

Local Government Planning and Climate Change

Planning and climate change action in Alaska



Department of Public Policy
and Administration

UNIVERSITY of ALASKA ANCHORAGE

Presenter: John Duffy, PhD, Dr. h.c., AICP, CM

Background



1. Professor with Department of Public Administration, University of Alaska, Anchorage
2. Research interests in local government climate related, sustainability, emergency response and resilience efforts
3. Over 30 years experience in local government
4. Have worked with local governments on climate mitigation and resilience building, both domestically and internationally
5. Have practical experience implementing climate related emergency response and mitigation practices

Outline

- I. Why should we care about local governments
- II. Local government planning powers and climate action
 - I. Planning powers
 - II. Relationship to climate action
- III. Alaska case study
- IV. Attributes related to “willingness” to act
- V. Questions

Why care about local governments?

- Because there are plenty of them...
 - Canada -- Ten provinces, 3 territories and more than 4,500 incorporated municipalities and local government districts
 - Europe -- 130,000 members in European Council of Municipalities and Regions
 - China – 31 provinces, 50 rural prefectures, 283 prefecture-level cities; 662 cities, 374 county-level cities, 852 county-level districts under the jurisdiction of nearby cities, and 1,636 counties, 43,258 township-level regions
 - South Africa -- Nine provinces and 279 municipalities
 - United States - 89,000 local governments, 50 states and 16 territories

Why care about local governments?



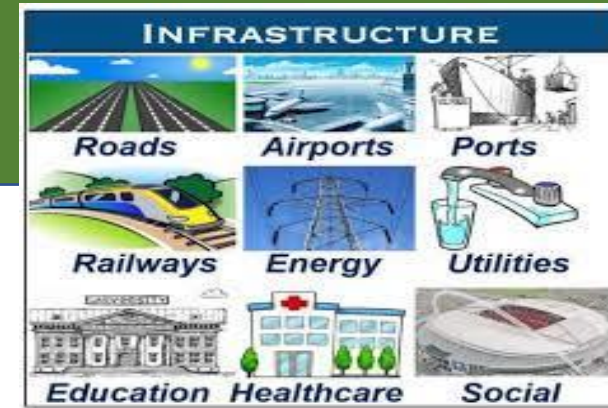
- Varied authorities and responsibilities
 - Primary implementors of national policies
 - 1st responders to extreme weather events, disasters

Why care about local governments?



- Varied authorities and responsibilities
 - Land use and land cover (a primary driver of climate change)
 - Planning (comprehensive, growth boundaries, trails)
 - Zoning (Euclidean, performance)
 - Building codes (structural, plumbing, electrical)
 - Both residential and commercial
 - Land subdivision (lot size, lot line, PUDs)
 - Stormwater management
 - Clean water and waste water management

Why care about local governments?



- Capital improvements (i.e., infrastructure)
- Education (funding)
- Proprietary activities (owner/operators-utilities, parking lots, buildings)
- Procurement (EPP)
- Emergency response (hazard identification, response, police)
- Health services
- Economic development and innovation

How important are local governments for addressing climate change?

The short answer:

- Local governments are crucial for addressing climate change
- In 1992 UN identified 2,509 actions to be taken to address climate change---of these actions, 1,681 require local governments

Planning tools of local governments for addressing climate change

Tools of Alaska local governments for addressing climate change

- Planning powers, policies and regulations
 - Comprehensive Plan
 - Functional Plan
 - Strategic Plan
 - Hazards Mitigation Plan
 - Capital Improvement Plan
 - Zoning Ordinance
 - Building codes

Available planning tools of Alaska local governments

➤ Planning powers, policies and regulations –

Comprehensive Plan

- A typical statutory requirement
- Describes the future, physical layout and design of community
 - Addresses the critical elements: land use, land cover, infrastructure and transportation
 - Long-term (20) year outlook

➤ Planning powers, policies and regulations –

Comprehensive Plan

- Lays the groundwork for climate mitigation, resilience and mitigation by addressing
 - Land cover decisions (the physical cover of land, e.g., forest, wetlands)
 - Land use decisions (for what purpose is the land is used, e.g., housing)
 - Managing urban (community) and related natural systems

➤ Planning documents –

Functional Plan(s)

- Addresses a specific topic / issue
 - Transportation, Climate Action
- Describes necessary actions to achieve goals
- Can design framework for climate mitigation, resilience and mitigation efforts

Actionable planning tools of local governments

➤ Planning documents –

Strategic Plan

- A document that lays out the strategies for achieving goals
- May include specific actions to address sustainability, climate risk and associated mitigations
 - Strengths, Weakness, Opportunities, Threat (SWOT) analysis
 - Environmental scan
 - Trend analyses
 - What are possible black swans?
 - What are the risks, changing probabilities?

Actionable planning tools of local governments

➤ Planning documents –

Hazards Mitigation Plan

- Provides opportunity to address climate related risks by management of potential disasters/emergencies
 - Creating mitigation measures
 - Building resiliency
- Necessary for obtaining Federal Emergency Management Agency financial disaster assistance in US

Planning tools of local governments

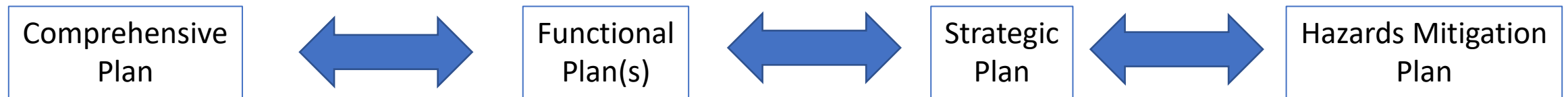
➤ Planning documents –

Zoning Ordinance, Building codes

- Implements (comprehensive) planning documents
- Describes what is allowed, what is not
- Describes how structures may be built
- Influences use of energy and emissions throughout community
- Have long lasting influence
- Provides major ability to address climate related risks

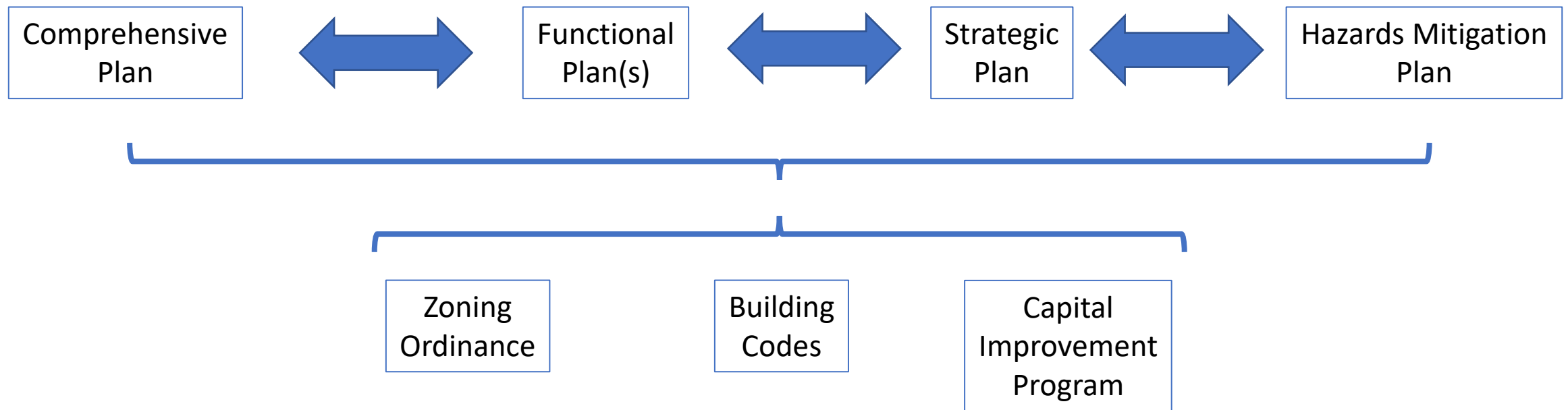
To make effective use of local government planning powers...

- Planning documents should be linked – speak to one another –



To make local government planning powers work...

- Planning documents should be linked – speak to one another – and should be implemented through the zoning ordinance, building codes and capital improvement program



But do these planning powers ‘work’ in the real world?

Planning and Urban Design – Use of natural, green coverage

- Singapore – The Garden City by the Bay
 - Green coverage in urbanized area has increased from 35% to 50% between 1986 and 2010 despite increased population and densification
 - Improved storm drainage,
 - Reduced urban heat island effects
 - Enhanced urban livability

Source: Zari, MacKinnon Varshney & Bakshi, 2022

Building Codes – Green roofs and green walls

- Allowing green roofs and green walls have been shown to save 85% and 48% cooling and heating needs, respectively
 - Athens, Greece has found that green walls have reduce wall surface temperatures 11⁰ C (F⁰)

Source: Zari, MacKinnon Varshney & Bakshi, 2022

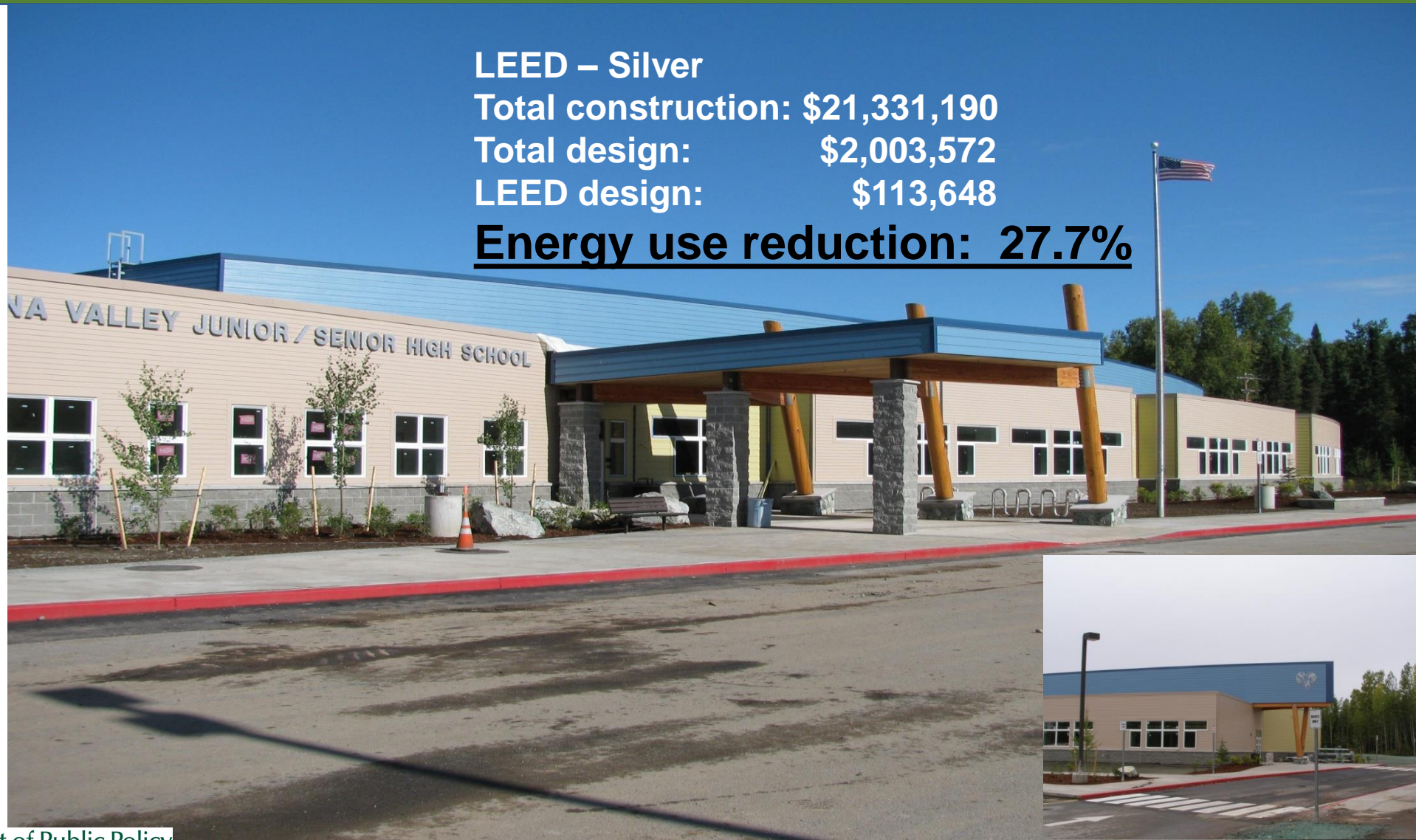
Linked plans, Zoning & Building Codes

A tale from two Portlands – Portland, Maine; Portland, Oregon (US)

- Changed zoning regulations
 - Allowing higher residential density
- Capital improvements
 - Additional trails and expanded light rail (Oregon)
- Payoffs to date:
 - Reduced CO₂ emissions by 19% (Oregon) and 34% (Maine)
 - Changing transportation related behaviors

Source: Bodin, 2021

Capital Improvements - Su Valley High School



LEED – Silver

Total construction: \$21,331,190

Total design: \$2,003,572

LEED design: \$113,648

Energy use reduction: 27.7%

Capital Improvements - Machetanz Elementary School



LEED – Silver

Total construction: \$17,349,683

Total design: \$1,336,248

LEED design: \$95,453

Energy use reduction: 33.8%



The Alaska experience ...

- We now know what the various planning powers are
- We have also seen what they can do

- So, what is the experience in Alaska?
- How have they used their planning powers to address climate change and sustainability?

The Alaska experience ...

- Study completed in 2015 — yet remains relevant
 - Analyzed planning documents have long “lives”; some 20+ years
 - Planning documents analyzed are still in use
- Presently completing research on Alaska local government financial capacity to address climate change and extreme events

Methods....

- Focused on local governments with populations between 10,000 and 50,000
 - This category represents largest group of local governments in US;
 - About 90% of all cities and about 60% of all counties have populations \leq 50,000

Methods....

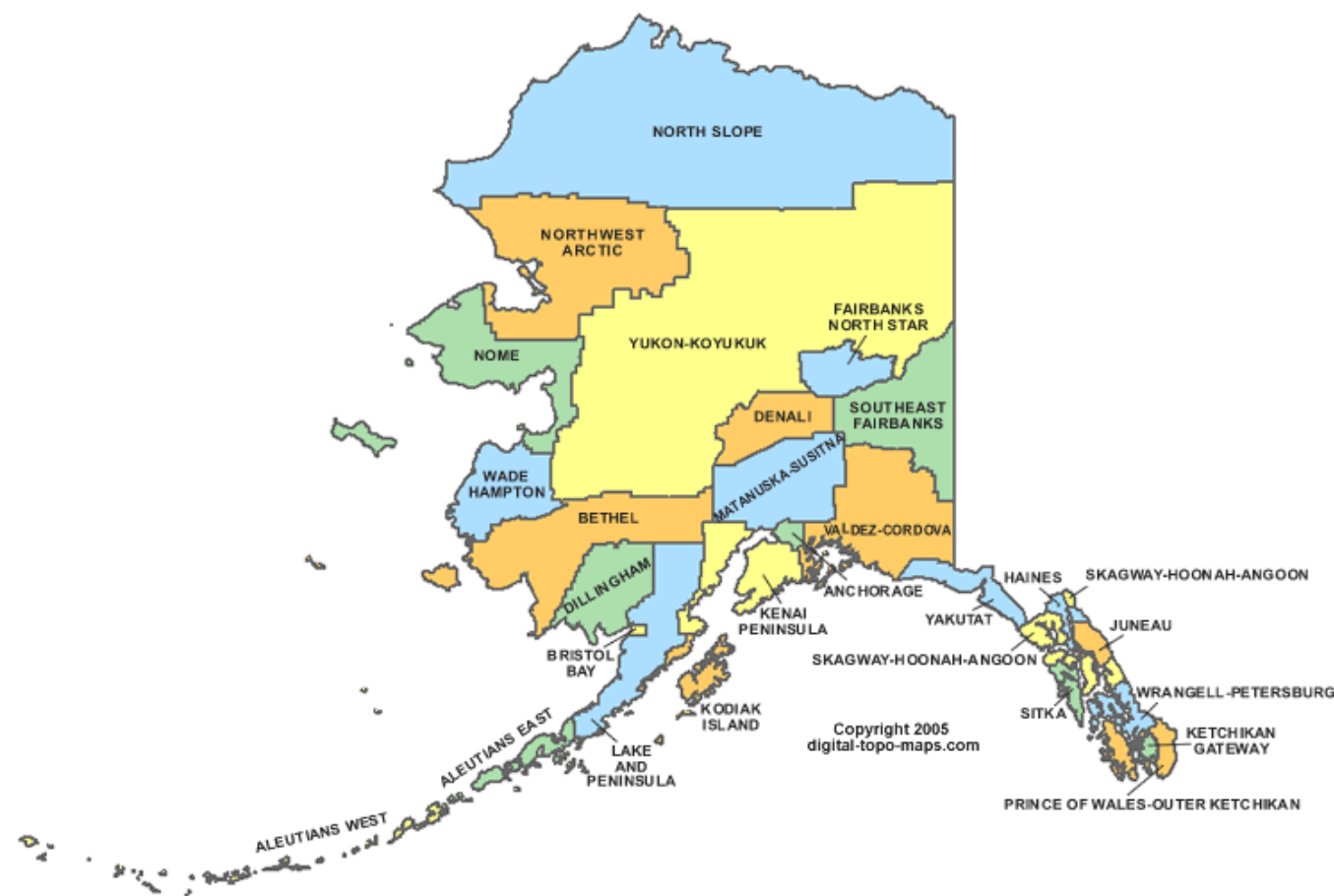
- Focused on local governments with populations between 10,000 and 50,000
 - Little is known about how local governments in this category operate
 - Most analyses have focused on local governments with populations exceeding 250,000; most are 500,000 and above
 - Local governments below 10,000 have fewer financial and organizational resources

Methods....

- Selected 6 local governments in Alaska
 - Boroughs which have the planning powers
 - Purposeful sampling to select boroughs
 - On and off road system
 - Located in Interior, Southcentral and Southeast regions

Sample....

- City and Borough of Juneau
- City and Borough of Sitka
- Ketchikan Gateway Borough
- Kenai Peninsula Borough
- Kodiak Island Borough
- Fairbanks North Star Borough



Methods....

- Reviewed 26 comprehensive plans that had been identified in the literature or via the snowball technique as local governments that have addressed climate change and/or sustainability
- Constructed coding sheets based on literature and contents of adopted plans

Jurisdiction	Plan Date
City of Berkley, CA	2009
City of Brooks, Canada	2010
City of Chicago, IL	2013
City of El Paso, TX	2009
City of Homer, AK	2007
City of Keene, NH	2007
City of Kingston, Canada	2010
City of Madison, WI	2011
City of Minneapolis, MN	2010
City of Peoria, AZ	2010
City of Saint Louis, MO	2013
City of San Francisco, CA	2002
City of Santa Fe, NM	2010
City of Santa Monica, CA	2006
County of Boulder, CO	2012
County of Buncombe, NC	2012
County of Carroll, MD	2010
County of Grand Prairie, Canada	2008
County of Huron, Canada	2011
County of Kane, IL	2013
County of Mecklenburg, NC	2012
County of Onondaga, NY	2012
County of Orange, FL	2014
County of Peoria, IL	2010
County of Scott, IL	2011
County of Strathcona, Canada	2009

Totals Plans	26	-
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Criteria for sustainability & climate change strategies – Comprehensive Plan

Category	Criteria
Goal/policy	<ol style="list-style-type: none"> 1. Sustainability identified as a goal/policy 2. Climate Change identified as a goal/policy 3. Resilience identified as a goal/policy
Plan process	<ol style="list-style-type: none"> 1. Assumptions contain references to: climate change, extreme weather, resource scarcity, food security, affordable housing, governance, or natural environment/ecosystem 2. Monitoring process described; performance measures used 3. Criteria for plan update
Public participation	<ol style="list-style-type: none"> 1. Policies addressing community engagement, public participation and involvement 2. Policies addressing governmental transparency
Sustainability & Climate change	<ol style="list-style-type: none"> 1. Recommendation for a separate Sustainability Plan 2. Recommendation for a separate Climate Action Plan
Economy	<ol style="list-style-type: none"> 1. Policies addressing workforce development (e.g., training, education) 2. Policies addressing local business retention and creation 3. Policies addressing non-preferred type of economic activity (industry/firm compatibility goals/standards) 4. Policies addressing revitalization 5. Policies addressing livable wages, minimum wages 6. Policies addressing poverty and low income
Land Use	<ol style="list-style-type: none"> 1. Policies addressing the conservation of ecologically valuable natural areas (e.g., wetlands, natural area connectivity and continuity, wildlife corridors, non-development zones) 2. Policies addressing native species use, tree planting, etc. 3. Policies addressing stormwater management 4. Policies addressing agricultural land preservation 5. Policies addressing open space

Disaster Resilience	<ol style="list-style-type: none"> 1. Policies addressing land development or redevelopment in high-risk zones 2. Policies addressing hazard mitigation and disaster preparedness 3. Policies protecting public infrastructure from hazards 4. Policies addressing building design and building codes to address hazards, e.g., special engineering reports, flexible piping, elevation 5. Policy(s) addressing reduced exposure and vulnerability to natural, human or technological disasters. 6. Policy stating sustainability as a means for improving disaster resilience made 7. Policies addressing climate change adaptation, e.g., design standards for docks (sea level rise) culverts and bridges (floods), drought (reservoirs, conservation), etc.
Housing	<ol style="list-style-type: none"> 1. Policies addressing affordable housing, homelessness
Transportation	<ol style="list-style-type: none"> 1. Policies addressing transportation management, e.g., TSM techniques, HOV lanes, car/van pooling 2. Policies addressing access and mobility, e.g., transit, bicycling, trails, sidewalks
Conservation	<ol style="list-style-type: none"> 1. Policies addressing energy efficiency and/or conservation 2. Policies addressing renewable energy (e.g., wind turbine permits/standards, solar envelope protection, etc.) 3. Policies addressing water conservation, e.g., water audits, low-flow showerheads/toilets, reuse 4. Policies addressing waste reduction, recycling, reuse
Health & Safety	<ol style="list-style-type: none"> 1. Policies addressing noise 2. Policies addressing light pollution 3. Policies addressing air quality, e.g., particulates, GHG emissions 4. Policies addressing water quality 5. Policies addressing community safety: traffic injuries, toxic/ hazardous materials location and handling 6. Policies addressing public health; teen pregnancy, obesity, heart disease, diabetics, sexually transmitted diseases, asthma 7. Policies addressing violent crime, e.g., community policing, homicide, rape, robbery, aggravated assault, domestic violence
Food security	<ol style="list-style-type: none"> 1. Policies addressing food security, e.g., farmers' markets, community gardens, home-based commercial agriculture

Criteria for sustainability & climate change strategies – Comprehensive Plan

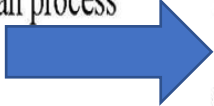

- Review criteria has a climate change and sustainability focus.
- The criteria is based on what the literature identified as important plan elements as well as what was found in local government plans that do address climate change and sustainability.



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Sustainability & Climate change	<ol style="list-style-type: none"> 1. Recommendation for a separate Sustainability Plan 2. Recommendation for a separate Climate Action Plan
Economy	<ol style="list-style-type: none"> 1. Policies addressing workforce development (e.g., training, education) 2. Policies addressing local business retention and creation 3. Policies addressing non-preferred type of economic activity (industry/firm compatibility goals/standards) 4. Policies addressing revitalization 5. Policies addressing livable wages, minimum wages 6. Policies addressing poverty and low income

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Criteria for sustainability and climate change standards – Zoning Ordinance

Category	Criteria
Land Use ★	<ol style="list-style-type: none"> Standards for protecting sensitive land forms (e.g., wetlands, forests, stream bank, riverbank, etc.) Standards for development in sensitive/hazardous zones Standards for non-development zones Standards for noxious weeds Standards addressing siting of hazardous materials handling, processing, manufacture Standards addressing maintenance or enhancement of natural vegetation including landscape standards Standards addressing green infrastructure, especially on-site management of stormwater Standards for cluster development/planned unit development Standards for open space Standards requiring a detailed assessment, analytical report, EA or EIS (or equivalent) analysis prior to "large-scale" development (other than destination resorts)
Disaster Resilience ★	<ol style="list-style-type: none"> Standards addressing extreme events (e.g., wind storms, earthquakes, wildland fires, other than floods)
Housing	<ol style="list-style-type: none"> Standards for affordable housing
Transportation	<ol style="list-style-type: none"> Standards/requirements for traffic impact analysis or transportation system impacts Standards addressing non-single occupied vehicle transport, e.g., bonus/incentives tied to public transit connectivity
Conservation	<ol style="list-style-type: none"> Standards addressing water conservation e.g., building codes - low flow toilets and showerheads, grey-water usage ★ Standards for solar access Standards addressing use and protection of renewable energy sources other than solar Standards for recycling Standards addressing energy use related to lighting (e.g., parking lot LEDs) Standards addressing energy use of buildings, includes LEED design
Health & Safety	<ol style="list-style-type: none"> Standards addressing light pollution Standards addressing noise pollution Standards for wood stoves (particulate pollution)
Food security	<ol style="list-style-type: none"> Standards addressing food production, especially in residential zones Standards addressing community gardens

Criteria for climate change and sustainability strategies – Hazards Mitigation Plan

Category	Criteria
Goal/policy ★	<ol style="list-style-type: none"> 1. Climate change/global warming acknowledged 2. Sustainability (a described role or goal) stated 3. Importance of resilience noted, e.g., building community resilience, economic resilience
Plan process ★	<ol style="list-style-type: none"> 1. Use of monitoring, performance measures
Land Use	<ol style="list-style-type: none"> 1. Acknowledgement of land use plans connection noted 2. Recommendations for land use plan made 3. Non development zone recommendation(s) made 4. Buy-out recommendations made 5. Building code recommendations made 6. Zoning recommendations made
Vulnerable population	<ol style="list-style-type: none"> 1. Vulnerable populations discussed 2. Sheltering discussion (other than note of sheltering sites)
Infrastructure	<ol style="list-style-type: none"> 1. Recommendation(s) to modify/revise infrastructure, physical plant 2. Recommendation for comprehensive review to modify/revise infrastructure designs
Conservation	<ol style="list-style-type: none"> 1. Energy security noted 2. Water conservation recommendation
Food security	<ol style="list-style-type: none"> 1. Food security noted

Methods...

Calculating scores...

- Used procedure employed by Lyles, Berke & Smith (2012)
- Binary scale, 0 or 1; 0 if key work or phrase not identified, 1 if so
- Modified...
 - Developed an ordinal scale
 - For Comprehensive and Hazards plan:
 - 0 if not stated
 - 1 if stated (e.g., build more affordable housing)
 - 2 if stated and expanded upon with direction given (e.g., build 150 affordable housing units by 2020)
 - For zoning ordinance;
 - 0 for absence of standards
 - 1 for a briefly stated standard (e.g., noise should not create a nuisance)
 - 2 if standard has specifics (e.g., noise has decibel limit or time of day restriction)

Methods....

Used sets of key words to search for categories

- Conservation category
 - Example: conservation, preservation, reserved use, green space, environment, parklands, etc.
- Use software (Adobe) to search for terms

Criteria for Sustainability and Climate Change standards – Comprehensive Plan- SCORES

Comprehensive Plan Scoring Results						
Plan Category	C&B of Juneau	Fairbanks NSB	Kodiak IB	C&B of Sitka	Kenai PB	Ketchikan GB
Conservation	6	4	4	3	0	3
Disaster Resilience	4	5	6	0	4	1
Economy	6	3	2	4	3	6
Food Security	0	1	0	1	0	0
Goals/Policies	4	0	0	0	0	0
Health & Safety	6	4	4	9	5	4
Land use	2	1	1	2	0	2
Housing	7	2	3	6	3	5
Sustainability / Climate change	0	0	0	0	0	0
Transportation	4	4	2	2	0	2
Plan process	2	0	4	0	4	4
Public participation	2	1	1	3	3	2
Total	19	11	5	9	5	3

Maximum points: 86; (1pt minimums = 43)

Criteria for Sustainability and Climate Change standards – Zoning Ordinance - SCORES

Zoning Scoring Results						
Plan Category	C&B of Juneau	Fairbanks NSB	Kodiak IB	C&B of Sitka	Kenai PB	Ketchikan GB
Conservation	2	0	0	0	0	0
Disaster Resilience	0	0	0	0	0	0
Food Security	0	1	0	1	0	0
Health & Safety	2	1	2	1	0	0
Housing	0	0	0	0	0	0
Land Use	11	8	3	7	5	3
Transportation	4	1	0	0	0	0
Total	19	11	5	9	5	3

Maximum points: 50; (1pt minimums = 25)

Criteria for climate change and sustainability strategies – Hazards Mitigation Plan - SCORES

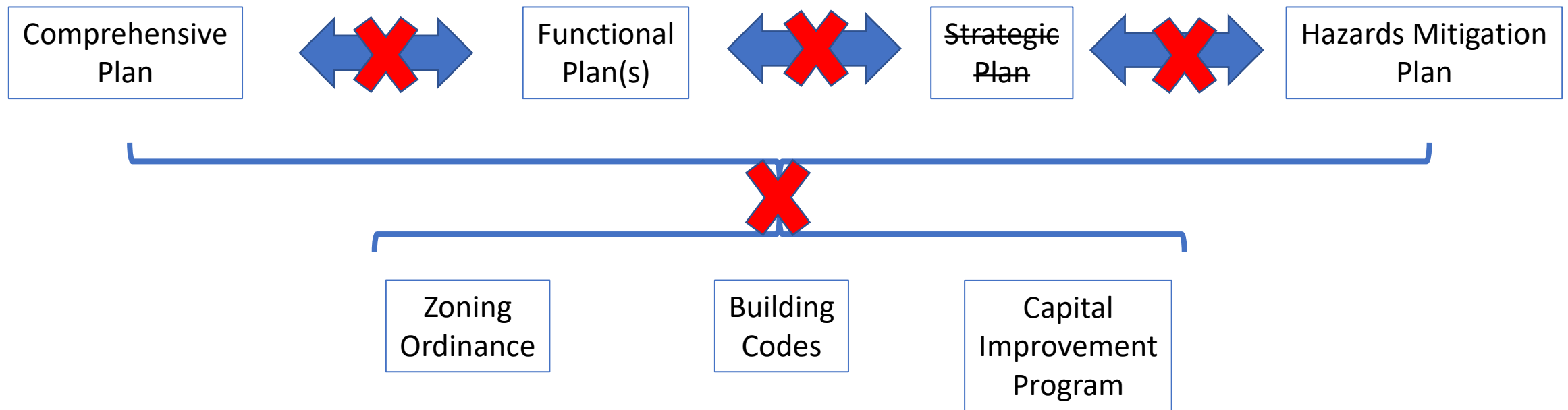
Hazards Mitigation Plan Scoring Results						
Plan Category	C&B of Juneau	Fairbanks NSB	Kodiak IB	C&B of Sitka	Kenai PB	Ketchikan GB
Conservation	0	0	0	0	0	0
Food Security	0	2	0	0	0	0
Goals/Policies	4	2	2	0	0	0
Infrastructure	0	0	0	0	0	0
Land Use	10	6	2	4	4	4
Plan Process	0	0	0	0	0	0
Vulnerable Population	2	0	0	0	0	0
Total	16	10	4	4	4	4

Maximum points: 34; (1pt minimums = 17)

Also checked for linkages between plans and implementation methods

No narrative linkages found

- For instance no hazards mitigation plan called for revisions in the comprehensive plan or zoning ordinance



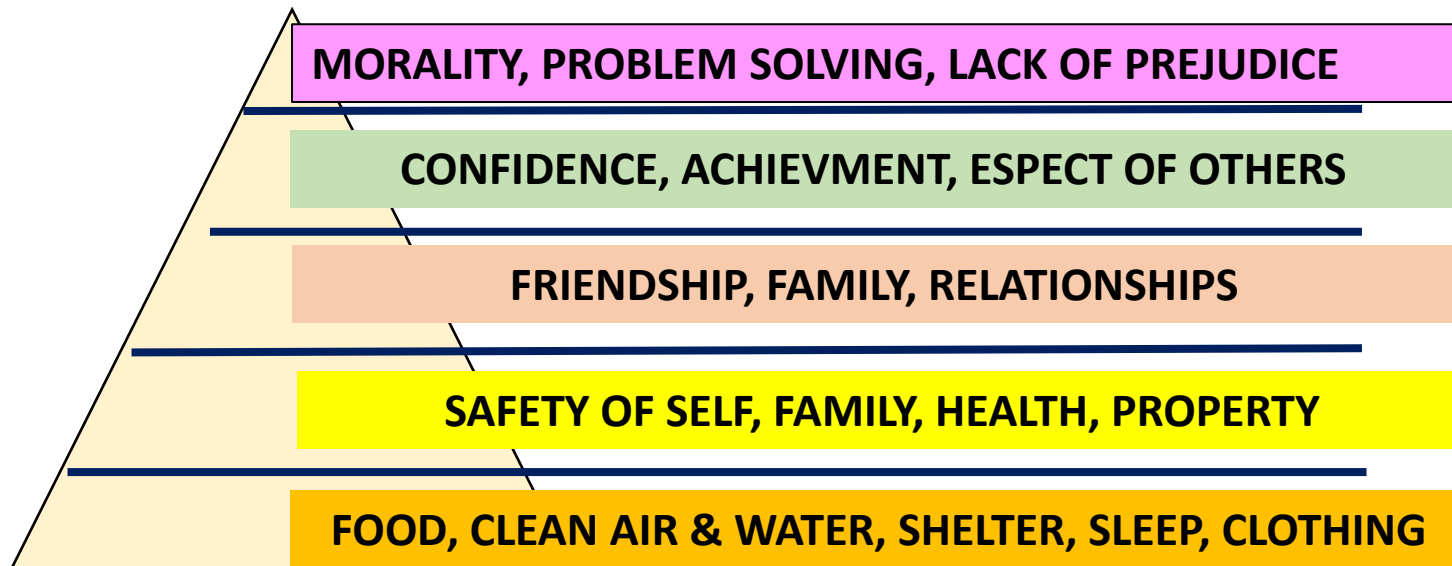
So, why little to no use of traditional planning tools to address climate change and/or sustainability?

Maslow's Hierarchy of Needs



Source: Simple Psychology

Maslow's Hierarchy of Needs for the Community



Local governments are spending their limited resources here;
Climate change has not risen to be a major community issue

People want their "basic" needs addressed first

Crime prevention, "good" roads, "good" schools, affordable housing

Potential reasons for the lack of local government climate action planning

- Developing a plan takes time, continual effort and resources
 - Once started you really do not know where you will end up
- Plans get completed and then put on the “shelf”
- Limited time, knowledge, available resources

Potential reasons for the lack of local government climate action planning

- Number of issues (other than planning) demanding attention
- People often confuse planning with “regulation”
- Short-term versus long-term thinking
- Partisan (tribalism) politics

Potential reasons for the lack of local government climate action planning

Some Alaska considerations

"It is difficult to get a man to understand something when his salary depends upon his not understanding it."

Upton Sinclair

Potential reasons for the lack of local government climate action planning

Some Alaska considerations

- Petroleum extraction funds up to 90% of Alaska's unrestricted General Fund revenues in most
- The oil and gas industry paid over \$3.1 billion in state and local taxes and royalties in FY 2019, including \$2.7 billion to state government and \$449 million to local governments.

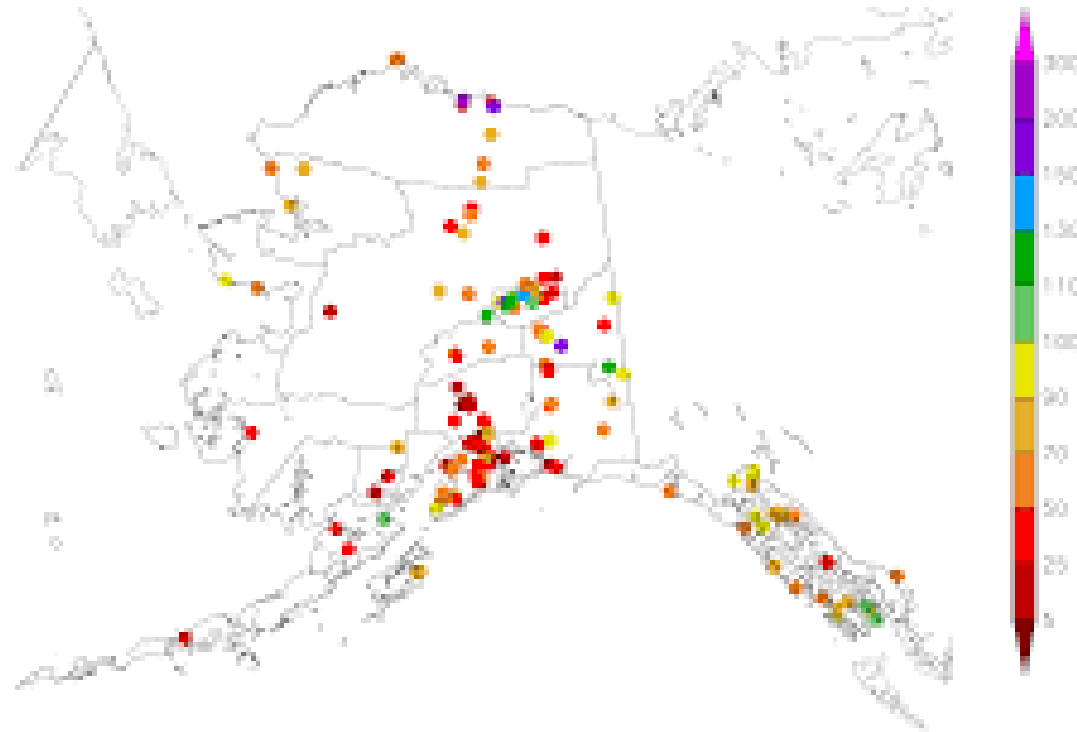


Source: alaskapublic.org

Source: Alaska Oil and Gas Association

Alaska (and US) population opinions appear to be changing...

Percent of Normal Precipitation (%)
4/1/2022 - 5/31/2022



Generated 8/1/2022 at HPRCC using provisional data.

NOAA Regional Climate Centers

May, 2022 Drought Report
Source: ncei.noaa.gov

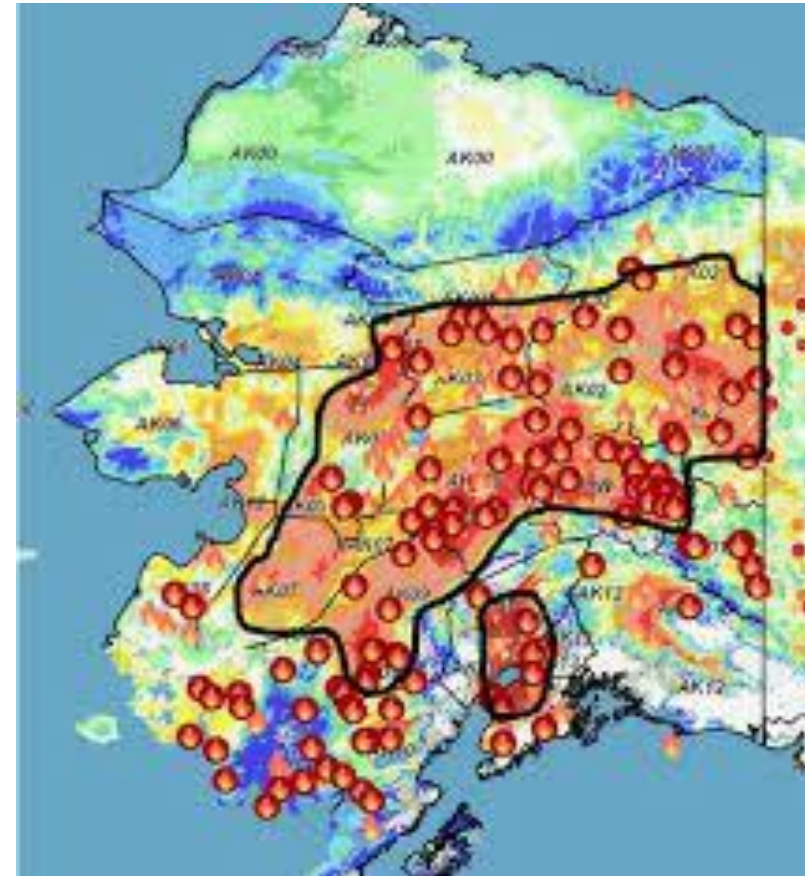
Alaska (and US) population opinions appear to be changing...



Source: UAF-IARC

3.08 million acres (1,246,432 hectares) burned Summer, 2022

Source: UAF



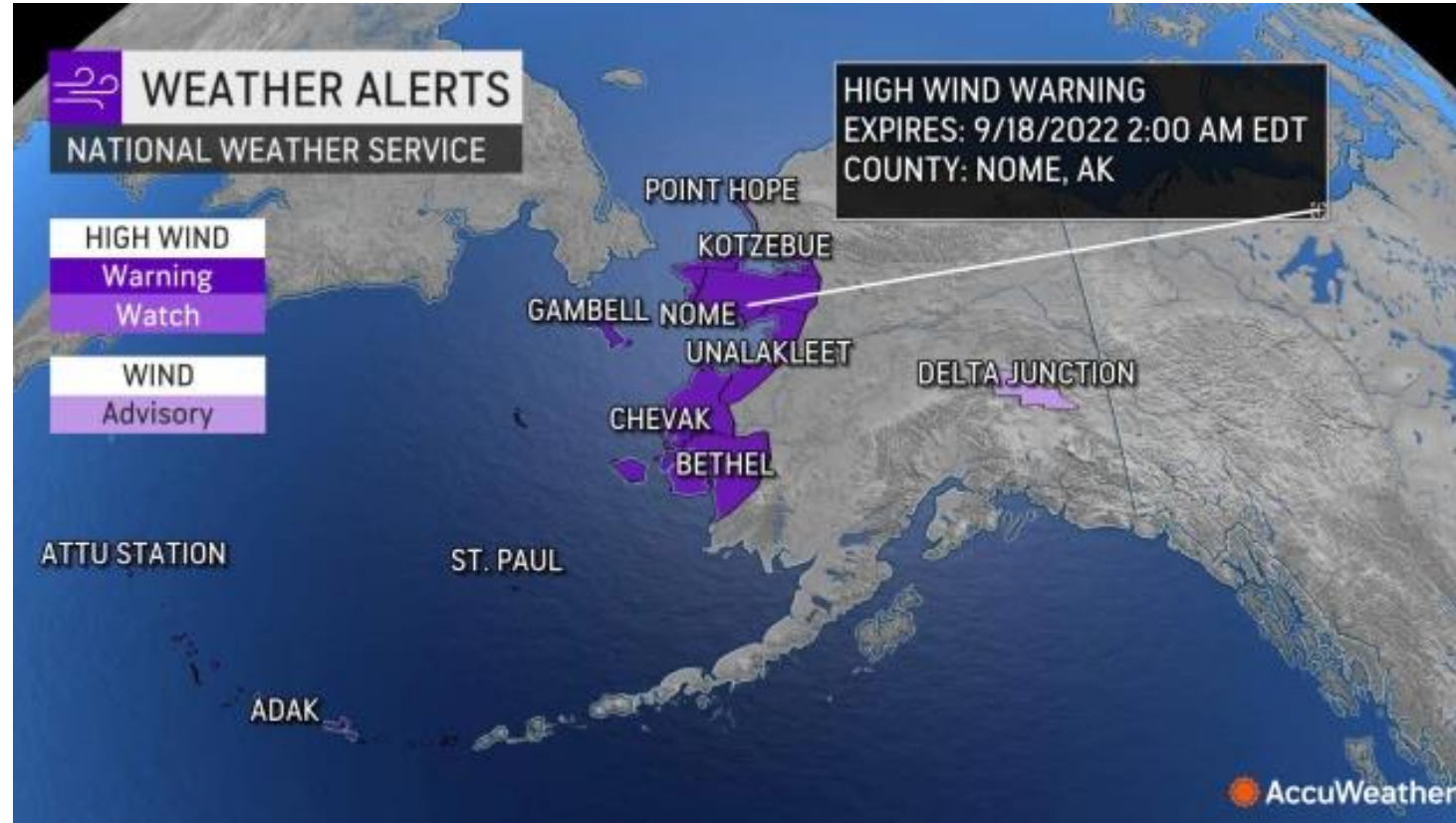
July, 2022 Fire Map

> 500 wildfires

Source: akfireinfo.com

Alaska (and US) population opinions appear to be changing...

4 meter storm surge
50 mph (80kph) wind speeds



Ex-Typhoon Merbok hits Alaska with hurricane-force winds
Source: upi.com

There is some hope...

- Planning documents do get updated and revised
- As public opinion changes and as local government costs related to extreme weather events increase (insurance, disaster response, higher interest rates) planning tools are more likely to be used to address climate change

Thank you!

Contact: jduffy@alaska.edu

Questions and Answers



Q&A

Time for discussion