Appendix H. Health and Culture Technical Work Group Recommended Adaptation Options

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HC-1 Surveillance and Control

This option will enhance current state programs and activities, as well as enhance partnerships with the public and private sectors, to protect the health of humans and animals from projected increases in the geographic range and incidence of climate-sensitive infectious diseases. Monitoring and evaluation are recommended to ensure the programs continue to be required and, if so, to identify changes to increase their efficiency and effectiveness.

Option Description

The Issue: Climate change is contributing to increases in the geographic range and incidence of climate-sensitive infectious and non-infectious diseases in Alaska, new problems in sanitation and solid waste management, and contaminant exposures.

Overview: This option addresses the observed and projected increase in infectious diseases in Alaska due to global climate change. Current programs are insufficient to identify and control changes in the distribution of climate-sensitive infectious diseases, thus increasing the risk of outbreaks in humans and animals. Existing infrastructure needs to be augmented to address these emerging concerns to develop new methods for surveillance, reporting, and control of human and animal disease.

Objective: The objective of this option is to protect the health of humans and animals, both domestic and wild, through surveillance and control from increased infectious disease risks due to climate change. Public health surveillance is the ongoing, systematic collection, analysis, and interpretation of data essential to the planning, implementation, and evaluation of public health practice. Improving surveillance will allow more robust tracking and identification of trends in order to expeditiously and effectively respond to and control emerging threats to humans and animals.

The Need: There is a scientific consensus that climate change has affected the distribution, including incidence and geographic range, of infectious and non-infectious diseases globally. Surveillance and control are necessary because they are the mechanisms by which public health practitioners prevent, prepare for, and respond to disease threats. Examples of human diseases that have already been or might soon be linked to climate change in Alaska include asthma, botulism, echinococcosis, giardiasis, paralytic shellfish poisoning, rabies, tick-borne encephalitis, venomous insect events, *Vibrio parahaemolyticus* gastroenteritis, and West Nile virus infection. Examples of animal diseases that have already been or might soon be linked to climate change in Alaska include leptospirosis; parasitic infestations in caribou, muskoxen and moose; toxoplasmosis in sea otters; tularemia; and winter tick infestation in moose.

Option Design

Structure: The state of Alaska agencies currently tasked with the responsibility for surveillance and control for human and animal diseases are the Alaska Department of Health and Social Services (DHSS), the Alaska Department of Environmental Conservation (DEC), and the Alaska Department of Fish and Game (ADF&G). The recommendations presented in this option will require augmentation of existing surveillance and control efforts performed by programs within these agencies. Implementation of the option recommendations will require increased human and material resources, including methods and tools within existing programs, as well as new and augmented partnerships with the public and private sectors, including memoranda of understanding to collect the necessary data.

Targets:

1. Improve surveillance for vectors and vectorborne diseases in vectors
    a. Expand wild/domestic animal sampling (e.g. equine, rodent, ruminants, beavers, hares)
        i. Sampling costs--$20k/yr
    b. Expand vectorborne disease vector surveillance
        i. Hire 1.0 Full Time Equivalent (FTE) entomologist--$150k/yr
        ii. Hire 0.5 FTE administrative clerk--$50k/yr
        iii. Hire 1.0 FTE technical assistant--$85k/yr
        iv. Monetary support for travel, lease space costs, and supplies (e.g. traps, microscopes, preservatives and containers, sampling kits, IT resources, postage and shipping costs, etc)--$75k
2. Expand and improve DHSS's hospital discharge and emergency room databases to improve detection of climate change-related diseases
    a. 0.5 FTE data analyst--$60k/yr
    b. 0.5 FTE project manager--$65k/yr
    c. Contractual services for data clearinghouse work--$80k/yr
3. Improve health care provider education around infectious disease reporting--$15k/yr
    a. Health aide conference lectures
    b. Public health nursing conference lectures
    c. Grand rounds in hospitals
    d. Zoonotic disease lectures at Veterinary Association meetings
    e. Develop a web-based medium for distribution of climate change-related information
4. Create a reporting system for sanitation/wastewater integrity disruptions within DEC
    a. Create a reporting system database
        i. 0.25 FTE data analyst--$30k/yr
    b. Educate around reporting requirements
    c. Create a community-based monitoring and reporting program in rural and subsistence communities
5. Improve interagency notification of drinking water and wastewater violations between Municipality of Anchorage (MOA), DHSS, DEC
    a. Establish a notification Memorandum of Understanding (MOU) between agencies
6. Increase monitoring in humans and animals for contaminants that are potentially related to climate change (e.g. mercury and persistent organic pollutants) that adversely impact human and animal health.
    a. 1.0 FTE Public Health Specialist I--$90k/yr
    b. Laboratory analysis costs for human biomonitoring--$150k/yr
    c. Laboratory analysis costs for animal biomonitoring--$100k/yr

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   d. Establish an MOU whereby federal agencies would agree to collaborate with state and local government officials in the collection and analysis of contaminant/irritant samples.

7. Provide surveillance and control program updates to stakeholders through a variety of means
   a. Epidemiology Bulletins
   b. Alaska Forum on the Environment talks
   c. Office of the State Veterinarian Quarterly Newsletter
   d. Other

Timing: It is recommended that each target be implemented as soon as possible to establish baseline data, and that the target activities by discontinued only if it is determined that the solution is no longer necessary during the evaluation process.

Participants/Parties Involved: DHSS, DEC, ADF&G, Alaska Department of Natural Resources (DNR), MOA, Alaska Native Tribal Health Consortium (ANTHC), Alaska Municipal League (AML), Alaska Hospitals and Emergency Departments, U.S. Department of Agriculture (USDA), Centers for Disease Control (CDC), Department of the Interior (DOI), National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA)

Evaluation: Ongoing monitoring and evaluation is recommended for each solution, with annual assessments regarding the need to continue the effort. A variety of evaluation mechanisms could be used, including the distribution of periodic survey forms to stakeholder agencies, including communities participating in surveillance efforts. Finally, the efforts could undergo evaluation by an outside consultant to enable continuous improvement.

Research and Data Needs: Sufficient evidence exists that implementation of this policy option will provide the intended benefits—namely, surveillance data for detection of disease and sanitation/wastewater violations. This information is critical for determining targeted public health control needs.

Implementation Mechanisms

See prior sections. Hardware, software, and personnel needs, as discussed above, are minimal but essential for implementation and management of the presented targets.

Related Policies and Programs

1. Center for Climate and Health, ANTHC
2. Environmental Public Health Program, DHSS
3. Infectious Disease Program, DHSS
4. Office of the State Veterinarian Program, DEC
5. Drinking Water Program, DEC
6. Wastewater Program, DEC
7. Solid Waste Program, DEC
8. Wildlife Conservation Program, DF&G
9. Reportable conditions policies, DHSS, DEC

Available Resources:

1. Existing public health and animal health infrastructure
2. Other resources, as discussed above

Feasibility

Feasibility: Each solution is highly feasible as no new legislative authority is needed and the basic governmental structure already exists for implementation with minimal cost in terms of capital infrastructure and personnel services support.

Constraints: Need for long-term funding.

Adaptation Benefits and Costs

- Estimates of the proposed surveillance and control financial costs are indicated in the Target section above.
- Health benefits include
  - Identification and prevention of climate change-related infectious and non-infectious diseases among humans and animals, and
  - Prevention of health consequences associated with contaminant exposures and water/sanitation disruptions
- Financial benefits include
  - Averted costs of human and animal health care associated with climate change-related diseases
  - Averted costs to state government for human and animal outbreak response
    - Outbreak response can be very costly in terms of personnel time, travel, laboratory resources, supplies, etc.
  - Averted costs to industry from aftermath of outbreaks
    - e.g. the outbreak of *Vibrio parahaemolyticus* gastroenteritis in Alaska in 2004 severely threatened the oyster industry in Alaska; a similar incident could involve other fish species (salmon), or mammal such as moose or reindeer.

Status of Group Approval

Approved unanimously, with no objections.

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HC-2 Community Health Impact Evaluation Initiative

Actions taken to mitigation greenhouse gas emissions or to adapt to the current and projected impacts of climate change also may benefit or harm human health. This option proposes a Community Health Impact Evaluation (CHIE) initiative to rapidly and efficiently screen proposed mitigation and adaptation activities to determine whether there may be associated health benefits or harms and to identify additional actions to maximize the benefits and reduce potential adverse impacts.

Option Description

The Issue: Mitigation and adaptation activities implemented in a wide variety of sectors can affect human health, from building new physical infrastructure, such as protective seawalls, to a review of historical burial site records. These auxiliary health effects are generally unintended and can range from none to highly significant. At present, there is no established mechanism for a brief, structured, and rapid professional evaluation of a proposed mitigation or adaptation measure to identify potential adverse or positive influences on health. This option would create such a mechanism to identify where health effects were unlikely, minor, few, or more significant. Such an evaluation would facilitate the design and implementation of necessary additional measures, including monitoring, to maximize benefits and to reduce potential likely and significant adverse effects.

Objective: The objective of this policy is to create a CHIE initiate to rapidly and efficiently screen proposed mitigation and adaptation measures to identify health benefits and harms, and to identify activities to maximize the benefits and reduce potential harms.

Option Design

Structure/design: The CHIE would require a designated Project Review Committee (PRC) with primary responsibility for examination and evaluation of each mitigation and adaptation measure recommended for implementation. To optimize efficiency and ensure rapid response, the PRC would have a core team that includes the State Department of Public Health, representatives from relevant State agencies, and public health professionals from other organizations. Implementing this option would not require the hiring of new professional staff, but would need part-time staff support.

The PRC would follow these steps:

1. The State agency responsible for proposing the mitigation or adaptation measure would forward a request to the PRC chair for an evaluation, along with a full description of the measure.
2. The PRC Chair would convene the core PRC members, with at least one representative from the responsible State agency. The proposed measure would be reviewed by the PRC to determine the possible need for an in-depth review. A detailed evaluation would be recommended if (1) multiple likely mechanisms for adverse health effects were identified, (2) one mechanism was identified with a high likelihood of adverse effect, or (3) the initial evaluation suggested that there was likely to be a public perception of possible adverse effects.
3. If the PRC evaluation concluded that there was a negligible likelihood for any adverse health effect, a report from the PRC would be issued to the responsible State agency. TARGET—one working week.

4. If the PRC decided an in-depth evaluation was advisable, an appropriate group of additional consultants, agency personnel, and citizen members would be convened, and the following steps taken:
    a. The PRC Chair would send an interim report to the responsible State agency recommending an in-depth evaluation and listing the reasons that justify the recommendation. TARGET - 2 working weeks.
    b. The PRC Chair would convene the expanded committee and:
        i. Ascertain the possible pathways or mechanisms of potential adverse effects or benefits.
        ii. Ensure all needed additional State, federal, municipal and other citizen groups possibly affected by the identified mechanisms were represented. This group would identify all aspects of effect mechanisms, positive and adverse, and suggest measures to mitigate adverse effects and maximize benefits.
        iii. Align measures designed to minimize adverse impacts, and measures designed to maximize benefits, with outcome monitoring indicators to create the most efficient monitoring strategy.
        iv. Submit a final report to the requesting State agency. TARGET--4-6 working weeks.

Timing: Implementation of the CHIE option would require authorizing legislation or regulations before the first mitigation and adaptation option is implemented.

Participants/Parties involved: The PRC should be the responsibility of the State Department of Public Health, with participation from community and environmental health professionals from other agencies and organizations. The expanded PRC required for an in-depth review would reflect the needs of the specific mitigation or adaptation option.

Evaluation: A variety of mechanisms for PRC evaluation could be used. The simplest could consist of regular feed back forms used by the PRC Chair to elicit evaluation comments from the participants and agencies involved in each review. In addition, regular feedback and critique could be solicited from involved agencies over the life of a mitigation or adaptation project, as well as residents potentially affected by the option. Monitoring reports should be maintained over the life of the project to fine-tune the option as needed, and to provide information to affected communities that might be useful for planning additional adaptation/mitigation strategies. Periodically, the PRC should undergo evaluation by an outside consultant to enable continuous improvement. Ideally, the reports, and monitoring reports, as well as all evaluation reports should be available to the public on a user-friendly website.

Research and Data Needs: The CHIE Option is based on existing models of assessing the impacts of policies and measures on community health, including those used by the Centers for Disease Control and Prevention, and does not require further research. It is a well-established, widely used public health protection mechanism.

Implementation Mechanisms

The CHIE Option would require at least authorizing regulations. Existing personnel in the Department of Public Health could probably meet the professional needs, but part-time support staff would be needed. It is anticipated that the number of mitigation and adaptation options selected by the State will not be large enough at any one time to make additional full-time professional staff a requirement.

Related Policies/Programs and Resources

Related Policies and Programs: No programs currently address the issue with the recommended specifity and process taking climate change into consideration.

Available Resources: Expertise within the DHSS, DEC, and other relevant agencies.

Feasibility

Feasibility: The proposed process for evaluating mitigation and adaptation options for potential adverse impacts on health is well established and widely used worldwide, with descriptions of the process published by the CDC and the World Health Organization, among others. Implementing this option in Alaska is feasible and consistent with established best practice.

Constraints: The primary constraint for ongoing effectiveness of a CHIE is the need to rapidly engage relevant agencies and stakeholders over short time periods with limited notice, when this activity would be in addition to current responsibilities. Ensuring high-level support for the option would help address this potential problem.

Adaptation Benefits and Costs

There is growing concern with the potential for mitigation and adaptation options to have adverse impacts on human health. In general, the public is skeptical that the agencies or departments proposing an option have carefully considered and addressed potential adverse consequences. An independent review by the Department of Public Health and others would provide a rapid, independent, and thorough evaluation of the possible benefits and harms of a proposed mitigation or adaptation option, and would identify additional actions to recommend when harmful impacts could arise.

The costs would be minimal as all that would be required would be some staff support.

Status of Group Approval

Approved by supermajority, with one objection. One AAG member objected to creation of a system because it would add an unnecessary layer of oversight. Additional costs in time and resources should be estimated and compared to that which is presently directed to assist communities in adapting their public health and water and sanitation infrastructure to warming.

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HC-3 Sanitation

Climate change is altering the effectiveness of current sanitation and solid waste management infrastructure and practices to prevent the outbreak of water- and vectorborne diseases. This option would build on current programs and activities to maintain and improve the control of infectious diseases associated with sanitation and solid waste management.

Option Description

The Issue: Increases in global temperatures have led to new and exacerbated existing problems in sanitation and solid waste management that are anticipated to negatively impact the health of communities.

Overview: Sanitation and solid waste management are intended to prevent the outbreak of waterborne, vector-borne, and hygienic diseases, limit environmental toxic exposure to humans and wildlife, and improve quality-of-life. Facility and program performance design is based on historical environmental factors. However, these design factors are shifting due to climate change. This option is intended to adapt program and facility design so that public health continues to be adequately addressed in the face of current and anticipated environmental changes. Current rural sanitation policies are insufficient to address these changes and need to be modified.

Objective: The objective of this option is to protect the health of humans and wildlife from the effect of climate change in Alaska by improving the capacity of the rural sanitation and solid waste management systems to respond to and/or control anticipated new and exacerbated disease and toxic exposures. The goal is to prevent or at least ameliorate acute and chronic health problems in the population.

The Need: There is a growing scientific consensus that climate change has affected the distribution, including incidence and geographic range, of infectious and non-infectious diseases that sanitation systems are intended to minimize. Additionally, changes in water quality, such as acidification and temperature that can affect human and wildlife toxic exposures are occurring in Alaska. Changes in drinking water supply (both quality and quantity) and location may occur with the changing hydrology regime. Permafrost, utilized in some cases as a waste liner for sewage lagoons and solid waste facilities, and riverbanks that support treatment cells and infrastructure are eroding. Additionally, permafrost lader soils, in some cases, serve as structural elements in the foundation of water storage tanks, buildings that are part of the community sanitation infrastructure and/or earthen berms that may contain fresh water for drinking or coral effluent from a sewage collection system. These phenomena are a concern as rural sanitation differs from urban and semi-rural facilities in that:

1) Solid waste and wastewater treatment and retention largely relies on earthen structures, unlined natural land cells, simpler water supply and treatment systems, and inadequate logistical opportunity for waste compaction, cover, and consolidation that make toxin and pathogen removal/barrier performance susceptible to physical environmental changes.

2) A high proximity of facilities to housing, drinking water sources, and a local diet of aquatic species is creating conditions amenable to water, vector, and hygienic disease spread, and

3) Economies-of-scale present extreme Operation and Maintenance (O&M) costs so that impacts from climate change threaten to exceed the tipping point of community's ability to pay.

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Option Design

Structure: The agencies currently tasked with the responsibility for rural sanitation and solid waste management include the DEC, the Alaska Native Tribal Health Consortium, Regional Tribal Health Organizations, local Environmental Programs, USDA, and U.S. EPA. Alaska Department of Health and Human Services, ADF&G, U.S. Fish and Wildlife are indirectly involved in identification and control for human and aquatic life negative health outcomes that may emanate from inadequate system performance.
The recommendations presented in this option will require augmentation of existing sanitation and waste management or human and aquatic life health efforts performed by programs within these agencies. Implementation of the option recommendations will require increased human and material resources, including methods and tools, within existing programs, as well as new and augmented partnerships with the public and private sectors. Additionally, these recommendations will require an update of existing environmental data sets (temperature and climate projections) in order that facilities can be constructed and/or renovated to meet future changed environmental conditions.

Targets:

1. Provide a portion of distressed community O&M costs in order to adequately protect system investment, via an annuity or other mechanism. Non-traditional approaches such as the Alaska Rural Utilities Collaborative may be considered for more wide spread utilization.
2. Collaborate with statewide sanitation and environmental health entities currently conducting infrastructure inspections to design inspection/evaluation protocols addressing severity, nature, and timing of climate change impacts.
3. Review existing Class III solid waste management guidelines (for rural and remote, non-hub communities) to adapt the regulations, recommendations, and community outreach to anticipate continued climate change impacts. For example:
    a. Design allowances such as permafrost loss and inability to rely on permafrost as a satisfactory liner
    b. Identify alternative or supplemental systems such as composting, hazardous waste storage facilities
    c. System design or operations for erosion, or flooding – such as leachate retention ponds
    d. Ensure designs are amenable to anticipated relocation (move back from eroding river or move community) such as sack-fill/road mat system that may be used to move entire landfill using local resources
    e. Identify minimum distances to housing and drinking water sources to allow for increased rodent, insect disease vector populations at disposal site
    f. Encourage open burning in covered containers to keep out increased precipitation, decreasing smoke toxicity
4. Review the State of Alaska Capital Improvement Project (CIP) list for solid waste projects and priority classifications in relation to substantial and relevant climate change issues
5. Make available financial resources or incentives for development of more efficient and lower-cost systems (e.g. Alaska-based manufacturing of road mats, modular treatment systems)
6. Establish an MOU between agencies with related responsibilities

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7 Assure to the extent possible that existing sanitation facilities are protected against system failure due to climatic events such as flooding, wind, erosion, permafrost melt, etc.

8 Include the potential for climate change in plans and designs for new sanitation facilities, to account changes that could damage or destroy these facilities

Timing: It is recommended that each target be implemented as soon as possible to establish protection-adaptive systems in the communities where resources are being allocated in the near-term. Without timely implementation, wastage of capital resources is at risk as system lifespan horizons are designed for 20 -40 years. Human and aquatic life health may suffer both acute and chronic effects as well as reduced quality of life.

Participants/Parties Involved: DEC, ANTHC, USDA, EPA, AML, Regional Tribal Health Organizations

Evaluation: Annual assessments are recommended for each solution with respect to the need to continue or modify the effort.

Research and Data Needs: Sufficient evidence exists that implementation of this policy option will provide the intended benefits—namely, modification of rural sanitation and waste management to meet health and quality-of-life performance goals in the face of anticipated environmental impacts will meet the intent of public health infrastructure in rural communities.

Helpful research needs for implementation:

- Use of Geo-tubes for waste or wastewater cells
- Economics of Supersack and road mat manufacture in Alaska
- Increased acidification in streams – increased mobilization and bioavailability of toxics impact on the National Pollutant Discharge Elimination System, ash settlement of open burning, leachate
- Engineering design parameters based on anticipated climate changes including temperature, precipitation, wind, sea level rise, etc.

Implementation Mechanisms

Key agencies and entities form a task force to identify and implement responsibilities and activities

Related Policies/Programs and Resources

Related Policies and Programs: ANTHC and Village Safe Water Project (VSW) sanitation programs, Regional Tribal Health Organizations environmental health programs

Available Resources: There are some resources available for sanitation infrastructure projects, but those resources have been on the decline. There is a very real possibility that new financial resources will be necessary, although much of the substantive expertise already exists to address sanitation infrastructure issues.

Feasibility

Feasibility: Each solution is highly feasible as no new legislative authority is needed and the basic governmental structure already exists for implementation. If systems are adapted to climate change, capital costs are not likely to increase dramatically.

Constraints: If systems need to be retrofitted or repaired due to climate change, the economic impact could be substantial. Some cost increases may be anticipated in communities where systems must be located further from towns, for systems with no alternative than supporting a higher protective level (e.g. a treatment cell liner), or for alternative systems (e.g. increased filter efficiencies, reverse osmosis, road mats in place of gravel roads). However, an initial increase in costs in switching to targeted adaptive policies will decrease over time as these methods become conventional and design and production costs lower.

Adaptation Benefits and Costs

Benefits (positive or beneficial effects)

This priority of this option is high as failure of sanitation systems is potentially catastrophic to public health, as well as being resource-intensive and often logistically complex to address after the fact. Addressing these risks in a timely proactive manner will be protective of health and require significantly less resources.

Benefits produced/metrics: Number of homes with adequate and protected drinking water, number of homes with indoor plumbing, number of communities meeting National Safe Drinking Water Act, number of communities meeting National Resource Conservation and Recovery Act, number of cases of communicable diseases, and number of potentially emerging vector infestations (e.g. Norway Rat).

Program Success: Program success would be defined as no catastrophic system failures, disease outbreaks, or negative health outcomes due to inadequate protective resulting from climate change impacts.

Time frame over which the option will produce benefits: Benefits continue over decades.

Considerations in producing benefits: Adequate and timely funding for effective systems, incorporation of operation and maintenance needs, and community buy-in may all lead to improved public health.

Unknowns: Unknowns include the number of communities affected and what each community might require, and optimal system treatment for changed water quality and/or quantity.

Costs (financial requirements or negative effects)

Overall Cost: This option carries a relatively small cost compared to the cost of pursuing a “no action” alternative. The provision of adequate supplies of water for drinking and hygienic practices has been shown to reduce health care costs.

Actions/activities associated with costs: Reviewing regulations, legislation, assessment, building, and training.

Programmatic costs involved: Capital costs, O&M costs, labor, equipment, fuel, technology, and design and manufacturing incentive programs.

Cost components of other activities: Overall Low. Assessment of this option can largely be performed with existing resources and entities. System feasibility studies are already performed and only incremental costs would be associated with adding climate change considerations. Costs for new and innovative approaches or locating an in-state manufacturer can largely be borne by the private sector with sufficient promises of use and/or an incentive program.

Cost components of taking adaptive action: Upgrading/adapting/relocating infrastructure, and identifying best system options.

Financed by: Financing would primarily come from the state and federal sector, and projects would be carried out by ANTHC, VSW or private contractors. Secondarily, the private sector may incur some or all costs associated with research and development of improvements and innovations with market potential. If this option is implemented with foresight and adequate funding, any additional costs incurred above current infrastructure funding are anticipated to be

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primarily temporary, with the exception of an anticipated need for permanent sources of funding for distressed communities to cover a portion of O&M costs.

Factors/circumstances affecting costs: Costs would be affected by the number of communities affected and what each community might require.

Unknowns: Unknowns include the number of communities affected and what each community might require, and optimal system treatment for changed water quality or quantity.

Ancillary Benefits and Costs

This option will protect community drinking water, supply some communities with improved drinking water quality, increase substantially the number of communities with safe solid waste systems, protect source water for drinking and subsistence uses, protect aquatic species of commercial, subsistence, and conservation interest, reduce substantially exposures to toxic contaminants, increase urban-based jobs via potential for local manufacturing of adaptive system components and/or incremental increased resources required for option implementation, and increase in rural-based jobs via subsidy of O&M.

Data Sources

- U.S. Army Corps of Engineers (USACE) Village Erosion Report
- USACE Evaluation of Supersacks for Erosion Control
- Department of Transportation evaluation report on road mats
- Community case studies using supersacks for waste disposal and road mats for roads/landfill roads
- ANTHC and VSW data and studies on existing systems (can be cross-indexed with USACE erosion study)
- Regional health corporation inspection reports
- ANTHC and VSW design and construction estimates

Status of Group Approval

Approved unanimously, with no objections.

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HC-4 Effects on Archaeological, Historical, and Cemetery Sites

The State, in partnership with tribes and other stakeholders and through augmentation of existing infrastructure, should coordinate the inventory, assessment and prioritization of cemetery, archaeological, and historic sites to develop mitigation strategies for threats due to climate change.

Option Description

The Issue: Alaska's gravesites, archaeological sites, and historic sites are becoming increasingly exposed and impacted through anthropogenic and natural processes, including global climate change. Coastal sites are particularly vulnerable. The sea level rise projected to occur over the next few decades will alter the shape of coastline and speed erosion, submerging or destroying many graves and cultural sites. Inland, warming temperatures have led to the melting of ice fields thousands of years old, exposing organic artifacts such as arrows to the elements. Warming temperatures are also causing lake and stream levels to become higher or lower than normal, exposing or inundating sites. In some areas, the onslaught of the bark beetle has had an effect on sites and structures.

Overview: This option addresses the observed and projected increase in the destruction of gravesites, archaeological sites, and historic sites due to the effects of global climate change. Programs within the state have the authorities, infrastructure, and expertise to coordinate identification, assessment and mitigation of adverse effects to these resources, but do not have adequate staff or funding to perform the duties. Appropriate responses to these challenges require augmentation to existing infrastructure.

Objective: The objective of this option is to identify, assess, prioritize, and mitigate adverse effects of climate change on gravesites, archaeological sites, and historic sites through the development of dedicated program areas within existing state authorities. This will provide for the coordination of efforts to identify, assess, prioritize, and develop mitigation plans to address the effects of climate change, and will enable the State to rapidly respond to threats as necessary.

The Need: There is strong scientific support for a relationship between global climate change and the environmental changes that are causing the destruction of gravesites, archaeological sites, and historic sites. The collection of baseline data and monitoring efforts are required to identify, assess and prioritize threatened sites, and develop plans for mitigating these threats. Examples of cemeteries and cultural sites that have been wholly or partially destroyed by changing weather patterns are widespread throughout Alaska.

Option Design

Structure: The state agency tasked with preservation and protection of archaeological and historical sites on state lands, including tidelands and submerged lands, is the Office of History and Archaeology (OHA). Housed within the Alaska DNR, Division of Parks and Outdoor Recreation, OHA carries out the policy of the state to "preserve and protect the historic, prehistoric, and archeological resources of Alaska from loss, desecration, and destruction so that the scientific, historic, and cultural heritage embodied in these resources may pass undiminished to future generations..." (AS 41.35.10). OHA also fulfills the responsibilities of the State Historic Preservation Office, a federally funded program that carries out the mandates of the National Historic Preservation Act of 1966 *(16 U.S.C. 470)* for a wide range of historic preservation activities, including maintenance of the official restricted-access statewide inventory of archaeological and historic sites. With regard to gravesites and human remains, OHA has provided forensic anthropology consultation to the State Medical Examiner under reimbursable

services agreements since 1988. In 2004, OHA initiated a Memorandum of Understanding with the State Medical Examiner and Alaska State Troopers that provides interagency guidance on the discovery and treatment of human remains.

With the ability to work across agency lines, staff expertise in the related fields, and a history of collaborations with tribes and other organizations, OHA is the best candidate for coordinating and facilitating the activities described under this option. While OHA has the authorities and infrastructure to begin assessing the effects of climate on the state's archaeological and historic sites, including gravesites, it does not currently have the staff or funding to carry out these duties. Implementation of this option will require increased human and material resources within this existing program, as well as new and augmented partnerships with other agencies, local governments, tribes, and organizations such as historical societies.

Targets:

1. Establish a new program area within OHA, with a dedicated archaeologist / anthropologist position and funding for travel and equipment to coordinate and facilitate cemetery issues. Duties would include coordination of studies to assess the effects of climate change and providing technical advice. Modeled somewhat after a successful program in Wisconsin, the proposed "Alaska Burial Sites Preservation Program" would coordinate closely with the Alaska State Troopers, the Alaska State Medical Examiners Office, tribes, and other stakeholders. The position should be supplemented as necessary to carry out specific program activities through the use of paid college interns or non-permanent state positions. The position would serve as OHA liaison with law enforcement agencies, the State Medical Examiner's Office, and the Bureau of Vital Statistics (for burial transit permits and disinterment / re-interment permits). The position would also facilitate communication with tribal representatives on matters involving human remains. As a part of program development, the position would:

   a. Help to establish the "Alaska Burial Sites Preservation Advisory Board" comprised of the State Archaeologist (nonvoting facilitator), program archaeologist, tribal members, scientists, university faculty, and other stakeholders. The Board will provide guidance and oversight to the "Alaska Burial Sites Preservation Program."

   b. Coordinate and facilitate field surveys, interviews, and records searches to identify, inventory, and determine the condition of cemetery and gravesites. Assess threats by erosion and quantify changes by measuring rates of erosion through time.

   c. Develop a dedicated restricted-access database for reported cemetery / gravesites and discovered human remains. This can best be accomplished by designing a supplemental Geographic Information Systems (GIS)-compatible module to the AHRS database, which is under ongoing development by the state's DNR Land Resources Information Service (LRIS)/GIS Section. The cemetery database would be the primary tool for identifying, managing and monitoring changes to gravesites. By implementing a map interface, it would also serve as an important tool for law enforcement agencies and the State Medical Examiner's Office by allowing a visual comparison between human remains discovery sites and known grave locations.

   d. In consultation with the "Alaska Burial Sites Preservation Advisory Board" and landowners, prioritize cemetery / gravesites based on level of threat, feasibility to relocate or mitigate, and importance to stakeholders such as tribes and local organizations.

   e. Help develop mitigation plans (such as relocation); seek supplemental funding opportunities and partnerships with tribes, other agencies, universities, non-profits, and other stakeholders for survey or to carry out mitigation projects;

   f. Coordinate with other OHA program areas to develop a public education program with site stewardship and monitoring components. This should be done in collaboration with

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other organizations when possible. This will give local community members an active role in monitoring sites for changes due to climate or disturbance, and will provide baseline information to the state.

2. Establish a new program area within OHA, with a dedicated archaeologist position and funding for travel and equipment, to coordinate and facilitate studies for addressing the effects of climate change on Alaska's archaeological and historic sites.

a. In collaboration with tribes, other agencies, and local organizations, this position will help to coordinate and facilitate field surveys, interviews, and records searches to identify and inventory threatened cultural resource sites. The position should be supplemented as necessary to carry out program activities through the use of paid college interns or non-permanent state positions.

b. Enter or update site records in the Alaska Heritage Resources Survey (AHRS) database, the state's official statewide inventory of archaeological and historic sites. The AHRS is the primary management tool for preservation planning under state and federal laws. Data fields in the AHRS record observations on current condition and provides baseline information for assessing changes to sites through time.

c. Prioritize sites based on level of threat, feasibility to mitigate, and importance to stakeholders such as tribes and local organizations.

d. Help develop mitigation plans (such as data recovery) for threatened sites; seek supplemental funding opportunities and partnerships with tribes, other agencies, universities, non-profits, and other stakeholders for survey and mitigation efforts.

e. Carry out a public education program with site stewardship and monitoring components. This should be done in collaboration with other organizations when possible. This will give local community members an active role in monitoring sites for changes due to climate or disturbance, and will help provide baseline information on changes for inclusion in the AHRS inventory.

3. Pursue funding to create a benefit for private landowners who actively protect listed cemeteries / gravesites and archaeological or historical sites on their land.

1. Timing:

Targets 1 and 2 (establishment of program areas within DNR/OHA) should be implemented as soon as possible. The intent of these targets is to identify and prioritize cemeteries and sites for mitigation, in consultation with tribes and other stakeholders, before the onset of crisis mode. The need already exists, as affirmed by increasing reports of damage from erosion and other effects of climate change. It is anticipated that after the "coordinating archaeologist" positions are filled, it will take around 6 months to create and appoint members to a burial sites advisory board, begin working with other agencies to develop agreement documents such as MOUs for interagency cooperation, begin meeting with key stakeholders in coastal areas, refine the framework for program areas, and establish a timeline for meeting specific goals. Within one year, it is expected that program infrastructures will be established and tested, and that the realization of direct benefits will have begun. Target 3, which would only help protect cemeteries/sites on private lands, is not as time critical. The Target 3 benefits would be long-term and cumulative, but less profound.

Participants/Parties Involved:

✓ DNR/Division of Parks and Outdoor Recreation (DPOR) OHA: OHA has state and federal authorities and infrastructure for addressing a broad range of cultural resource issues, and is the logical agency to incorporate the Target 1-2 program areas. OHA has the ability to work across agency lines, staff expertise in related fields, and a history of collaborations with tribes, agencies, and other organizations. OHA, along with the Alaska State Troopers and the

State Medical Examiner, has already signed a Memorandum of Understanding that establishes protocols for the treatment and investigation of ancient human remains.

✓ Tribal Organizations: Tribal organizations will be represented on the Alaska Burial Sites Preservation Advisory Board, and will be consulted during the identification, prioritization, and mitigation planning for eroding cemeteries and archaeological sites.

✓ DHHS / Public Health / Office of the State Medical Examiner (SME): The SME, with jurisdiction over human remains, will be consulted under Target 1 (cemetery issues) as appropriate. The DNR position created under Target 1 will serve as liaison with the SME.

✓ DHHS / Public Health / Bureau of Vital Statistics (BVS): BVS issues permits for the relocation of burials (i.e., Burial Transit Permits, Disinterment - Re-interment Permits). The BVS will be consulted under Target 1 (cemetery issues) as appropriate. The DNR position created under Target 1 will serve as liaison with the BVS.

✓ Department of Public Safety Alaska State Troopers (AST): The AST, with jurisdiction over criminal investigations, will be consulted under Target 1 (cemetery issues) as appropriate under the existing MOU. The DNR position created under Target 1 will serve as liaison with the AST, and will coordinate both with local posts and with the Alaska Bureau of Investigation (ABI) Missing Persons Bureau.

✓ University of Alaska: The various campuses of the University of Alaska support programs and expert staff that can enhance our abilities to understand and address climate change. For example, university programs include anthropologists, ocean scientists, earth scientists, climatologists, and experts in other related fields. The university also trains students who can be employed through internships to help with implementing the described tasks.

✓ Federal Agencies: The U.S. National Park Service (NPS) coordinates actions under the Native American Graves and Repatriation Act (NAGPRA) (43 CFR 10.2.f.1-2). NAGPRA applies to Native American remains located on federally owned, federally controlled, or tribal lands. In Alaska, federally controlled lands include more than 200,000,000 acres of federal lands, as well as federally restricted properties such as Native Allotments. Human remains in museums that are entirely or partially federally funded are also covered under sections of NAGPRA. NPS and federal land managers are potential consulting parties on NAGPRA issues, along with affected tribes. The DNR position created under Target 1 will serve as liaison with federal agencies on NAGPRA issues.

✓ Local Governments: Local governments, including law enforcement jurisdictions and historic preservation commissions, will be consulted as appropriate under Targets 1 and 2. The DNR position created under Target 1 will serve as liaison with local governments.

✓ Private Foundations: The DNR positions created under Targets 1-2 potentially will collaborate with tribes and other organizations to solicit grant funds for specific measures (such as cemetery re-location and archaeological data recovery) to mitigate the effects of climate change.

✓ Private Corporations: The DNR positions created under Targets 1-2 will coordinate with and solicit assistance from corporate landowners and regional managers to help identify and protect cemeteries and archaeological sites under their oversight (Tasks 1 and 2). Under Task 3 (tax incentive), private corporations potentially could benefit by protecting such sites.

Evaluation:

A measure of the success of Year 1 (implementation) includes the following hallmarks:

✓ Create and appoint members to an Alaska Burial Sites Preservation Advisory Board, establish a meeting schedule and operating procedures (Task 1);

✓ Develop, through meetings and teleconferences, a comprehensive list of contacts in affected communities, local governments, and partner agencies. Schedule meetings in key communities (Tasks 1-2);

✓ Initiation or modification of agreement documents (MOUs, MOAs, Cooperative Agreements, etc.) to enhance cooperation between OHA and other organizations (Tasks 1-2);

✓ Establish a database structure for recording baseline information on burial sites (cemeteries, graves, discovered human remains) and evaluating effects of climate change (Task 1);

✓ Incorporate the burial sites database structure into the OHA Integrated Business System as a component of the Alaska Heritage Resources Survey (AHRS). This is dependent on funding for DNR GIS programmers, and will probably extend into subsequent years (Task 1);

✓ Establish a database structure for evaluating the effects of climate change on archaeological and historical sites;

✓ Establish methods and protocols, in consultation with other scientists, for measuring the effects of climate change on cemeteries and archaeological / historical sites (i.e., cadastral surveys, photo stations, satellite data, NOAA studies, annual measurements of ice field boundaries, etc.) (Tasks 1-2);

A measure of the success of Year 2 and subsequent years includes the following quantitative data:

✓ The number of burial sites and archaeological / historical sites added to appropriate modules in the AHRS inventory as a result of investigations under Tasks 1 and 2;

✓ The number of updated records for burial sites and archaeological / historical sites in the AHRS inventory as a result of investigations under Tasks 1 and 2;

✓ The number of burial sites and archaeological / historical sites evaluated for effects of climate change and prioritized for the development of mitigation plans (Tasks 1-2);

✓ The number of burial sites and archaeological / historical sites for which mitigation plans were developed in partnership with other organizations (Tasks 1-2);

✓ The number of burial sites and archaeological / historical sites for which mitigation measures were carried out with OHA assistance (i.e., relocation of burials or artifacts, shoreline stabilization, etc.) (Tasks 1-2);

✓ The number of field investigations conducted by OHA under Tasks 1 or 2 with or without partners;

✓ The number of grants or requests for assistance initiated and/or received for specific mitigation measures.

✓ The measures of success should be evaluated within the same framework as other OHA program areas. Direct program oversight will be provided by the Chief of OHA (State Historic Preservation Officer) and State Archaeologist (Deputy State Historic Preservation Officer). In carrying out its duties, OHA is advised by the Alaska Historical Commission (AS 41.35.300-380), comprised of individuals appointed by the Governor and chaired by the Lt. Governor. Course corrections should be initiated if review determines that desired outcomes aren't being met.

Research and Data Needs:

1. In cooperation with appropriate entities, complete an assessment of archaeological sites most at risk, and develop a plan for their protection or recovery. 2. Complete a statewide assessment of and response to the gravesites most at risk. Improve understanding of the potential cultural impacts of climate change. Increased temperatures, changing precipitation patterns, flooding, melting permafrost, and other climate change-related risks will affect the stability of archeological sites and gravesites, requiring plans for protection or recovery

This adaptation options effectively presents a means for coordinating and gathering the data necessary to accomplish the objectives of this policy. No additional research or data needs are anticipated.

Related Policies/Programs and Resources

Related Policies and Programs: The State's OHA, located within DNR/DPOR, has the infrastructure, expertise, and authority (under AS 41.35) to carry out most of the suggested target activities, but does not have funding or positions for new program areas. Other state agencies with relevant authorities include the Alaska State Troopers (criminal / human remains investigations), the Alaska State Medical Examiner's Office (human remains investigations), the Bureau of Vital Statistics (burial transit and disinterment / re-interment permits), the DNR Division of Ocean and Coastal Management (coastal erosion), and the DNR Division of Mining, Land and Water (management of the state's coastal lands, including tidelands and submerged lands). Federal agencies have management authorities for archaeological resources (36 CFR 800, 16 U.S.Code 470aa-470mm, and others) and human remains (43 CFR 10.2.f.1-2) under their jurisdictions. Some of the major federal landowners include Bureau of Land Management, NPS, US Fish and Wildlife Service (USFWS), and USFS. The Bureau of Indian Affairs (BIA) has responsibility for carrying out agency responsibilities for Native trust lands. These agencies employ archaeologists to address site and historic cemetery issues on their lands. Some Native organizations (including regional corporations, village corporations, and heritage organizations) have undertaken intermittent efforts to protect cemeteries and sites on their lands. Most do not have the funds or professional expertise, however, for a formal program or sustained effort. Because the State owns the vast majority of tidelands and active river channels where erosion is most prevalent, State permits or partnerships will usually be necessary even if work occurs at the local level.

Available Resources: The State's OHA, located within DNR/DPOR, has the infrastructure, expertise, and authorities (under AS 41.35) to carry out most of the suggested target activities. There is no funding mechanism in place for the new program areas and added responsibilities. Conceptually, the two new positions, if implemented, would serve as liaisons with other organizations (tribes, federal agencies, state agencies, non-profits, universities, etc.) to develop plans and cooperative projects, as well as collaborate on grant proposals for specific activities. OHA has the ability to work across agency lines, staff expertise in the related fields, and a history of collaborations with tribes and other organizations.

Feasibility

Feasibility: The solutions listed are highly feasible and can be implemented under existing infrastructure. As the primary owner of tidelands and active river channels in Alaska, as well as other key landforms, the State should take the lead in managing cemeteries and archaeological sites threatened by climate change. This should be done through cooperation and collaboration with other stakeholders.

Constraints: Targets 1 and 2 will require funding for staff positions, travel, and emergency response actions to mitigate short-term effects of climate change (for example, deployment of staff to assist a local community with identifying and re-interring burials exposed by a storm). Travel to remote areas can be costly, but is important. Target 3 (property tax benefit) is conceptual, but has been implemented successfully in other states. This target, which will require legislative action, should be further defined in consultation with other state agencies and local governments.

Adaptation Benefits and Costs

The creation of two new program areas under Targets 1 and 2, each staffed by a single "coordinator" position assisted by college interns as needed, will produce cost effective benefits. Tasks 1 and 2 can be implemented with confidence that the intended benefits will be provided. Overall authorities and infrastructure already exist within State government. While Tasks 1 and 2 should be regarded as ongoing processes, tangible results are expected to begin accumulating

after approximately 6 months of implementation. Task 3 (tax incentive), which has precedent in other states, is expected to yield long-term benefits that may not be provided for several years.

Status of Group Approval

Approved unanimously, with no objections.

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