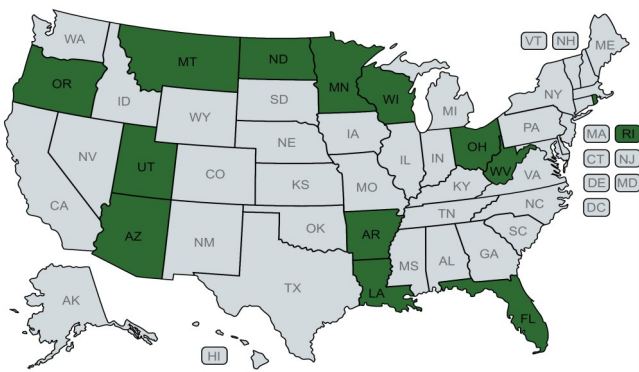


Climate Science and Policy for Nonscientists

One Picture is Worth a Thousand Words.

State Climate Assessments

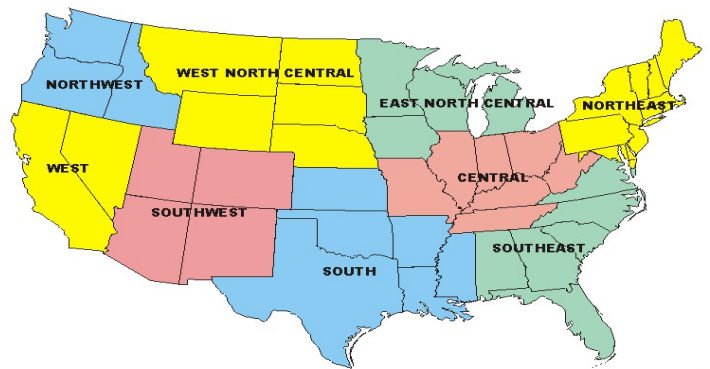


Climate scientists routinely divide the US into nine climate regions. As discussed in last month’s newsletter, average US data, e.g. the average US temperature, may conceal significant regional differences. Also the impact of climate changes in different regions may be different. For example, warming may be beneficial in some regions but harmful in others. This newsletter presents findings from a number of state assessments around the US.

WHERE’S THE US CRISIS?

Last month’s newsletter explored, mostly on a world-wide basis, the question, “Where’s the Crisis?” This newsletter continues exploring that question with a focus on the US and on the state climate assessments that have been published to date. A little over a dozen such assessments exist. Overall the state climate assessments show that climate change in the US has been mild and in some respects beneficial, a very different picture than what generally appears in the media.

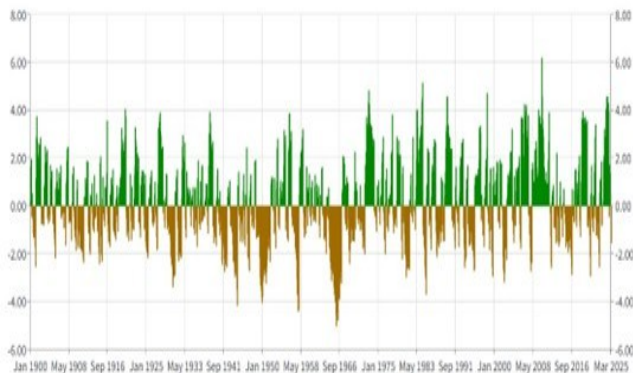
THE NINE REGIONS AS DEFINED BY THE NATIONAL CLIMATIC DATA CENTER (NCDC) AND REGULARLY USED IN CLIMATE SUMMARIES



CLIMATE PREDICTION CENTER, NOAA

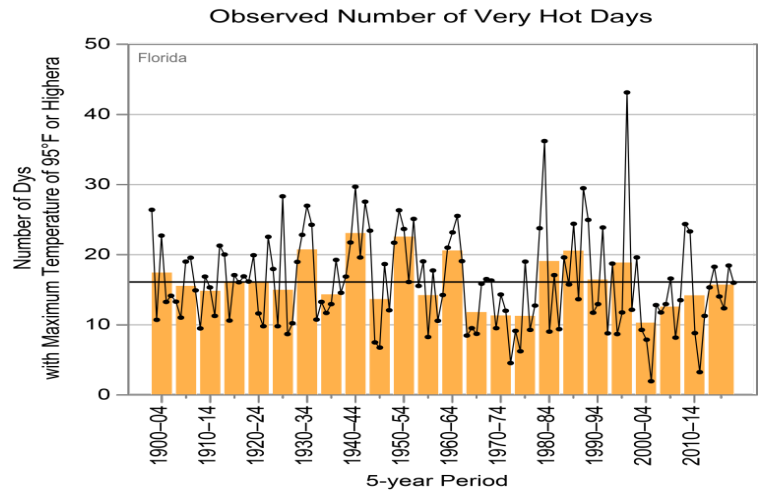


Rhode Island Palmer Drought Severity Index (PDSI)

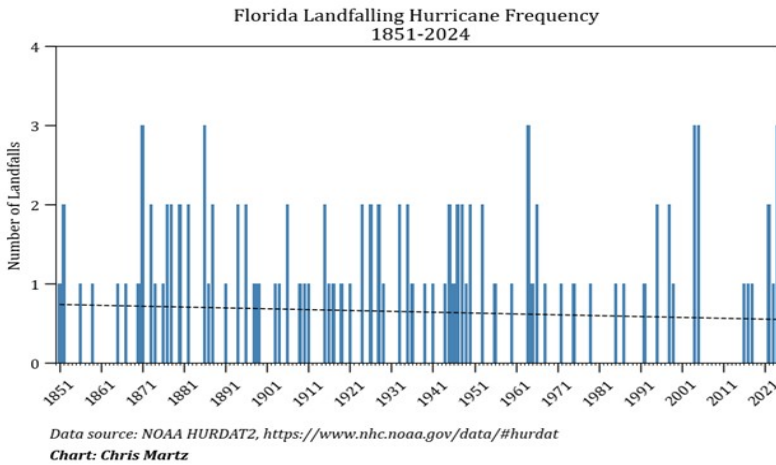


Rhode Island is the only New England state to have completed a climate assessment. It found a slight increase in rain and no sign of drought worsening. The state has “moderately” warmed with a decline in the number of very cold days. Agriculture and aquaculture are “thriving.” Sea level rise has been “modest,” roughly the same as measured by tide gauges around the world, about 8" per century, and there has been no acceleration in the rate of rise.

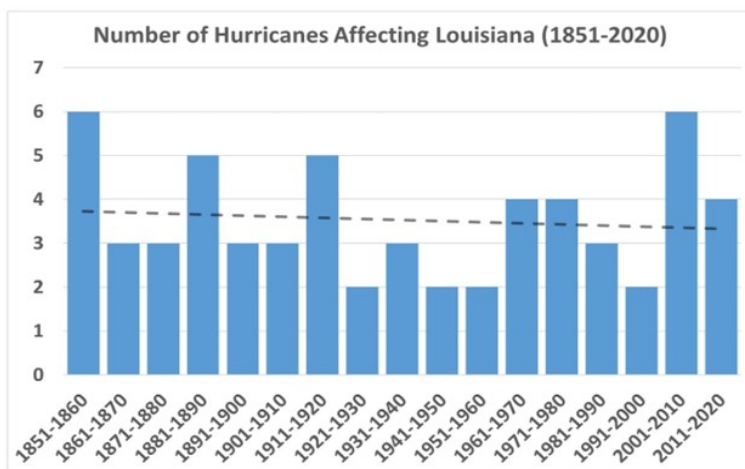
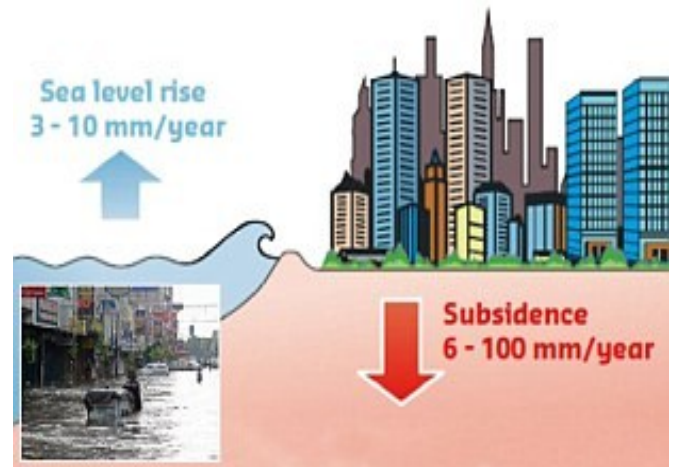
Moving down the coast to Florida, that state's assessment concludes overall that climate change is not damaging the state. The observed number of very hot days (over 95 F) since 1900 has not increased and perhaps declined very slightly.



The frequency of land falling hurricanes per year since 1851 has varied from zero to three with perhaps a very slightly declining trend.

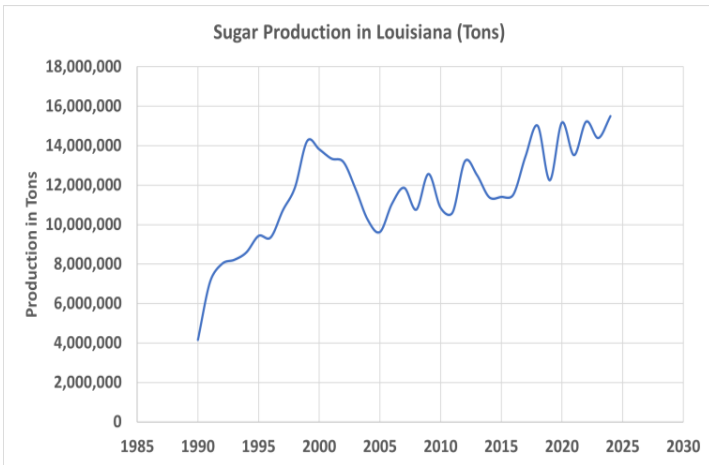
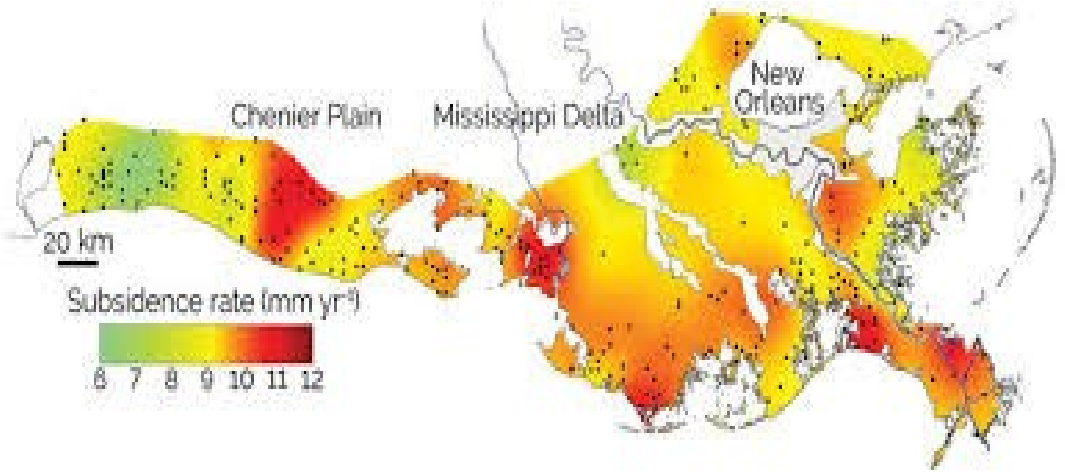


Sea levels are a major concern due to subsidence. In a number of areas, particularly Tampa, subsidence greatly exceeds the rate at which the sea is actually rising. Subsidence in Florida is commonly caused by groundwater extraction, particularly where there is urban development along the coast. The problem varies significantly from one place to another in Florida. Overall the problem is caused much more by urban development than by climate change.



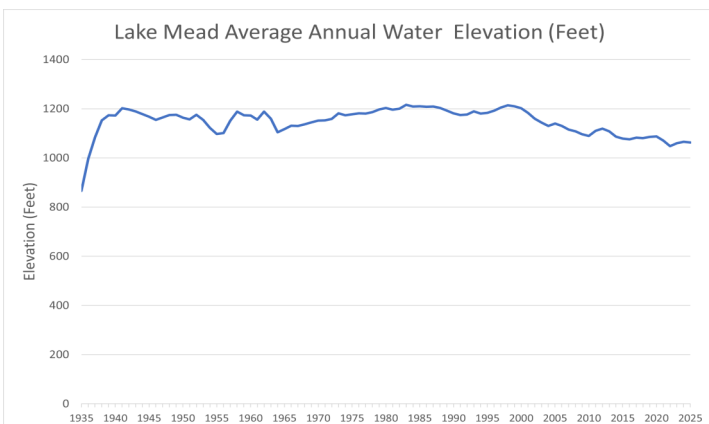
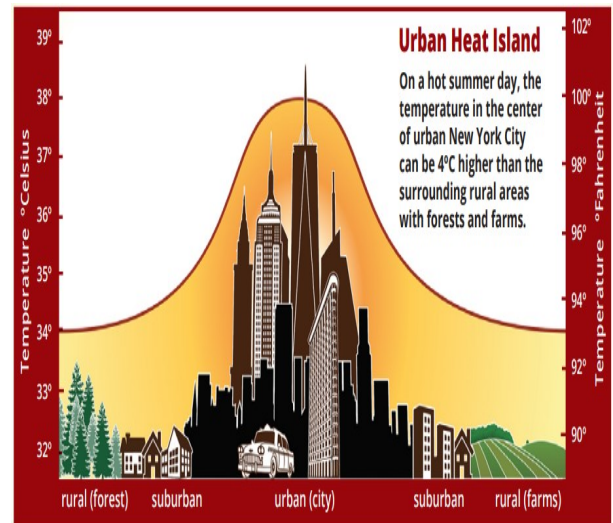
Louisiana is another state exposed to hurricanes, and to temperature and sea level rises. But the long term trend in hurricanes affecting the state is down, and the number of very hot days has "significantly decreased" since the first half of the 20th century.

Louisiana has the highest rate of relative sea level rise in the US, due primarily to the high level of land subsidence. According to the assessment, the amount of subsidence “swamps” actual sea level rise.



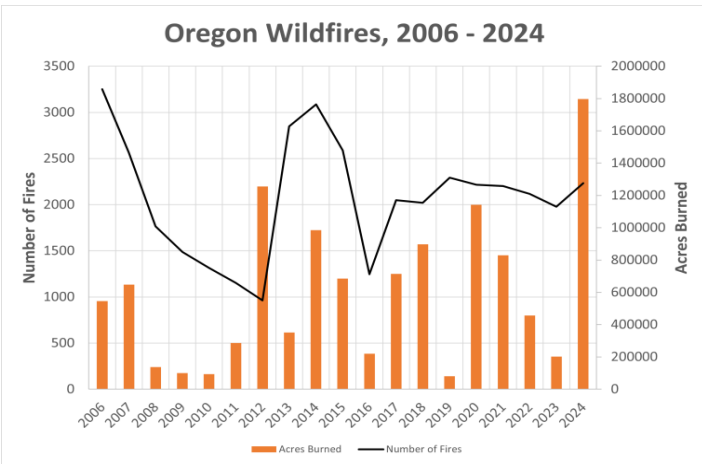
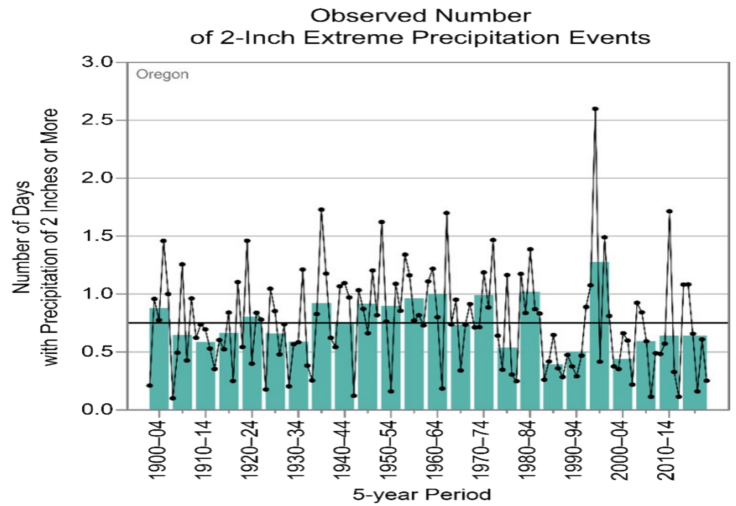
Louisiana has had a huge increase in sugar production, and the production of rice, its other major crop, has also increased. The Louisiana assessment concludes that, overall, climate change may be benefitting the state, because of the increase in agricultural production.

Arizona is a desert state and, as such, faces challenges from heat and water scarcity. Temperatures have risen 2.5 F (1.4 C) since 1900 with both daytime and nighttime temperatures increasing. A “large amount” of the warming, particularly at night, can be attributed to the Urban Heat Island Effect. Desert cities like Phoenix can have temperatures 10-15 F higher than nearby rural areas. The contribution of this effect to global measured temperature rises is greatly debated with the IPCC taking the position that the effect is minimal, but there are a number of studies showing the effect to be significant.



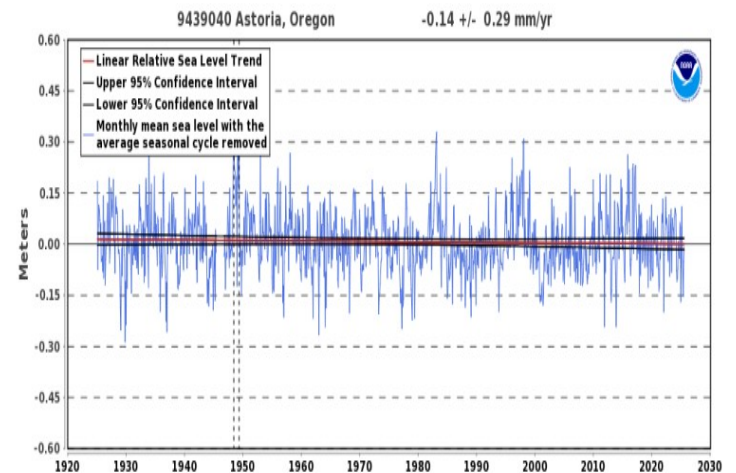
Rapid increases in population have placed pressure on water resources. The water level in Lake Mead has declined significantly over the last 25 years. The “most important factor” behind this decline is the rapid and large increase in populations drawing water from the Colorado River system. Note that the level was significantly lower during the heat extremes of the 1930s. Crop production in Arizona remains stable.

On the West coast there are no assessments for California or Washington. The Oregon assessment finds that Oregon has experienced “modest” temperature increases. A slight decrease in below-zero nights has resulted in fewer overall temperature-related deaths. Precipitation is variable but shows no long term trend. Extreme precipitation events (2" or more per storm) are shown in the graph and have, if anything, slightly declined since 1900. Major agricultural products have experienced improved yields.



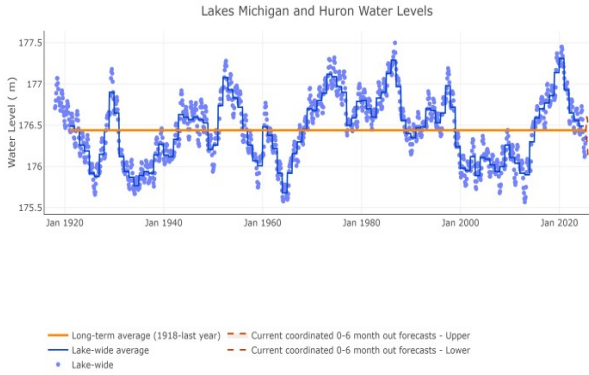
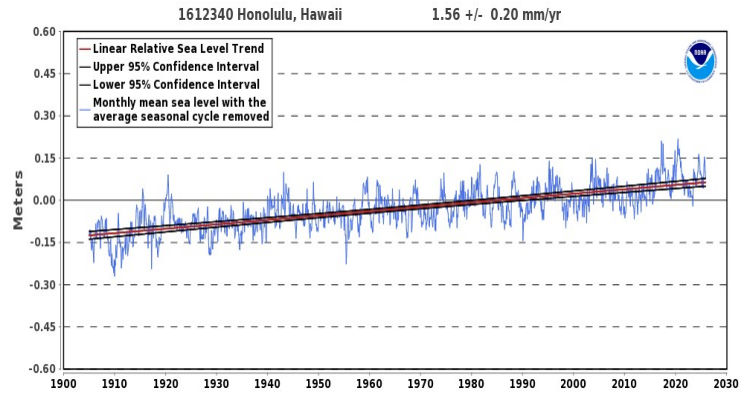
Oregon is prone to wildfires. Both the number of fires and the area burned have shown tremendous variability from year to year with no apparent trend upwards or downwards. Worldwide wildfires are down, but they are up on the US West coast, particularly in California. (See CliSciPol science topic: Wildfires)

In general, Oregon has had “modest” relative sea level rise, and some coastal areas, such as Astoria on the Northern coast, show relative sea level declining slightly, because the land is rising faster than the sea.



This image provides one example of the media misrepresentation of climate change science. These commonly occur. Public perception of climate change is inevitably affected by such reporting.

The actual data shows that the rate of sea level rise at Honolulu from 1905 to 2025 has been only 1.56 mm/yr, which equals 6.2" per century. with no indication that the rate is increasing. This rate of 6.2" per century is less than the world average (about 8" per century) and significantly less than the Boston rate (11.3" per century).



Wisconsin's climate was discussed in the prior newsletter based on a newly-released assessment. A second, earlier assessment adds that Wisconsin is highly dependent on the Great Lakes for water. The assessment concludes (as shown) that water levels in Lakes Michigan and Huron have cycled significantly since 1920, but that there is no long-term trend either up or down. Lake Superior's water level has remained far more stable and with no long-term trend. Agricultural production in the state has been increasing.

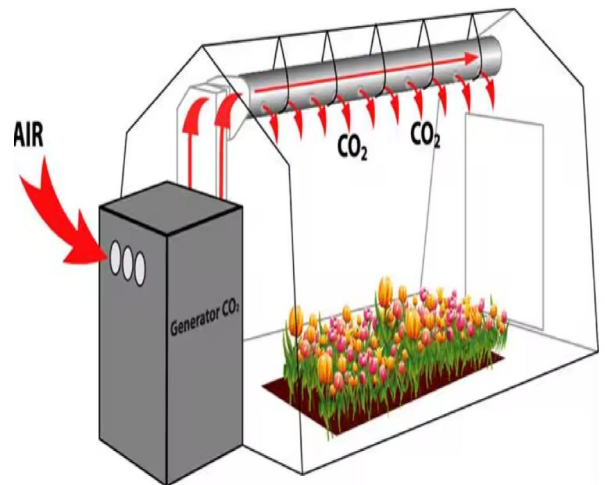
CONCLUSION

Consideration of various US state climate assessments shows, in general, mild warming that has been benefitting agriculture. There have been reductions in cold extremes and no significant increases in hot extremes. As a result there has been a reduction in temperature-related deaths. Relative sea level rise for coastal states is modest except in areas that are experiencing large land subsidence. But Charleston is a rare example of a city where modest sea level rises over centuries have been ignored and are now finally causing problems of increasing severity. (See CliSciPol Policy Topic: Coastal Cities Exposure)

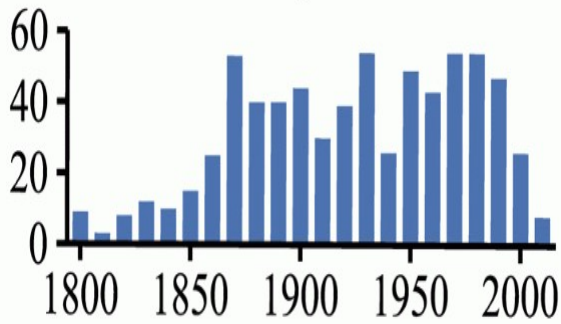
Overall, no general issues emerge, such as with hurricanes, wildfires, or drought, although particular states are experiencing problems. For example, California has a wildfire problem and the states of the Colorado River Basin face shortages of fresh water. But climate change is not a significant cause of such problems, and human activities other than greenhouse gas emissions are clearly major causes. Such other human activities include urbanization, forest mismanagement, habitat destruction, and ground water depletion.

Greening World - Grapes

A recent article has summarized 22 studies from 2001 to 2020 on the effect of rising CO2 levels on the growth of grape vines. Collectively these studies suggest that an increase of around 300 ppm of CO2 above today's level of 430 ppm will boost growth by over 70%, and one study concluded that an addition of 600 ppm (to 1030 ppm) would boost growth by 125%. Commercial greenhouses use CO2 generators to raise the CO2 levels. Such greenhouses usually operate with CO2 in the range of 1000-1500 ppm, roughly three times the concentration presently in the atmosphere. (See CliSciPol Science Topic: Greening World).



All species



Cold, not heat, is the great killer of living things. Just as mild warming is helping cause global greening, mild warming may be beneficial for birds and other animals. A recent study followed a colony of 17,000 King penguins for 24 years, and found that, due to the mild warming, the penguins were breeding 19 days earlier than before, which resulted in greater success rates for chick survival.



Among the approximately 16,000 new species described every year, roughly 6,000 are insects. Pictured here is a lanternfly from India.

Meanwhile scientists continue to discover and describe roughly 16,000 new species every year, including this lanternfly from India. Of the 16,000 new species, roughly 6,000 are insects. To date 1.1 million insect species have been identified. A common estimate is that there are another roughly 5 million insect species that have not yet been identified, and one scientist has estimated more than three times that number. The current rate of extinction (all species) is about 10 species per year.

Winter Storms - Electricity Reliability

Winter storm Fern hit large areas of the US January 23-27, 2026, severely testing the reliability of the electricity grids in the affected states. During winter storms, which commonly last for days, wind and solar generation typically falls to very low levels. During Fern states were saved from serious blackouts by the ability of coal-fired plants to ramp up to meet the need for electricity as wind and solar production fell to almost nothing. In the Midwest coal provided 40% of the power and in the Eastern states 24%. For the foreseeable future US grids can not provide reliable power without coal.



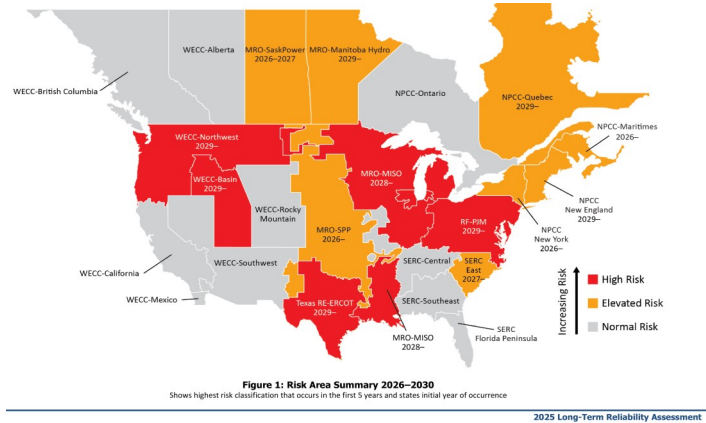
Extinctions

A recent study analyzed the 912 extinctions that have been identified over the last 500 years. It found that the rate of extinction has fallen since the 1930s, as shown. Most extinctions have occurred on isolated islands (such as Hawaii) and were due to invasive species brought by humans, such as rats. For continental extinctions the principal cause has been habitat destruction. The study could find no evidence that climate change was increasing the rate of extinction. (See CliSciPol Science Topic: Extinctions)



Fern has been described as “mild” in comparison to Uri, which hit primarily Texas Feb. 13-17, 2021. The resulting blackout left more than 4.5 million people without power. 246 people died, and damages were estimated to be \$80-130 billion

The government agency with oversight responsibility for electric grid reliability currently estimates that nearly half of the US is at “high risk” of electricity shortages through 2030. New England has an “elevated risk.” This is due primarily to fossil fuel and nuclear power plants having been shut down before compensating wind and solar projects have actually been built.



Fern and previous winter storms have demonstrated that wind and solar are not reliable sources of electricity during such storms. Advocates of wind and solar propose battery back-up to provide reliability. But grid-size battery back-up projects can provide substantial power for only a few hours. One of the world’s largest “super battery” projects, shown here, is being built in Waratah, Australia. It will cost about \$1 billion, and the batteries are rated at 850 MW/1680 MWh, which means, at best, they can deliver 850 MW of power for 2 hours, or 425 MW for 4 hours before going dead.

Conclusion

In November, 2025, while undergoing testing before the Waratah project actually became operational, one of the main transformers suffered a “catastrophic” failure. It is unclear when the project will be able to start regular operation. One article comments that this failure “throws coal-to-renewables transition into disarray.” There never has been a demonstration project showing that grid-scale battery backup projects reliably work over a reasonable period of time. With present technology such projects can provide back-up power for at most a few hours, which is nowhere near enough to provide the back-up power needed during major US winter storms, which last for days.

