Still Melting: How Climate Change and Subsistence Laws Constrain Alaska Native Village Adaptation

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Subsistence hunting and fishing practices are essential to maintain the physical, economic, and cultural continuity of Alaska Native Villages ("ANVs"). The combination of rapid climate change, laws that restrict hunting and fishing, and systems for participating in decision-making about hunting and fishing all limit the ways in which ANV residents can legally adapt their subsistence practices to fluctuations in species populations and location. This Article outlines impacts to subsistence experienced by ANV residents, legal and institutional constraints to adaptation, and recommendations for change. A key finding is that subsistence-oriented adaptation takes place more often at an individual or household level, rather than at a community level. This is significant because the subsistence lifeway involves exchange with people in and beyond the community, even though the acts of hunting and fishing may be at the individual and household level. At the community level, ANVs are hindered by their lack of jurisdiction over fish and game and the challenges of participating in state and federal decision-making. Short of legal change, agencies could increase ANV participation by spending more time in ANVs and making efforts to increase involvement and employment of ANV citizens. ANV governments could improve food security by subsidizing and seeking funding to support subsistence, food storage, and other forms of food production.

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INTRODUCTION

Alaska Native Villages ("ANVs") are federally recognized tribes located in Arctic and sub-Arctic village sites that are often distant from ur-

ban centers. The inhabitants of many ANVs depend on subsistence[1] practices for their nutritional and cultural needs.[2] Given the high costs of flying commercial foods into remote villages off the road system, subsistence helps promote food security.[3] In addition, subsistence enables families to spend time together and pass down knowledge and values.[4]

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1 I use the State of Alaska's legal definition for subsistence:

> the noncommercial, customary and traditional uses of wild, renewable resources by a resident domiciled in a rural area of the state for direct personal of family consumption as food, shelter, fuel, clothing, tools, or transportation, for the making and selling of handicraft articles out of nonedible by-products of fish and wildlife resources taken for personal or family consumption, and for the customary trade, barter, or sharing for personal or family consumption.

ALASKA STAT. § 16.05.940. This definition does not convey the significance of subsistence to many Alaska Natives, who value it as a fundamental part of their culture. E. Barrett Ristroph, *Alaska Tribes' Melting Subsistence Rights*, 1 ARIZ J. ENVTL. POL. 49 (2010).

2 Philip A. Loring et al., *Ways to Help and Ways to Hinder: Governance for Effective Adaptation to an Uncertain Climate*, 64 ARCTIC 73 (2011); Patricia Cochran, et al., *Indigenous Frameworks for Observing and Responding to Climate Change in Alaska*, 120 CLIMATIC CHANGE 557 (Oct. 2013).

3 Cochran, et al., *supra* note 2, at 560; Davin Holen, *Fishing for Community and Culture: The Value of Fisheries in Rural Alaska*, 50 NORTHERN FISHERIES 403 (2014); Shannon Michele McNeeley, SEASONS OUT OF BALANCE: CLIMATE CHANGE IMPACTS, VULNERABILITY, AND SUSTAINABLE ADAPTATION IN INTERIOR ALASKA 6 (2009). By "food security," I mean "a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life." *See* FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, THE STATE OF FOOD INSECURITY IN THE WORLD 2001 (2002), http://www.fao.org/docrep/005/y7352e/y7352e00.htm; Rachel Engler-Stringer, *Food Security*, *in* ENCYCLOPEDIA OF QUALITY OF LIFE AND WELL-BEING RESEARCH 2326–27 (Alex C. Michalos, 2014). In the context of ANVs, "preference" is particularly important since Western foods may be culturally unacceptable. *See* Mark Nuttall et al., *Hunting, Herding, Fishing and Gathering: Indigenous Peoples and Renewable Resource Use in the Arctic*, *in* ARCTIC CLIMATE IMPACT ASSESSMENT 654, 649–90 (2005). Also important is the "active and healthy life" component, since subsistence supports an active and healthy lifeway. Aaron Wernham, *Inupiat Health and Proposed Alaskan Oil Development: Results of the First Integrated Health Impact Assessment/Environmental Impact Statement for Proposed Oil Development on Alaska's North Slope*, 4 ECOHEALTH 514 (2007).

4 Michael Hibbard & Robert Adkins, *Culture and Economy: The Cruel Choice Revisited*, *in* RECLAIMING INDIGENOUS PLANNING 94, 108 (Ryan Walker et al. eds., 2013); Jonathan M. Hanna, *Native Communities and Climate Change: Protecting Tribal Resources as Part of National Climate Policy: Report* 11 (2007), http://scholar.law.colorado.edu/cgi/viewcontent.cgi?article=1014&context=books_reports_studies; Nuttall et al., *supra* note 3, at 654; Holen, *supra* note 3.

But this lifeway faces challenges, including the rapid climate change that has been occurring since the late twentieth century.[5] Climate change has contributed to species shifts—changes in species abundance or migration routes—that affect ANV subsistence practices.[6] Not only are species shifting, but access to them has become more difficult.[7] During the summer, low river water levels impede boat travel.[8] During the fall and winter, snowmachine travel can be complicated and dangerous due to reduced snow coverage and rivers that remain unfrozen late in the season.[9] Hunters can adapt by using bigger snowmachines and boats that are safer and can travel farther, but this adaptation results in greater dependency on fossil fuels[10] and greater susceptibility to fluctuations in the market economy.[11] Some hunters may not be able to travel as much due to high fuel costs.[12]

In addition to shifting and impeding access to vital species, climate change complicates food preservation.[13] On the North Slope, melting permafrost has made it more difficult to store food in traditional ice cellars.[14]

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5 Brooke C. Stewart et al., *Regional Climate Trends and Scenarios for the U.S. National Climate Assessment, Part 7, Climate of Alaska* (2013), http://www.nesdis.noaa.gov/technical_reports/NOAA_NESDIS_Tech_Report_142-7-Climate_of_Alaska.pdf; C.B. Field et al., eds., CLIMATE CHANGE 2014: IMPACTS, ADAPTATION, AND VULNERABILITY, CONTRIBUTION OF WORKING GROUP II TO THE FIFTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 32 (2014).

6 McNeeley, *supra* note 3, at 95; Shannon M. McNeeley, *Examining Barriers and Opportunities for Sustainable Adaptation to Climate Change in Interior Alaska*, 111 CLIMATIC CHANGE 835, 839 (2012); Nicole J. Wilson, *The Politics of Adaptation: Subsistence Livelihoods and Vulnerability to Climate Change in the Koyukon Athabascan Village of Ruby, Alaska*, 42 HUMAN ECOLOGY 87, 95 (Feb. 2014).

7 Todd J. Brinkman, et al., *Arctic Communities Perceive Climate Impacts on Access as a Critical Challenge to Availability of Subsistence Resources*, 139 CLIMATIC CHANGE 413 (2016).

8 *See* McNeeley, *supra* note 3, at 129.

9 Corrine N. Knapp et al., *Parks, People, and Change: The Importance of Multistakeholder Engagement in Adaptation Planning for Conserved Areas*, 19 ECOLOGY AND SOC'Y 16 (2014); Gary P. Kofinas et al., *Resilience of Athabascan Subsistence Systems to Interior Alaska's Changing Climate*, 40 CAN. J. FOREST RES. 1347, 1350 (2010).

10 Amanda H. Lynch & Ronald D. Brunner, *Context and Climate Change: An Integrated Assessment for Barrow, Alaska*, 82 CLIMATIC CHANGE 93, 96 (Mar. 2007); *See* Henry P. Huntington & Roger G. Barry, *"It's Not That Simple": A Collaborative Comparison of Sea Ice Environments, Their Uses, Observed Changes, and Adaptations in Barrow, Alaska, USA, and Clyde River, Nunavut, Canada*, 35 AMBIO 203, 209 (2006).

11 Wilson, *supra* note 6, at 92.

12 Brinkman et al., *supra* note 7, at 425.

13 McNeeley, *supra* note 3, at 129.

14 Ristroph, *supra* note 1.

As soil temperatures rise, the cellars are less likely to protect food from pathogens that cause foodborne illness.[15]

These obstacles may reduce subsistence participation, which may contribute to health problems by increasing consumption of more commercial foods,[16] reducing physical exertion,[17] and increasing stress.[18] Reduced subsistence participation can result in a loss of community knowledge associated with traditional subsistence practices.[19]

Alaska Natives have a long history of adapting subsistence practices to climate change and other challenges.[20] Strategies adopted by individuals and families include flexible hunting practices (i.e., hunting at different times or places or for different species);[21] monitoring weather conditions more closely;[22] using traditional environmental knowledge[23] as well as

15 MICHAEL BRUBAKER ET AL., ANTHC CENTER FOR CLIMATE HEALTH, CLIMATE CHANGE IN POINT HOPE, ALASKA, STRATEGIES FOR COMMUNITY HEALTH 26 (2010).

16 CAROL BALLEW ET AL., ALASKA NATIVE HEALTH BOARD, FINAL REPORT ON THE ALASKA TRADITIONAL DIET SURVEY, 81 (Mar. 2004), http://anthctoday.org/epicenter/publications/Reports_Pubs/traditional_diet.pdf; MICHAEL BRUBAKER & RAJ CHAVAN, ANTHC CENTER FOR CLIMATE AND HEALTH, CLIMATE CHANGE IN KIANA, ALASKA, STRATEGIES FOR COMMUNITY HEALTH 23–26 (2011); Wernham, *supra* 3, at 505.

17 Hanna, *supra* note 4, at 12.

18 Wernham, *supra* note 3, at 506;

19 T.B. Bull Bennett et al., *Indigenous Peoples, Lands, and Resources*, *in* CLIMATE CHANGE IMPACTS IN THE UNITED STATES: THE THIRD NATIONAL CLIMATE ASSESSMENT, 297, 301 (Jerry M. Melillo et al. eds., 2014); James Ford et al., *Reducing Vulnerability to Climate Change in the Arctic: The Case of Nunavut, Canada*, 60 ARCTIC 150, 155 (2007); McNeeley, *supra* note 3, at 13; E.B. Ristroph, *Integrating Community Knowledge into Environmental and Natural Resource Decision-Making: Notes from Alaska and Around the World*, 3 WASH. & LEE J. ENERGY, CLIMATE, & ENV'T 81, 96–97 (2012).

20 Loring et al., *supra* note 2, at 74; George W. Wenzel, *Canadian Inuit Subsistence and Ecological Instability—If the Climate Changes, Must the Inuit?* 28 POLAR RES. 89, 97 (2009).

21 Fikret Berkes & Dyanna Jolly, *Adapting to Climate Change: Social-Ecological Resilience in a Canadian Western Arctic Community*, 5 CONSERVATION ECOLOGY 18 (2001); Kenneth L. Pratt, Joan C. Stevenson, & Phillip M. Everson, *Demographic Adversities and Indigenous Resilience in Western Alaska*, 37 ÉTUDES/INUIT/STUDIES 35, 45 (2013); Wenzel, *supra* note 20; Jon Rosales & Jessica Chapman, *Perceptions of Obvious and Disruptive Climate Change: Community-Based Risk Assessment for Two Native Villages in Alaska*, 3 CLIMATE 812, 824 (2015).

22 James D. Ford, & Barry Smit, *A Framework for Assessing the Vulnerability of Communities in the Canadian Arctic to Risks Associated with Climate Change*, 57 ARCTIC, 389, 392 (2004).

23 Berkes & Jolly, *supra* note 21.

modern technology;[24] sharing and trading;[25] hunting illegally;[26] and eating more store-bought food.[27] While these strategies demonstrate that ANVs and their residents are clearly capable of adapting, the magnitude of today's rapid climate change, along with the restrictions posed by the western legal system and socio-economic pressures, presents a more significant adaptation challenge to Alaska Native subsistence than ever before.[28]

In a previous article,[29] I called attention to ways in which laws and climate change constrain Alaska Natives' subsistence opportunities and rights. This Article provides a more in-depth analysis informed by additional research, changes that have occurred in the intervening decade, and 153 interviews and interview-like conversations[30] with ANV residents and

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24 Ford & Smit, *supra* note 22, at 392.

25 Berkes & Jolly, *supra* note 21; Shauna BurnSilver et al., *Are Mixed Economies Persistent or Transitional? Evidence Using Social Networks from Arctic Alaska*, 118 AM. ANTHROPOLOGIST *passim* 121 (2016); Liesel Ashley Ritchie, *Individual Stress, Collective Trauma, and Social Capital in the Wake of the Exxon Valdez Oil Spill*, 82 SOCIOLOGICAL INQUIRY 187, 194 (2012); Sophie Theriault et al., *Legal Protection of Subsistence: A Prerequisite of Food Security for the Inuit of Alaska*, 22 ALASKA L. REV. 35, 54 (2005); McNeeley, *supra* note 3, at 65–66.

26 Joseph J. Spaeder, *Co-Management in a Landscape of Resistance: The Political Ecology of Wildlife Management in Western Alaska*, 47 ANTHROPOLOGICA 165, 167 (2005).

27 Consumption of commercial foods is not a preferred strategy for many Alaska Natives, Ristroph, *supra* note 1, at 51; Ashlee Willox et al., "*From This Place and of This Place*:*" Climate Change, Sense of Place, and Health in Nunatsiavut, Canada*, 75 SOCIAL SCI. & MED. 538, 543 (2012); Elizabeth Grossman, *Natural Food, Unnatural Shortages*, ALASKA DAILY NEWS (Nov. 22, 2014), https://www.adn.com/we-alaskans/article/natural-food-unnatural-shortages/2014/11/23, but may be a better alternative than risking an expensive, unsuccessful, or potentially illegal hunt. Loring et al, *supra* note 2, at 81. *See also* Winslow D. Hansen et al., *Meeting Indigenous Subsistence Needs: The Case for Prey Switching in Rural Alaska*, 18 HUMAN DIMENSIONS OF WILDLIFE 109 (2013); Philip A. Loring & S. C. Gerlach, *Food, Culture, and Human Health in Alaska: An Integrative Health Approach to Food Security*, 12 ENVTL. SCI. & POL'Y 466 (2009); Kalb T. Stevenson et al., *Sustainable Agriculture for Alaska and the Circumpolar North: Part I. Development and Status of Northern Agriculture and Food Security*, 67 ARCTIC 271 (2014).

28 Loring et al., *supra* note 2; Elizabeth Marino, *The Long History of Environmental Migration: Assessing Vulnerability Construction and Obstacles to Successful Relocation in Shishmaref, Alaska*, 22 GLOBAL ENVTL. CHANGE 374, 375, 378 (2012); Ristroph, *supra* note 1, at 65; Wenzel, *supra* note 20, at 96.

29 Ristroph, *supra* note 1.

30 These were conversations where participants essentially answered the interview questions but did not want to be formally interviewed. Interviews and conversations took place between June 2016 and March 2017 in person in ANVs and at conferences pertaining to ANVs, or through phone calls from Fairbanks to participants' locations.

individuals outside ANVs who make or influence laws that affect ANVs.[31] This Article draws additional insight from community plans relevant to the fifty-nine ANVs from which I selected participants, including hazard mitigation plans required by the Federal Emergency Management Agency ("FEMA") for certain kinds of disaster assistance[32] and plans related to economic development and land use. This Article not only considers how ANVs and their members adapt subsistence practices in response to climate change, but also how U.S. and Alaskan laws and institutions impede adaptation. It also explores what ANVs and external entities could do to facilitate adaptation and sustainable, participatory management of fish and game populations.

Part I of the Article briefly outlines the highly complex legal regime that governs subsistence and describes how this regime poses obstacles to ANV adaptation. For each set of obstacles identified in Part I, Part II summarizes the views of the research participants concerning how they are affected, how they are responding, and what legal and institutional changes they would like to see. Part III discusses potential remedies for each set of obstacles.

I. HOW THE SUBSISTENCE LEGAL REGIME CAN IMPEDE ADAPTATION TO CLIMATE CHANGE

This Part outlines the major state and federal laws that affect how most ANV residents engage in subsistence, starting with the laws that wrested management responsibilities from ANVs and placed them in the hands of state and federal agencies. While there have been efforts to involve ANVs in agency decision-making and to adjust rules in response to changing climate conditions, ANVs and Alaska Natives have less ability

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31 This research was authorized by the Institutional Review Board of the University of Hawaii and ethical considerations require that the identity of research participants be kept confidential. For this reason, names of participants and ANVs are generally not mentioned in this article. The differences in the questions answered by different participants (despite starting out with just two questionnaires—one for each set of participants) limited the ability to quantitatively compare responses between different participants. Given this limitation and the subjectivity of my coding, I decided that using inferential statistics was not appropriate. *See* H. RUSSELL BERNARD & GERY W. RYAN, ANALYZING QUALITATIVE DATA: SYSTEMATIC APPROACHES (1st ed. 2009); Yan Zhang & Barbara M. Wildemuth, *Qualitative Analysis of Content*, 1 ANALYSIS 1 (2005). I thus avoid referring to specific numbers of participants in this article. To give an order of magnitude of the responses I received, I refer to "a few" (about 2 to 5), "several" (about 6 to 10), "a number of" (10-30), or "many" (more than 30). These categorizations are not statistically significant and should not be interpreted as such.

32 *See* 42 U.S.C. § 5165(a) (2018).

under the current legal regime to adapt than they did prior to colonization. I argue that this loss of control and the restrictive nature of some laws impedes the ability of ANV residents to adapt their subsistence practices to climate change.[33]

A. Limited Jurisdiction and Opportunities for Meaningful Co-management by ANVs

While Alaskan tribes retain some of the inherent sovereign powers held by all tribes in the United States,[34] they generally lack jurisdiction over their traditional lands, fish, and game.[35] The Alaska Native Claims Settlement Act ("ANCSA") provided for portions of these lands to be transferred to regional and village Native Corporations in fee simple.[36] ANCSA not only purported to extinguish aboriginal title over Alaskan lands, it also sought to end aboriginal hunting and fishing rights in Alaska.[37] As a result, Alaskan tribes have limited opportunities to manage traditional hunting and fishing in ways that would facilitate adaptation.[38]

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33 I have narrowed the scope of this discussion to the laws and issues most relevant to adaptation. Notably, participants raised many additional concerns about conflicts between subsistence and other kinds of hunting and fishing, as well as conflicts between traditional practices and the Western, paper-intensive system of regulation.

34 *See* Act of May 1, 1936, Pub. L. No. 74-538, 49 Stat. 1250 (1936) (codified at 25 U.S.C. § 473(a)) (amending the Indian Reorganization Act of 1934 to include Alaska Natives); Indian Tribal Justice Act, Pub. L. No. 103-176, § 2,107 Stat. 2004 (1993) (codified at 25 U.S.C. §§ 3601 et seq. (2010)) ("Indian tribes possess the inherent authority to establish their own form of government, including tribal justice systems."); 25 U.S.C. § 5123(h)(1) (formerly codified at 25 U.S.C. § 476) ("each Indian tribe shall retain inherent sovereign power to adopt governing documents under procedures other than those specified in this section"); FELIX S. COHEN, HANDBOOK OF FEDERAL INDIAN LAW 248 (1982 ed.) ("A tribe may determine who are to be considered members by written law, custom, intertribal agreement, or treaty with the United States."); Kimball v. Callahan, 590 F.2d 768, 777–78 (9th Cir. 1979) (inherent power to determine membership does not depend on having a territorial base, so even tribes with no Indian country may retain this power); John v. Baker, 982 P.2d 738 (Alaska 1999) (holding that ANCSA did not extinguish tribal sovereignty).

35 Act of Aug. 15, 1953, Pub. L. No. 83-280, 67 Stat. 588 (1953) (codified at 18 U.S.C. § 1162, 25 U.S.C. §§ 1321–26, 28 U.S.C. §§ 1360 *et seq.*).

36 *See* 43 U.S.C. §§ 1611, 1613, 1618 (2018). These corporations are owned by Native shareholders, but not all members of an ANV may be shareholders of the corporation associated with that ANV, and shareholders may live outside the ANV or even outside Alaska. This disparity of membership and the fact that corporations are private entities rather than governments mean that ANVs are no longer in control of their traditional lands.

37 43 U.S.C. § 1603(b) (2018).

38 Spaeder, *supra* note 26, at 166; *see generally* John Sky Starkey, *Protection of Alaska Native Customary and Traditional Hunting and Fishing Rights through Title VIII of ANILCA.(Alaska National Interest Lands Conservation Act*), 33 ALASKA L. R. 315

Congress passed the Alaska National Interest Lands Conservation Act ("ANILCA")[39] in an effort to provide some subsistence rights to those who had traditionally depended on this lifeway.[40] ANILCA prioritizes subsistence over other consumptive uses of fish and game and gives "rural" subsistence users priority over urban users.[41] The federal government determines which communities are rural based on population as well as community characteristics, such as economy and integration with urban centers.[42]

ANILCA has been a disappointment to Natives who feel that the preference should have been "Native," not "rural."[43] As Natives have moved toward urban areas and the percentage of non-Natives in rural areas has increased, the rural preference has been less beneficial to Alaska Natives as a whole.[44]

ANILCA Section 809 and other laws[45] allow for some shared management responsibilities in the form of "co-management" and "collaborative management" of subsistence, which can facilitate adaptation and power-sharing by integrating community knowledge into decision-making.[46] Co-management is a legislatively-authorized relationship between

(2016). The situation of Alaska tribes contrasts with many tribes in the Lower 48, who maintain rights to regulate hunting, fishing, grazing, zoning, and water use and quality within their reservations. City of Albuquerque v. Browner, 97 F.3d 415, 418–19 (10th Cir. 1996); Morris v. Hitchcock, 194 U.S. 384 (1904); United States v. Wheeler, 435 U.S. 313, 322 n.18 (1978); *see* Merrion v. Jicarilla Apache Tribe, 455 U.S. 130 (1982).

39 Alaska National Interest Lands Conservation Act, Pub. L. No. 96-487, 94 Stat. 2371 (1980) (codified as amended at 16 U.S.C. §§ 410hh–3233, 43 U.S.C. §§ 1602–1784).

40 ANILCA expresses an intent "to provide the opportunity for rural residents engaged in a subsistence way of life to continue to do so." 16 U.S.C. § 3101(c) (2018).

41 16 U.S.C. § 3114 (2018).

42 *See* 36 C.F.R. § 242.15 (2018); 50 C.F.R. § 100.15 (2018) (rural determination process); *See also* 36 C.F.R. § 242.23 (2018); 50 C.F.R. § 100.23 (2018) (identifying non-rural areas). The federal government, through the National Marine Fisheries Service ("NMFS"), also has non-subsistence areas for halibut fishing around Ketchikan, Juneau, Valdez, and Anchorage. 50 C.F.R. § 300.65(h)(3) (2018).

43 Starkey, *supra* note 38, at 319; Robert T. Anderson, *Sovereignty and Subsistence: Native Self-Government and Rights to Hunt, Fish, and Gather after ANCSA (Special Issue on the Forty-Fifth Anniversary of the Alaska Native Claims Settlement Act)*, 33 ALASKA L. REV. 187, 215 (2016); Miranda Strong, *Alaska National Interest Lands Conservation Act Compliance & Nonsubsistence Areas: How Can Alaska Thaw out Rural & Alaska Native Subsistence Rights*, 30 ALASKA L. REV. 71, 83 (2013).

44 ALASKA POLITICS AND PUBLIC POLICY: THE DYNAMICS OF BELIEFS, INSTITUTIONS, PERSONALITIES, AND POWER, 302 (Clive S. Thomas et al., eds. 2016).

45 *E.g.*, Indian Self-Determination Act, 25 U.S.C. §§ 5361–5638.

46 Hanna, *supra* note 4, at 47; *See generally* E. Barrett Ristroph, *Strategies for Strengthening Alaska Native Village Roles in Natural Resource Management*, 4 WILLAMETTE ENVTL. L. J. 57 (2016).

subsistence participants or stakeholders (such as ANVs or Native non-profit entities) and a government agency in which some degree of responsibility or authority is conferred to both parties.[47] Collaborative management is the term used by agencies for arrangements that are similar to co-management, but may lack a specific legal mandate and be more flexible.[48]

In Alaska and elsewhere, the lack of trust between parties[49] and lack of technical and financial resources to carry out agreements have impeded effective co-management.[50] The result is that co-management is often more akin to what has been called "consultation" or "tokenism" than true citizen control.[51] There is at least one important exception. The Alaska Eskimo Whaling Commission ("AEWC") is a Native entity that

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47 Vyddiyaratnam Pathmanandakumar, *The Effectiveness of Co-Management Practices: The Case of Small-Scale Fisheries in Sri Lanka*, 8 J. AQUACULTURE RESEARCH & DEV. 1 (2017).

48 Sally Jewell, Order No. 3342, Identifying Opportunities for Cooperative and Collaborative Partnerships with Federally Recognized Indian Tribes in the Management of Federal Lands and Resources (2016), https://www.doi.gov/sites/doi.gov/files/uploads/so3342_partnerships.pdf (last visited Feb. 28, 2019). Some of the literature is sanguine on the benefits of co-management. *See, e.g.*, Sibyl W. Diver, *Towards Sustainable Fisheries: Assessing Co-Management Effectiveness for the Columbia River Basin*, NATURE PROC. (2009), https://core.ac.uk/download/pdf/288810.pdf (last visited Feb. 28, 2019); HENRY P. HUNTINGTON, WILDLIFE MANAGEMENT AND SUBSISTENCE HUNTING IN ALASKA (1992); Albert Peter & Doug Urquhart, *Co-Management of the Porcupine Caribou Herd*, 16 RANGIFER 272 (1996); Jack Kruse et al., *Co-Management of Natural Resources: A Comparison of Two Caribou Management Systems*, 57 HUMAN ORG. 447 (1998); Stephanie Pacey, *Co Management: Merging the ESA with Political Pressure to Create a Viable Alternative to ESA Listing (Whale Hunting by Alaskan Natives)*, 21 J. NAT'L. ASSOC. ADMIN. L. JUDGES 131 (2001). However, other literature is critical of how it has been carried out. *See e.g.*, Richard Howitt et al., *Capacity Deficits at Cultural Interfaces of Land and Sea Governance*, *in* RECLAIMING INDIGENOUS PLANNING 141 (Ryan Walker et al. eds., 2013); Annette Watson, *Misunderstanding the 'Nature' of Co-Management: A Geography of Regulatory Science and Indigenous Knowledges (IK)*, 52 ENVTL. MNGMT. 1085 (2013); Mary Ann King, *Co-Management or Contracting? Agreements between Native American Tribes and the U.S. National Park Service Pursuant to the 1994 Tribal Self-Government Act*, 31 HARV. ENVTL. L. REV. 475, 490 (2007).

49 MARINE MAMMAL COMM'N, REVIEW OF CO-MANAGEMENT EFFORTS IN ALASKA (2008), https://alaskafisheries.noaa.gov/sites/default/files/mmc_comgmtrev2008.pdf; Spaeder, *supra* note 26, at 173.

50 MARINE MAMMAL COMM'N, *supra* note 49, at iv; Laurie Richmond, *Incorporating Indigenous Rights and Environmental Justice into Fishery Management: Comparing Policy Challenges and Potentials from Alaska and Hawai'i,* 52 ENVTL. MNGMT. 1071 (Nov. 2013).

51 Sherry R. Arnstein, *A Ladder of Citizen Participation*, 35 J. AM. INST. PLANNERS 216 (1969).

co-manages Alaska's bowhead whale hunt in cooperation with the National Oceanic and Atmospheric Administration ("NOAA"), pursuant to the Marine Mammal Protection Act.[52] What makes AEWC effective is the

- meaningful entrustment of authority to tribal entities,[53]
- ample funding (including support from industry and the North Slope Borough),
- longevity of cooperation between AEWC and NOAA,
- Western scientific expertise (provided by North Slope Borough Wildlife Management, which is composed of indigenous subsistence users),[54] and
- feasibility of regulating a limited harvest (less than a hundred individuals of a single species) where there is limited competition (in contrast to land animals along the road system).[55]

Many of these factors have similarly helped the Alaska Beluga Whale Committee use community knowledge in its regulation.[56]

In summary, even though state and federal laws provide for co-management, there is a lack of authority allocated to tribal entities and a lack of tribal capacity to meet Western management expectations. As a result, true co-management is limited and ANVs generally have less ability to control fish and game management than they did prior to colonization.

B. Dual Management System by State and Federal Government

Another institutional challenge to adaptation is the confusion and fragmentation of the subsistence regime, which impedes the understanding of what kind of hunting and fishing are allowed in a given location. This

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52 Marine Mammal Protection Act, Pub. L. No. 103-238, § 119, 86 Stat. 1027 (1972) (codified at 16 U.S.C. § 1388).

53 Chanda L. Meek et al., *Building Resilience through Interlocal Relations: Case Studies of Polar Bear and Walrus Management in the Bering Strait*, 32 MARINE POLICY 1080, 1082 (2008).

54 NOAA, FINAL ENVIRONMENT IMPACT STATEMENT FOR ISSUING ANNUAL QUOTAS TO THE ALASKA ESKIMO WHALING COMMISSION FOR A SUBSISTENCE HUNT ON BOWHEAD WHALES FOR THE YEARS 2013 THROUGH 2018, at 10 (2013), https://www.fisheries.noaa.gov/resource/document/final-environment-impact-statement-issuing-annual-quotas-alaska-eskimo (last visited Feb. 28, 2019).

55 Ristroph, *supra* note 46, at 96–97.

56 Maria E. Fernandez-Gimenez et al., *Integration or Co-Optation? Traditional Knowledge and Science in the Alaska Beluga Whale Committee*, 33 ENVTL. CONSERVATION 306 (2006).

subsection outlines the relevant agencies and laws governing subsistence to illustrate the complexity of this regime.

ANILCA was originally intended to be implemented by the State of Alaska through the Alaska Department of Fish and Game ("ADFG").[57] Consistent with ANILCA, the State of Alaska adopted laws that provided for a subsistence priority over other consumptive uses,[58] and later for a rural priority over urban subsistence participants.[59] But after the Alaska Supreme Court determined that the rural priority established under ANILCA violated the Alaska Constitution,[60] Alaskans were instead left with a dual state and federal management system where the rural priority under ANILCA only applied to federal lands.

For some time, there was an expectation that the State would regain management over subsistence on federal lands, but this has not occurred.[61] Thus, ANILCA applies to most federal public lands[62] and waters that flow in or adjacent to most federal wildlife refuges, parks and preserves, conservation areas, recreation areas, and national forests.[63] State law governs subsistence on state and private lands, including those owned by Native corporations.[64] State law also applies to waters on general public domain lands managed by the Bureau of Land Management ("BLM") as well as

57 16 U.S.C. § 3115(d) (2018).

58 1878 ALASKA SESS. LAWS 151.

59 This was adopted first through regulations, ALASKA ADMIN. CODE tit. 5 § 01.597 (2018), which were invalidated by Madison v. Alaska Dept. of Fish and Game, 696 P.2d 166, 178 (Alaska 1985) for inconsistency with the 1978 statute. After *Madison*, the state legislature revised the 1978 statute to add a rural preference. ALASKA STAT. § 16.05.90 (1986).

60 McDowell v. State, 785 P.2d 1, 9 (Alaska 1989).

61 Theriault, *supra* note 25; Mara Kimmel, *Fate Control and Human Rights: The Policies and Practices of Local Governance in America's Arctic*, 31 ALASKA L. REV. 179 (2014); Jack B. McGee, *Subsistence Hunting and Fishing in Alaska: Does ANILCA's Rural Subsistence Priority Really Conflict with the Alaska Constitution*. 27 ALASKA L. REV. 221 (2010).

62 Alaska National Interest Lands Conservation Act, Pub. L. No. 96–487, § 102(1)-(3), 94 Stat. 2371 (1980) (codified as amended 16 U.S.C. § 3102(1)-(3) (1998)) (defining "land," "Federal land," and "public lands," respectively). Regulations are issued jointly by the Interior and Agriculture Departments; two identical sets of regulations appear in 36 C.F.R. §§ 242.1-242.28 (2019) and 50 C.F.R. §§ 100.1-100.28 (2019).

63 36 C.F.R. § 242.3 (2018) (listing each federal land unit); John v. United States, 720 F.3d 1214 (9th Cir. 2013), *cert. denied,* Alaska v. Jewell, 134 S. Ct. 1759 (2014) (upholding 1999 federal regulations on which 36 C.F.R. § 242.3 is based).

64 State v. Morry, 836 P.2d 358, 367 (Alaska 1992).

waters on or adjacent to Native allotments.[65] There has been confusion among ANV residents regarding where different laws apply.[66]

To help implement ANILCA, the Secretaries of the Interior and Agriculture established the Federal Subsistence Management Program and the Federal Subsistence Board ("FSB").[67] Initially, the FSB adopted the state's hunting and fishing subsistence regulations. Since then, the FSB has been revising regulations biennially (with subsistence hunting and trapping regulations in even-numbered years and subsistence fishing and shellfish regulations in odd-numbered years) based on proposals from ten Regional Advisory Councils as well as the public.[68] The four land management agencies in Alaska—the Fish and Wildlife Service ("FWS"), National Park Service ("NPS"), Forest Service, and BLM)—retain the ability to issue regulations based on the various statutes that govern public lands in Alaska, which results in differing hunting and fishing rules depending on the land manager and the status of the land. Other key federal laws affecting subsistence include the Migratory Bird Treaty Act,[69] Marine Mammal Protection Act,[70] Endangered Species Act,[71] and Magnuson-Stevens Act.[72] The Magnuson-Stevens Act, which regulates offshore commercial as well as subsistence fishing, is administered by the North Pacific Fishery Management Council for waters offshore of Alaska.

At the state level, Alaska's Board of Game ("BOG") regulates hunting seasons, limits, and methods,[73] while the Board of Fisheries ("BOF")

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65 John v. U.S., 720 F.3d 1214 (9th Cir. 2013), *cert. denied*, Alaska v. Jewell, 134 S. Ct. 1759 (2014). The *John* case upheld 1999 federal regulations on which 36 C.F.R. 242.3 is based. That regulation delineates the federal lands with waters subject to ANILCA. It includes reserved BLM lands (i.e., the National Petroleum Reserve-Alaska and the Steese National Conservation Area), but not general, undesignated BLM lands.

66 McNeeley, *supra* note 3, at 170.

67 36 C.F.R. § 242.10 (2018); 50 C.F.R. § 100.10 (2018).

68 Regional advisory councils were established under 36 C.F.R. § 242.11 and 50 C.F.R. § 100.11. There is a provision under 36 C.F.R. § 242.12 and 50 C.F.R. § 100.12, for local advisory councils, but these have not been established thus far.

69 Act of July 3, 1918, ch. 128, 40 Stat. 755 (1918) (codified as 16 U.S.C. §§ 703 *et seq.*); Migratory Bird Treaty with Great Britain (as signatory for Canada) (1916); Migratory Bird Treaty with Mexico (1937); Migratory Bird Treaty with Japan (1974); Migratory Bird Treaty with the Soviet Union (now Russia) (1976). The Migratory Bird Treaty Act exempts Alaska Native subsistence hunting from a prohibition on the take of migratory birds during the spring and summer seasons. 16 U.S.C. § 712 (2018).

70 16 U.S.C. § 1362 (12).

71 Pub. L. No. 93-205, 87 Stat. 884, Dec. 28, 1973 (codified as 16 U.S.C. §§ 1531–44).

72 Pub. L. No. 94–265, 90 Stat. 331, Apr. 13, 1976 (codified as 16 U.S.C. §§ 1801–83).

73 ALASKA STAT. § 16.05.255.

regulates fishing seasons, limits, and methods.[74] These Boards issue regulations for all types of hunting and fishing, not just subsistence. BOG has divided Alaska into twenty-six game management units [75] and issued hunting regulations specific to each unit.[76] Likewise, BOF has issued unique regulations for each subsistence management area.[77] The significant differences in regulations for each unit or area represent an adaptive approach that considers the geographical, biological, and cultural differences across Alaska, though they add to the complexity of the subsistence regime.

The Boards are advised by eighty-four Fish and Game Advisory Committees statewide.[78] Proposals to change regulations can come from these advisory committees, federal agencies, ADFG, the public, or in rare cases, the Boards themselves.[79]

In the early 1980s, ADFG signed general management agreements with FWS and BLM, in which the federal agencies recognized ADFG as the primary agency responsible for management of use and conservation of fish and wildlife resources on FWS and BLM lands within Alaska.[80] While such agreements cannot supersede federal laws, they are an attempt to harmonize management. Federal hunting regulations initially aligned with state regulations in terms of seasons, hunting methods, and limits, but this changed in the 2000s with the State's intense focus on eliminating predators.[81]

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74 ALASKA STAT. § 16.05.251.

75 ALASKA ADMIN. CODE tit. 5 § 92.450 (2018).

76 Alaska Dep't of Fish & Game, *Alaska Hunting Regulations*, http://www.adfg.alaska.gov/index.cfm?adfg=wildliferegulations.hunting (last visited Dec. 10, 2018).

77 Alaska Dep't of Fish & Game, *Subsistence Fishing Information by Area*, https://www.adfg.alaska.gov/index.cfm?adfg=fishingSubsistenceByArea.main (last visited Jan. 27, 2019).

78 Alaska Dep't of Fish & Game, *Advisory Committee Information*, http://www.adfg.alaska.gov/index.cfm?adfg=process.advisory (last visited Dec. 10, 2018).

79 *See* Alaska Dep't of Fish & Game, *2017–2018 Proposal Book*, http://www.adfg.alaska.gov/index.cfm?adfg=gameboard.proposalbook&tableformat=true&boardcycle=2017-2018 (last visited Dec. 10, 2018).

80 Bureau of Land Mgmt., *Master Memorandum of Understanding between the Alaska Department of Fish and Game and the U.S. Bureau of Land Management*, (Aug. 3, 1983), https://eplanning.blm.gov/epl-front-office/projects/lup/66965/83522/100152/Master_MOU_Alaska_Department_of_Fish_and_Game_and_BLM_Anchorage.pdf (last visited Feb. 28, 2019); U.S. Fish & Wildlife Serv., *Master Memorandum of Understanding between the Alaska Department of Fish and Game and the U.S. Fish and Wildlife Service*, (Mar. 13, 1982), http://dnr.alaska.gov/commis/cacfa/documents/FOSDocuments/MasterMOUs/ADFG_USFWS_MMOU.PDF (last visited Feb. 28, 2019).

81 Shannon M. McNeeley, *Examining Barriers and Opportunities for Sustainable Adaptation to Climate Change in Interior Alaska*, 111 CLIMATIC CHANGE 835, 838 (2012); Krista Langlois, *Feds and State Officials Square off on Alaska Hunting Regulations*, HIGH

BOG has authorized intensive management rules for predator culling in certain cases as well as measures that ease or encourage predator hunting (i.e., eliminating bag limits and permits, allowing baiting and feeding, and allowing the sale of skulls).[82] Federal intensive management is limited by the purposes of the National Park Service Organic Act[83] (for NPS lands), the National Wildlife Refuge System Improvement Act[84] (for FWS lands), ANILCA[85] (for all federal lands in Alaska), and the Wilderness Act[86] (for federal lands declared "Wilderness"),[87] but there have been exceptions.[88]

As outlined above, subsistence is highly regulated in Alaska. On one hand, this contributes to adaptive management by tailoring rules to the particular circumstances of each species in each area. On the other hand, it complicates adaptation because subsistence participants trying to adapt their practices must understand all these rules and risk significant penalties for noncompliance, including forfeiture of their catch and gear.[89]

C. Obstacles to the Participation of ANV Members in Agency Decision-Making

Merely understanding the subsistence regime is a challenge. But, as this subsection explains, attempts at changing this regime by participating in decision-making processes can be even more challenging. Theoretically, both the federal and state systems for creating subsistence rules are open to public participation. Both state boards and FSB accept proposals from the public, unlike fish and wildlife management systems in many other states. But not all see the subsistence rule-making process as being

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COUNTRY NEWS (Apr. 1, 2014), http://www.hcn.org/blogs/goat/federal-and-state-officials-square-off-on-alaska-hunting-regs.

82 TED SPRAKER, FINDINGS OF THE ALASKA BOARD OF GAME 2016-215, WOLF MGMT. POL'Y, (Mar. 17, 2016), http://www.adfg.alaska.gov/static/regulations/regprocess/gameboard/pdfs/findings/16215.pdf; Julie Lurman & Sanford P. Rabinowitch, *Preemption of State Wildlife Law in Alaska: Where, When, and Why*, 24 ALASKA L. REV. 145, 156 (2007).

83 54 U.S.C. §§ 100101, 100502 (2018).

84 16 U.S.C. §§ 668dd(a)(2), 668ee(4) (2018).

85 Alaska National Interest Lands Conservation Act § 815(1), 16 U.S.C. § 3125(1) (2014); *See also* 36 C.F.R. § 242.4 (2018); 50 C.F.R. § 100.4 (2018).

86 16 U.S.C. §§ 1131–34.

87 Julie Lurman Joly, *National Wildlife Refuges and Intensive Management in Alaska: Another Case for Preemption*, 27 ALASKA L. REV. 27 (2010); Lurman & Rabinowitch, *supra* note 82.

88 Joly, *supra* note 87, at 30.

89 *See, e.g.*, 36 C.F.R. § 242.8; 36 C.F.R. § 242.25(h)(5); 50 C.F.R. § 100.8; 50 C.F.R. § 100.25(h)(5); ALASKA ADMIN. CODE tit. 5 §§ 39.002, 92.002, 92.049, 92.050(a)(8), 92.072(f); *See also* McNeeley, *supra* note 81, at 836, 840.

truly open to participation by ANVs and their citizens. BOG has traditionally been primarily composed of urban, non-Natives with commercial interests.[90] The culture of agencies charged with subsistence management is often exclusionary and constrained by bureaucratic processes, which imposes limits on those within the agencies who do want to collaborate with subsistence participants.[91]

Even when ANV members are present in decision-making forums, they often find that their views and knowledge are not meaningfully considered.[92] Community knowledge regarding hunting and fishing activity does not always meet agency standards. Agencies sometimes incorporate only the "data" associated with the knowledge, leaving out context that is important to the community.[93] Furthermore, agency decisions are often made in forums with language and procedures that can marginalize ANV knowledge and participation.[94]

There is no easy answer for increasing ANV participation in state and federal agency decision-making regarding subsistence.[95] While decentralizing management could expand collaboration and the use of local information,[96] it is not clear how this would be carried out. Incorporating traditional and indigenous knowledge in state and federal agency decisions is important but difficult.[97] In short, while agencies and researchers have

90 McNeeley, *supra* note 81, at 841; Kofinas et al., *supra* note 9, at 1354; Loring et al., *supra* note 2, at 81.

91 Loring et al., *supra* note 2, at 81.

92 Starkey, *supra* note 38, at 318.

93 Taylor Brelsford, *"We Have to Learn to Work Together:" Current Perspectives on Incorporating Local and Traditional/Indigenous Knowledge into Alaskan Fishery Management*, *in* PACIFIC SALMON: ECOLOGY AND MANAGEMENT OF WESTERN ALASKA'S POPULATIONS, (Charles Krueger & Christian Zimmerman eds. 2009); S. CHARNLEY ET AL., TRADITIONAL AND LOCAL ECOLOGICAL KNOWLEDGE ABOUT FOREST BIODIVERSITY IN THE PACIFIC NORTHWEST (2008), www.fs.fed.us/pnw/pubs/pnw_gtr751.pdf; HOWITT ET AL., *supra* note 48, at 330; Philip H. Jos & Annette Watson, *Privileging Knowledge Claims in Collaborative Regulatory Management An Ethnography of Marginalization*, ADMIN. & SOC'Y 1 (2016); Ristroph, *supra* note 19.

94 Jos & Watson, *supra* note 93, at 22; Deborah McGregor, *Representing and Mapping Traditional Knowledge in Ontorio Forest Management Planning*, *in* RECLAIMING INDIGENOUS PLANNING 414, 418 (Ryan Walker et al. eds., 2013); Libby Porter, UNLEARNING THE COLONIAL CULTURES OF PLANNING 87 (2010); Annette Watson, *Misunderstanding the "Nature" of Co-Management: A Geography of Regulatory Science and Indigenous Knowledges (IK)*, 52 ENVTL. MNGMT. 1085 (2013).

95 Wilson, *supra* note 6, at 88, 97.

96 Loring et al., *supra* note 2, at 83.

97 DANIEL R. WILDCAT, RED ALERT!: SAVING THE PLANET WITH INDIGENOUS KNOWLEDGE 34 (2009); ARCTIC COUNCIL, ADAPTATION ACTIONS FOR A CHANGING ARCTIC

acknowledged the social, cultural, and financial barriers to ANV participation, there remain significant challenges.

D. Lack of Flexibility

Even when laws provide for ANV subsistence and participation in decision-making, they can still be problematic if they cannot adapt in response to climate change. As climate change shifts habitats and species across the United States, there has been recognition that wildlife and natural resource laws are overly stationary.[98] In Alaska, stationary laws can reduce the ability of subsistence participants to adapt by adjusting the time, manner, and place of their practice.[99] This is especially problematic when the times that hunting and fishing are legally allowed are inconsistent with the times that fish and game are available.[100]

As mentioned in Section X, both BOG and FSB have mechanisms in place to revise regulations in response to species changes. Both provide for proposed revisions to go through advisory boards prior to consideration at BOG or FSB meetings,[101] and both allow emergency petitions to be reviewed outside of the normal meeting process.[102] But hunters have pointed out that BOG meets and makes determinations well before anyone could anticipate local weather conditions during the hunting season. So

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(AACA)-BERING/CHUKCHI/BEAUFORT REGION OVERVIEW REPORT 21 (2017), https://oaarchive.arctic-council.org/handle/11374/1941; Leonie Sandercock, *Interface, Planning and Indigenous Communities*, 5 PLAN. THEORY & PRAC. 95 (2004); Ristroph, *supra* note 19.

98 F. Stuart Chapin III et al., *A Framework for Understanding Change*, *in* PRINCIPLES OF ECOSYSTEM STEWARDSHIP: RESILIENCE-BASED NATURAL RESOURCE MANAGEMENT IN A CHANGING WORLD 3, 18 (F. Stuart Chapin III, Gary P. Kofinas, and Carl Folke eds. 2009); Robert L. Fischman & Jillian R. Rountree, *Adaptive Management*, *in* THE LAW OF ADAPTATION TO CLIMATE CHANGE : U.S. AND INTERNATIONAL ASPECTS 19, 22 (Michael Gerrard & Katrina Fischer Kuh eds. 2012); Robin Kundis Craig, *"Stationarity Is Dead"—Long Live Transformation: Five Principles for Climate Change Adaptation Law*, 34 HARV. ENVTL. L. REV. 9, 29 (2010); Army Corps, *Climate Change Adaptation Plan*, U.S. ARMY CORPS OF ENGINEERS HEADQUARTERS (Oct. 31, 2014), http://www.usace.army.mil/Media/NewsArchive/StoryArticleView/tabid/232/Article/547550/the-us-army-corps-of-engineers-releases-robust-climate-change-adaptation-strate.aspx; Arie Trouwborst, *Climate Change Adaptation and Biodiversity Law*, *in* RESEARCH HANDBOOK ON CLIMATE CHANGE ADAPTATION LAW 298, 298 (2013); ALASKA DEP'T OF FISH & GAME, CLIMATE CHANGE STRATEGY, 13 (2010), https://www.adfg.alaska.gov/static/lands/ecosystems/pdfs/climatechangestrategy.pdf.

99 Pratt, et al, *supra* note 21, at 45; Wilson, *supra* note 6, at 95.

100 McNeeley, *supra* note 81; Ristroph, *supra* note 1, at 72.

101 Proposals can also come directly from members of the public. ALASKA STAT. § 44.62.220 (2018); ALASKA ADMIN. CODE tit. 5 § 96.625(a) (2014).

102 36 C.F.R. § 36.19(a) (2018); 50 C.F.R. § 100.19(a) (2018); ALASKA STAT. § 44.62.230 (2018), ALASKA ADMIN. CODE tit. 5 § 96.625 (2014).

advance regulations are frequently inconsistent with actual weather patterns.[103] Also, the State "board[s] may decline to act on a subsistence proposal for any reason"[104] and there is a perception among ANVs that emergency petitions to the State and federal boards are not often granted.[105] "This has fueled a cycle of unintended stress and mistrust, which delegitimizes the systems for local stakeholders and breeds more resentment between tribes and agencies, which in turn breeds more incentive for noncompliance with the regulations."[106] Still, there have been some successes. For example, BOG adopted a proposal at its February 2015 meeting to extend the winter moose season in one unit.[107]

Limitations on who exactly can hunt and how much hunters can take act as yet another legal constraint on flexibility. Historically—and in many parts of Alaska today—an ANV's subsistence needs have often been met by a small group of hunters who provide for the entire community.[108] Essentially, these hunters serve as "proxies" for other community members who are not well-positioned to hunt. But in many cases under both state and federal law, Alaska's land mammal subsistence hunters and fishers are subject to bag limits and permits or licenses for each individual hunter.[109] Limits under the federal and state systems generally cannot be combined to increase the entitlement of one individual.[110]

Both the state and federal systems provide for proxy hunting and fishing to a limited degree that is inconsistent with traditional subsistence practices. Under state law, one individual may hunt on behalf of another only where the beneficiary is blind, physically disabled, or 65 years or

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103 Loring et al., *supra* note 2, at 79.

104 ALASKA ADMIN. CODE tit. 5, § 96.615(c) (2019).

105 McNeeley, *supra* note 81, at 847.

106 McNeeley, *supra* note 3, at 174.

107 ALASKA BOARD OF GAME, CENTRAL/SOUTHWEST REGION MEETING SUMMARY, (Feb. 13–20, 2015), http://www.adfg.alaska.gov/index.cfm?adfg=gameboard.meetinginfo&date=02-13-2015&meeting=wasilla.

108 BurnSilver et al., *supra* note 25, at 2; MOUHCINE GUETTABI ET AL., EVALUATING DIFFERENCES IN HOUSEHOLD SUBSISTENCE HARVEST PATTERNS BETWEEN THE AMBLER PROJECT AND NON-PROJECT ZONES, NATURAL RESOURCE REPORT NPS/GAAR/NRR—2016/1280 18 (2016); VICTORIA REYES-GARCÍA & AILI PYHÄLÄ, HUNTER-GATHERERS IN A CHANGING WORLD 165 (2016).

109 *E.g.*, ALASKA ADMIN. CODE tit. 5, § 92.130.

110 Dep't of the Interior, *Permits*, FEDERAL SUBSISTENCE MANAGEMENT PROGRAM (Sept. 4, 2015), https://www.doi.gov/subsistence/statewide/permits.

older[111] and only for certain animals.[112] Proxies are somewhat more flexible under the federal system,[113] except for halibut fishing, where proxies are not allowed.[114] Both systems have permit and reporting requirements for proxies.[115]

In the 2010s, the State attempted to implement a land mammal hunting program more responsive to community needs through community subsistence harvest permits.[116] Once a community harvest area is created, a person representing twenty-five or more residents may apply for a community harvest permit. The permit requires extensive reporting for each participating household or resident, as well as limits on other types of hunting (i.e., on individual hunts for the same species). The community harvest permit generally does not expand the hunting season or increase the overall number of animals that may be taken. The Ahtna Group, a collection of tribes and Native Corporations in Interior Alaska, obtained community moose and caribou hunt permits through this program,[117] but there were unintended consequences. As the program became more attractive, the number of participating groups increased from six to seventy-three. Applicants could team up and apply for a permit without even knowing each other. The program drifted greatly from its original purpose of facilitating community-oriented subsistence for the Ahtna people as urban individuals crowded out community subsistence users. A 2016 Memorandum of Agreement between the Department of Interior and Ahtna, Inc.[118] attempts

111 ALASKA STAT. § 16.05.405(b) (2017), ALASKA ADMIN. CODE tit. 5, § 92.011(a), (d) (2018).

112 ALASKA ADMIN. CODE tit. 5, § 92.011(k) (2018).

113 36 C.F.R. § 242.10(d)(5)(ii) (2011); 36 C.F.R. § 242.25(a) (2018); 36 C.F.R. § 242.25 (d), (e) (2018); 50 C.F.R. § 100.10(d)(5)(ii) (2011); 50 C.F.R. § 100.25(a) (2018); 50 C.F.R. § 100.25 (d), (e) (2018).

114 NOAA Fisheries, *Alaska Subsistence Halibut Program: Frequently Asked Questions* (May 2, 2016), https://alaskafisheries.noaa.gov/fisheries/sharc-faq.

115 ALASKA ADMIN. CODE tit. 5, § 92.011 (b), (h) (2019); 36 C.F.R. § 242.10(d)(5)(ii) (2011); 50 C.F.R. § 100.10(d)(5)(ii) (2011) (Board authority to allow hunting designation); 36 C.F.R. § 242.25(a) (2018); 50 C.F.R. § 100.25(a) (2018) (definition of designated hunter); 36 C.F.R. § 242.25 (d), (e) (2018); 50 C.F.R. § 100.25 (d), (e) (2018) (hunting and fishing by designated hunter).

116 ALASKA ADMIN. CODE tit. 5, § 92.072 (2018).

117 Ahtna, Inc., *2016-2017 Ahtna Tene Nene' C&T Community Subsistence Harvest, Permit Program* (Nov. 5, 2015), http://www.ahtna-inc.com/wp-content/uploads/2015/11/Guide-Sheet-Subsistence-Harvest-Hunt-2016-2017.pdf.

118 Department of the Interior, *Memorandum of Agreement between the United States Department of the Interior and the Ahtna Inter-Tribal Resource Commission for a Demonstration Project for Cooperative Management of Customary and Traditional Subsistence Uses in the Ahtna Region* (Nov. 29, 2016), https://www.doi.gov/sites/doi.gov/files/uploads/ahtna_doi_moa_with_signature_pages_final.pdf.

to better provide for Ahtna's subsistence users by including them in a new rule-making process and advisory committee. However, it only applies to federal lands in the Ahtna people's traditional usage area.[119]

Thus, while there are efforts to provide for rule change in response to changing climate and species conditions, the rules continue to constrain subsistence participants' flexibility to adapt because they cannot keep up with species shifts and are overly rigid in their requirements.

II. KEY FINDINGS ON PARTICIPANTS' VIEWS REGARDING CLIMATE CHANGE, ADAPTATION, AND OBSTACLES

This Part begins with an overview of how climate change has affected research participants' subsistence practices, and how they have attempted to adapt. It then presents participants' observations on the obstacles discussed in the previous Part.

A. Climate Change Impacts to Subsistence

Nearly two thirds of the participants from ANVs and a few[120] from outside of ANVs referred to animals, blossoms, or leaves arriving at different times, as well as migration changes. Several participants described changes in animal behavior regarding mating and hibernation, and the phenomenon of predators coming into ANVs more often. A number of them referred to reductions in animal or plant populations, an increase in diseased or stressed animals, and/or an increase in insects or invasive species. Several participants described more brush and ground cover, bigger plants, and treelines higher up on mountains.

More than one third of the ANV participants and several outside of ANVs described impacts on subsistence.[121] A number of them described difficulty accessing hunting, trapping, or gathering areas due to low snow or ice (which impedes overland vehicular travel), shallow water (which impedes boat travel), or fire, or having to travel further to hunt and trap game. Several participants described hunting as less safe due to thin ice

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119 *Id.*

120 Only ANV participants (not those outside of ANVs) were asked how climate change had affected their lifeways, although a few participants from outside of ANVs provided information on this topic.

121 This is similar to the findings of McNeeley, *supra* note 81; Wilson, *supra* note 6; Todd J. Brinkman et al., *Arctic Communities Perceive Climate Impacts on Access as a Critical Challenge to Availability of Subsistence Resources*, 139 CLIMATIC CHANGE 413 (2016).

and incidents of people falling through. Several, mostly from the north, said that food was harder to keep fresh. On the North Slope, they noted that ice cellars on the North Slope are melting and filling with water. A few participants from interior Alaska noted that it is harder to hunt moose because leaves are still on the trees during moose season, making the moose more difficult to see. A few participants from west coast villages described damage from storms to their subsistence camps and infrastructure.

A number of participants mentioned positive impacts, including easier boat travel, longer hunting or growing seasons, fewer bears present, and increased deer population and abundance in berries.[122] But more often, participants described negative impacts, including a number of participants who specifically used the phrase "food security" or described a sense of food insecurity. Several referred to an increase in health problems such as diabetes and cancer.

Nearly half of ANV participants spoke about threats to subsistence that they had to deal with in addition to climate change. For instance, a number of them referred to competition from commercial fishermen and sport hunters, and several talked about industrial development or increased Arctic shipping. The extent to which these threats, as opposed to climate change, restrictive laws, or other factors, have impeded subsistence is unclear.

But regardless of which threat is most significant, the result is less participation in subsistence now than in the twentieth century. Several participants specifically mentioned the reduction in participation and several referred to a loss of knowledge, cultural practices, and values (such as the language and respect for elders) that are intertwined with subsistence. For example, a participant from northeast Alaska said, "My grandfather told me, 'You gotta learn to live on the land.' That's part of the culture that's slowly going by the wayside. Values that were passed down are deteriorating."[123]

One Native now living in Anchorage described the combination of climate change and other impacts to subsistence this way:

> Colonization is intertwined with the challenges created by climate change. Young Native men have been hit the hardest because their lifestyle has changed the most. There are fewer subsistence resources to go around and people have to spend much more to pursue them. No longer can a man just go outside his

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122 These findings contrast with other studies. *See generally*, *Brinkman* et al., *supra* note 121; Todd Brinkman, et al., *Impact of Fuel Costs on High-Latitude Subsistence Activities*, 19 ECOLOGY & SOC'Y (2014); Ford and Smit, *supra* note 22; Nuttall et al., *supra* note 3.

123 Telephone Interview Number 119, Native non-profit (Feb. 7, 2017).

> home and harvest all the food his family needs. Unhealthy foods like Lunchables are now being marketed as "cool." In any society, when there are too many restless young men without meaningful work, there is a danger of societal collapse.[124]

Yet despite the various threats to subsistence and reduced participation levels, subsistence still holds great importance to many participants. In the words of one subsistence hunter from northern Alaska:

> If we couldn't go whaling . . . if nobody were speaking Inupiaq . . . I might just relocate to Anchorage. . . . The reason I want to live here is because I can get on my snowmachine, drive 5 minutes away, and hunt caribou. Or I can take my kids out on the ice and teach them whaling. . . . If you don't [get out on land], what's the point of living here?[125]

While moving to urban settings is certainly an adaptation strategy that many Alaska Natives (including some research participants) have taken in response to various challenges, subsistence continues to be a basic component of the ANV lifeway. Thus, the increasing changes in species and difficulties in accessing them is a significant problem for ANV members, and the need for adaptation strategies within the law is important in solving the problem.

B. Adaptation Strategies

Much of the subsistence adaptation participants described occurs at the household level in response to reduced harvest levels, rather than at the level of a community anticipating and preparing for future losses.[126] This is significant because, as a number of participants emphasized, subsistence is much more than the individual acts of hunting and fishing. It is a lifeway that involves sharing within and beyond a community and embracing values related to patience, upholding traditions, and self-reliance. About two thirds of all ANV participants described individual and family strategies concerning subsistence, while half that number mentioned community-level strategies for subsistence and other ways to promote food security (such as gardening).

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124 Interview Number 137, Native non-profit, in Anchorage, Alaska (Oct. 27, 2016).

125 Telephone Interview Number 20, tribal council member (Feb. 17, 2017).

126 *See generally* Berkes & Jolly, *supra* note 21; Fikret Berkes, *Indigenous Knowledge and Resource Management Systems in the Canadian Subarctic*, *in* LINKING SOCIAL AND ECOLOGICAL SYSTEMS: MANAGEMENT PRACTICES AND SOCIAL MECHANISMS FOR BUILDING RESILIENCE 98 (Fikret Berkes et al. eds., 1998); Tristan Pearce et al., *Inuit Traditional Ecological Knowledge (TEK), Subsistence Hunting and Adaptation to Climate Change in the Canadian Arctic*, 68 ARCTIC 233 (June 2015).

Subsistence was mentioned as important in forty-nine of the fifty-nine ANV community plans reviewed in this study. These include hazard mitigation plans, required by FEMA, for thirty-five ANVs and more general plans for twenty-nine ANVs, as well as the Nome adaptation plan.[127] Nineteen plans suggested action items to address subsistence impacts and food security, but there were no mitigation action items connected to subsistence in hazard mitigation plans.[128] Action items included seeking regulatory change, raising food locally, creating habitat and implementing conservation measures, improving trails to access subsistence areas, and storing food.

Many participants demonstrate immense flexibility, and are thus able to alter hunting and fishing patterns to some degree to accommodate climate change. As one subsistence participant from northwest Alaska explained, this flexibility involves

> doing what you can when you can. . . . It's not a whole lot different than in the past as far as the environment dictating people's activities, it's just that the timing of the activities are changing, as are some of the opportunities themselves, which may no longer be available, or if they are at a very reduced time period, or quantity.[129]

A number of participants referred to hunting or fishing in different places, using different access routes or modes of transportation, at different times or for longer. "Western" resources help to some degree: a few described using more fuel to travel farther out or using better technology such as snowmachines and GPS, to increase their hunting range and reduce travel time. One participant referred to programs in the ANVs of Chenega and Kotzebue that subsidize the cost of fuel and ammunition, and a few indicated a desire for similar programs in their communities. At the same time, a few participants said they were prepared to return to "old ways" of doing things if Western resources were not available.[130]

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127 The Nome plan was for four tribes based in the Village of Nome, including the Nome Eskimo Community, the Native Village of King Island, the Native Village of Solomon, and the Native Village of Council. *See* Nathan Kettle et al., NOME TRIBAL CLIMATE ADAPTATION PLAN 6 (2017).

128 Hazard mitigation plans are required for getting hazard mitigation assistance from the Federal Emergency Management Agency. 42 U.S.C. § 5165(a) (2012).

129 Telephone Interview Number 75, tribal staff (July 25, 2017).

130 While most Alaska Natives have whole-heartedly embraced Western technology as a means of surviving and thriving in a colonized society, there is a perception among some non-Natives that Natives are somehow cheating the system when they use such technology. This view is seldom expressed in academic literature, but frequently expressed in online forums such as in the "comments" section after news articles in the Anchorage Daily News on Alaska Natives and subsistence. Much of this viewpoint was not expressed among

Several people said they were eating different animals or using new subsistence resources—i.e., bison or invasive species—though one person said that reliance on different subsistence resources puts a strain on these other resources. Several participants said they were eating more store-bought foods. A few of them said they were sharing more and relying on others to hunt.

Several participants suggested that hunting out of season or beyond the legal limit, described by some participants as "doing what one needs to do," is a strategy hunters sometimes must consider. One participant said, "There's a difference between 'hunting-hunting' and 'feeding-our-families-hunting,'" the latter being illegal. None of the participants said that they had personally sold food harvested under the subsistence regime,[131] but a few participants from outside ANVs suggested that this was a strategy for individuals to be able to afford to participate in subsistence.

At the community level, the main strategy for addressing subsistence impacts is to seek regulatory change concerning hunting and fishing limits and seasons. A number of participants who worked for ANVs referred to conducting their own research to suggest different regulations and filing petitions to change hunting seasons. Along these same lines, eight community plans called for more active participation in agency decision-making processes on subsistence. This participatory approach is more common among ANVs that have more funding and can afford to have Western scientists (who tend to be non-Native) on their staff, since, as several ANV participants explained, state and federal boards may not accept "traditional knowledge" as a basis for changing rules.

Other community-level adaptation measures included facilitating access to subsistence through improving or maintaining trails and developing better ways to store foods, such as community ice cellars. Four plans and a few participants referred to supporting subsistence indirectly through conservation and habitat creation.[132]

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participants in this research, perhaps due to selection bias or perhaps because this viewpoint is usually not expressed among educated, "elite" people. But one planner interviewed said, "You can't say they're living a traditional native lifestyle anymore because they're riding snowmachines and eating white people's food." Telephone Interview Number 81, planner (Aug. 3, 2016).

131 Different types of harvest (i.e., commercial, sport, personal use, and subsistence) are governed by different rules with different types of permit and license requirements. Some species (most marine mammals) are only supposed to be harvested for subsistence purposes, but can be sold under limited circumstances. 16 U.S.C. § 1371(b)(2) (2012). In many cases, sales of game are prohibited. ALASKA ADMIN. CODE tit. 5, § 92.200 (2019).

132 GT CONSULTING, HYDABURG COMMUNITY ACTION PLAN 8, 10 (2002), https://library.alaska.gov/asp/edocs/2005/07/ocm61112567.pdf.; LEVELOCK WATERSHED COMMUNITY PLANNING PROJECT: FINAL SUMMARY REPORT 4, 44 (2005), http://www.agnewbeck.com/pdf/downloads/Levelock/SummaryReportCOMBINED_9-30-05.pdf.; CITY

Some communities are seeking to increase food security by means that do not involve subsistence fishing or hunting. Five plans and several participants talked about the potential for gardening, farming, hatcheries, and herding. But few ANVs have been able to assemble the equipment and supplies needed for large-scale gardening or herding, and only one participant (a non-Native ANV resident) referred to having his own garden. A few ANV residents referred to having some sort of food bank available in ANVs. Finally, a few participants suggested that game management agencies could help food security by stocking waterbodies with fish or introducing a new subsistence species. ADFG has done this in the past, most recently by reintroducing bison to Interior Alaska.[133]

To summarize, adaptation to climate-related changes in subsistence continue to take place at the individual and family level as they traditionally have, with some help from modern technology. Subsistence adaptation at the community level is more limited and focuses on changing state and federal rules. There is interest but little movement towards increasing food security beyond subsistence hunting and fishing.

C. Experiences and Obstacles Described by Participants

Sections I(A) and I(C) outlined laws and policies that constrain subsistence users from participating in decision making. The following section describes these constraints in the words of those who participated in this research.

1. Limited Opportunities for Meaningful ANV Management

Among the research participants, a number identified ANVs' limited jurisdiction over lands and wildlife as a barrier to adaptation. These participants were largely Native and described the effect of the ANCSA and ANILCA as follows:

- "ANCSA took a lot of land from Natives. ANILCA Title 8 set up advisory committees, but they don't seem to work. There are laws and court orders requiring agencies to work with tribes, government to government, but they don't happen."[134]

AND BOROUGH OF SITKA COMPREHENSIVE PLAN UPDATE 48, 49 (2007), http://www.cityofsitka.com/government/departments/planning/documents/CompPlanNovember06.pdf.; UNALASKA COMPREHENSIVE PLAN 2020 115 (2011), https://www.commerce.alaska.gov/dcra/DCRARepoExt/Pages/CommunityPlansLibrary.aspx.

133 Riley Woodford, *Wood Bison Restoration in Alaska*, Article in *Alaska Fish & Wildlife News*, ALASKA DEP'T OF FISH AND GAME (Oct. 2006), http://www.adfg.alaska.gov/index.cfm?adfg=wildlifenews.view_article&articles_id=245.

134 Telephone Interview Number 77, tribal elder (July 16, 2016).

- "ANCSA, ANILCA, those are bad things for the Alaska Natives."[135]
- "The local people did not cede the land or fight for it. They did not vote in favor of ANCSA."[136]
- "Natives didn't understand about owning land and got cheated out of their land."[137]

In short, while ANCSA may be settled law, not everyone perceives it as a fair settlement of Native land and subsistence rights. Participants, particularly those from ANVs, had few suggestions for crafting a fair remedy. A few participants from outside of ANVs called for methods to allow regional tribal groups or partnerships between tribes and the state to regulate hunting and fishing.

Few participants, even those interviewed from outside ANVs, offered praise for current co-management and collaborative management practices. A few participants said it is not working, or gives limited jurisdiction at great cost. One participant from the state's subsistence division said, "There is no real co-management under state or federal law, outside of that for marine mammals."[138] An environmental manager from an ANV described co-management as an agency saying, "'We manage, you cooperate.' There seems to be more 'give' on the community end. If we all had equal seats at the table, that would be perfect."[139]

Some offered reasons why co-management is easier said than done—namely the need for funding and staff to conduct the Western science that agencies feel is required. One agency scientist said, "If ANVs did have co-management, they would have to hire people to do it—it requires a scientific and technical background. But educated Natives tend to leave the villages. If people have enough ambition to get a master's degree, they're not going to stay in the villages."[140] Another agency official described collaborative managements opportunities as "great ideas but really unfunded mandates. . . . I would have to cut people or programs to pay for them."[141]

Still, a number of participants, all Native and mostly from ANVs, suggested that entering into co-management agreements or other arrangements for ANVs to carry out state and federal functions could be an adaptation strategy. Several ANV representatives indicated that they had been

135 Telephone Interview Number 43, tribal staff (July 29, 2016).

136 Interview with tribal council member, *supra* note 125.

137 Telephone Interview Number 31, tribal citizen (Jan. 20, 2017).

138 Telephone Interview Number 86, agency manager (July 12, 2016).

139 Telephone Interview Number 40, tribal staff (Nov. 8, 2016).

140 Interview Number 118, agency manager, in Fairbanks, Alaska (Nov. 14, 2016).

141 Interview Number 136, agency director, in Anchorage, Alaska (Feb. 9, 2017).

able to develop monitoring programs that followed Western science protocols, and this increased agency willingness to share management responsibilities.

Thus, co-management opportunities involving state and federal agencies and Native entities have not enabled ANVs and their members to manage subsistence in ways that facilitate climate change adaptation, though ANVs able to "adapt" to agency expectations of Western science-based management have achieved greater control over subsistence.

2. Challenges of the Dual State-Federal Management System

Several research participants cited the lack of a rural priority under the State of Alaska system and the complications of the dual state-federal system as barriers to adaptation. A few ANV participants as well as agency participants commented on the lack of clarity regarding the application of state and federal rules, and on occasional conflicts between different rules. Regarding the rural priority, a former ANV resident now living in Anchorage said, "People should not lose their rural preference because they move to a city, the same way an American does not lose citizenship when moving to Europe."[142] This same person and a few others noted that ANILCA does not help urban Natives, and wished ANILCA would have a Native priority rather than a rural priority. Thus, while the rural priority under the federal regime generally helps those who reside in ANVs (which are generally rural), it does not help Alaska Natives who adapt by moving to urban settings.

A few senior state officials said they would support changing the Alaska Constitution to provide for a rural priority. One offered the caveat that such an amendment would need to result in the state taking over all subsistence management, which he thought could be difficult considering how vested federal agencies have become in this arena.[143] The participants who discussed potential amendments to the Alaska Constitution or ANILCA viewed them as unlikely, given the influence of urban, non-Native hunters.

While rural ANV residents who benefit from the federal rural priority may prefer the federal regime, this conclusion does not amount to clear-cut support for federal management. Some believe the state's more intensive predator management increases their likelihood of getting moose or caribou. One said, "We take great respect harvesting our animals. We've always harvested bears in their dens in the fall. We have been doing it and we're going to continue to do it."[144]

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142 Interview Number 39, tribal citizen, in Anchorage, Alaska (Oct. 28, 2016).

143 Telephone Interview Number 133, agency director (July 8, 2016).

144 Interview with tribal citizen, *supra* note 137.

One researcher said that intensive management can serve as an adaptation strategy for Alaska Natives grappling with social, economic, and environmental change.[145] This person noted that in the twentieth century, a trapping economy kept the wolf population lower. This economy is much more limited today.[146] Also, this person noted there are fewer moose today, given the increasing number of hunters and the loss of moose habitat with changing hydrology.

A scientist with NPS took a more nuanced view. This person said that implementing intensive predator management without adequate study could be a maladaptation. "In some extreme cases involving transformational changes [where the current system cannot be resilient], more intensive management could be appropriate. But it is generally a last resort for NPS."[147]

To summarize, uniting the subsistence regime under a single manager could simplify management in ways that might facilitate adaptation, but this is infeasible as long as federal and state law conflict and neither seeks to resolve the issue. It is not clear which regime—state or federal—would be more beneficial to ANV and Alaska Native adaptation. The federal regime often gives ANVs a greater share of subsistence resources while the state regime may or may not increase the availability of game.

3. Limited Participation in Agency Decision-Making

Many of the research participants expressed frustration with the lack of influence and participation of ANVs and their members in agency decision-making; however, few suggested solutions. More than a fifth of all participants, including a number of those outside ANVs, referenced the lack of political influence of ANVs and rural areas compared to that of urban areas, corporations, and other interests. A lower-level agency manager said,

> An obstacle to change is the anti-rural subsistence sentiment and the urban influence at regulatory meetings. There is not a lot of accurate information and education about the realities of rural life.[148]

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145 Telephone Interview Number 156, researcher (Mar. 23, 2016).

146 BOG made a similar observation in its justification for establishing a wolf predation control area in Unit 13 of Interior Alaska. ALASKA ADMIN. CODE tit. 5, § 92.121(b)(1) (2019).

147 Telephone Interview Number 154, agency advisor (Aug. 9, 2016).

148 Interview with agency manager, *supra* note 138.

Several participants noted that ANV residents have difficulty participating in state and federal advisory board meetings and other public meetings of decision-makers. One village elder from Western Alaska said,

> A lot of regulations are made far away, it's very hard to go there and testify. It can cost $180 to get to Nome, and then $500-600 to get to Anchorage, and you have to get a hotel. Then you only get three minutes to testify. It's not effective to talk on the phone. Face to face is more effective to convey feelings and get the point across. It's bad because we can't see each other on equal footing.[149]

Still, a number of participants, mainly in ANVs, saw enough value in participating in regulatory/advisory boards and public meetings to suggest this as an adaptation strategy.

A number of participants, half of which were ANV residents, referred to the distrust between ANVs and outside government entities. One ANV environmental coordinator[150] said,

> People in agencies have a mental block when Natives are trying to explain their way of life. It would be good for them to have some sort of cultural acceptance training, where they learn to listen and absorb knowledge rather than trying to counter or debate it.[151]

A number of participants expressed frustration with agencies not considering community knowledge on par with Western science. A southeastern tribal leader referred to the gaps in knowledge that come with failure to consider community knowledge as follows:

> The combination of "so-called" science and indigenous science can be useful. If you're really a scientist, why would you leave any knowledge out? It's essential to incorporate local people into research, not just if you happen to have funding. To not include them would be like leaving out beakers from a lab experiment. All of this has to be planned at the beginning. Elders can't be hired as an afterthought. This is not good science.[152]

Yet bridging community knowledge with Western science continues to be more aspirational than realistic, described by a lower-level agency manager as follows:

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149 Interview Number 23, tribal citizen, in Nome, Alaska (Jan. 23, 2017).

150 This is a tribal staff position that is funded by the U.S. Environmental Protection Agency for most tribes.

151 Telephone Interview Number 72, tribal staff (Nov. 23, 2016).

152 Interview Number 51, tribal administrator, in Ketchikan, Alaska (Sept. 23, 2016).

> Agencies talk about how valuable [community knowledge] is but don't really use it. All biologists have done is casually ask people if there are more or less of a species. I proposed using it once three years ago and got shot down.[153]

A few participants from outside ANVs thought it would be helpful to give more authority to lower-level decision-makers, game managers, and advisory boards; however, they were not sure how to accomplish this. For example, a senior state official said, "It helps to push down law to the lowest level possible." He paused and then admitted, "The State asks for this [from the federal government] but doesn't give it."[154]

A few participants noted that some lower-level agency staff can be supportive of ANV subsistence, but upper-level staff may not be. An ANV environmental coordinator stated,

> There's people closer to the ground level who understand the difficulty but they can't do anything about it because they need their jobs. People at the top level aren't taking action. Many of the on-the-ground game management staff are good people who help the tribe in every way they can.[155]

A lower-level agency staff member offered similar views as follows:

> On-the-ground cooperation between federal and state game management agencies has improved in the last decade, but there is still a lot of tension at the upper levels that handle policy issues. A lot of the on-the-ground issues get replaced by upper level policy issues.[156]

Participants, at least those in ANVs and lower-level agency managers, recognized the challenges ANVs face in influencing decisions regarding subsistence management and the need for better use of ANV knowledge. Yet there is no clear pathway forward to increase ANV participation.

4. Lack of Flexibility

A number of participants (mostly in ANVs) referred to overly strict laws controlling time, place, and manner of subsistence as barriers to adaptation. One ANV participant described it this way: "It's kind of like having to ask [the agency] permission to have to go to the bathroom."[157] Several participants, half of which were ANV residents, said they would like

153 Interview with agency manager, *supra* note 140.

154 Interview Number 99, state advisor, in Juneau, Alaska (Mar. 9, 2017).

155 Telephone Interview Number 53, tribal staff (Aug. 31, 2016).

156 Interview with agency manager, *supra* note 138.

157 Interview with tribal staff, *supra* note 155.

to see easier mechanisms to adjust season dates that would allow fish and game managers to start and stop seasons in response to climate rather than seemingly arbitrary dates.

Among the participants who were asked for examples of flexible laws (all outside ANVs), a few referred to the use of emergency petitions to state and federal boards and petitions to change the agenda of regular board meetings. One agency representative characterized the petitions as an example of adaptive management. But another agency representative suggested that the petitions are not adequately resolving subsistence problems associated with climate change as follows:

> Since the mid-2000s, local advisory committees and councils have been submitting emergency petitions and letters to the Board of Game and the Federal Subsistence Board asking for an extension in the moose season. Most are rejected as not fitting emergency criteria. This is becoming a regular event that ADFG needs to take seriously.[158]

Still, as noted in Part II(B) above, a number of participants, mostly in ANVs, referred to conducting research and filing petitions to change regulations as an adaptation strategy. The process of allowing subsistence participants to seek changes in rules and meeting agendas can help adaptation, but the petition rules may need to be re-examined to improve the efficacy of the process.

III. DISCUSSION: THE BEST ADAPTATION STRATEGIES UNDER EXISTING LAW AND THE POTENTIAL FOR LEGAL AND INSTITUTIONAL CHANGE

ANVs are experiencing impacts to subsistence not only from climate change, but also from laws that constrain adaptation, industrial development, and increased competition for fish and game from a growing population. There is no turning back the clock to precolonial times when there were far fewer hunters, institutions, and commercial development entities to satisfy. While legal and institutional change to increase the ANV role in decisions about fish and game resources would be ideal from the standpoint of ANVs, such change is not easy. Among the barriers to adaptation, research participants cited the lack of ANV political influence, second only to a lack of political will of state and federal decision-makers to address ANV climate change impacts. This section evaluates subsistence adaptation strategies in the context of these political limitations, and offers

158 Interview with agency manager, *supra* note 138.

modest recommendations that may be more likely to garner political acceptance than those requiring greater change.[159] The analysis focuses on strategies for ANVs and state and federal agencies to increase ANV participation in planning processes and reduce restrictions to adaptation that are not necessary to conserve subsistence resources. These recommendations could benefit ANVs regardless of climate change, but several of them—particularly those related to increasing flexibility and intensive predator management—are particularly relevant to the need for adaptation strategies in the face of climate change.

A. Addressing the Dual Regulatory Regime

As discussed in Part II(C), several participants expressed confusion regarding navigation of separate state and federal rules on hunting and fishing, along with frustration regarding the lack of a Native or rural priority under state law. But it seems unlikely that the State would change its constitution to regain control over subsistence management and implement a rural priority.[160] This subsection examines alternative recommendations to address issues stemming from the dual regulatory regime.

A relatively feasible legal change would be to adjust federal board rules specifying which communities are "rural" and thus entitled to the federal rural subsistence preference, as well as state board rules specifying which areas are "urban," such that they get no preference for subsistence over other types of hunting. Expanding "rural" and limiting "urban" could increase participation of Alaska Natives and ANVs closer to urban centers, but still have a subsistence lifeway. On the other hand, such a change could increase competition from non-Native urban users. Whether the change benefits a particular ANV depends on whether the Board considers the

159 Ahjond S. Garmestani & Melinda Harm Benson, *A Framework for Resilience-Based Governance of Social-Ecological Systems*, 18 ECOLOGY & SOCIETY 9 (2013); Susan C. Moser & Julia A. Ekstrom, *A Framework to Diagnose Barriers to Climate Change Adaptation*, 107 PROC. OF THE NAT'L ACAD. OF SCI. 22026 (2010).

160 As discussed in Part II, in order for the State to gain control over subsistence on federal lands, it would need to amend Section VIII of the State constitution (which provides for equal access to subsistence resources by all residents) so as to accommodate the rural priority under ANILCA. Several participants suggested that such a change would be unlikely so long as there are urban hunters and fishers with significant political influence and voting power who do not wish to see a rural priority. I speculate that these constituents could be convinced of the benefits of an amendment if they believed that the state provisions on predator management (allowing for more predator hunting with the goal of increasing the number of caribou and moose) would take effect statewide.

ANV in question to have a more "rural" character than non-Native communities in the area.[161]

Assuming the dual regime stays in place, there are ways to reduce current confusion. The state has already developed a program for making custom hunting maps to print or use on a mobile device, showing what animals can be hunted on what lands under different types of hunts.[162] One must still refer to the Alaska Hunting Regulations booklet for hunting limits, seasons, and additional regulations concerning each type of hunt. The state should incorporate this additional information into the maps, if possible. Ideally, a hunter/fisher could see, based on his GPS location, what rules apply based on the target species and type of hunt. Since there is no comparable federal system in place, the State and federal government should cooperate to develop the existing system.

As climate change brings more species changes and greater difficulties in accessing species used for subsistence, there may be a need for more rule changes to reflect environmental circumstances. Ensuring that subsistence participants understand what rules apply can help the subsistence management system better adapt as a whole.

B. Increasing ANV Participation

As participants suggested, one way to increase ANV participation in decision making is to get more ANV residents to serve on decision-making boards and within agencies. FSB provides an example, since two seats on the board are specifically reserved for rural subsistence users. As of this writing, FSB is chaired by the mayor of the ANV of Hydaburg. Implementing a similar requirement for BOG and BOF could be difficult, since these boards allocate game among *all* hunters, not just subsistence users. Even in the absence of reserved seats, ANVs should encourage their citizens to seek these positions.

Another entity that could benefit from ANV representation is the North Pacific Fishery Management Council, one of eight governing bodies

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161 For example, a 2007 decision reclassifying various communities hurt the Native Village of Saxman in southeast Alaska, because the board decided that it was "urban." Subsistence Management Regulations for Public Lands in Alaska, Subpart C; Nonrural Determinations, 72 Fed. Reg. 25688 (May 7, 2007). The same decision may have helped ANVs on the Kenai Peninsula, since several non-Native communities were reclassified as urban. A decision that would be more beneficial to ANVs would automatically consider them "rural" if they have subsistence traditions, even if they are not far from urban areas.

162 *Hunting Maps by Hunt Type, Search Results for Tier II Hunts*, ALASKA DEP'T OF FISH AND GAME, http://www.adfg.alaska.gov/index.cfm?adfg=huntingmaps.byhunttype (last visited Dec. 20, 2018).

that control ocean fisheries under the Magnuson Stevens Act.[163] The Act currently provides for tribal representation only for the Pacific Council (not the North Pacific) for tribes with federally recognized fishing rights from California, Oregon, Washington, or Idaho.[164] Congress could amend the Magnuson Stevens Act to provide for ANV representation on the North Pacific Fisheries Management Council.

Another way to support ANV input is to give deference to findings made by local advisory committees. Under ANILCA section 805(c),[165] FSB must defer to committee findings unless they are not supported by substantial evidence, violate recognized principles of fish and wildlife conservation, or would be detrimental to the satisfaction of subsistence needs. A similar provision for the state boards could be useful.

There are a number of ways for ANVs to increase their participation in decision-making even without legal change. These include entering into agreements with agencies under laws that allow for co-management, participating in agency decisions as a "cooperating agency" under the National Environmental Policy Act,[166] and engaging in government-to-government consultation.[167] That said, despite the literature describing the benefits of co-management,[168] the reality in Alaska is that co-management and related strategies are expensive and time-consuming, and the ANV voice may not be heard if it is not supported by some form of Western science.

It is important to note that ANVs and Native entities with strong environmental management programs often have non-Native Western scientists on their staff or as consultants, and these people may not live in ANVs. For example, one environmental coordinator interviewed as part of this research lived in Anchorage rather than the remote ANV she worked for. While it might be ideal to incentivize Natives with master's

163 16 U.S.C. § 1852 (2007).

164 16 U.S.C. § 1852(b)(5)(A).

165 16 U.S.C. § 3115(c) (1998).

166 42 U.S.C. § 4331 (2006); 40 C.F.R. §§ 1501.6, 1508.5.

167 Ristroph, *supra* note 46, at 2.

168 *E.g.*, W. Neil Adger, *Social Capital, Collective Action, and Adaptation to Climate Change*, 79 ECON. GEO. 387 (Oct. 2003); Carl Folke et al., *Transformations in Ecosystem Stewardship*," *in* Chapin et al., *supra* note 98, at 103; Fikret Berkes et al., *Conservation, Community, and Livelihoods: Sustaining, Renewing, and Adapting Cultural Connections to the Land*, *in* Chapin, et al., *supra* note 99, at 129; George R. Spangler, *Closing the Circle: Restoring the Seasonal Round to the Ceded Territories*, in MINWAAJIMO: TELLING A GOOD STORY–PRESERVING OJIBWE TREATY RIGHTS FOR THE PAST 25 YEARS (LaTisha A. McRoy & Howard J. Bichler (eds., 2011); Robert Arthur et al., *Fostering Collaborative Resilience through Adaptive Comanagement: Reconciling Theory and Practice in the Management of Fisheries in the Mekong Region*, *in* COLLABORATIVE RESILIENCE : MOVING THROUGH CRISIS TO OPPORTUNITY 255 (Bruce Evan Goldstein ed., 2011).

degrees to return to ANVs, a second-best alternative may be to have urban-based scientists willing to work for ANVs, and willing to take seriously their community knowledge and values. Where ANVs cannot afford Western scientists and higher levels of participation, they are at least entitled to government-to-government consultation (at the agency's expense for federally sponsored or permitted activities that affect tribal resources).[169]

ANVs cannot be saddled with all the burden for increasing their participation—agencies should also do their part. Some of the disconnection and mistrust between agencies and ANVs could be addressed by having outside decision makers spend more time in the villages. This suggestion is particularly important for upper-level agency officials who, unlike some of the lower-level staff, have not spent any time in ANVs and do not understand the concerns about food security or the importance of the subsistence lifeway.

An example of the significance of having upper-level officials visit ANVs was President Obama's September 2015 visit, where he met with subsistence participants in several ANVs and ate food captured through subsistence hunting and fishing. During the visit, he announced that the Denali Commission would play the lead coordination role for federal, state and tribal resources to assist communities with climate change adaptation.[170] Sometime after the visit, over the protest of Alaska's Congressional delegation, President Obama issued an executive order related to subsistence.[171] The order provided for some of the principles outlined in this article, including the creation of a co-management entity known as the Bering Task Force to incorporate ANV input and traditional knowledge regarding management of the Bering Strait region. While the President's visit to ANVs is an ideal example of this suggestion, social connections can also be fostered by regular phone contact between staff and ANV leaders, and ensuring that upper level staff attend key Native events such as the annual statewide Alaska Federation of Natives conference.

While some legal changes could allow greater deference to ANV perspectives, laws providing for more ANV authority may not be helpful if ANVs lack the capacity (from a Western point of view) to administer subsistence management. ANVs may need to resort to hiring non-ANV staff if they are not able to get local staff with the capacity needed for co-man-

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169 Exec. Order No. 13175, 65 Fed. Reg. 218 (Nov. 6, 2000); Secretarial Order No. 3,206 (June 5, 1997).

170 White House, *FACT SHEET: President Obama Announces New Investments to Combat Climate Change and Assist Remote Alaskan Communities* (Sep. 2, 2015), https://obamawhitehouse.archives.gov/the-press-office/2015/09/02/fact-sheet-president-obama-announces-new-investments-combat-climate.

171 Exec. Order No. 13754 (Dec. 9, 2016).

agement. In turn, state and federal agencies should support capacity-building efforts, including funding for ANVs, and at the very least spend more time in ANVs to better understand their subsistence concerns.

C. Increasing Flexibility

Responding to climate change may require the law to provide decision-makers, communities, and individuals with greater flexibility so that they have a reservoir of options to choose from when environmental conditions change.[172] There is more than one way to approach this.

One possibility is a change to the laws that govern land mammal hunting and fishing to allow for more flexibility, similar to that of ocean mammals and fish. For example, the AEWC has a cooperative agreement with NOAA to manage the annual bowhead whale hunt in Alaska.[173] The International Whaling Commission allocates a certain amount of bowhead whale "strikes" to AEWC, which in turn allocates the strikes among Alaska's eight whaling villages. Each strike at a whale that a hunter takes counts against that village's quota for that year, whether or not the whale is successfully landed. One village may share its quota with another village, and AEWC has previously shared its quota with Siberian Yupik Eskimos.[174] There are no government-imposed seasonal limits to whaling. This has allowed St. Lawrence Island whalers to take advantage of later fall freeze-up to pursue bowhead whales later in the year, offsetting some of the difficulties they have experienced during the traditional period for whaling.[175]

Another example of flexibility in regulation of ocean mammals and fish is the Community Development Quota,[176] which is designed to give western and Aleutian ANVs a stake in commercial Bering Sea fisheries.[177] The coastal system allows fishers to meet their ground-fish quotas at any time during an extended fishing period.[178] Coastal subsistence fishers have

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172 McNeeley, *supra* note 81, at 837; F. STUART CHAPIN & PATRICIA COCHRAN, COMMUNITY PARTNERSHIP FOR SELF RELIANCE AND SUSTAINABILITY, FINAL REPORT TO COMMUNITIES FROM THE ALASKA NATIVE SCIENCE COMMISSION AND THE UNIVERSITY OF ALASKA FAIRBANKS (2014).

173 NOAA, *Cooperative Agreement Between the National Oceanic and Atmospheric Administration and the Alaska Eskimo Whaling Commission*, https://alaskafisheries.noaa.gov/sites/default/files/aewc2013.pdf (2013).

174 *See* Alaska Eskimo Whaling Commission, Bowhead Harvest Quota, http://www.aewc-alaska.com/bowhead-quota.html (last visited Mar. 1, 2019).

175 Cochran, et al., *supra* note 2, at 562.

176 16 U.S.C. § 1855 (i)(2)(B)(iii) (2012).

177 Loring et al., *supra* note 2; Richmond, *supra* note 50.

178 Loring et al., *supra* note 2, at 81.

described the benefits of the longer open seasons, which reduce the incentive to take unsafe, risky actions in order to obtain adequate catch within a short season.[179]

A third example of flexibility is NMFS's Community Harvest Permit.[180] The program allows certain coastal and rural communities as well as tribes to appoint individuals from their communities or tribes to harvest subsistence halibut from a single vessel under reduced gear and harvest restrictions.[181]

A fourth example, which has not enjoyed the success of the other three, is the State's community subsistence harvest permits described in Part I(D). While that program had unintended consequences, it, along with the other examples described, offers lessons for future community quota programs. Future programs should also recognize the difficulties associated with the land fish and game regime, which is more complex than the marine regimes described in the successful examples above. So long as there is a dual management regime, it will be difficult to regulate animal populations that move across federal and state lands.

A revised "pilot" program for a community quota might start with a species like elk, which has a limited range and is large enough to count with relative ease. The management board could assign an annual quota to a village within the limited range, and each village could develop its own system for allocating the hunt among village residents. A village could trade or share a quota with another village. Rather than implementing a fixed end date for a season, the season could close when the community has met its quota. Such a program would work only if there is no competition from subsistence participants outside of the limited range, and if the participating village is able to fulfill the potential tracking and reporting requirements of the program.

If shifting quotas from individuals to communities proves too politically difficult, a simpler change could involve liberalizing the proxy system to better enable hunting and fishing on behalf of others. One should not have to be blind, elderly, or disabled to receive a proxy hunting license, as is required under the current system.

Aside from community quotas and proxies, another approach to increase flexibility is to grant lower level staff greater authority to make adjustments and exceptions. Some researchers[182] have suggested that regulatory managers should work with weather and climate forecasters and subsistence specialists to try to both anticipate and respond to both climate

179 *Id*.

180 50 C.F.R. § 300.65 (j) (2003).

181 *Id.*

182 McNeeley, *supra* note 3, at 184.

conditions and village harvest success during each season. These collaborations may already be occurring to some degree, based on interviews with state and federal agency participants. Managers for both the state and the federal government have occasionally lengthened a season or expanded a usage area for fishing and hunting, though there is nothing in the regulations directly providing for such a decision.

Another way to increase flexibility relates to the timing of seasons. Alaska regulates vehicular travel across the tundra on a flexible basis, based on the occurrence of an event (sufficient snow thickness and temperature) rather than a calendar date.[183] Ideally, such logic could be applied to establish thresholds for opening and closing hunting seasons for prey and fish, rather than relying on calendar dates or emergency petitions. Hunting and fishing seasons could be opened and closed when agency biologists, in cooperation with ANV residents, document certain activities occurring, such as the presence of a population of a certain size in a particular area.

Another option regarding timing would be to allow for a longer regulatory open season (e.g., May 1 to September 1) and limit a user to a certain number of consecutive days (e.g., 60 within that season). In this example, if the species does not arrive until June 1, a hunter could start on that day and continue until the end of July.

In short, agencies already possess the tools to facilitate flexibility by expanding quotas to include more hunters and providing for longer seasons. In using these tools, the aim is not necessarily to increase the overall harvest, but to ensure that users can obtain harvest levels to which they are legally entitled in the face of climate change and other obstacles. Further, empowering subsistence participants to exercise more control over their practices may create greater "buy-in" to the rules and help avoid illegal harvest.[184] Agencies should explore pilot projects using existing tools for more flexible management.

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183 The tundra is open to off-road travel in coastal areas when the soil temperature at a depth of twelve inches reaches -5˚C and when there is six inches of snow on the ground. In the foothills areas, tundra opening occurs when the soil temperature reaches -5˚C and when there is nine inches of snow on the ground. The date of tundra opening has ranged from as early as November 4 to as late as January 27. *Off-Road Travel on the North Slope on State Land*, ALASKA DEP'T OF NATURAL RESOURCES, http://dnr.alaska.gov/mlw/factsht/land_fs/off-road_travel.pdf (Apr. 2015).

184 Elinor Ostrom, UNDERSTANDING INSTITUTIONAL DIVERSITY 230, 260 (2005); Elinor Ostrom, *Collective Action and the Evolution of Social Norms*, 14 J. ECON. PERSP. 137, 147 (2000); Evelyn Pinkerton, *Coastal Marine Systems: Conserving Fish and Sustaining Community Livelihoods with Co-Management*, *in* Chapin et al., *supra* note 98, at 251.

Intensive Predator Management as a Form of Adaptive Management

Regardless of its ethics or efficacy, intensive management is an example of adaptive management, since it only occurs when biologists receive data showing reduced populations of big game prey.[185] The regulatory agency establishes a threshold for action and implements a different hunting regime when the threshold is reached.[186] Both state and federal agencies should consider the long-term effects of intensive predator management to determine whether it is actually effective or if it simply decreases predator populations unnecessarily. If it is an effective tool, then it is already well within the authority of the state to use it. There is potential legal conflict with predator control on federal lands, but less so for lands managed under the "multi-use" regime of the Forest Service and the BLM.[187] Some of the conflict may be reduced by the Trump Administration. While the Obama Administration resisted efforts to apply intensive predator management tactics in National Parks and Refuges, the Trump Administration and Congress have shown their support for the state view by invalidating federal regulations that limited intensive management in Refuges[188] and proposing new rules allowing predator control in Parks.[189]

D. Other ANV Actions

This subsection discusses additional strategies raised by research participants concerning actions that ANVs can take with or without outside help. Since ANVs retain sovereignty over their members, ANV councils can pass ordinances governing members' subsistence actions. This can be effective in regulating resource access if there is no competition from those outside the community.[190] One of the research participants described how the ANVs of Nanwalek and Port Graham outlawed freezing bidarki (a

185 ALASKA STAT. § 16.05.255(e)–(f).

186 ALASKA ADMIN. CODE tit. 5, § 92.111(c)(4)(C), (E).

187 BLM operates under Federal Land Policy Management Act, which directs multi-use management. 43 U.S.C. §§ 1701(a)(7), 1702(c) (2006); The Forest Service operates under the National Forest Management Act, which has a similar directive. 16 U.S.C. § 1600(3) (2012). In contrast, as discussed in Part II, the mandates of the National Park Service and the U.S. Fish and Wildlife Service relate more to conservation.

188 H.J. Res. 69, 115th Cong., 131 Stat. 86 (2017).

189 National Park Service, Alaska; Hunting and Trapping in National Preserves, 83 Fed. Reg. 23621 (proposed May 22, 2018) (to be codified at 36 C.F.R. pt. 13).

190 Ostrom (2005), *supra* note 184, at 261.

mollusk) to limit the harvest, and put a temporary moratorium on harvesting eelgrass near the village. The State of Alaska had no regulations dealing with these resources, so it did not object to the ANV law.

Another action that ANVs can take on their own is to develop community strategies to support subsistence. This may involve subsidizing fuel and ammunition, as some ANVs have done, or may involve creating a community space for food processing and storage.

Finally, ANVs should consider increasing food security in ways other than subsistence, such as community greenhouses. Government entities like the U.S. Department of Agriculture and the Bureau of Indian Affairs, as well as Native non-profit entities responsible for Native health and welfare, could provide equipment and training for this. Agencies should recognize that some of these ways may seem "colonial" and inconsistent with traditional practices.[191] But, just as ANV residents have embraced the best of technology for their own hunting and traveling, they may embrace gardening if it is their own program rather than one imposed by outsiders.

CONCLUSION

Subsistence is an integral part of ANVs' physical and cultural continuity that must not be overlooked in efforts to assist ANV adaptation. Many subsistence participants are concerned about obstacles to subsistence—not just from climate change, but also from development, increased competition, and inflexible laws. There is some flexibility at the household level to legally adapt subsistence practices to climate change and other constraints, though not all adaptations, such as reliance on more fossil fuels and imported foods may be sustainable in remote locations.

Compared to strategies at the individual and household level, relatively little is being done at the community level in terms of planning for or carrying out adaptation actions. ANVs that can afford to hire Western scientists have been more successful than other ANVs with changing or influencing fish and game management. Overall, however, few participants had concrete suggestions for increasing ANV jurisdiction over fish and game management. If desired by ANV community members, ANV governments could improve food security by subsidizing and seeking funding to support subsistence, other forms of food production, food storage, and participation in state and federal advisory boards. Outside entities might be more willing to assist with such efforts than with efforts that would require regulatory change.

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191 Philip A. Loring & S. Craig Gerlach, *Outpost Gardening in Interior Alaska: Food System Innovation and the Alaska Native Gardens of the 1930s through the 1970s*, 57 ETHNOHISTORY 183, 190 (2010); Stevenson et al., *supra* note 27.

This is not to suggest that ANVs should simply roll over and accept top-down control of fish and game management by state and federal agencies. But management shifts are more likely to go towards larger entities with more ability to navigate Western laws and science, and with a larger territory for a management unit. In other words, co-management is more likely to occur with a regional Native entity such as the Native regional corporation Ahtna or the North Slope Borough than with a small tribe. Native entities with sufficient capacity to do so should push for greater co-management power through existing laws that have been underutilized, such as the Indian Self-Determination Act,[192] or ANILCA Section 809.[193] This strategy depends on the willingness of state and federal government entities to actually collaborate rather than just consult or inform, and to invest limited budgets into coordinating co-management.

Though participants in this study were reluctant to discuss illegal hunting as a strategy, and it is seldom discussed in other research, it is a strategy nevertheless, particularly where laws are perceived as inflexible. Removing factors that impede ANVs from participating in law-making could help bridge the gap between laws that exist on the books and the unwritten laws that exist out on the landscape.[194] Again, it would be ideal if state and federal lawmakers pursued legal changes to increase the jurisdiction and participation of ANVs and rural residents as well as the flexibility of subsistence laws. But even without legal change, game management agency representatives could increase ANV participation in decision making by spending more time in ANVs and making efforts to increase involvement and employment of ANV citizens.

192 25 U.S.C. §§ 5361–5638 (2012).

193 16 U.S.C. § 3120 (2012).

194 Ostrom (2005), *supra* note 184, at 259.