Current Climate Change Policy Analysis

Alachua County, City of Gainesville, and Gainesville Regional Utilities

Purpose

The following summary of policies, programs, and projects that address the regional impacts of anthropogenic climate change was prepared by the Citizen Climate Advisory Committee (CCAC) for the elected leaders, staff, and residents of Alachua County and the City of Gainesville. Our goal is to provide a concise overview of climate change-related initiatives already in-place or in-the-works in our community in order to:

1. Highlight the areas in which the County, City, and GRU are excelling in shaping our community to be more resilient and sustainable in the face of climate change
2. Identify areas in which more work is needed
3. Facilitate enhanced cross-jurisdictional collaboration by allowing leaders within the County, City, and GRU to identify opportunities for synergy
4. Enable awareness of, participation in, and advocacy for these and future initiatives by members of our community

Methodology

A survey requesting information about the aforementioned initiatives was prepared by the Chair of the CCAC and distributed to Alachua County, City of Gainesville, and Gainesville Regional Utilities (GRU) staff by the liaisons to the CCAC of these jurisdictions. The survey was provided in the Fall of 2021, and the results were compiled in this document by the CCAC Chair during the Spring of 2022.

The current Chair of the CCAC, Megan D. Walker, is an American Meteorological Society Certified Consulting Meteorologist who runs an active weather and climate consultancy and whose educational background and professional experience in the atmospheric sciences includes evaluation of regional climate change impacts and extreme weather. Ms. Walker prepared the survey based on a qualitative assessment of anticipated climatic changes and subsequent community impacts that will or may affect Alachua County over the coming decades.

The list of regional climatic changes was compiled via review of both the peer-reviewed literature as well as official government agency publications. Only those climatic changes that the science supports as having a medium-to-high probability of occurring in north-central Florida during the 21st century were included. Those changes were then considered the context of how we live, work, move, and play in Alachua County to assess the resultant societal and environmental impacts to our communities.

The list of anticipated climatic changes and resultant community impacts was provided to all members of the CCAC for their consideration, review, and contribution.

This list of impacts was then organized by the primary sector affected: Natural Ecosystems, Agriculture and Food Security, Transportation, Energy, the Built Environment (Housing, Buildings, Infrastructure, Planning), Water, Public Health, and Critical Infrastructure/Key Resources (CIKR). The vast majority of these impacts affect multiple sectors, but for the sake of survey organization, they were presented within the sector deemed to be most significantly affected (i.e. the "primary sector").

The results of this survey are summarized and presented below using the same organizational structure. Within each primary sector, existing and upcoming (planned and/or proposed) initiatives are listed for each jurisdiction and labeled with the impact or concern to which they most directly relate. Categories are intentionally left blank where no initiatives were provided by the responding jurisdictions.

Background information, including the aforementioned lists of anticipated climatic changes and societal impacts, is provided at the end of this document.

Survey Results

Natural Ecosystems Initiatives

Alachua County

Existing:

- Wetlands: Code requires protection of all wetlands in unincorporated areas of County with minimum buffer standards (Countywide Wetland Protection Code)
- Sensitive & Protected Ecosystems: Code requires protection of upland habitat, significant geologic features, & strategic ecosystems in unincorporated areas of County (Countywide Natural Resources Protection Code)
- Invasive Species: Program to control Cogon grass on County ROWs
- Invasive Species: Exotic/invasive plant control on County preserves

Upcoming:

- Vulnerability Analysis: assessment of the impacts of ACC on critical infrastructure, natural systems, neighborhoods, and agriculture

City of Gainesville

Existing:

Upcoming:

- Invasive Species: Surveys of invasive species in transportation corridors (Urban Forest Management Plan)

- Wildfires: Development of a prescribed fire and fire management program for all nature parks (Urban Forest Management Plan)

GRU

Existing:

- Wetlands: Sweetwater Wetlands uses highly treated reclaimed water to restore natural ecosystems & recharge the aquifer

Upcoming:

- Wetlands: Designing and constructing a groundwater recharge wetland to further increase aquifer recharge

Agricultural and Food Security Initiatives

Alachua County

Existing:

Upcoming:

- Vulnerability Analysis: assessment includes the impacts of ACC on agriculture

City of Gainesville

Existing:

Upcoming:

GRU

Existing:

Upcoming:

Transportation Initiatives

Alachua County

Existing:

- Transit Demand: Mixed-use development incentives to reduce number & length of vehicle trips, and increase bus, bike, & pedestrian transportation modes (Multi-Modal Transportation Policies)

Upcoming:

- Vulnerability Analysis: assessment includes the impacts of ACC on critical infrastructure & neighborhoods

City of Gainesville

Existing:

- Street Flooding: Level of Service requires local road storm systems be sized to address 10-yr rainfall events (Engineering Design & Construction Manual)

Upcoming:

- Street Flooding: Participation in FloodWise Communities, which includes a self-guided vulnerability study

- Urban Heat Island Effect: Implement design standards that support healthy trees to provide >40% shade cover to the multi-modal transportation network (Urban Forest Management Plan)

GRU

Existing:

Upcoming:

Energy Initiatives

Alachua County

Existing:

Upcoming:

- Vulnerability Analysis: assessment includes the impacts of ACC on critical infrastructure & neighborhoods
- Energy Costs and Use: Review of comprehensive plan policies regarding solar, including ideal sites, incentives for adoption, and equity
- Energy Costs and Use: Grant program to fund energy efficiency upgrades in low-income rental housing (Energy Efficiency & Affordable Housing Grant Program)

City of Gainesville

Existing:

- Energy Costs and Use: Minimum energy efficiency standards for residential rental units (Rental Housing Ordinance, effective 10/01/2021)

Upcoming:

- Energy Costs and Use: Partnership with Community Weatherization Coalition (provision of financial support), thereby allowing for expansion of CWC to additional homes and renters (GCRA)
- Energy Costs and Use: Use of landscape/vegetative shading to reduce heat island effect via requirement that all new commercial/industrial landscape designs meet LEED certification standards (Urban Forest Management Plan)
- Energy Costs and Use: Develop training & educational materials for homeowners regarding proper placement of trees around the home to reduce heat loading and energy use, with goal of 10% net energy savings (Urban Forest Management Plan)

GRU

Existing:

- Energy Use: Current overcapacity on electric generation will be able to absorb increases in energy demand of the next decade
- Energy Use: Combination of improved efficiencies & low population growth has actually reduced GRU's peak demand. Annual electric consumption has been relatively flat over the past decade.

Upcoming:

- Energy Use: Integrated Resource Plan (IRP) projects future consumer demand and GRU's ability to serve that load (next IRP late 2022/early 2023)
- Energy Cost: Given generation overcapacity, risk of increased cost/kWh comes from lower consumption, not higher consumption. 90% of GRU costs are fixed, so higher consumption reduces the per-unit cost. (Note: This actually creates an economic incentive to *increase* electricity consumption in order to increase the financial security of our regional utility.)

Built Environment Initiatives

Alachua County

Existing:

- Housing Demand: Mandate to provide adequate area for residential development for projected 20-yr population growth (Note: unconfirmed whether this projection includes estimation of the effects of anthropogenic climate change – e.g. in-migration from coastal areas – on local population growth) (Comprehensive Plan Future Land Use Map & Residential Policies)
- Urban Heat Island Effect: Code requirement addresses tree canopy for developments, parking lots, & roads (County and City tree codes)

Upcoming:

- Vulnerability Analysis: assessment includes the flooding-related impacts of ACC on critical infrastructure & neighborhoods

City of Gainesville

Existing:

- Urban Heat Island Effect: Reduce urban heat island effect via tree plantings in ROWs, City facilities, and parks - min of 400/yr, although 800+ planted in 2020 (Tree Planting Program)
- Storm Water Infrastructure and Flooding: Design & performance standards for control of storm water runoff, conservation & improvement of surface waters, and floodplain elevations for 100-yr events (Note: the climate period used for estimation of 100-yr events is unconfirmed, but likely does not assess future climate and flood risk) (Engineering Design & Construction Manual)
- Storm Damage: System-wide assessments performed after named storm events, with funding associated with declarations of emergency routinely applied for to fund larger repairs (Emergency Operations)

Upcoming:

- Urban Heat Island Effect: Development of a canopy cover monitoring program to address requirement of no net loss of canopy coverage (Urban Forest Management Plan)
- Urban Heat Island Effect: Prepare code amendment that requires all RFPs for landscape design in public parks address the reduction of urban heat loading (Urban Forest Management Plan)

- Flooding: Performance of a self-guided vulnerability study to assess the City's storm water system in the context of changing climate & weather patterns – anticipated performance, adaptive capacity, and vulnerable areas (participation in FloodWise Communities program)
- Storm Damage: Conduct a tree risk assessment of all trees in high use areas with goal of reducing the risk of property damage or personal injury (Urban Forest Management Plan)

GRU

Existing:

- Storm Damage: Recovery of significant reimbursements from FEMA for storm-related repair costs
- Storm Water Infrastructure and Flooding: Programs to assess, upgrade, and replace aging water and wastewater infrastructure to increase resiliency with regards to extreme weather events, with a goal of being more proactive and less reactive. Actively seeking federal & state cost-share grant funding to assist in these efforts.

Upcoming:

Water Initiatives

Alachua County

Existing:

- Pollutants, Fertilizer, & Pesticide Runoff: Code limits the use of landscape fertilizer to spring growing season (Mar – Jun), requires 50% slow release nitrogen, and prohibits phosphorus (Water Wise Landscaping – Water Quality Code)
- Irrigation: Code requires landscape irrigation systems meet design standards, be reviewed prior to installation, and limits the amount of irrigated area on developments; irrigation restrictions limit irrigation to 1-2 days/wk (Countywide Irrigation Code)

Upcoming:

- Vulnerability Analysis: assessment includes the water-related impacts of ACC on critical infrastructure, neighborhoods, natural systems, and agriculture
- Irrigation: Seeking authority from the water management districts to limit irrigation to 1 day/wk, year-round

City of Gainesville

Existing:

Upcoming:

- Pollutants, Fertilizer, & Pesticide Runoff: Development & implementation of inter-governmental strategic plan to incorporate green infrastructure into City's storm water & water conservation programs (Urban Forest Management Plan)

- Irrigation: Increased communication and support for community garden program, including installation of drip irrigation (Community Garden Program)

GRU

Existing:

- Water Use: GRU customers have cut their water use by 25% since 2001
- Water Use: GRU customers' residential water use is 30% below the regional average (59 gal/person/day vs 85 gal/person/day)
- Water Use: All wastewater is treated & either returned to the aquifer or used to offset the amount of water GRU pumps to serve customers
- Water Use: Educate customers about the importance of conserving water & abiding by local watering restrictions
- Water Use: Commitment to maintaining consumptive use permit allocation at similar rate since 2001
- Water Cost: Implementation of a conservation rate structure in the third water tier to discourage irrigation use. GRU provides the first tier of water at a discounted price to ensure drinking water is available to all customers. Tier 2 is provided at cost. Tier 3 is set at a higher rate to subsidize the first tier and discourage irrigation

Upcoming:

- Water Use: Partnerships with Alachua Co EPD and UF to promote, evaluate, and tailor innovative water conservation strategies to specific communities (e.g. H20SAV)

Public Health Initiatives

Alachua County

Existing:

Upcoming:

City of Gainesville

Existing:

Upcoming:

GRU

Existing:

Upcoming:

Critical Infrastructure/Key Resources Initiatives

Alachua County

Existing:

- Cascading Failures: Vulnerability of infrastructure & facilities is generally identified by the responsible agency and ranked through the LMS Committee (Local Mitigation Strategy)

Upcoming:

- Vulnerability Analysis: assessment includes the flooding-related impacts of ACC on critical infrastructure

City of Gainesville

Existing:

- Cascading Failures: Vulnerability of infrastructure & facilities is generally identified by the responsible agency and ranked through the LMS Committee (Local Mitigation Strategy)

Upcoming:

- Cascading Failures: The scoring/ranking of projects assessed via the Local Mitigation Strategy may potentially be changed (Local Mitigation Strategy)
- CIKR Hardening: Use of FEMA BRIC funding to increase building & infrastructure resiliency (BRIC Program)
- CIKR Hardening: Adding additional criteria for Critical Facilities into newest EDCM (Engineering Design & Construction Manual)
- CIKR Hardening: Utilization of rapid, mobile risk assessment surveys to ID hazardous trees for removal, with emphasis on emergency and evacuation routes (Urban Forest Management Plan)

GRU

Existing:

- CIKR Hardening: Acquisition of funding from FEMA & other federal agencies for system hardening
- CIKR Hardening: High-proportion of underground electric lines (60%) where practical, avoiding undergrounding lines in flood-prone areas
- CIKR Hardening: Location of GRU's Murphree Wellfield in 7,100 acres of conservation land with clay layers protects the local groundwater supply from contamination
- CIKR Hardening: Electric generation system is built with redundancies and alternate options (e.g. biomass, solar, landfill gas, natural gas, coal, & fuel oil), including converting Deerhaven to dual-fuel (coal + NG) operation
- CIKR Hardening: GRU can islandize its generation or supplement it with external power purchases
- CIKR Hardening: Water resources are in excess of planned usage
- CIKR Hardening: Water & wastewater resources are being upgraded through systemic rehabilitation, including underground piping, pumping systems, & treatment processes
- CIKR Hardening: Water supply system is built with redundancies. Murphree Water Plant can be supplied with power from multiple sources, multiple circuits and/or onsite emergency back-up generators

- CIKR Hardening: Permanent onsite back-up generators are maintained at critical wastewater pump stations; a fleet of portable generators provide resiliency to the wastewater collection system during storm events

Upcoming:

- Vulnerability Assessment: GRU working with Public Works to conduct flood vulnerability assessment & develop flood mitigation plan to protect utility-related CIKR. The mitigation plan will ID infrastructure improvement projects & will be leveraged to secure state and federal cost-share grant funding.

Other Initiatives

Alachua County

Existing:

- Solid Waste Management: strategies and programs designed to promote reduce, reuse, & recycling activities in Alachua County. Report scheduled to be presented to County & City Commissions in September 2021 (Zero Waste Strategy Report)

Upcoming:

- Solid Waste Management: specific projects to be developed from Zero Waste Strategy Report

City of Gainesville

Existing:

Upcoming:

- GHG Emissions Assessment: Performance of Greenhouse Gas Inventory to inform reduction of greenhouse gas emissions
- Solid Waste Management: City is contemplating changes to its solid waste ordinance to address food waste, reuse, building C&D, and commercial & multifamily recycling (Zero Waste Ordinances)
- Solid Waste Management: Internal policies being developed to require greener purchasing, reduced use of single-use-plastics, & expand waste diversion (Zero Waste Policies)
- Solid Waste Management: Bidding the City-wide waste services contract to include carts for recycling, low- or no-emissions vehicles, & more uniform multifamily recycling (Solid Waste Collection Contract)

GRU

Existing:

Upcoming:

Reference Information

Anticipated Climatic or Climate-Related Changes Affecting North-Central Florida

- Increasing temperatures (nighttime and daytime)
- Intensification of the hydrologic cycle (local storms and tropical cyclones)
- Sea level rise (will have indirect effects in Alachua County, e.g. due to saltwater intrusion of the aquifer and in-migration of coastal populations)
- Increasing risk of compound extreme events

Anticipated Adverse Societal and Environmental Impacts

Increasing Temperatures

- **Societally Relevant Effect:** increasingly frequent, dangerously high temperatures and heat indices during the day & increasingly frequent, warm nights (i.e. does not cool off at night). Note: overnight low temperatures are increasing faster than daytime high temperatures.
    - **Adverse Impact:** potential heat stress & heat stroke for people who work outside
        - **Sectors**: public health
    - **Adverse Impact:** increased energy use due to increased air conditioning load (increased cooling degree days)
        - **Sectors:** energy, built environment
    - **Adverse Impact:** increased utility costs to low-income residents due to increased air condition load
        - **Sectors:** energy, built environment, public health
    - **Adverse Impact:** people will be less inclined or less able to use non-vehicular modes of transportation (e.g. walking, biking)
        - **Sectors:** transportation, public health
    - **Adverse Impact:** heat stress in livestock
        - **Sectors:** agriculture
    - **Adverse Impact:** increased urban heat island effect
        - **Sectors:** public health, energy, water, built environment
- **Societally Relevant Effect:** changes to the growing season & hardiness zones (increasing number of warm nights and hot days)
    - **Adverse Impact:** some agricultural products that are currently suitable to be grown in Alachua County may no longer be suitable or may have a shortened growing season
        - **Sectors:** agriculture
    - **Adverse Impact:** some native, wild species may suffer if they are not adaptable to the new temperature regime (ecosystem shift)
        - **Sectors:** ecosystems
    - **Adverse Impact:** invasive species range expansion (e.g. tropical species from farther south moving into north-central FL – ecosystem shift)
        - **Sectors:** ecosystems

    - **Adverse Impact:** potential for additional or enhanced pest & "weed" activity, especially during the shoulder/transition seasons, resulting in additional pesticide & herbicide use and possible negative impacts on pollinators
        - **Sectors:** agriculture, ecosystems
    - **Adverse Impact:** potential impacts on wetlands (flood prevention, wildlife habitat)
        - **Sectors:** ecosystems, CIKR, built environment
- **Societally Relevant Effect:** expansion of vector-borne diseases (spatially and temporally)
    - **Adverse Impact:** enhanced threat from Aedes aegypti-borne diseases (dengue, chikungunya, and Zika)
        - **Sectors:** public health
- **Societally Relevant Effect:** worsening air quality
    - **Adverse Impact:** increased emissions from internal combustion vehicles (running A/C, not using non-vehicular forms of transit due to heat)
        - **Sectors:** public health, transportation
    - **Adverse Impact:** increased emissions from power plants under increased cooling demand
        - **Sectors:** public health, energy
    - **Adverse Impact:** expansion of pollen season
        - **Sectors:** public health
    - **Adverse Impact:** potential expansion or intensification of wildfire season
        - **Sectors:** ecosystems, agriculture, public health, built environment, transportation, CIKR
    - **Adverse Impact:** potential increase in ground-level ozone under warmer conditions, especially if precipitation patterns shift to provide a longer season with warm & dry weather
        - **Sectors:** public health
- **Societally Relevant Effect:** potential reductions in soil moisture due to enhanced evapotranspiration under higher temperatures (may be offset by increases in precipitation)
    - **Adverse Impact:** increased need for irrigation for crops and landscaping (increased water use)
        - **Sectors:** water, agriculture, built environment
    - **Adverse Impact:** some native, wild species may suffer if they are not adaptable to the new soil moisture regime (ecosystem shift)
        - **Sectors:** ecosystems
    - **Adverse Impact:** invasive species range expansion (ecosystem shift)
        - **Sectors:** ecosystems

Intensification of the Hydrologic Cycle

- **Societally Relevant Effect:** more intense tropical cyclones producing heavier rainfall along their track (possibly also slowing of TC forward speed, possibly also increasing number of Atlantic TCs)

    - **Adverse Impact:** neighborhood (residential, commercial, industrial) flooding due to overwhelmed storm-water system; likely disproportionate in lower-income areas
        - **Sectors:** built environment, public health
    - **Adverse Impact:** street flooding – transportation disruptions
        - **Sectors:** transportation, built environment
    - **Adverse Impact:** pollutant run-off into surface- and ground-water
        - **Sectors:** water, public health, built environment
    - **Adverse Impact:** CIKR generally
        - **Sectors:** CIKR, built environment
- **Societally Relevant Effect:** more intense tropical cyclones producing damaging winds potentially over a larger area for a longer period of time (larger storm, slower storm motion)
    - **Adverse Impact:** power outages, especially over long periods of time, due to downed trees, branches, and power poles – residential, commercial, industrial
        - **Sectors:** energy, built environment, public health
    - **Adverse Impact:** CIKR generally (e.g. water treatment, health care, etc)
        - **Sectors:** CIKR, public health, built environment, water, energy
- **Societally Relevant Effect:** potentially more frequent and intense extreme rainfall events (data are consistent that this is already occurring throughout much of the SE US, but less consistent in FL specifically)
    - **Adverse Impact:** agricultural impacts – more rain coming in heavy events (more runoff) than in gentle, soaking rains with implications for irrigation needs and fertilizer runoff
        - **Sectors:** agriculture, water, public health
    - **Adverse Impact:** for multi-day extreme rainfall events, ecosystem and agricultural impacts from water-logged soil
        - **Sectors:** agriculture
    - **Adverse Impact:** same as for TC rain impacts
        - **Sectors:** built environment, public health, transportation, water
- **Societally Relevant Effect:** potentially more frequent and intense droughts
    - **Adverse Impact:** agricultural impacts, including crop loss and increased irrigation needs
        - **Sectors:** agriculture, water
    - **Adverse Impact:** increased wildfire activity
        - **Sectors:** ecosystems, agriculture, public health, built environment, transportation, CIKR
    - **Adverse Impact:** ecosystem shifts as less drought-tolerant species retreat/die off
        - **Sectors:** ecosystems
    - **Adverse Impact:** increased water usage for irrigation, with associated implications for water scarcity
        - **Sectors:** water, agriculture, built environment

Sea Level Rise

- **Societally Relevant Effect:** in-migration of coastal populations
  - **Adverse Impact:** increased housing demand
    - **Sectors:** built environment
  - **Adverse Impact:** increased transportation demand
    - **Sectors:** transportation, built environment
  - **Adverse Impact:** increased water demand
    - **Sectors:** water, built environment
  - **Adverse Impact:** increased energy demand
    - **Sectors:** energy, built environment
  - **Adverse Impact:** increased demand for municipal services
    - **Sectors:** built environment, CIKR, public health
  - **Adverse Impact:** increased need for local jobs
    - **Sectors:** built environment
- **Societally Relevant Effect:** salt-water intrusion into the aquifer
  - **Adverse Impact:** reduced fresh-water availability for the state as a whole, with consequent local impacts
    - **Sectors:** water, agriculture, public health, built environment

Compound Extreme Events

- **Societally Relevant Effect:** cascading infrastructure failure
  - **Adverse Impact:** traditional risk assessment and infrastructure design approaches usually consider only one driver in isolation, but under a climate change regime, extremes are more likely to occur simultaneously or in rapid succession, thereby interacting and multiplying the effect of any one driver/extreme
    - **Sectors:** energy, water, agriculture/food, ecosystems, built environment, transportation, public health, CIKR

Survey

Primary Sector	Concern/Vulnerability
Natural Ecosystems	
	shifts in wetlands (biodiversity & ecosystem svcs/flood protection) changes to silviculture (pests/disease, need for irrigation, etc) changes to sensitive/protected ecosystems (pests/diseases, climatic suitability, etc) invasive species expansion (flora & fauna) expansion and/or intensification of wildfire season/extent
Agricultural Compatibility	
	changing crop compatibility (temp & hydrologic cycle) more frequent crop failures due to erratic growing season weather conditions increased irrigation water use (due to higher temps, extreme precip, potentially more frequent droughts) increased pests/weeds/invasive species increased need for more fertilizer, pesticide, herbicide due to increased run-off during heavy rain events livestock heat stress increased food cost due to climatic changes impacting distant agricultural production regions (e.g. droughts in the CA Central Valley = decreased supply and increased cost for those crops imported to Alachua Co)
Transportation	
	public transit and non-vehicular transit vulnerable to disruption due to increased heat & storms increased transit demand (due to in-migration of population from the coasts) - impacts on RTA, bike/ped routes, and roads increased street flooding (due to increasingly heavy precip/storms)
Energy	
	increased energy demand due to: increased cooling demand due to hotter temps increased demand due to increasing population (in-migration from coasts) increased infrastructure repair costs due to storm-related damage increased energy costs to consumers (increased consumption & possibly increased price per unit)
Built Environment (Housing, Buildings, Infrastructure)	
	increased housing demand (due to in-migration from coasts) overwhelmed stormwater infrastructure due to increasing heavy/extreme rainfall increased demand for jobs, goods, & svcs (due to in-migration) increased urban heat island effect increased neighborhood flooding (residential, commercial, industrial) due to increasing heavy/extreme rainfall tree damage due to storms structural damage due to storms (private & public property) infrastructure damage due to storms (roads, stormwater system, power grid, etc)
Water	
	increased pollutant, fertilizer, & pesticide run-off into sfc and ground water (due to increasing heavy precip events & possible increased use of chemicals due to climate-related shifts in weather, pests, diseases, etc) increased water use due to: agriculture irrigation landscaping irrigation increasing population (in-migration) increased water costs to consumers (increased consumption & likely increased price per unit) - potable, irrigation reduced fresh-water availability due to salt-water intrusion of aquifer
Public Health	
	increased risk of heat stress & heat stroke for people who working outside for people using non-vehicular modes of transit for people without means or access to consistent air conditioning increase in respiratory ailments due to increased emissions from personal internal-combustion vehicles (running A/C, diverted from public or non-vehicular transit) vector-borne disease spread (e.g. Aedes aegypti) - increase in range and season expansion of pollen season increase in respiratory ailments due to expansion and/or intensification of wildfire season/extent potential increase in ground-level ozone
Critical Infrastructure/Key Resources (CIKR)	
	increased likelihood of cascading failures due to stressed, inter-connected systems (e.g. what happened during Hurricane Katrina and the OK/TX cold snap last year - one system fails, which causes another system to fail, which causes a third to fail, and so on) need to harden CIKR (power grid, water treatment, health care, emergency services, etc) against increasing risk of: flooding electricity outages water outages transportation disruptions possibly wildfires