due to loss of body salts and fluid.
- Heat stroke (confusion, seizures, loss of consciousness), which occurs when the body cannot regulate its core temperature.

Heat stress can effect crops and livestock as well and can consequently impact food systems. Increased temperatures can also result in increased occurrence of salmonella

Outdoor Air Quality

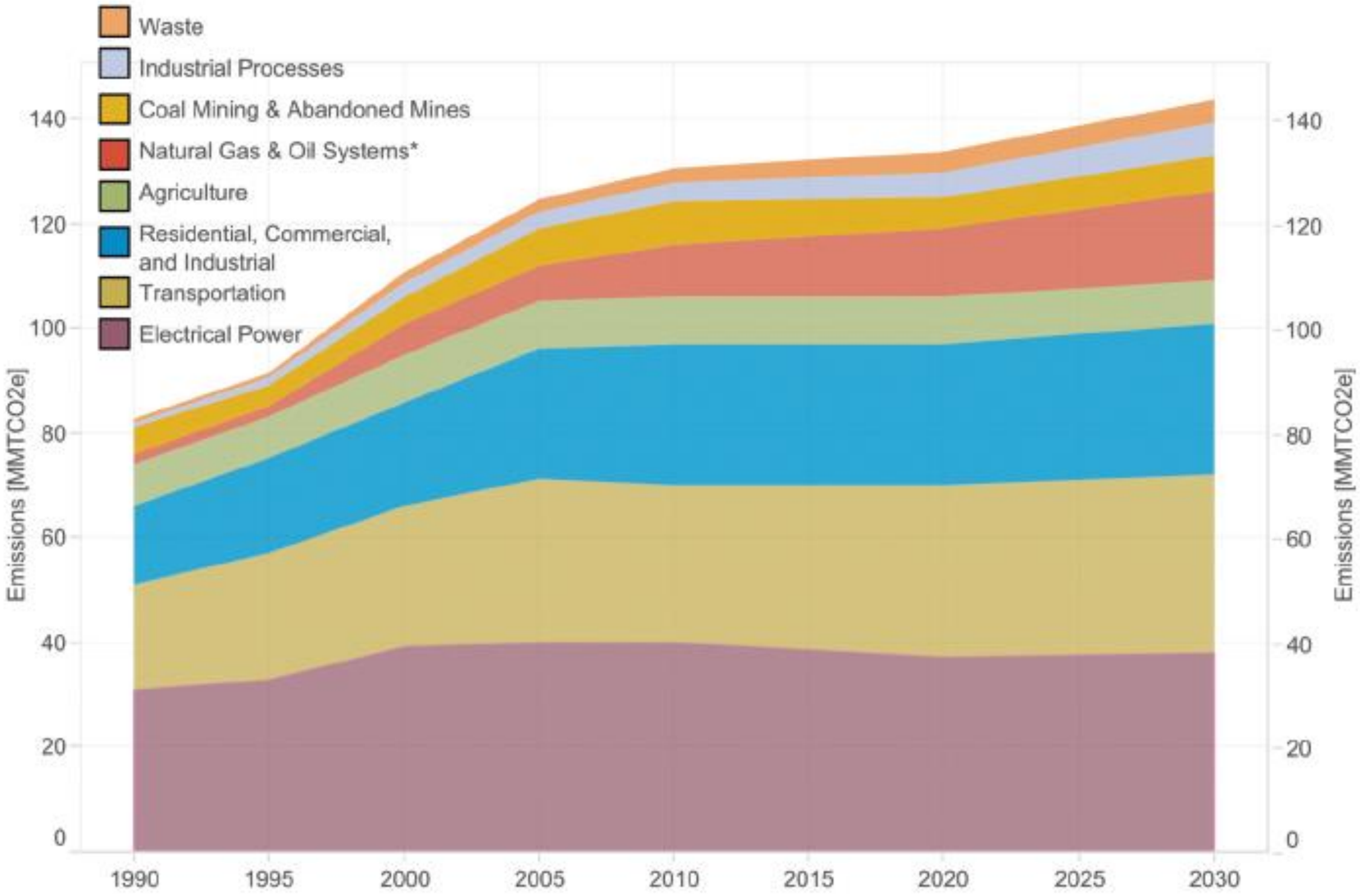
- Increased emissions can further perpetuate all climate change impacts

- Increased concentration of ground-level ozone, fine particulates, and aeroallergens can result from climate change

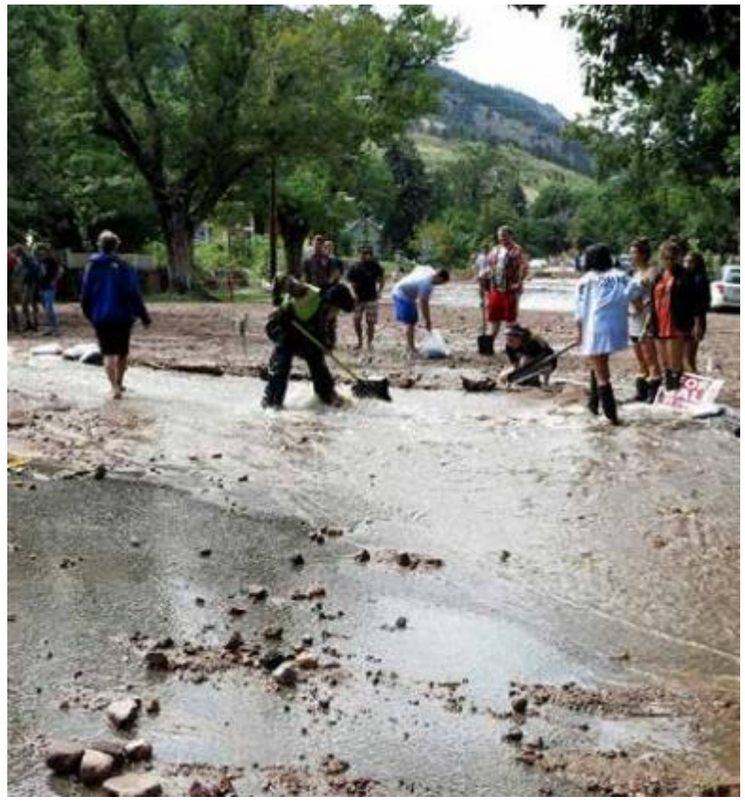
- Increased occurrence of fires can decrease air quality

- Poor air quality can adversely impact human health and result in respiratory problems and other health conditions.

Summary of Colorado GHG Emissions by Sector (MMTCO2e)



Extreme Events



Includes: fires, flooding, drought, dust storms

- Increased temperatures can contribute to increased fire potential and drought

- Drought can result in increased dust storms, loss of crops & livestock and decreased air quality

- Extreme events can increase mental health stressors and even increase suicide rates.

- Increased population growth into the WUI and floodplains can increase exposure.

Vector Borne Disease

• Typically reflect seasonal patterns, suggesting they are weather sensitive

•High temperatures can both increase and decrease survival rates

•Mosquitoes, fleas, ticks are common vectors in Colorado

- West Nile virus
- Hantavirus
- Plague
- Rabies
- Tularemia
- Tick-borne diseases

Water

Vulnerabilities: Changes in streamflow, peak runoff and crop demands. Decreases in Snowpack. Increases in drought. Increased water temperatures. Decreased water quality.

Water Quality

- Increased temperatures can effect TDS levels and occurrence of water borne infections like *Vibrio vulnificus (seafood)*

- Decreased flows, decreases dilutions

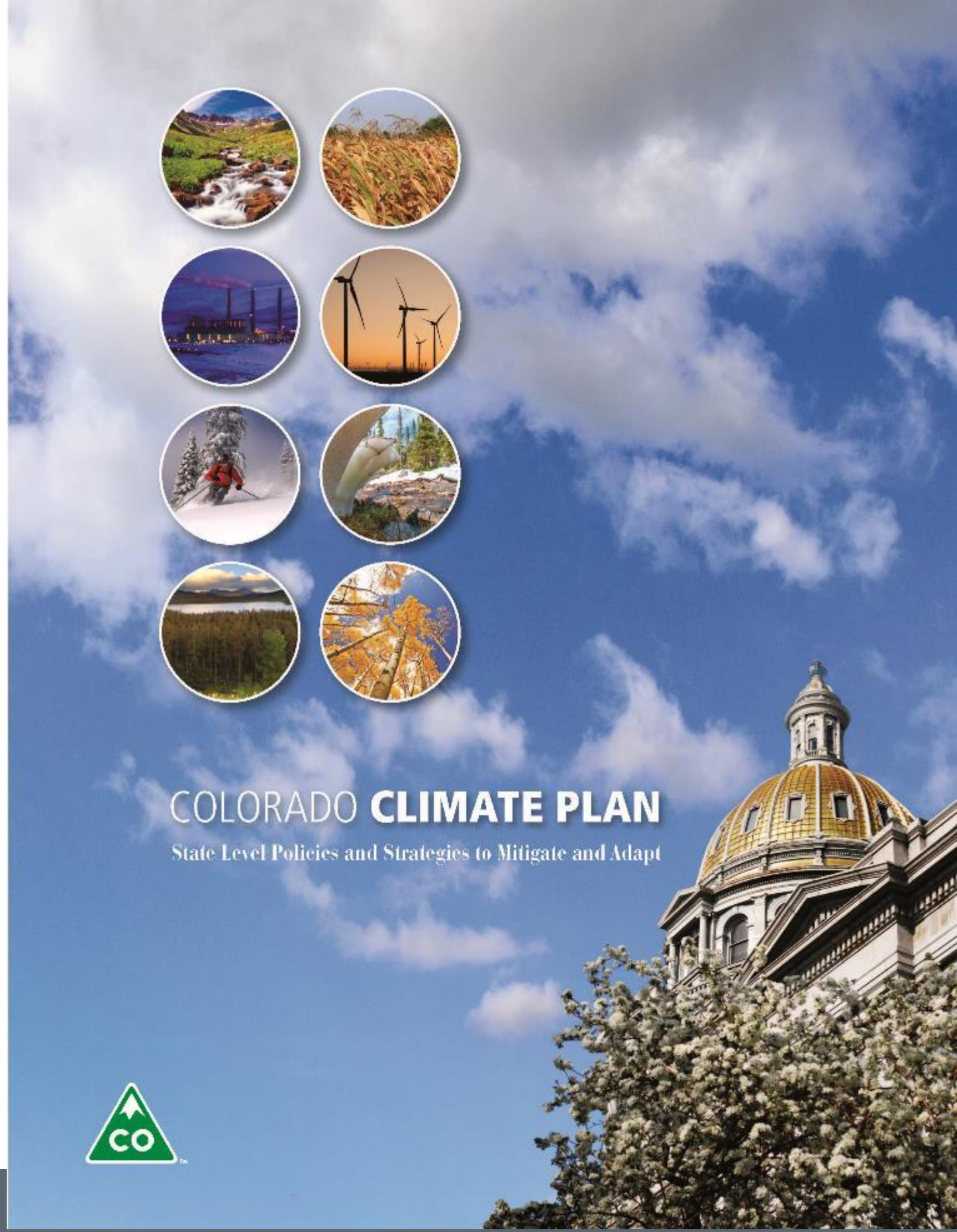
- Some water quality standards are temperature dependant.

- Decreased quality means higher treatment costs and possible energy requirements.

- Fires in watersheds can decrease water quality

- Decreased water quality can impact agricultural production

- Mutli-sectoral state level policies and recommendations
- Includes mitigation and adaptation
- Collaborative effort by state agencies



STRATEGIES AND POLICY RECOMMENDATIONS

- Coordinate with the Public Utilities Commission, the CEO, and additional stakeholders to develop and implement a Colorado-specific plan to substantially reduce carbon dioxide emissions from fossil fuel fired EGUs.

- Fully implement Colorado's 2014 and 2016 oil and gas emission regulations, evaluate the resulting reductions of methane and other pollutants, and evaluate potential refinements to those regulations.

- Continue to monitor and evaluate particulate matter levels and issue public health advisories as appropriate.

- Continue to assess potential correlations between vector borne diseases and climate factors, incorporate the results into public health guidance, and communicate any revised risk reduction measures to local governments and the public.

- Emphasize climate-related disaster preparedness in emergency response plans and exercises.

CDC BRACE

A five-step process for public health agencies called Building Resilience Against Climate Change Effects

1) forecast climate impacts and vulnerabilities to identify the scope of the most likely climate impacts, the potential health outcomes associated with those impacts, and the populations and locations vulnerable to these health impacts within a jurisdiction;

2) project the disease burden to estimate the additional burden of health outcomes due to climate change in order to support prioritization and decision making;

3) assess public health interventions to identify the most suitable interventions for the health impacts of greatest concern based on the health risk assessment;

4) develop and implement a Climate and Health Adaptation Plan that addresses the health impacts, gaps in the critical public health functions/services, and a plan for enhancing adaptive capacity in the jurisdiction;

5) evaluate the processes used, determine the value of the framework and the value of climate and health activities undertaken to improve quality and incorporate refined input based on updated and new information.

Questions?

Please direct questions/comments to:

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