



Navigating climate change adaptation assistance for communities: a case study of Newtok Village, Alaska

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Abstract

Climate change is significantly impacting Alaska Native Villages (federally recognized tribes) as well as other rural and place-based communities that wish to continue their traditional lifeways. While many communities are looking to state and federal governments for assistance with climate change and other emergencies, there are limits to assistance under the current political and legal framework. This article discusses strategies for climate change adaptation that Alaska Native Villages and similarly situated communities may be able to take on their own. The article acknowledges the limits to these strategies and the gaps likely to remain in adaptation assistance. The article considers the Native Village of Newtok, Alaska, which is relocating to another site as an adaptation to climate change, as a case study in navigating adaptation assistance. While each community is different, several factors that have helped Newtok may benefit other communities: strong leadership; unified community vision and policy; a local coordinator serving as a continued point of contact; strong capacity for grantwriting; trusted, reasonably priced consultants; professional accounting services; and a housing policy to ensure fairness.

Keywords Climate change · Relocation · Alaska Natives

Introduction

From severe weather to flooding and rising sea levels, climate change has begun to affect the well-being of communities across America (Walsh et al. 2014). Alaska has distinct impacts, as it is warming far more rapidly than other parts of the USA (Chapin et al. 2014; Walsh et al. 2014). Also, Alaska is home to 41% of the nation's federally recognized tribes (BIA 2017), many of whom maintain traditional hunting and fishing lifeways that are deeply affected by climate change (Ristroph 2010; 2019a). Alaska Native Villages¹ (ANVs) are grappling with changes in flooding and erosion, melting permafrost, later snowfall, and river freezeup (preventing access to subsistence) and later formation of shorefast ice that previously served as a protective barrier from destructive fall storms (Field et al. 2014; Chapin et al. 2014; Ristroph 2010). Thirty-one ANVs have been described as “imminently threatened” by climate change (GAO 2003, 2009).

ANVs along with other communities across the nation have increasingly turned to state and federal governments for help in the face of climate change and other disasters (Reeves 2011; McCarthy 2014; Lindsay 2014; FEMA 2020). Scholars and community advocates have called for major legal and institutional changes to facilitate adaptation, including a new agency to lead or coordinate adaptation (Craig 2010; Flatt 2012, 2014; Moser et al. 2017). Indeed, there is a moral and political argument that “climate justice” requires the USA to assist historically marginalized climate-vulnerable communities such as ANVs that have contributed little to climate change (Ristroph 2019b). In particular, there have been calls to increase the power and jurisdiction of ANVs and other indigenous groups over land and financial resources that could facilitate adaptation (Whyte 2013; McNeeley 2017; Ristroph 2019b).

But in the absence of a disaster that directly affects policy-makers, sweeping change to existing institutions are unlikely (Ristroph 2019b). It took a September 11, 2001, terrorist attack to develop the Department of Homeland Security and implement meaningful airport security measures.

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¹ This term refers to the federally recognized tribe as well as its village site. Most residents of an ANV are citizens of the affiliated tribal nation as well as citizens of the USA.

In the face of the COVID-19 disease, which has literally “gone viral” across the USA in the span of weeks, the federal government has been slow to react (Edwards 2020). As for tribal jurisdiction in Alaska, there have been nearly five decades of criticism of the Alaska Native Claims Settlement Act (Berger 1991; Chaffee 2008, Indian Law and Order Commission 2015), and some incremental amendments to adjust it,² but no new settlement has emerged to take its place. ANVs lack the political clout to significantly change the existing regime (McNeeley 2012; Kofinas et al. 2010; Loring et al. 2011).

Hence, it is important that ANVs are able to take advantage of existing legal and economic opportunities to adapt to climate change. In this paper, I consider how the extremely climate-vulnerable community of Newtok, Alaska, has marshaled federal and state resources to relocate its townsite. Since the mid-1990s, the village’s goal has been to completely relocate its townsite to Mertarvik, the only high ground in the vicinity, situated on an island nine miles away (Agnew Beck Consulting 2011). As of this writing, Newtok has established a community multi-purpose building (funded as an evacuation center), some basic infrastructure and roads, and about one-third of the needed homes at Mertarvik. I outline the particular advantages and strategies that have benefited Newtok—strategies and advantages that may not be available to other climate-vulnerable communities. Finally, I consider what the future may hold for Newtok as well as other communities in the absence of external assistance.

This work is based on my Ph.D. dissertation, which involved reviews of planning documents for 59 ANVs and 153 interviews and interview-like conversations during 2016 and 2017 with ANV residents and those outside of ANVs involved in facilitating adaptation (Ristroph 2018a). It is also based on the legal and planning work I have done with the Newtok Village Council since 2017.

Climate vulnerability in Newtok and other ANVs

In the second half of the twentieth century, average temperatures in Alaska have increased by 3°F (Stewart et al., 2013; Thoman and Walsh 2019). This has resulted in changes to snow cover and precipitation patterns, changes in flooding and erosion, species shifts, melting permafrost, more wildfires, more acidic oceans, and later formation of landfast ice (Chapin et al. 2014; Stewart et al., 2013; Field et al., 2014). Under the most conservative estimates, Alaska is projected

to warm by 6 to 8°F in the north and 4 to 6°F in the rest of the state by the end of the century (Stewart et al. 2013; Markon, et al. 2018). These changes affect weather events as well as subsistence (Cochran et al. 2013; McNeeley, 2009). Researchers have documented climate change impacts in various interior, west coast, and north coast ANVs from the vantage of Western science (Nichols et al., 2004; Chapman et al., 2009; Ignatowski & Rosales 2013; Carothers et al. 2014; Brown et al., 2015) as well as indigenous community knowledge (Cochran et al. 2013; Ignatowski & Rosales 2013).

In 2003, the Government Accountability Office (GAO) found that flooding and erosion affected 86% of all ANVs (GAO 2003). In 2009, GAO identified 31 ANVs facing imminent flooding and erosion threats, with four villages in dire need of relocation (GAO 2009). Newtok Village, a roadless community which sits on an inlet of the sea in southwest Alaska known as the Niglik River, is one of these four villages. “Usteq,” a combination of melting permafrost and erosion, has led to significant land loss along the bank (URS Corporation 2015; DHS&EM 2018). The other end of the town is subject to frequent flooding, and many of the houses suffer from black mold due to the combination of moisture and poor ventilation (Environmental Protection Agency (EPA) 2010; Seltnerich 2012; URS Corporation 2015).

In 2006, the Army Corps completed a vulnerability assessment of Newtok, leading to a map projecting what land would be lost each year to usteq (Army Corps of Engineers 2006a). Thus far, the projections are more accurate, and the entire village may go under water by 2027 (Army Corps of Engineers 2006a). A 2019 vulnerability assessment based on permafrost melt, erosion, and flooding ranked Newtok as the seventh most vulnerable village in Alaska in all of these factors and most vulnerable in terms of permafrost melt (University of Alaska Fairbanks(UAF) and Corps of Engineers 2019). That same year, houses were removed from the bank just in time to avoid being washed away by a fall storm. The drinking water source and the school, which serves as a community gathering point and has sheltered those who were temporarily without houses, will soon succumb to the rising waters (Eichelberger 2017).

The problem is not just a loss of land and buildings, but also a loss of infrastructure that provides the most basic sanitation. Since there is no running water in community homes, residents previously disposed of sewage in a sewage lagoon (Eichelberger 2017). Likewise, residents previously disposed of household garbage in the community landfill. Both of these disposal options have now partially eroded away, leaving no good options for waste treatment (Eichelberger 2017). To compound these troubles, the community washeteria has been inoperable for extended periods, and power generators continue to break. Not only are repairs difficult given

² E.g., Pub. L. No. 108–452 (2004); Pub. L. No. 104–42 (1995); Pub. L. No. 96–487 (1980); Pub. L. No. 95–178 (1977).

Newtok's remoteness and harsh weather (which frequently prevent planes from landing), there is little incentive to invest in infrastructure that will soon be under water.

Keeping infrastructure running and services provided in Newtok and other villages is a challenge with or without climate change. It is important to note that climate change is one of several factors that contribute to ANV vulnerability (Loring et al. 2016; Arctic Council 2017; Wildcat 2013). Like Newtok, most ANVs are located in remote (at least from an urban viewpoint), Arctic, or sub-Arctic environments with limited means of accessing Western goods and services. Many are accessible only by planes or off-road vehicles, and only in decent weather. When severe weather impedes flights, residents are left with limited resources (Cochran et al. 2013; Chapin & Cochran 2014). While ANVs are dependent on subsistence foods for their nutritional and cultural needs, they also rely on Western goods and services that are hard to produce locally—especially fossil fuels (Marino 2012). Remoteness, historical trauma, and lack of a police presence in many ANVs has made space for problems such as a sense of disempowerment, chemical addictions, violence, and even suicide (Chapin et al. 2014; Berger, 1999; Napoleon 2014; Wexler 2014; Kemberling & Avellaneda-Cruz 2013; Tobias & Richmond 2014; Seale et al. 2006; Indian Law and Order Commission 2015). These social problems can reduce adaptive capacity to address challenges like climate change (Abate & Kronk 2013; Hausam 2013).

Adaptation and relocation impediments

ANVs and their residents are adapting to climate change in many ways. A number have worked with consultants on adaptation plans or hazard mitigation plans (which serve a similar function and make communities eligible for Federal Emergency Management Agency funding) (42 U.S.C. § 5165(a, d); Ristroph 2018b). Many ANVs have used “hard armoring” to shore up their banks against erosion (Ristroph 2019c). At a household and family level, Alaska Natives are adapting their subsistence practices as they have for thousands of years by shifting the time, place, and manner of hunting and fishing (Ristroph 2019a). But large-scale adaptations, particularly those where a community seeks to relocate its townsite, can be extremely difficult (Bronen 2012; Ristroph 2017).

Relocation was not always so difficult. Prior to the Alaska Natives Claims Settlement Act (ANCSA), 43 U.S.C. § 1603, *et seq.*, in 1971, many settlements were seasonal and could be moved if flooded out (Ristroph 2017). After ANVs were forced to permanently settle, residents came to depend on Western-style infrastructure common to

the Lower 48 (Ristroph 2019c). This infrastructure can be very expensive in ANVs disconnected from the road system, where a house without plumbing can cost as much as half a million dollars (Ristroph 2017). While some ANVs have gradually built settlements on higher ground, there has not been a complete relocation in recent times other than that of Newtok and ANVs assisted through federal disaster declarations (Ristroph 2017).

Communities that wish to implement large-scale adaptation measures or relocate not only lack funding to do so, they face institutional barriers to assistance. There is not a single agency or a clear path to obtaining adaptation and relocation assistance (Ristroph 2017; Bronen 2012). Communities typically have to compete for multiple grants from different agencies, each with peculiar requirements that take time to fulfill. Many grants have a match component that can only be fulfilled from certain sources. For example, a grant from one federal agency typically cannot be supported by a match from another federal agency. Small communities without grantwriters or administrative capacity to carry out grants are at a significant disadvantage.

The following table summarizes key adaptation barriers for ANVs (Ristroph 2018a).

Barrier	Description
Belief	Lack of recognition of climate change as problem for government to address
Responsibility	Lack of clarity on who is responsible for what aspects of adaptation and options for villages
Uncertainty	Lack of data, particularly regarding future political conditions
Motivation	Lack of motivation or political will to address climate change
Institutional inertia	Difficulty in adjusting laws to provide climate change assistance
Capacity	Lack of funding or ability to exercise options or carry out adaptation-related programs under existing laws and plans; misunderstanding of laws
Jurisdiction	Lack of jurisdiction over resources needed for adaptation
Cooperation	Lack of communication or cooperation between a community and outside governments; between outside agencies, and within a community
Influence	Lack of tribal influence on external political decisions
Leadership	Poor community leadership or lack of support for leadership

Barrier	Description
Infrastructure	Infrastructure is difficult/expensive to move (in part because labor and building standards); it takes a long time to get proper buildings and amenities; and it is extremely difficult to simultaneously support infrastructure at two community locations
Location	People want to live by water and many do not want to leave their traditional homes; there is not a suitable, affordable location for expansion or relocation
Laws	Subsistence laws are overly restrictive; regulations of different agencies pose conflicting standards for new construction; laws are inflexible, unadaptable
Funding	Difficulty obtaining and managing grants

As the above table suggests, lack of funding is one of many impediments to adaptation, but it is an important one. The following section details how Newtok has sought funding for the first half of its relocation.

Funding for relocating Newtok

Like most ANVs, Newtok is home to both a federally recognized tribe (referred to as Newtok Village) and a landholding corporation created by ANCSA (referred to as Newtok Native Corporation). Newtok Native Corporation owns land in and around the Newtok townsite. In the late 1990s, Newtok Village and Newtok Native Corporation, with the help of the Corporation's lawyer Glen Price, sought to trade Corporation-owned land for land managed by the US Fish and Wildlife Service at Mertarvik. ANCSA allows for land trades, even on an uneven basis, if the trade is considered to be in the public interest (43 U.S.C. § 1621(f); *c.f.* 16 U.S.C. § 3192). Yet, it took seven years to broker an act of Congress to allow for the needed land exchange (Public Law 108–129 2003; DCRA [n.d.a](#)).

Obtaining the land for the new townsite was only the beginning of the relocation. The US Army Corps of Engineers projected in 2006 that \$80 million to \$130 million would be required to complete the location (Army Corps of Engineers [2006a](#)). At that time, it seemed possible that the Army Corps could play a key role in relocation funding. Congress had recently authorized the Corps “to carry out, at full federal expense, structural and non-structural projects for storm damage prevention and reduction, coastal erosion, and ice and glacial damage in Alaska, including relocation of affected communities and construction of replacement facilities” (Public Law 108–447, Title I, § 117 2004).

But this authority was repealed in March 2009 (Public Law 111–8, Title I, § 117 2004). At this time, Army Corps funding had only gone so far as to assist with designing the Mertarvik Evacuation Center and roads (GAO [2009](#)). Congress renewed the Army Corps' authority to assist with relocation in 2010, but required a 35% match (33 U.S.C. § 2213). As of this writing, Newtok has not been able to get assistance through this program. The remainder of this section outlines the key funding Newtok has been able to secure.³

State of Alaska support

The Alaska Division of Community and Regional Affairs (DCRA [2020](#)), which is charged with helping communities address erosion (among other duties), has provided several ANVs with adaptation planning assistance (Alaska Administrative Order No. 231 2006, Administrative Order No. 239 2008). In 2006, DCRA (through the efforts of Sally Russell Cox) worked directly with the tribal leadership (at that time, the Newtok Traditional Council, with Tribal Administrator Stanley Tom) on forming the Newtok Planning Group to facilitate coordination assistance from agencies (DCRA [n.d. b](#)). Despite leadership changes in Newtok, Cox and the group have continued to meet on a regular basis. While these meetings have not necessarily led to more funding, they have raised awareness of Newtok's situation among agencies and have garnered some technical assistance from agencies.

With support from DCRA, Newtok was able to get \$6.5 million from the State legislature to construct the Mertarvik Evacuation Center. The need for an evacuation center may be questionable in the new location, which is highest ground in the area and not projected to flood (Two Bears 2019). That said, the building has played a critical role in settlement by serving as a school and will continue to serve as a multi-purpose community building (as well as a potential evacuation center) once a new school is built (42 U.S.C. § 3121, *et seq.*).

Denali Commission funding

The Denali Commission is a federal agency working exclusively in Alaska to provide critical utilities, infrastructure, and economic support, particularly to remote communities (42 U.S.C. § 3121). In 2015, President Obama designated the Denali Commission to lead funding of climate change adaptation and relocation in Alaska, but provided no funding

³ There are various other small grants that Newtok has obtained from agencies not mentioned here; the purpose of this section is to highlight key sources of funding that may be available to other communities.

for this effort (Russell 2015). Denali Commission used its own limited funding to create a Village Infrastructure Program, through which it paid for “relocation coordinators” in the four villages considered most climate-threatened (Newtok, Kivalina, Shishmaref, and Shaktoolik) and funded grant writers to build on community funding (Denali Commission 2017).

Around this same time, Newtok’s leadership (through the efforts of Newtok Village Council President Paul Charles, Relocation Coordinator Romy Cadiente, and Attorney Michael J. Walleri) lobbied for a Congressional appropriation for relocation. In 2018, Congress made a one-time \$15 million appropriation to Denali Commission for its work with all Alaska villages (Public Law 115–141 2018). Denali Commission granted this funding to the Alaska Native Tribal Health Consortium (a non-profit entity that provides water and sewer services to ANVs) on behalf of Newtok. Most of the funding went towards the 2019 construction season at Mertarvik, which resulted in a landfill, a preliminary barge landing, a temporary airstrip, 13 houses with partial plumbing (each costing between \$500,000 and \$600,000), roads, a preliminary power plant, bulk fuel storage, and a preliminary water and wastewater treatment plants. Denali Commission funding also served as a match for the FEMA funding discussed in the next subsection.⁴

FEMA hazard mitigation assistance

The Federal Emergency Management Agency (FEMA) has two hazard mitigation programs that Newtok has benefited from: the post-disaster Hazard Mitigation Grant Program (HMGP) and the Pre-Disaster Mitigation Program (PDM). These programs can fund measures designed to prevent future disasters, such as building elevations, relocations, and buyouts (Federal Emergency Management Agency (FEMA) 2015). A community can apply to a state for funding as a “subapplicant,” while a state applies directly to FEMA as an applicant (44 C.F.R. 206.434(a), 206.2(a)(16)). Federally recognized tribes can apply for funding either directly as applicants or indirectly as subapplicants through states (42 U.S.C. 5170(b); 44 C.F.R. 201.7).⁵ When applying directly to FEMA, there is potential for greater funding, but there is

⁴ The enabling legislation of the Denali Commission is more flexible than that of most federal agencies. It allows Denali Commission funding to be used as a match for other federal projects in certain situations. 42 U.S.C. § 3145. Also, the Denali Commission may waive its own matching requirements for certain grants to tribes. 42 U.S. Code § 3144.

⁵ A tribe can only apply directly to FEMA for HMGP if the tribe itself has had a presidential disaster declaration. 42 U.S.C. § 5170c. As of this writing, no ANV has succeeded in getting a presidential disaster declaration.

also a match requirement.⁶ HMGP funding is typically much greater than PDM funding, since it is based on a percentage of funds spent on a recent federal disaster declaration within the state (42 U.S.C. 5170c(a); 44 C.F.R. 206.432). PDM funding is smaller but has generally occurred annually (without the need to wait for a disaster).

Starting with funding opportunities in 2020, PDM will be replaced by Building Resilient Infrastructure and Communities (BRIC) (FEMA 2019). BRIC will potentially provide a larger amount of funding than PDM: the President may set aside 6% of the funding spent on presidential disaster declarations in the previous federal year for the BRIC funding (42 U.S.C. § 5133(i)(1)). The funding will take the form of an annual competition open to states that have had a major disaster declaration in the last seven years (FEMA 2019). As with PDM, there will potentially be funding set aside specifically for tribes (FEMA 2019). As of this writing, FEMA is in the process of finalizing the regulations for BRIC.

Newtok was able to win roughly \$1.7 million in 2018 to buy out seven of the most climate-threatened homes in Newtok.⁷ The homeowners opted to put the purchase funds into a council-maintained account to be used for new houses, in exchange for being assured that they would receive new houses at Mertarvik (which they did). Newtok has also received various small PDM grants, which it has used to install the gravel “pads” needed as a foundation for buildings throughout most of Alaska, plus a larger PDM grant (\$3.7 million) for water and sewer improvements. Newtok was able to find an independent small engineering firm (LeMay Engineering and Consulting) to carry out the project management for the FEMA grants at a relatively low cost, and to work with Newtok to apply for additional grants.

US Department of Housing and Urban Development Grants

The US Department of Housing and Urban Development (HUD) offers various grants for low-income housing and infrastructure to communities, including grants specific

⁶ Both HMGP and PDM require a 25% match, or 10% for small and impoverished communities (for which Newtok qualifies). 42 U.S.C. 5170c(a); 44 C.F.R. 206.432. 42 U.S. Code § 5133(h).

⁷ Newtok had considered relocating buildings to the new site, but initial analyses suggested that nearly all the buildings were not sufficiently structurally sound to survive a move. Furthermore, the logistics of moving buildings across water were complicated. Since the water does not freeze as completely as it did in the past, there was little desire to risk falling through the ice during a winter move. While moving in open water during the summer was a possibility, buildings could not be moved over the marshy landscape without snowcover and sleds. Thus, buildings would have had to be moved overland by sleds in winter, then wait by the shore until ice melted sufficiently to allow boat passage.

to tribes. There are two main sets of tribal housing grants: the Indian Housing Block Grant (IHBG) (25 U.S.C. 4101 *et seq.*) and the Indian Community Development Block Grant (ICDBG) (42 U.S.C. 5301 *et seq.*). The latter has two grant cycles, one that is competitive on a semi-annual basis (24 C.F.R. § 1003.100), and another (“Imminent Threat”) that is available on a non-competitive basis for a problem “which if unresolved or not addressed will have an immediate negative impact on public health or safety” (24 CFR § 1003.4; 24 C.F.R. 1003.400). ICDBG money is considered “Indian money” rather than “federal money,” such that it may be used as a match for other federal grants with similar purposes (24 CFR 1003.201(g)). In Alaska, tribes are not eligible to apply directly for these grants (except for Imminent Threat grants); rather, they must go through a regional housing authority that applies for and manages the grant.⁸

Newtok has not received competitive ICDBG funding or IHBG funding, but has directly received about \$1.4 million ICDBG imminent threat grants for two houses and to fund the evacuation center. Newtok has also benefited from a HUD program to guarantee low interest loans, which provided for two houses at Mertarvik.⁹

Bureau of Indian Affairs

The Bureau of Indian Affairs (BIA) provides small amounts of funding on an annual basis to each federally recognized tribe through several programs, including a Tribal Transportation Program (23 U.S.C. § 201, *et seq.*; 25 C.F.R. Part 170), Housing Improvement Program (25 U.S.C § 13, *et seq.*; 25 CFR Part 256), and Self Determination¹⁰ funding. BIA funding is particularly useful in that no match is required to obtain the funding, and the funding may be used as a match

⁸ NAHASDA provides IHBG grants to “tribally designated housing entities” (TDHE) (as defined under 4(22) of NAHASDA) which in Alaska can only be regional housing authorities. For ICDBG, a Community Based Development Organization (CBDO) must apply for funding, and in Alaska, only regional housing authorities are eligible. Housing and Community Development Act, 42 U.S.C. §5301 *et seq.*; 24 C.F.R. part 1003.

⁹ The Title VI Loan Guarantee Program was created to assist tribes, Alaska Native Villages, and Tribally Designated Housing Entities (TDHE) with financing affordable housing as prescribed in the Native American Housing Assistance and Self-Determination Act of 1996 (NAHASDA). The tribe/TDHE leverages Indian Housing Block Grant funds (IHBG) by pledging grant funds to HUD, and HUD provides the guarantee to the lender.

¹⁰ Under Public Law 93–638, Indian Self-Determination and Education Assistance Act, 25 U.S. Code 5301 *et seq.*, tribes receive annual funding (based on the number of members) for reoccurring needs, programmatic shortfalls, and special projects not including construction (25 CFR Part 1000, 25 CFR 1000.105). Tribes have the option of taking over some programs that would otherwise be provided by the Departments of the Interior and Human Health Services. (25 U.S.C. § 450a(b); 25 CFR Part 900).

for other grants (25 CFR § 256.29; 25 CFR § 1000.405; BIA 2017).

Under the Tribal Transportation Program, Newtok and other tribes get annual allocations of funding for road design, construction, and maintenance. The annual allocation may be several hundred thousand dollars, depending on a tribe’s size. Newtok has used this funding to help pay for gravel harvesting and construction of pioneer roads at Mertarvik.

Under the Housing Improvement Program, Newtok has been able to get a few hundred thousand dollars in each of the last few years to provide housing for extremely low income people. In 2016, this program funded a moveable home designed for maximum heat efficiency by Cold Climate Housing Research Center and constructed by local workers. In 2020, program funding will support a novel engineering approach to construct two small two-bedroom houses, each for around \$150,000.

Volunteer labor

In developing its housing policies, the Newtok Village Council considered having mandatory or voluntary labor provisions for the future homeowners of Mertarvik. The Council ultimately decided against these provisions due to the expense of liability insurance, including workers’ compensation, and the need to closely supervise those without certifications or skillsets for particular jobs. But “volunteer” labor nevertheless played a role in the 2019 construction season, when the Department of Defense’s Innovative Readiness Training program (DOD *n.d.*), which provided some labor for roads, homes, and the evacuation shelter. The program serves as training opportunity for National Guard members to boost their skills. ANTHC’s general contractor, UIC Construction, LLC, supervised the National Guard workers. Since the workers brought their own food and created their own housing and were under the authority of the Department of Defense, they did not result in a net cost or increased liability to Newtok.

Housing policy

In cooperation with tribal attorneys and a committee composed of representatives from HUD and other agencies, Newtok’s Council developed a housing policy to guide the fair allocation of housing in Mertarvik (Newtok Village Council 2020). The policy:

prioritizes relocation for households ranked most “at-risk” due to flooding and erosion, as well as for households with workers needed to provide essential services and school children needed to establish the quorum required for the school to operate at Mertarvik;

requires those who receive funding from FEMA buyouts to remit all funds to the Council to use for housing only; requires homeowners at Mertarvik to make monthly payments based on income (which go into a fund for housing only); generally prohibits homeowners from transferring their Mertarvik homes unless they reimburse the Council for the value of the homes.

As of this writing, only about one-third of the needed houses have been constructed at Mertarvik. Two-thirds of the residents remain at the Newtok townsite. Assuming no additional Congressional funding is appropriated for housing at Mertarvik, the monthly housing payments from homeowners will be critical to continuing the relocation. Money from these payments will go into a fund used to pay for additional houses at Mertarvik for those still in Newtok: it will either pay directly for construction or be used as a match to get additional grants.

Self-generated revenue

For Newtok to continue to exist at the new location, a long-term source of revenue is essential. Limited external assistance means that some sort of economic development strategy is needed. This is extremely challenging given Newtok's remote location and the difficulty of transporting goods to and from Newtok. Newtok is considering positioning itself to sell fuel and gravel to villages and projects in the vicinity, as it is adjacent to a gravel mine and is currently seeking funding to build up a new barge landing at Mertarvik for exports.

It is difficult to strike a balance between preparing for long-term economic development and completing the relocation as soon as possible. Newtok learned this when the Council and local corporation entered into a contract to supply gravel to a vendor, only to face the prospect of having insufficient gravel to complete its own roads. In short, careful budgeting and long-term economic planning are important to complete the relocation and to remain at the new townsite.

Strategies for success

There are several factors that have contributed to the success of Newtok's relocation in recent years. The first may be the availability of nearby land on which to relocate. Many place-based or traditional communities are reluctant to relocate if relocation requires losing traditional lands and lifeways (Hibbard and Adkins 2013; Huntington et al. 2009). While Newtok residents have a strong attachment to their homes, they know that they will be able to continue to reach the

same subsistence areas they have always used (other than those lost to erosion) and will not be competing with another community for resources. And while they may be attached to homes in Newtok, they are very aware of the imminent threat to these homes, and they look forward to living in a community where there will be roads and running water.

Another factor in Newtok's success is the sense of community cohesion and a cultural value of conflict avoidance (see Kofinas and Chapin 2009; Ritchie and Gill 2010; Chapin and Cochran 2014). The relocation suffered a significant setback in 2012, when the leadership of the previous Newtok Traditional Council declined to step down after an election for new officers. The community was forced to form an entirely new governing body, the Newtok Village Council, and seek recognition of the new government from the Bureau of Indian Affairs (Newtok Traditional Council 2015). After the transition, the former leadership continued to retain documents and funds belonging to the tribe, and to represent itself at nationwide conferences as the current government. The Newtok Village Council was able to obtain injunctive relief against the former government in 2015 and the community was able to move forward (Newtok Village Council 2015). Still, members of the former government have remained a part of the community and former Tribal Administrator Stanley Tom has served a useful role in continuing to publicize the challenges that Newtok faces. The current government is committed to providing homes at Mertarvik for all Newtok residents, including members of the former government.

Since 2015, Newtok has had fairly strong leadership that has facilitated the relocation (see Ostrom 2000; Folke et al. 2009; Hamin et al. 2014; Chapin and Cochran 2014). In particular, Newtok's leadership has been able to communicate its vision to community residents (to avoid misinformation) and to external agencies (see Jacobs and Brooks 2011; Kofinas 2009). For example, Newtok's leadership has insisted on prioritizing houses over other types of infrastructure, given the need to quickly house people before the current townsite is lost. The idea is that residents would rather have a house with no toilet (which is the current situation in Newtok) than a sewer system at Mertarvik but no house to live in.

Cooperation between the tribal council and the village corporation (cultivated by the corporation's late lawyer Glen Price) has been another factor that may set Newtok apart from some ANVs (see Hibbard and Adkins 2013; Chapin and Cochran 2014; Ristroph 2019c). The corporation was willing to provide the land for the new townsite and enter into an agreement with the tribal council such that the council had the necessary site control for construction (Newtok Native Corporation and Newtok Village Council 2018). The corporation, which owns part of the nearby gravel quarry, collaborated with the tribal council on gravel mining for village roads.

Another important factor in Newtok's success has been the Denali Commission-funded "relocation coordinator" position. Newtok resident Romy Cadiente has served in this position since it was initiated. He is a single point of contact for the many agencies and entities that Newtok works with. He has accrued a great deal of institutional knowledge regarding funding agencies and at the same time understands what is taking place in Newtok and Mertarvik on a day-to-day basis.

Beyond having a relocation coordinator and solid leadership, Newtok has benefited from the team of people it assembled to carry out different functions. This article has mentioned specific people by name in recognition that particular individuals can have a crucial role in adaptation success (see Osbahr et al. 2010; May 2017). When Newtok first began to get major relocation grants, a flock of consultants emerged to take advantage of funding opportunities. Newtok went through a number of consultants before establishing its present team, consisting mostly of independent individuals that have reduced fees and little to no overhead. The team, which provides legal, planning, grantwriting, project management, engineering, and accounting support,¹¹ meets weekly by phone to synergize their efforts and avoid duplication. The team has worked to form relationships with agencies as well as supply vendors and has been able to take advantage of opportunities of which Newtok might have otherwise been unaware.¹² Newtok pays for its consultants through the "indirect" costs that it receives through most of its grants.¹³

Grantwriters for Newtok have been "opportunistic," meaning that they have applied for all grants that Newtok had a strong likelihood of getting and that would provide revenue needed for either relocation or community services (even if the grants would not fulfill a high-priority need). Maintenance of basic community services cannot be ignored in the larger vision for community adaptation (Loring et al. 2016). Newtok has benefited from getting grants to support a local court and waste management.

There are tradeoffs in relying on multiple independent consultants as opposed to a centralized project manager or general contractor. When Newtok previously engaged a consulting firm as a general project manager, it was convenient to engage with a single entity for grantwriting and management of multiple projects. Procurement was simplified, as

Newtok did not have to issue multiple requests for proposals from different professional service providers. The cost of this entity was extremely high, however, and the Council ultimately decided that the value of the service was not worth the cost. Similarly, when a single "master builder" managed the 2019 construction season, construction was efficient and the housing of all of the workers simultaneously in the "mancamp" at Mertarvik was simple. But the cost of working with one general contractor, as opposed to putting each construction project out to bid for the best value, was extremely high. Each new home cost nearly \$600,000, despite the fact that construction was occurring "in bulk" and with assistance from the Department of Defense.

Finally, the development of a community housing policy was important to clarify and codify the community's overarching vision that every resident would receive housing in Mertarvik. The policy is designed to prevent "gaming" of the system, whereby someone could get a house for free and then transfer it to someone else and leave the community. Paying for housing gives community members a greater stake in their homes and in the new settlement than they would have under a free allocation system, and the payments are an important source of funding to construct new houses.

Prospects for other communities

Not every community will have the same factors that have contributed to Newtok's recent success. From a geographic and economic perspective, there are limitations in land available for expansion or relocation—particularly for communities in densely populated areas in the lower 48 and elsewhere. Reluctance to relocate to an area populated by another culture may add to community members' desire to stay where they are (Warnecke et al. 2010; Kasakove 2019; Scott and Lennon 2020). In contrast, land in Alaska is abundant, even if higher ground may not be adjacent to a community. Much of the land is owned by the federal government and can be traded with tribes or Native corporations (ADNR 2000; 43 U.S.C. § 1621(f); 16 U.S.C. § 3192).

From a socio-political perspective, not every community will have a uniform vision for community adaptation, particularly when the issue is relocation. An example is the Native Village of Kivalina, which has considered relocation since 2000, but is still not in agreement as to where to relocate (Brubaker et al 2011).¹⁴ Community cohesion and strong leadership can be a challenge when there are factions

¹¹ Professional accounting support is an extremely important function given the large volume of grant funding and the risk that improper fund management could end the possibility of future grants.

¹² For example, the engineer, Patrick LeMay, was able to negotiate with a barging company to both haul materials to the construction site and haul away debris from home demolitions at Newtok,

¹³ Indirect costs are awarded to cover costs that may not be directly attributable to a single grant, such as utility expenses, and may be difficult to predict (2 CFR to Part 200, Appendix VII).

¹⁴ The community did vote in 2000 to move to a new site, but a 2006 US Army Corps of Engineers Study called into question the sustainability of this location and relocation to this site was not pursued (Army Corps 2006b).

with differing visions. This can be a problem for some Alaskan communities in which there is a tribal government as well as a municipal government, and possibly a village corporation with a different agenda from the tribe (Chapin and Cochran 2014, 10; Ristroph 2010; Ristroph 2019d).

Small communities can experience frequent turnover in leadership, which can impede the collective action needed for community adaptation and limits the ability to accrue institutional knowledge (Howitt 1978; Slack et al. 2003). If a community is not able to retain a permanent civil servant to act as a point of contact for adaptation and relocation, it may consider retaining a consultant who lives in or travels to the community, works on an occasional basis, and maintains all of the files, contact information, and grant opportunities relevant to the community's projects. That said, careful management of consultants is needed to avoid cost overruns and products that do not reflect the community's vision.

Adaptation requires funding, and obtaining funding requires some basic level of funds to at least pay a grantwriter. Grantwriting can be expensive, particularly for complex grants such as FEMA's hazard mitigation assistance that can cost tens of thousands of dollars to write. Some communities may lack even the most basic level of funds needed for community adaptation efforts—every penny may go into keeping the current infrastructure running. For this reason, the willingness of a state or federal agency to pay for community grantwriting (as the Denali Commission did for Newtok) can be a valuable contribution.

Much of the funding that is available for "adaptation" is only available for adaptation plans and studies and not for construction.¹⁵ So called strategic plans for relocation and adaptation done by outside entities may accomplish little beyond building a common vision, and they may not even build a common vision when they lack broad community participation (Ristroph 2018c). The Newtok relocation plan done in 2011 (Agnew Beck Consulting, 2011) was not used in any way in the development of Mertarvik's infrastructure since 2018. Communities may wish to "leapfrog" over such plans and work directly on getting funding to elevate or move critical infrastructure. FEMA's hazard mitigation

assistance, which is expensive to apply for (and requires a hazard mitigation plan), is one route to get funding for such improvements. The State of Alaska Division of Homeland Security hires consultants that can provide Alaskan communities with hazard mitigation plans free of charge (Ristroph 2018c). While the quality of many of these plans is such that they may never be implemented (Ristroph 2018b), they may be useful if a community is prepared to hire a consultant to write a grant for a particular project related to the plan contents.

Finally, when considering factors that facilitate adaptation and relocation, it is important to remember that there are existential challenges to ANVs beyond climate change. A number have disappeared (DCRA n.d.c.) and the populations of Interior Alaska communities without fishing or mineral revenue have dwindled significantly in recent decades (Hamilton et al. 2016; Ristroph 2019d). Urban migration as a form of individual and household adaptation to changing economic and social conditions (in addition to environmental conditions) may continue, leaving behind some of the most vulnerable ANV residents (Hamilton et al. 2016; Ristroph 2019d).

Conclusion

Adaptation challenges for ANVs and other traditional, place-based rural communities are daunting. Aside from the technological and financial challenges of building infrastructure, there is potential for internal community conflict, confusion about how to move forward, and limited political will on the part of external entities to offer assistance. Despite the odds, Newtok Village, Alaska—a tiny, remote community surrounded by wetlands with limited access to the outside world—has managed to move over half of its townsite to a completely different location on an island nine miles away. The fact that such progress has been made in the absence of a national coordinating agency, act, or dedicated funding stream should offer encouragement to other communities that must adapt now to preserve themselves. While each community is different, several factors that have helped Newtok may benefit other communities: strong leadership; unified community vision and policy; a local coordinator serving as a continued point of contact; strong capacity for grantwriting; trusted, reasonably priced consultants; professional accounting services; and a housing policy to ensure fairness. In the absence of major funding to finish the relocation, success will be contingent on housing payments made by those who have already received housing in Mertarvik, and on strong leadership to hold the two sites (Newtok and Mertarvik) together as a single community.

¹⁵ As part of my dissertation reach, I catalogued laws, agencies, and programs that could be used to assist ANV adaptation and found that most supported adaptation research and planning rather than carrying out plans or adaptive actions. Similar results can be replicated by searching the Catalog of Federal Domestic Assistance for "climate change adaptation." See https://beta.sam.gov/search?index=cfda&sort=-relevance&page=1&keywords=climate%20change%20adaptati on&cfda_published_date_filter_model=%7B%22dateRange%22:%7B%22startDate%22:%22%22,%22endDate%22:%22%22%7D%7D&cfda_modified_date_filter_model=%7B%22dateRange%22:%7B%22startDate%22:%22%22,%22endDate%22:%22%22%7D%7D&date_filter_index=0&inactive_filter_values=false

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