Routledge
Taylor & Francis Group

Local Environment

The International Journal of Justice and Sustainability

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/cloe20

Collaborative climate mitigation and adaptation planning with university, community, and municipal partners: a case study in Anchorage, Alaska

Micah B. Hahn , Catherine Kemp , Chelsea Ward-Waller , Shannon Donovan , Jennifer I. Schmidt & Stephanie Bauer

To cite this article: Micah B. Hahn , Catherine Kemp , Chelsea Ward-Waller , Shannon Donovan , Jennifer I. Schmidt & Stephanie Bauer (2020) Collaborative climate mitigation and adaptation planning with university, community, and municipal partners: a case study in Anchorage, Alaska, Local Environment, 25:9, 648-665, DOI: 10.1080/13549839.2020.1811655

To link to this article: https://doi.org/10.1080/13549839.2020.1811655

Published online: 29 Aug 2020.

LOCAL ENVIRONMENT
2020, VOL. 25, NO. 9, 648–665
https://doi.org/10.1080/13549839.2020.1811655

Routledge
Taylor & Francis Group

Collaborative climate mitigation and adaptation planning with university, community, and municipal partners: a case study in Anchorage, Alaska

Micah B. Hahn[a], Catherine Kemp[b], Chelsea Ward-Waller[c], Shannon Donovan[d], Jennifer I. Schmidt[e] and Stephanie Bauer[f]

[a]Institute for Circumpolar Health Studies, University of Alaska Anchorage, Anchorage, AK, USA; [b]Municipality of Anchorage, Anchorage, AK, USA; [c]University of Alaska Anchorage, Anchorage, AK, USA; [d]Department of Geography and Environmental Studies, University of Alaska Anchorage, Anchorage, AK, USA; [e]Institute of Social and Economic Research, University of Alaska Anchorage, Anchorage, AK, USA; [f]Department of Philosophy, University of Alaska Anchorage, Anchorage, AK, USA

ABSTRACT

Cities around the world are creating formal planning documents proposing local actions to mitigate and prepare for the impacts of climate change. Despite a growing number of examples of such plans and "toolkits" that outline the process for undertaking these planning efforts, many cities are still struggling to know where to start. Furthermore, meta-analyses of existing climate action plans show that many suffer from similar limitations including lack of scientific input, failure to consider strategies across multiple sectors within local government, limited public involvement, narrow focus on mitigation, and lack of detail regarding implementation and monitoring. This paper describes our process for developing the Anchorage Climate Action Plan and our experience fusing a three-way partnership between the municipal government, a local university, and the broader Anchorage, Alaska community. We describe the nuts and bolts of our funding, leadership structure, and technical working sessions and reflect on the key structural, political, and social elements that catalysed plan development, adoption, and implementation. Our experience suggests that public support from municipal leaders, commitment from local experts, a dedicated steering committee, a diverse set of stakeholders, and a good working relationship with the local government officials (e.g. Assembly members or City Council) are critical to creating a successful framework for climate mitigation and adaptation planning in a community. Collaborative planning with a local university that prioritises community-engagement can support the development of a robust planning document that integrates local scientific expertise and is representative of the community it is meant to serve.

ARTICLE HISTORY
Received 22 December 2019
Accepted 11 August 2020

KEYWORDS
Climate change; climate adaptation; climate action planning; municipal-university collaboration; community engagement

1. Introduction

Local governments are responding to the threat of climate change by engaging in climate action planning. The resulting plans include actions related to mitigation (reducing greenhouse gas emissions) and adaptation (reducing harms or benefitting from opportunities caused by the effects of

CONTACT Micah B. Hahn mbhahn@alaska.edu Institute for Circumpolar Health Studies, University of Alaska-Anchorage, 3211 Providence Drive, BOC3 270, Anchorage, AK 99508, USA

Supplemental data for this article can be accessed https://doi.org/10.1080/13549839.2020.1811655

climate change). During the initial rise of climate action planning in the late 1990s and 2000s, plans focused almost exclusively on mitigation (Wheeler 2008). Since 2005, more than 40 U.S. communities have created separate climate adaptation plans, but many more incorporate adaptation actions into other documents, such as sustainability or hazard mitigation plans (Stults and Woodruff 2017).

Meta-analyses of these plans have found that climate action planning processes and final planning documents often face a number of barriers. While national and regional climate models are now more easily accessible due to the U.S. National Climate Assessment and Intergovernmental Panel on Climate Change (IPCC) reports, cities often need information about local climate effects to gain support from policy makers, elected officials, and the general public (Mastrandrea et al. 2010; Tang et al. 2010). In addition, the specificity of plans can be limited by the lack of localised and understandable information about climate impacts (Mastrandrea et al. 2010; Tang et al. 2010; Baker et al. 2012). However, having access to local climate information does not necessarily predict utilisation of the information (Mastrandrea et al. 2010; Baker et al. 2012). Climate data may not be in a format that can be easily related to city decision-making processes, or city officials may be unfamiliar with interpreting climate data (Dessai and Hulme 2004; Moss et al. 2013). Some have found that involving scientists and other stakeholders from the outset helps cities create more comprehensive climate action plans (Preston, Westaway, and Yuen 2011; Bierbaum et al. 2013).

Climate action plan initiation and implementation can be challenging for cities due to a lack of staff capacity, funding, and political support (Bassett and Shandas 2010; Baker et al. 2012; Bierbaum et al. 2013; Shi, Chu, and Debats 2015). In fact, some have found that reallocating staff time and identifying funding is perceived by city staff to be more challenging than accessing climate information (Moser and Ekstrom 2012; Shi, Chu, and Debats 2015). Lack of political leadership, particularly from local elected officials during the initial parts of planning processes, can prevent staff from allocating time to the planning process and make it more difficult to obtain adequate funding (Moser and Ekstrom 2012; Shi, Chu, and Debats 2015).

Previous plans have also suffered from a lack of significant public involvement (Baker et al. 2012). Participatory planning approaches can lead to more effective plans because the incorporation of local knowledge helps identify culturally-relevant and practical goals and solutions (Pearce et al. 2009). Substantial public involvement also fosters community support for the plan, which can accelerate implementation (Wiseman, Williamson, and Fritze 2010; Preston, Westaway, and Yuen 2011).

Finally, climate action plans to date tend to lack specificity about plan implementation and monitoring of progress (Wheeler 2008; Baker et al. 2012; Woodruff and Stults 2016). Many do not include a prioritisation of actions, costs, funding sources, timeline, and/or monitoring and reporting requirements (Baker et al. 2012; Stults and Woodruff 2017). While the quality of implementation guidance in plans and the scope of proposed adaptation actions have been assessed (Bierbaum et al. 2013), there is little research assessing barriers to and catalysts of progress on plan implementation.

1.1. University and municipal collaboration

Communities host universities and in turn universities are often a fundamental component of communities, providing employment opportunities, education for residents, and a knowledge base and academic resources (e.g. faculty, students, libraries, and laboratories). Engagement between communities and universities is often between individual faculty members or departments and local organisations, community members, or leaders (Allahwala et al. 2013; Jackson and Marques 2019), but it can expand more broadly to encompass multiple courses or long-term, multidisciplinary research projects (Schlossberg et al. 2018). Here we define university-municipality partnerships as relationships in which a local government and faculty and/or students work together to co-create a final product that advances both education and community innovation.

University-municipality relationships often struggle with a number of issues such as defining common goals and mission statements, unequal power or resources, dissimilar operational timelines (e.g. semester-based projects versus ongoing municipal operations) and staff turnover (Koza and

Lewin 2000; Curry 2016). Furthermore, building relationships between universities and local governments can be difficult because governments and their departments often have very specific goals and tasks whereas universities are more flexible with their goals, allowing more leeway for academics (Wiewel and Lieber 1998).

When these potential hurdles are overcome, benefits can be reaped. The International City Managers' Association found that when communities are facing difficult economic times, collaborating with universities can help provide valuable expertise to support decision-making and help develop successful grant applications to revitalise the economy and attract more business (ICMA 2014). University-municipality relationships can channel faculty and student efforts towards tackling complex issues that span multiple municipal departments. Additionally, universities have more flexibility to encourage and propose creative solutions for pressing community challenges that can help push the bounds of risk-averse governmental decision-making processes (Schlossberg et al. 2018). At the same time, students and faculty benefit from applying their knowledge and skills to real world problems, which has been shown to have positive impacts on student academic performance, civic engagement, self-efficacy and self-esteem, and leadership capacity (Furco and Root 2010).

Municipal climate action plans are becoming a more common tool for city planning and are an excellent opportunity for universities and municipalities to work together on a mutually beneficial project. Successful collaborations can help municipalities develop data-driven mitigation and adaptation goals and substantially expand their research capacity. Through a university partnership, municipalities can access a wide variety of expertise in one place, including climate scientists, engineers, epidemiologists, policy and administration experts, economists, ecologists, and computer scientists. On the other hand, faculty can apply their expertise to an applied, community need and can forge new research partnerships with community organisations and other faculty interested in the intersection of science and policy around climate change. Additionally, the background research, facilitated stakeholder meetings, and community engagement events that are part of typical climate action plan development are key opportunities to involve students in a real world project.

University-municipality partnerships around climate action planning can vary substantially in the level of engagement between partners. For example, university personnel can provide climate data or create fact sheets for the municipality as a planning tool for decision-making. Or, university engagement could involve consultation on a specific issue such as understanding the impacts of increased rainfall on municipal stormwater utilities and identifying adaptive engineering solutions. More in-depth collaboration could include municipalities partnering with students through their coursework (Haight, Lawless, and Yip 2016; Schlossberg et al. 2018) or working with a university to create and implement a climate change scenario workshop to facilitate planning. A key difference is whether communities are involved throughout the research or facilitation process, or if they are simply "end-users" of university research. The National Oceanic and Atmospheric Administration's (NOAA) Regional Integrated Sciences and Assessments (RISA) programme provides examples of university and community engagement around climate adaptation planning across this spectrum (Combest-Friedman, Nierenberg, and Simpson 2019).

1.2. Community engagement around climate action planning

In addition to university involvement in climate action planning, there has been a recent push to expand these public processes to include residents. Providing meaningful opportunities for participation allows for diverse voices to engage throughout the planning process and helps develop climate action plans that are equitable and representative of community needs and interests. Public engagement also builds trust between community members and the local government, facilitates more effective plans when action relies on behaviour change by individuals and households, and may result in cost savings if high engagement mobilises volunteer efforts during plan implementation (Wiseman, Williamson, and Fritze 2010). Arnstein (1969) initiated an important discourse around citizen engagement and participation in community planning. Her "ladder of citizen

participation" includes eight levels where the lowest rungs represent non-participatory approaches and include *Manipulation* and *Therapy* and the top rungs represent the highest levels of community involvement and include *Partnership*, *Citizen Control,* and *Delegated Power*. In between, Arnstein labels *Informing*, *Consultation*, and *Placation* as approaches that amount to tokenism.

More recently, several states have developed or implemented guidelines for community participation in climate action planning. California outlines the following three strategies to meaningfully engage the public in climate planning: (1) *Public information and outreach* activities are one-way information sharing events, (2) *Public consultation* provides opportunities for feedback, and (3) *Public deliberation* involves two-way dialogue, knowledge sharing, and collaborative decision-making (Institute for Local Government and California Air Resources Board 2010). Portland's climate action planning process utilised a set of guidelines around community engagement from the International Association for Public Participation (Portland Development Commission 2005). This engagement spectrum spans from "inform, consult, and involve" to "collaborate and empower" and provides a statement to the public that characterises the role it has in the process at each level (Figure 1). The Urban Sustainability Directors Network (USDN) Guide to Equitable, Community-Driven Climate Preparedness Planning provides guidance to cities about how to approach planning in a way that advances procedural, distributional, and structural equity (Yuen et al. 2017).

In addition to creating community advocates for the plan and developing actions and policies that are socially and culturally appropriate, community involvement in climate action planning can also help make sure that new initiatives are implemented in a way that addresses climate equity. More specifically, this concept means that "all people have the opportunity to benefit equally from climate solutions, while not taking on an unequal burden of climate impacts" (ICLEI 2019). For example, municipal programmes for solar panel rebates or home weatherization may be more accessible to higher income homeowners than to renters who have less control over their housing. Addressing climate equity also means recognising that some people are disproportionately affected by sudden shocks or events and identifying adaptation solutions that help alleviate this burden.

In practice, community engagement in public policy processes can be time consuming, opens the door for politically-charged public criticism, and is perhaps unfamiliar territory for municipal governments or university partners. Although meaningful community engagement may be a stated value at the beginning of a climate planning process, many times the public is not approached until the

	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTCIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problems, altnernatives, and/or solutions.	To obtain public feedback on analysis, alternatives, and/or decision.	To work directly with the public throughout the process to ensure that public issues and concerns are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision-making power in the hands of the public.
PROMISE TO THE PUBLIC	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and issues are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for direct advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.
EXAMPLE TOOLS	• Fact sheets • Websites • Open houses	• Public comment • Focus groups • Surveys • Public meetings	• Workshops • Deliberate polling	• Citizen advisory committees • Consensus building • Participatory decision-making	• Citizen justice • Ballots • Delegated decisions

Figure 1. Community engagement spectrum. Reprinted with permission from the International Association for Public Participation.

implementation phase of climate planning, and engagement strategies may be used as a way to check boxes rather than to actually enhance the planning process (Burton and Mustelin 2013). Universities can help municipalities with the community engagement process while developing their climate action plan though deliberative dialogue events, surveys, focus groups, facilitated community workshops, or plan dissemination.

This paper takes an in-depth look at the development of a climate action plan in the Municipality of Anchorage, Alaska. The goal of this case study is to (1) provide details on how the plan was developed from conception to adoption, (2) demonstrate how a collaborative process that intertwined expertise and contributions from a local university, the community, and municipal staff addressed some of the previous limitations of climate action plans, and (3) reflect on the key structural, political, and social elements that catalysed plan development, adoption, and implementation. By providing a detailed and candid assessment of our experience in Anchorage we hope that other communities can learn from our successes and missteps to create more effective climate change mitigation and adaptation public policy.

2. Anchorage, Alaska – policy context

This case study takes place between January 2018 and December 2019 (Figure 2). The pre-planning stage of the project took place between January and August 2018. The climate action plan was developed between September 2018 and May 2019, and the Anchorage Assembly formally adopted the plan in May 2019. Implementation of the plan began immediately after adoption.

The Municipality of Anchorage is situated between Cook Inlet, an extension of the Pacific Ocean, and the Chugach Mountains (Figure 3). While the high density "Anchorage Bowl" is in the middle of the Municipality, the jurisdiction extends north into the communities of Eagle River and Chugiak and southeast to Girdwood, encompassing an area the size of the state of Delaware (5130 km^2). The population of the Municipality is nearly 292,000, which represents approximately 40% of the state population (U.S. Census Bureau 2019). Anchorage sits on the traditional homelands of the

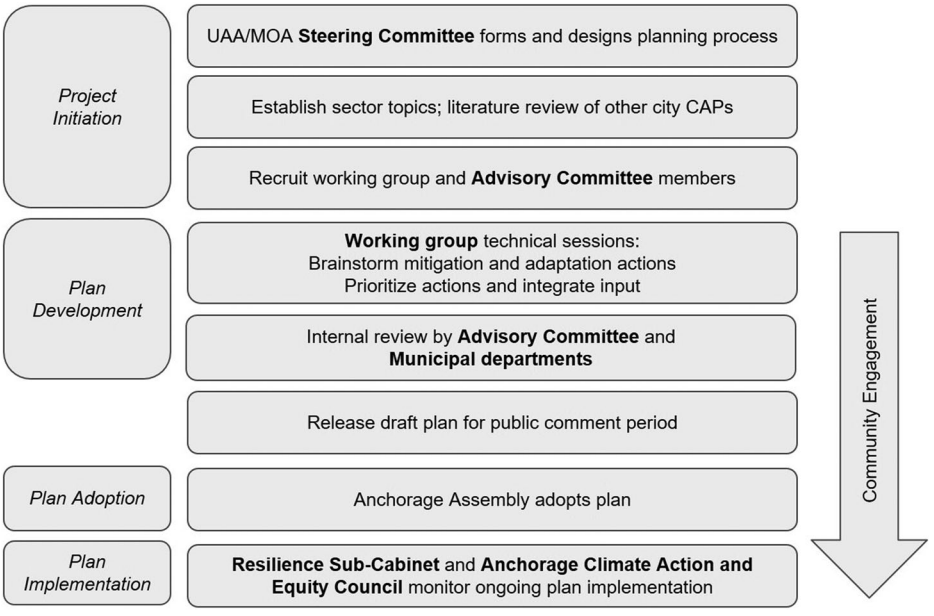

Figure 2. Schematic of the process and integration of the key stakeholders for the development the Anchorage Climate Action Plan.

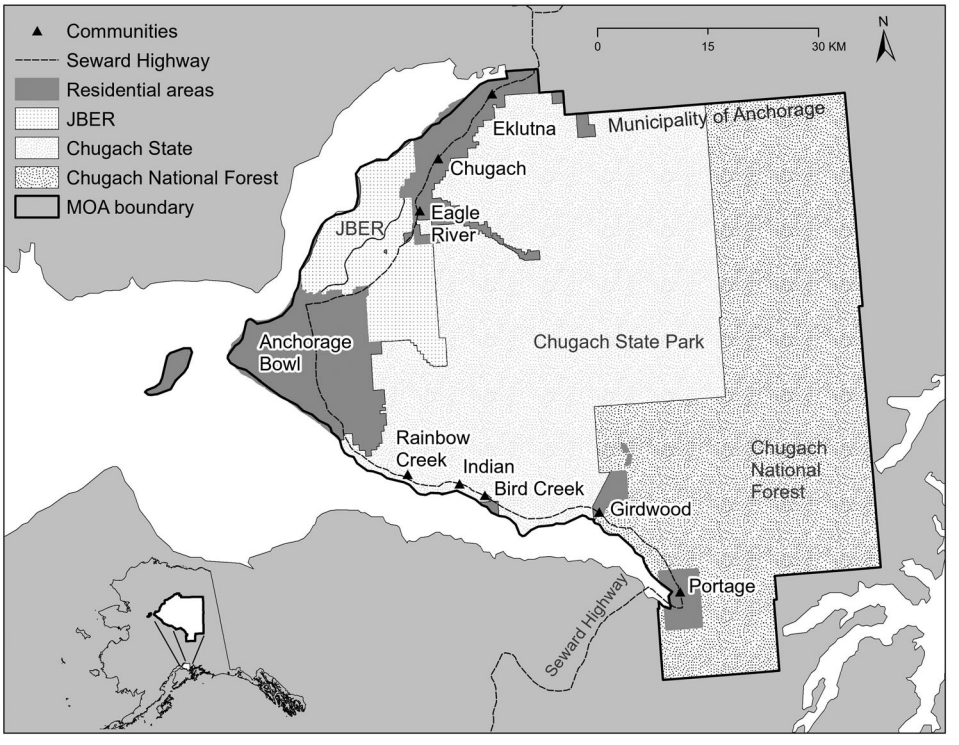

Figure 3. Map of the Municipality of Anchorage boundaries and its location in Alaska.

Dena'ina Athabascans, who have lived in the region for thousands of years. In addition to the prominent Alaska Native culture, the city is among the most ethnically diverse communities in the United States, with over 100 languages spoken in area schools (Farrell 2018).

Over the last 50 years, Alaska has warmed twice as fast as the contiguous United States (Markon et al. 2018). The effects of climate change are part of daily life for many Alaskans. Thawing permafrost and receding sea ice threaten communities in the western, northern and interior regions of the state. In Southcentral Alaska, the impacts include increased wildfire risk and less predictable freeze–thaw patterns. Communities and Alaska Native tribes throughout the state are creating climate action plans to cut emissions and adapt to these environmental changes (Meeker 2017).

The initial effort to develop a climate action plan for Anchorage began in 2007. University of Alaska-Anchorage (UAA) faculty and students wrote a plan, but it was not adopted by the Municipality. A decade later, in December 2017, the Municipality of Anchorage and UAA signed a Memorandum of Understanding agreeing to explore the "development of collaborative projects and joint activities" and the "development of faculty externships, service projects, creative activity and research opportunities". Discussions began between a few university faculty, staff and the Mayor's office about a reignited effort toward a climate action plan. Mayor Ethan Berkowitz and his administration were supportive of discussions around climate mitigation and adaptation and agreed to let two of his staff members use part of their work time to participate in these initial conversations. Shortly after, the Municipality hired their first Energy and Sustainability Manager, who joined the planning effort and consolidated the core of the project steering committee (from hereafter, the steering committee is referred to as "we").

At the state level, Governor Bill Walker created a task force to develop a climate strategy for Alaska in October 2017 under Administrative Order 298 (Plumer 2018). The Climate Action for Alaska Leadership Team (CALT) presented the plan to Governor Walker in September 2018. Shortly after Governor

Mike Dunleavy was sworn in, he disbanded the CALT and removed their proposed climate strategy from the state website. This state-level action reinforced the importance of continuing climate mitigation and adaptation planning at the local level and emphasised the need to institutionalise climate strategies within the community so that they are not tied to a specific administration.

3. Climate action plan development

3.1. Funding and project initiation

We received funding for the climate action plan development in three stages. The first small grant was from an ear-marked UAA "sustainability" fund that provided funding to hire two part-time undergraduate interns for a semester to conduct a literature review of other municipal climate action plans. The second grant was through an initiative from the UAA Center for Community Engagement and Learning on "Resilient Cities". This funding allowed us to hire a graduate assistant, hire a graphic designer, and work with a student videographer to create a short film for community outreach (more details below under "Plan development process"). The final grant was through a one-time University of Alaska initiative to support projects that enhanced cross-campus collaboration. This funding covered some faculty time, meals for the working group technical sessions (described below), and printing costs for community outreach events. In-kind support from the Municipality through staff time and access to municipal event spaces supplemented the university funds.

In addition to the funding provided by the "Resilient Cities" grant, the community engagement centre on campus also provided technical support for a workshop related to the project. We utilised this workshop in May 2018 to shift the project from an internal student research project into a municipal-university-community collaboration. We invited a group of attendees from across organisations in Anchorage with expertise in many of the topics we wanted to see in the final plan (e.g. energy, water utilities, transportation, public health and emergency response). During the workshop, we presented a proposed set of "sectors" addressing these concerns. We asked attendees to self-identify with a particular sector and discuss which topics they thought should be included in the sector and propose working group members who would ultimately develop recommendations within that sector. The small groups shared their perspectives and then as a large group, we refined the sector titles and defined the scope of each sector.

3.2. Key partners and leadership structure

Four groups of people were involved in the development of the Anchorage Climate Action Plan (Figure 2). The *Steering Committee*, made up of UAA faculty, staff, and students and Municipality of Anchorage staff, was formed to create the framework for the plan, design and implement the technical sessions, develop and recruit the Advisory Committee and working group members, plan and run community engagement meetings, and oversee the development of the plan. The *Advisory Committee* was composed of a group of technical advisors with a wide range of expertise with the various plan sectors as well as community-based organisations focused on advancing equity and representing a constituent base that reflects the diversity in Anchorage. The committee's role was to review drafts of the plan, ensure that the themes of equity, public health, and economic prosperity were incorporated throughout, and catalyse rapid implementation of the plan. Seven *working groups* were developed to represent the seven sectors (e.g. Buildings and Energy, Land Use and Transportation, Urban Forests and Watersheds, Food Systems) of the plan. UAA and Alaska Pacific University faculty were identified to serve as working group leads. Municipality of Anchorage staff, other UAA faculty, staff, and students, non-profit representatives, local businesses, and state and federal government employees made up the rest of the working group members. Finally, the *Anchorage community* was involved throughout the development of the climate action plan. Community comments were included along with input from municipal staff and the Advisory Committee to help identify and

prioritise actions. Community input was analysed and considered while developing the overarching goals, vision, and targets as well as the actions and implementation strategies.

3.3. Plan development process

Through a series of three technical sessions, the working groups developed the first draft of the objectives and actions in the plan as well as the narrative text in each of the seven sectors of the plan. During the first technical session, the University of Alaska-Fairbanks Scenarios Network for Alaska + Arctic Planning (SNAP) presented projections for local environmental changes in Anchorage to working group members who discussed potential impacts within each sector. Working group members worked together to fill in a table that helped them define the severity of each of the potential impacts on public health, the local economy, equity, and the local environment (Supplemental Material). In the second session, participants brainstormed possible actions and solutions for the climate impacts and ranked and organised their top recommendations. After the second session, the proposed recommendations were shared with the Advisory Committee and vetted in several community meetings. In the final session, working group members reviewed and integrated the feedback and defined the long-term vision for their sector.

Throughout the development of the plan, we organised several types of community engagement events so that residents could participate in the planning process. We hosted a series of seven public "open house" style events, which included a brainstorming session at the public library where residents were asked to list ideas for climate solutions, a session at the Anchorage Museum where residents could provide feedback on posters with proposed plan actions, and a final town hall public comment and Q&A event (for more details on the community engagement events, see Supplemental Material). In order to increase participation and make it easier to learn about and provide feedback on the plan, we also held a series of "mobile climate workshops" where we travelled to existing community meetings. Residents could request a workshop through the municipal climate action plan webpage. These workshops were hosted by groups ranging from community councils to high school classes and provided an opportunity to teach people about the process, share drafts of the proposed recommendations, and facilitate group feedback sessions in a way that was tailored to the specific group. Facilitators compiled community feedback and shared it with the working groups during the third technical session, where they incorporated the feedback into their respective chapters. Finally, a formal public comment period was held in Spring 2019 to collect online feedback on the overall draft plan before it was presented to the Anchorage Assembly. We advertised community meetings and project milestones through press releases, newspaper articles, the Mayor's Facebook page and personal pages of our working group members, and through our organisational partners.

4. Key outcomes

4.1. Organisational affiliation of contributors to plan development

Over 1500 Anchorage residents contributed to the climate action plan development. The most substantial contributions to the plan development came from the 77 working group members who participated in the technical sessions, 6 of whom also served on the steering committee. Working group members included university faculty ($n = 23$) and representatives from the Anchorage Municipality ($n = 13$), non-profit organisations and community groups ($n = 18$), state agencies ($n = 12$), private business ($n = 6$), federal agencies ($n = 2$), and the Anchorage School District ($n = 3$). The steering committee was made up of university ($n = 5$) and municipal staff ($n = 3$). The advisory committee primarily consisted of non-profit and community group representatives ($n = 9$), but university leadership ($n = 4$) and private business owners ($n = 4$) were also part of this committee.

Over 1300 Anchorage residents contributed primarily through participation in community meetings (7 community open house events and 28 "mobile climate workshops") or by submitting comments during the public comment period. During the online public comment period for the draft plan, 155 online comments were submitted, and 22 residents testified in support (zero testimonials in opposition) of the plan at the Anchorage Assembly meeting. Testimonials came from the public, students, business owners, and local non-profits, acknowledged the imminent nature of climate change in Alaska, and noted the collaboration between local experts and the public to craft the plan:

> I have lived in Alaska for 40 years and like so many others here, have witnessed our glaciers recede, our growing season lengthen, and the devastating impacts of worsening coastal storms, sea level rise, and increasing breakup floods that are flooding our rural villages and causing increased maintenance and repair costs for our transportation and other infrastructure, among other impacts. It is time to act - to transition to clean, renewable energy by 2 0 5 0 . – Anchorage resident

> We urge the Municipality to be bold, move beyond aspiration to direct action that maximizes the use of limited resources and the time and energy of the many government experts and people of Anchorage who engaged in the process. – Regional non-profit

4.2. Structure of the plan

The full 2019 Anchorage Climate Action Plan is available on the Municipality website.[1] The plan begins with a broad vision for Anchorage:

> In 2050, Anchorage is a resilient, equitable, and inclusive community prepared for the impacts of a changing climate. Winter cities around the world look to Anchorage as a leader in stewardship and energy innovation. Anchorage is self-sufficient and the heart of our state's globally competitive economy.

The final plan has actions organised into seven sectors (i.e. Buildings and Energy, Consumption and Solid Waste, Land Use and Transportation, Health and Emergency Preparedness, Food System, Urban Forests and Watersheds, and Outreach and Education). Each of the seven sectors also has a vision for the year 2050. Within each sector, actions are organised thematically under four to five broader objectives that represent steps towards achieving the broad sector vision (Table 1). An implementation timeline for each action is included to categorise actions as near-term (plan adoption to June 2020), mid-term (2020–2025), long-term (2026 and beyond), existing and/or ongoing, or uncertain (depends on funding or other factors). It is important to note that climate action plans are not mandated under local, state, or federal law; nor are they required as part of government funding programmes. Therefore, there are no specific requirements for elements included in

Table 1. Example action table from the Buildings and Energy sector in the 2019 Anchorage Climate Action Plan.

Sector: Buildings and Energy; 2050 Vision: Buildings and infrastructure in Anchorage are safe, healthy, and affordable for all and our building practices demonstrate leadership in high latitude climates. Residents, businesses, and organisations have access to affordable clean energy.

Objective 1. Improve energy efficiency of buildings in all sectors.					
No.	Actions	Co-benefits	Primary Municipal Liaison	Potential Partners	Timeline
1A	Explore incentives for energy and water efficiency, storage, and renewable energy (e.g. expedited permitting, rebates, property tax incentives, utility programmes, etc) for all public and private buildings.	environment, equity, jobs and prosperity	Office of Economic and Community Development (OECD), Office of Energy and Sustainability (OES)	Project Management & Engineering (PM&E), MOA Property Appraisal, Anchorage Home Builders Association (AHBA), Building Owners and Managers Association (BOMA), Anchorage School District (ASD), realtors, contractors, design and construction community, Development Services	Near-term and Ongoing

climate action plans, so they take a variety of different forms that may or may not look like more "traditional" city plans, such as comprehensive plans.

Approximately half of the actions ($n = 69$, 49.2%) in the plan are focused solely on mitigation of greenhouse gases, while about one-third of the actions ($n = 42$, 30.0%) focus on adaptation to present and future climate-related concerns in the city (Table 2). Some actions address both mitigation and adaptation ($n = 29$, 20.7%). For example, strategies to support the local food system decrease carbon emissions associated with importing food while also strengthening household and community preparedness. Other actions that involve engaging community members in new municipal programmes related to the climate action plan also contribute to both mitigation and adaptation. Three sectors (Buildings and Energy, Land Use and Transportation, and Consumption and Solid Waste) include primarily mitigation actions, while Health and Emergency Preparedness is focused solely on adaptation to the impacts of climate change. Most of the actions in the other three sectors (Food Systems, Urban Forest and Watersheds, and Outreach and Education) simultaneously address mitigation and adaptation.

While all the actions are focused within the geographic bounds of the Municipality of Anchorage, many of the actions require support and collaboration from organisations outside of municipal government. These potential partnerships are designated in the Anchorage plan in the action tables in each sector. Overall, the plan lists 108 potential partners, including state and federal agencies, utilities, nonprofits, educational organisations, professional associations, and cultural groups. The number of proposed partners for an action ranges from one to twelve partners. For example, action 4B, "Continue to work with utilities to allow all customers to opt in to pay for a higher portion of renewable energy" lists electric utilities as the sole partner. Meanwhile, action 1B, "Establish codes that improve energy efficiency. Reach for best practices such as Living Building Challenge, Architecture 2030, LEED, Passive House, net zero, etc. for new residential, commercial, and municipal buildings" lists 12 partners ranging from the Anchorage Home Builders Association to the Alaska Energy Authority.

Most of the actions in the final plan can be initiated from within the municipal government. However, roughly one-fifth of the actions were designated as "partner-led", meaning that implementation action will likely come from outside the local government; from the university, a non-profit, or a state or federal agency. For example, action 17D from the Health and Emergency Preparedness sector states,

> Develop an emergency food plan that includes a food needs assessment, plan for stockpiling the necessary food supplies, and a distribution and public communication plan that takes into account those most at risk for food insecurity. Work with local retailers, producers, and warehouses to obtain and store the necessary food stocks.

While the city's Office of Emergency Management will serve as the city liaison, the action will be initiated by a partner. This concept is noted in the plan action tables with tan colour coding on partner-led actions.

Table 2. Actions in the 2019 Anchorage Climate Action Plan by sector.

	Number of mitigation and adaptation actions			Number of municipal-led and partner-led actions		
Sector	Mitigation	Adaptation	Both*	Municipal-led	Partner-led	Total number of actions
Buildings and Energy	25	1	0	26	0	26
Land Use and Transportation	20	5	0	23	3	26
Consumption and Solid Waste	20	0	0	20	0	20
Health and Emergency Preparedness	0	24	0	14	9	23
Food Systems	4	0	13	11	6	17
Urban Forest and Watersheds	0	12	7	14	5	19
Outreach and Education	0	0	9	9	0	9
TOTAL	69	42	29	117	23	140

*There are actions that address both mitigation of greenhouse gases and adaptation to climate-related impacts.

Each of the actions also has an indicator of potential *co-benefits*, or the intended or unintended benefits that occur as a result of mitigation or adaptation action directed at addressing climate change. There are notations when an action has the potential to support jobs, advance equity, improve local environmental quality, or improve the health of Anchorage residents.

The final section of the Anchorage Climate Action Plan addresses implementation and monitoring of the plan with two key goals: to track implementation progress and to institutionalise the plan in order to hold the city accountable and ensure progress regardless of changes in municipal administration. The plan calls for an annual progress report and a full climate action plan update every five years, which speaks to the plan's legacy as an iterative, "living" document that will change as technology, markets, knowledge, and community needs continue to evolve. Throughout implementation of the plan, key municipal departments create workplans and keep track of progress on actions that are relevant to their department, which will inform the annual report.

We identified two strategies to support institutionalisation of the plan. The first was the development of a Municipal Resilience Sub-Cabinet comprised of representatives from several municipal departments. This team meets quarterly to report on progress and to discuss implementation challenges. This team will develop an annual progress report that is available to the Anchorage community on a public website. By incorporating or "mainstreaming" climate action across many different departments, the responsibility for implementation is shared beyond the Office of Sustainability.

The second strategy was the development of the Anchorage Climate Action and Equity Council. The plan outlines that this external body includes a variety of representatives from entities such as the Municipality, the university, non-profit organisations, state government, tribal entities, local utilities, and local businesses. This external oversight group will convene at least annually to review and provide comments on the annual climate action plan report and workplan created by the Municipality. They will also review and provide comments on the updated climate action plan every five years and participate in the update as necessary. Finally, they will provide consultation on equity considerations during implementation of the plan.

4.3. Use of grant funds and in-kind contributions

We received approximately $89,000 through three small grants to develop the Anchorage Climate Action Plan. Most of this funding was utilised to hire a graduate assistant for a year and to buy out faculty time (12 faculty total) to lead the working groups throughout the development process. Other major costs for plan development included meals for technical working sessions (~$4200), graphic design of the final plan ($2000), printing costs for technical sessions and community engagement events ($1000), videography and logo design ($3600), and conference registration and travel to share the results of work ($2000).

We leveraged this funding with thousands of hours of volunteer time from faculty, municipal staff, and technical working group members. For example, in the three technical sessions alone, working group members provided over 1200 hours of their time. Because we were working with the Municipality, we could reserve public library spaces for technical working sessions and community engagement events for free. Additionally, two of the faculty members on the project steering committee taught courses related to the climate action plan and developed assignments through which students contributed to the development process. In one of the courses, students worked with a student videographer to make the climate action plan outreach film that was used at many of our community outreach events. Through class discussions, students worked together to decide what message they wanted to convey through the film. They learned how to develop interview questions and conduct interviews and participated in film editing. In the other course on environmental policy, students conducted a policy analysis to identify current municipal codes and plans that overlapped with the proposed actions in the plan. Community organisations used email and social media networks to advertise events and mobilise members to submit comments and write their Assembly

representatives in support of the plan. Finally, we worked with local businesses and nonprofit partners to donate food for several of our community engagement events.

Through engagement with the university, we were also able to leverage ongoing events and programmes to further plan development at no cost to our project. For example, the community engagement centre on campus hosts an ongoing *Think Tank* series where faculty members propose a topic and the centre provides lunch, space, and advertising in order to bring the campus and broader Anchorage community together for a conversation. UAA also has a *Books of the Year* programme that organises speaker panels and discussions around the chosen theme, which was "Building Community Resilience" during this project. We organised events about the climate action plan within each of these established programmes.

5. Lessons learned

Looking back at the process we used to develop the Anchorage Climate Action Plan, it is clear that there were key structural, political, and social elements that contributed to our success from project conception through implementation of mitigation and adaptation strategies in Anchorage. Many of the relationships that helped launch the project came into play throughout the plan development process, and the impact of some of our early activities did not become evident until we were presenting the plan to the Assembly for a vote. It is only now, upon reflection of what transpired, that we can outline how the network of people involved and the process we used to engage a wide range of interests converged to develop a key planning resource for the Municipality and the residents of Anchorage.

5.1. Project initiation

The memorandum of understanding (MoU) between the Municipality and the University served as the foundation for the project. Developing a clear and concise MoU can be helpful for defining roles and expectations at the beginning of a project (Norris et al. 2007). This agreement gave faculty the ability to document their time on the project as part of their service requirement for the university. Although the mayor would likely have provided two part-time staff to participate in early meetings about the project without the MoU, the agreement provided additional justification for this use of human resources. One of the small seed grants through the university provided funding for two undergraduate interns, who rounded out the initial project team. This municipality-university team met regularly to develop the scope and framework for the plan and applied for additional grants to fund the project. Partnering with the university helped overcome the issue of lack of municipal staff capacity to initiate a large multi-stakeholder planning process. Early collaboration to define the scope of the project and a formal MoU were key elements that ensured that the project would be mutually beneficial for both the municipality and university as well as the staff involved in the project.

5.2. Plan development

We received support from city leadership throughout this project, but these relationships proved most influential during the plan development phase. Mayor Berkowitz had been a leader in clean energy and climate during his time in the Alaska State Legislature, and has continued to prioritise climate action in his mayoral agenda. The Mayor had a key role in gaining support of department directors at the beginning of the plan development process. At a department directors' meeting, Mayor Berkowitz explained the project and informed the group that city staff would be contacting them or their staff about participating in a working group and/or reviewing draft chapters that were relevant to their department. This connection was crucial in demonstrating the legitimacy of the project, facilitating relationships between the steering committee and directors, and securing

the commitment of city employees to serve on the working groups. Early and regular communication with municipal departments was critical. We found that departments that were more engaged in early discussions about the process provided more ideas and suggestions on drafts than departments who were approached after we had already developed draft actions.

We also received strong support from University leadership for this effort. Most substantially, UAA leadership encouraged faculty members to participate in the working groups and supported adding this activity to their official university workloads. Chancellor Cathy Sandeen recorded a video to encourage students and staff to participate in the community engagement process, and the University Advancement team developed social media campaigns to advertise key community events throughout the project.

Even with support from municipal and university leadership, we found that there was some disconnect between municipal and university functions, timelines, and seasonal calendars. University staff were unfamiliar with municipal department functions, and municipal staff were not aware of faculty and student capacity and academic timelines. Before embarking on collaborative projects of this scope in the future, we would likely design an orientation session for all stakeholders to outline some of these key operational principles. A further disconnect was in the level of detail desired in the final plan. Municipal staff prioritised a short, concise report, while university faculty favoured a more comprehensive document. Ultimately, the team reached a compromise by including a high level of detail in the final plan and creating a brief, high-level strategy document that highlighted high priority, near-term actions.

Contributions from UA faculty were also particularly important during the project development phase. One of the major obstacles for the municipality in developing adaptation strategies was the lack of easily accessible information on potential impacts of climate change at a local scale that were relevant to municipal planning. Because university faculty made up almost one-third of the working group members, they could offer their expertise on the relevant local research and help guide discussions to prioritise major impacts. For example, faculty members from public health and with experience in disaster planning chaired the Health and Emergency Preparedness working group; a scientist with expertise in renewable energy and microgrids led the Buildings and Energy group; and a faculty member from the business and public policy programme who studies sustainable food systems chaired the Food Systems working group. Engineers, wildlife biologists, land use planners, and small business advisors who research and practice in Alaska also contributed to the plan. This background knowledge accelerated the development of the plan because municipal staff did not have to begin with a literature review to understand how climate change is affecting Anchorage. By combining the scientific expertise of the university with the experience of local practitioners and municipal staff, the technical working sessions facilitated conversations that could quickly move from science to practice.

Notably, UAA is committed to community engagement, and many faculty teach service-learning and community-engaged courses and are involved in community-based research. As a result, when two faculty members proposed integrating aspects of the climate action plan development process into their courses, the idea was welcomed. Additionally, several faculty members who were on the steering committee have extensive experience designing and implementing community conversations. For example, many faculty involved in the project are part of the university "Difficult Dialogues" programme[2] that facilitates civil discourse around potentially controversial topics. The faculty experience in this realm was an important resource for the plan development and helped shape the community engagement strategy.

The municipal staff on the steering committee also felt that diverse methods of outreach and conversation were important, and together, the municipal-university team prioritised public involvement throughout plan development. The numerous public open houses and the mobile climate workshops, in particular, increased the number and breadth of residents who participated in the development of the plan and undoubtedly strengthened its quality. By working with community groups to tailor their mobile climate workshop according to their members' interests and expertise, we were

able to get more buy-in and helpful feedback. Furthermore, by contributing to the development of the plan, residents felt ownership of the project and many advocated for the plan to their friends, family, and Assembly representatives. Building broad-based community support will also ensure that the city continues to make progress on implementation. While municipal staff on the steering committee were able to commit significant time to organising and facilitating community engagement events, cities who do not have the same capacity should consider leveraging additional university resources to achieve this level of public involvement.

Throughout the Anchorage plan development process, the steering committee met weekly to keep the process on track, ensure clear communication between the municipality and the university, and to collaborate on designing new aspects of the project. These regular meetings, open conversations, and a clear point of contact for the project were among the most important factors that led to completion of the plan. Every person on the steering committee took on this role as part of their full time job at the city or university, and they each went through the necessary paperwork to make it an official part of their job (e.g. gaining supervisor approval, adding it to their workload). While neither the municipality of the university could commit a full time person to the project, the team approach with multiple part-time staff who met regularly created a sense of shared purpose and design in every aspect of the project.

5.3. Plan adoption

An early measure of success of this project was the approval of the plan by the Anchorage Assembly. Several activities led to gaining the support of the Assembly. After the initial scoping of the project, the steering committee worked with the Mayor to draft a resolution of support for the development of the plan, which was co-sponsored by 6 of 11 Assembly members. The municipal staff on the steering committee presented the proposed planning process to the Assembly, and the resolution was approved unanimously. This public show of support by the Assembly helped demonstrate broad political support across party lines, which strengthened the legitimacy of the project during public meetings. In order to maintain our relationship with the Assembly, we updated Assembly members throughout the process and hosted two work sessions during which members could ask questions and propose changes.

Early in the planning process, the steering committee made the decision that the plan would not include a broad legislative package or specific budget line items. Even with broad Assembly support, any changes to city code would take many months or even years, which would fall outside of the political timeline under which we were working. Rather than structure the plan as a set of prescriptive guidelines, we developed recommendations that would provide municipal departments and the Assembly with the flexibility to accomplish the plan's goals and objectives according to current circumstances and available resources. As other communities embark on this process, our experience suggests some level of compromise will be necessary. Having a clear understanding within the leadership team of your broad goals will allow concessions without derailing your ultimate objective.

We also wanted to include the business community in the process, but lacked the appropriate connections. Mayor Berkowitz helped bridge the gap by hosting a business community happy hour event funded by the Environmental Defense Fund and by speaking about the climate action plan in various forums, including his 2018 *State of the City* address to the Anchorage Chamber of Commerce and local Rotary clubs. Similarly, due to our early engagement with the UAA leadership, the Chancellor was willing to submit a letter of support to the Anchorage Assembly when they were considering adopting the plan.

In addition to eliciting input from the Anchorage community at-large, one of the reasons that we prioritised community engagement throughout the plan development process was that it would give Anchorage residents a sense of ownership of the plan. Similarly, half of the working group members and three-quarters of the Advisory Committee were representatives from outside the municipality or university (i.e. representatives from various non-profit organisations, state and federal organisations,

and private business). Co-creation of the climate action plan with a diverse set of stakeholders meant that we had a number of partners who were invested in mobilising community members to write to their Assembly representatives, writing their own letters of support, and providing public testimony at the Assembly meeting where the plan was being considered for adoption.

5.4. Plan implementation

Although still early in the process of implementing the Anchorage Climate Action Plan, there are some early lessons learned. Community ownership of the plan has continued to be an important element during implementation. Non-profit organisations have organised community forums to support the roll out, and several related projects are underway, such as K-12 teachers integrating the plan into their curriculum and the school district considering development of their own climate action plan.

The collaboration with the university continues through two primary mechanisms: (1) ongoing research to fill the gaps noted in the plan or to support resilience planning (e.g. through the development of maps or other planning tools) and (2) the development of an external community oversight body for the plan. Although we have political support from the city government now, a key challenge in the future may be an administration that does not prioritise resilience planning. We are currently building structures to institutionalise the plan within the government culture (through the Municipal Sub-Cabinet) and through external oversight (by the Anchorage Climate Action and Equity Council) to counter this potential shift. Other challenges and needs that we continue to address are the development of appropriate monitoring strategies and identifying external funding for new programmes. While the Municipality does not have the financial or human resources to meet all of these requirements up front, the relationships developed during the creation of the plan support implementation through collaborative grants, student projects, and joint project committees that include Municipality staff and university faculty.

6. Future opportunities and broader implications

The goal of this paper is to critically assess the key structural, political, and social elements that helped overcome the limitations of previous climate action planning efforts with the hope that these strategies can be implemented in other communities working towards climate planning or resilience planning, more broadly. Although there were many aspects of our approach that we would recommend to other communities, there were also missed opportunities that we would encourage others to explore. For example, although we strived to spread information about the public meetings and opportunities for input through broad types of media (e.g. newspaper, radio, Facebook, non-profit listservs), we did not collect information that would allow us to evaluate which method was most effective at reaching a broad segment of the Anchorage population. In addition, we did not test different types of content in our public outreach messages. Marketing and communication around community planning efforts is resource intensive, and it would be helpful to establish a set of best practices on how to effectively encourage public input.

Most of the people invited to be working group members accepted the invitation and attended all three of our full-day technical sessions. Municipal employees were given blanket approval to participate in the process by the mayor, but the other five dozen working group members who were not employed by the local government committed to participation through other means. We did not ask working group members about the motivation for their participation. As new planning processes or research projects arise, it would be helpful to know why stakeholders from different agencies and organisations choose or choose not to participate in a given activity. Additionally, new projects could be structured so that tangible deliverables (e.g. a final report, a manuscript) or intangible benefits (e.g. networking opportunities) that are appealing to a wide range of stakeholders are built into the project.

Another potential area of research would be a deeper evaluation of the impact of community engagement and outreach activities both in terms of perceived influence on the plan development as well as the influence on individual behaviour change. It would be helpful to know which types of facilitated workshops created the strongest sense of ownership and empowerment among residents so that these activities could be utilised in future planning efforts. In sum, our process engaging in collaborative climate mitigation and adaptation planning with university, community, and municipal partners in Anchorage, Alaska can provide strategies and ideas for leveraging local expertise to develop a comprehensive resilience planning document. This is particularly important when municipalities are struggling with lack of human resources and local climate information. Collaboration with the broader Anchorage community helped ensure the plan was relevant to and representative of Anchorage residents. Community discussions also spurred new ideas and contributed to a sense of community ownership of the plan. Broad stakeholder engagement has already proven useful in the early stages of implementation, and we hope it will continue to be a driving force over the coming decades. Timing this process during a key window in political leadership and early engagement of municipal departments ensured buy-in from the local government. Finally, the partnership provided a number of opportunities for university researchers to apply their knowledge to a significant community issue and integrate real-world projects into their courses. By engaging in projects that address local challenges and integrate students through service-learning activities, universities can play a unique role in finding solutions to current issues while preparing the next generation to contribute to strengthening community resilience.

Notes

1. http://www.muni.org/climateactionplan.
2. UAA Difficult Dialogues https://www.uaa.alaska.edu/academics/institutional-effectiveness/departments/center-for-advancing-faculty-excellence/difficult-dialogues/.

Acknowledgements

We want to thank the members of the steering committee, working groups, and advisory committee as well as the substantial number of Anchorage residents who contributed to the development of the 2019 Anchorage Climate Action Plan. Thank you specifically to Brian Brettschneider and Shaina Kilcoyne for your feedback on this manuscript.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the University of Alaska Faculty Initiative Fund; the University of Alaska Anchorage Center for Community Engagement and Learning Resilient Cities grant; and the Jack and Martha Roderick Sustainability Fund.

Supplemental material

As we were developing the Anchorage Climate Action Plan, several other Alaskan communities approached us with questions about our process. To help address this need, we developed a toolkit that describes our process in detail and includes resources we referenced while developing our process, the worksheets from the technical sessions, and a description of the different types of community meetings we facilitated. The toolkit and final Anchorage Climate Action plan can be accessed at the Municipality of Anchorage's Sustainability website (www.muni.org/sustainability).

References

Allahwala, Ahmed, Susannah Bunce, Lesley Beagrie, Shauna Brail, Timothy Hawthorne, Sue Levesque, Jürgen von Mahs, and Brenda Spotton Visano. 2013. "Building and Sustaining Community-University Partnerships in Marginalized Urban Areas." *Journal of Geography* 112 (2): 43–57. doi:10.1080/00221341.2012.692702.

Arnstein, Sherry R. 1969. "A Ladder Of Citizen Participation." *Journal of the American Institute of Planners* 35: 216–224. doi:10.1080/01944366908977225.

Baker, Ingrid, Ann Peterson, Greg Brown, and Clive McAlpine. 2012. "Local Government Response to the Impacts of Climate Change: An Evaluation of Local Climate Adaptation Plans." *Landscape and Urban Planning* 107 (2): 127–136. doi:10.1016/j.landurbplan.2012.05.009.

Bassett, Ellen, and Vivek Shandas. 2010. "Innovation and Climate Action Planning: Perspectives from Municipal Plans." *Journal of the American Planning Association* 76 (4): 435–450. doi:10.1080/01944363.2010.509703.

Bierbaum, Rosina, Joel B Smith, Arthur Lee, Maria Blair, Lynne Carter, F. Stuart Chapin, Paul Fleming, et al. 2013. "A Comprehensive Review of Climate Adaptation in the United States: More Than Before, but Less Than Needed." *Mitigation and Adaptation Strategies for Global Change* 18 (3): 361–406. doi:10.1007/s11027-012-9423-1.

Burton, Paul, and Johanna Mustelin. 2013. "Planning for Climate Change: Is Greater Public Participation the Key to Success?" *Urban Policy and Research*. doi:10.1080/08111146.2013.778196.

Combest-Friedman, Chelsea, Claudia Nierenberg, and Caitlin Simpson. 2019. "Building a Learning Network: Reflections from the RISA Program." *Current Opinion in Environmental Sustainability* 39 (August): 160–166. doi:10.1016/j.cosust.2019.10.006.

Curry, Joanne E. 2016. "The Dynamics of University/City Government Relationships: It's Personal." *Metropolitan Universities* 27 (1): 56–70.

Dessai, Suraje, and Mike Hulme. 2004. "Does Climate Adaptation Policy Need Probabilities?" *Climate Policy* 4 (2): 107–128. doi:10.1080/14693062.2004.9685515.

Farrell, C. R. 2018. "The Anchorage Mosaic: Racial and Ethnic Diversity in the Urban North." In *Imagining Anchorage: The Making of America's Northernmost Metropolis*, edited by J. K. Barnett, and H. C. Hartman, 374–391. Fairbanks, AK: University of Alaska Press.

Furco, Andrew, and Susan Root. 2010. "Research Demonstrates the Value of Service Learning." *Phi Delta Kappan* 91 (5): 16–20. doi:10.1177/003172171009100504.

Haight, Keagan, Victoria Lawless, and Christiana Yip. 2016. "Lemon Grove Climate Action Planning: Mitigation and Adaptation Strategies for Climate Change in Lemon Grove, CA." Lemon Grove, CA. https://digitallibrary.sdsu.edu/islandora/object/sdsu%3A19156.

ICLEI. 2019. "Climate Equity." 2019. http://icleiusa.org/programs/climate-equity/.

ICMA. 2014. "When a University Partners with Local Governments in Innovative Ways." 2014. https://icma.org/articles/pm-magazine/when-university-partners-local-governments-innovative-ways.

Institute for Local Government and California Air Resources Board. 2010. "How to Harness the Power of Your Community to Address Climate Change." https://www.ca-ilg.org/sites/main/files/file-attachments/cc_and_public_participation.pdf.

Jackson, April, and Melanie Marques. 2019. "DIY Do's and Don'ts: Limitations to Building University-Community Partnerships with Low Resource Communities of Color." *Planning Practice & Research* 34 (3): 318–345. doi:10.1080/02697459.2019.1578917.

Koza, Mitchell, and Arie Lewin. 2000. "Managing Partnerships and Strategic Alliances: Raising the Odds of Success." *European Management Journal* 18 (2): 146–151. doi:10.1016/S0263-2373(99)00086-9.

Markon, C., S. Gray, M. Berman, L. Eerkes-Medrano, T. Hennessy, H. Huntington, J. Littell, M. McCammon, R. Thoman, and S. Trainor. 2018. "Alaska." In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*, edited by D. R. Reidmiller, C. W. Avery, D. R. Easterling, K. E. Kunkel, K. L. M. Lewis, T. K. Maycock, and B. C. Stewart, 1185–1241. Washington, DC: U.S. Global Change Research Program. https://doi.org/10.7930/NCA4.2018.CH26.

Mastrandrea, Michael D., Nicole E. Heller, Terry L. Root, and Stephen H. Schneider. 2010. "Bridging the Gap: Linking Climate-Impacts Research with Adaptation Planning and Management." *Climatic Change* 100 (1): 87–101. doi:10.1007/s10584-010-9827-4.

Meeker, Danielle. 2017. "A Synthesis of Climate Adaptation Planning Needs in Alaska Native Communities."

Moser, Susanne C., and Julia A. Ekstrom. 2012. "Identifying and Overcoming Barriers to Climate Change Adaptation in San Francisco Bay: Results from Case Studies." Berkeley, CA.

Moss, R. H., G. A. Meehl, M. C. Lemos, J. B. Smith, J. R. Arnold, J. C. Arnott, D. Behar, et al. 2013. "Hell and High Water: Practice-Relevant Adaptation Science." *Science* 342 (6159): 696–698. doi:10.1126/science.1239569.

Norris, Keith C., Rebecca Brusuelas, Loretta Jones, Jeanne Miranda, O. Kenrik Duru, and Carol M. Mangione. 2007. "Partnering with Community-Based Organizations: An Academic Institution's Evolving Perspective." *Ethnicity and Disease* 27–32.

Pearce, Tristan D., James D. Ford, Gita J. Laidler, Barry Smit, Frank Duerden, Mishak Allarut, Mark Andrachuk, et al. 2009. "Community Collaboration and Climate Change Research in the Canadian Arctic." *Polar Research* 28 (1): 10–27. doi:10.1111/j.1751-8369.2008.00094.x.

Plumer, Brad. 2018. "'Impossible to Ignore': Why Alaska Is Crafting a Plan to Fight Climate Change." *The New York Times*, May 15, 2018. https://www.nytimes.com/2018/05/15/climate/alaska-climate-change.html.

Portland Development Commission. 2005. "Public Participation Manual." https://www.portlandoregon.gov/civic/article/84435.

Preston, Benjamin L., Richard M. Westaway, and Emma J. Yuen. 2011. *Climate Adaptation Planning in Practice: An Evaluation of Adaptation Plans from Three Developed Nations. Mitigation and Adaptation Strategies for Global Change*. Vol. 16. https://doi.org/10.1007/s11027-010-9270-x.

Schlossberg, Marc, Nico Larco, Carissa S. Slotterback, Charles Connerly, and Mike Greco. 2018. "Educational Partnerships for Innovation in Communities (EPIC): Harnessing University Resources to Create Change." In *Urban Book Series*, 251–268. Springer. https://doi.org/10.1007/978-3-319-55967-4_17.

Shi, Linda, Eric Chu, and Jessica Debats. 2015. "Explaining Progress in Climate Adaptation Planning Across 156 U.S. Municipalities." *Journal of the American Planning Association* 81 (3): 191–202. doi:10.1080/01944363.2015.1074526.

Stults, Missy, and Sierra C. Woodruff. 2017. "Looking under the Hood of Local Adaptation Plans: Shedding Light on the Actions Prioritized to Build Local Resilience to Climate Change." *Mitigation and Adaptation Strategies for Global Change* 22 (8): 1249–1279. doi:10.1007/s11027-016-9725-9.

Tang, Zhenghong, Samuel D. Brody, Courtney Quinn, Liang Chang, and Ting Wei. 2010. "Moving from Agenda to Action: Evaluating Local Climate Change Action Plans." *Journal of Environmental Planning and Management* 53 (1): 41–62. doi:10.1080/09640560903399772.

U.S. Census Bureau. 2019. "American FactFinder." 2019. https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml.

Wheeler, Stephen. 2008. "State and Municipal Climate Change Plans: The First Generation." *Journal of the American Planning Association* 74 (4): 481–496. doi:10.1080/01944360802377973.

Wiewel, Wim, and Michael Lieber. 1998. "Goal Achievement, Relationship Building, and Incrementalism: The Challenges of University-Community Partnerships." *Journal of Planning Education and Research* 17 (4): 291–301. doi:10.1177/0739456X9801700404.

Wiseman, John, Lara Williamson, and Jess Fritze. 2010. "Community Engagement and Climate Change: Learning from Recent Australian Experience." *International Journal of Climate Change Strategies and Management* 2 (2): 134–147. doi:10.1108/17568691011040399.

Woodruff, Sierra C., and Missy Stults. 2016. "Numerous Strategies but Limited Implementation Guidance in US Local Adaptation Plans." *Nature Climate Change* 6 (8): 796–802. doi:10.1038/nclimate3012.

Yuen, Tina, Eric Yurkovich, Lauren Grabowski, and Beth Altshuler. 2017. "Guide to Equitable, Community-Driven Climate Preparedness Planning." https://www.usdn.org/uploads/cms/documents/usdn_guide_to_equitable_community-driven_climate_preparedness-_high_res.pdf.