# Navigating the New Arctic (NNA) Virtual Investigators Meeting, 16-17 April 2020

# Summary Notes

**Important:** These summary notes from the Navigating the New Arctic (NNA) virtual Investigators Meeting held 16-17 April 2020 are not intended as the official report of the meeting and have not yet been reviewed by meeting participants nor copy-edited. A formal meeting report, which will be reviewed by meeting participants, is forthcoming, but given the call for proposals for an NNA Coordination Office, the meeting organizers (ARCUS and NSF), felt that it was important to release this draft version of meeting notes as quickly as possible.

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# Session 1.2: Enhancing Collaboration Capacity

## What Does "Knowledge Co-Production" Mean?

NSF identifies co-production of knowledge as research in which local and Indigenous people and organizations fully engage in the complete research process from development of questions, to the collection, use, and stewardship of data, and interpretation and application of results. ([NSF 19-017](#)).

Navigating the New Arctic (NNA) meeting participants also characterized Knowledge Co-Production as:

- Using local community priorities/needs to inform research questions and activities
- Including local and/or Indigenous community members as equal partners in all stages of a research project (e.g. identifying research questions, taking part in research activities, interpreting information).
- Respecting that there are multiple perspectives of what constitutes "knowledge"
- Using research as a tool for empowering local and/ or Indigenous communities and to establish long-term relationships between scientists and community partners based on ongoing dialogue, reciprocity, mutual respect, and trust.
- It shares many of the same principles as "community-based participatory research".

# What Recommendations do NNA Investigators Have for Implementing a Co-Production of Knowledge Approach in Research Activities?

## Developing a Foundation for Strong Working Relationships

- Don't pre-design your research.
- Commit to developing relationships that may last much longer than any one research project or grant cycle.
- Try to develop a relationship with community members without the expectation that they engage in knowledge co-production from the start.
- Take the time to learn what people are comfortable with and to establish trust.
- Be aware of community differences and variable capacities within or across communities. Different regions and societies will also have differing degrees of receptivity to outreach and involvement.
- Do your best to maintain an interpersonal stance that is other-oriented (or open to the other) in relation to aspects of cultural identity that are most important to your community partners.
- Be prepared to back off if community members make that request.
- Be sensitive to community concerns about outsider access and timing of visits to their communities.
- When you are in the area, make an effort to participate in the social life of the community.
- Be open to different worldviews other than your own.
- Be sensitive to historic and current inequities.
- Be aware of your own discomforts and how you react to them.
- Be vulnerable.

## Developing Research Questions

- Do your homework before going to the community. (e.g. literature reviews, learning about other projects in the same area) but avoid making assumptions of what local communities need/want before you ask them directly.
- Find out what research has already been done so you are not duplicating and can better coordinate with the efforts of others.

- Be sure to consider what aspects of a project do not require a co-production approach (not everything does). Trying to force co-production can backfire and lead to increased research fatigue in communities.
- Consider seeking guidance from other Arctic research community members with long-established relationships in communities on how best to establish contact.
- Identify specific community individuals that can provide insight to questions you have. Then be prepared to LISTEN.
- Reach out to local leaders &/or existing coordinating bodies. However, keep in mind that not all communities have the same access to technology or telecommunication capacity;  be prepared to be adaptive to their communication preferences and capabilities.
- Use the concept of reciprocity to design your project by considering the following questions:
    - What are you as a research team giving?
    - Are you making assumptions with regard to what people need and want?
    - What are we impacting?
    - What matters to the people there?
    - What do people say about what is being done?
    - What social, economic considerations need to be considered?
    - Would others agree with this research?
- Find ways to compensate community members for their time and assistance during this consultation process. This might take the form of formal honorarium payment or through less formal arrangements such as sharing food or door prizes at community meetings.
- Consult with community advisors to help identify research priorities &/or to learn how researchers can support projects that the community owns and to identify data/information needs at the local community level.
- Identify emergent issues that you have the power to help the community address.
- Consult with teachers around opportunities to engage with local schools. Education is a center point for many communities: developing ways to share technologies and education materials is a great way to build bridges.
- Be prepared for projects to go in different directions as the specific needs of communities emerge.

## Designing the Project & Research Proposal

- Manage expectations.
- Include community members as leaders and Co-Investigators from the very beginning.

- Compensate community members for their time co-authoring proposals and for their contributions to the proposed research.
- Include funding to provide community members with laptops/cover the cost of internet access.
- Develop an iterative community engagement process that outlines how community partners will be involved at different stages of the research project.
- Jointly develop a project/network charter, collaboration plan, &/or guidelines/principles for collaboration and mutual benefit.
- Define common terms and language being used.
- Develop shared conceptual frameworks and use this model with local and Indigenous partners to refine desired outcomes together.
- Establish community liaisons who will work with community representatives throughout the project.
- Include an expert on working with K12 outreach on your project team.
- Include local and Indigenous partners in travel exchanges.
- Keep the community informed about the funding outcome of your proposal - let them know if your proposal is funded or if it isn't!

## Conducting Research

- Be flexible and open to changing project roles and leadership as different community members become involved in different ways.
- Host workshops in places that promote cultural identity (e.g. fish camps).
- Find effective ways to share information and keep people informed.
- Use communication tools that are familiar to the community. The way communities accept/receive info is different from the way the science community often operates.
- Work to mitigate research that is exploitative &/or condescending

## Collecting Data & Evaluating Outcomes

- Data collected from different knowledge systems can create incompatibilities with standard data collection norms. Give forethought to data sovereignty issues.
- Include local and Indigenous partners in the interpretation of information
- Validate the outcomes of your research project with your partners (learn what works, what doesn't, what needs to change).
- Recognize that knowledge systems may disagree and that is ok. It is still useful to identify the differences between them. Respect for pluralism may need to be prioritized over any desired goal for convergence.

- Measurements of success are not one-size-fits-all. If you are doing co-productive or collaborative work, and community members are equal partners in the work, it is the team itself that determines if the co-productive process was successful. If only scientist team members think it was successful, but community team members don't (or vice versa), then the project has not been entirely successful.

## Communicating Results

- The original knowledge holder(s) may want to be acknowledged and named through data attribution or manuscript co-authorship credits. Identify and honor those preferences.
- Be accountable to the communities you work with as well as to the land, ancestors, animals that are important to that community.
- Report back to communities what you learn in your research in a way that is accessible and takes into consideration the language and rhetoric of the community.
- Make sure the co-production paradigm is respected with regard to authorship on publications.
- Publish community-friendly materials (such as books for children on language).
- Go beyond publications. Develop products/meaningful outcomes that have practical applications/use within the community and work to expand the application of results.
- Help communities preserve and document their knowledge so that it is not lost.

## Post-Project Needs & Considerations

- Help find ways for projects to continue in communities after the research/grant ends.
- Connect communities with consultants who can help implement proposed solutions.
- Help promote the value of knowledge co-production in promotion and tenure processes.

# What Does "Convergence Research" Mean?

NSF identifies Convergence Research as having two primary characteristics:

- *Research driven by a specific and compelling problem.* Convergence Research is generally inspired by the need to address a specific challenge or opportunity, whether it arises from deep scientific questions or pressing societal needs.
- *Deep integration across disciplines.* As experts from different disciplines pursue common research challenges, their knowledge, theories, methods, data, research communities and languages become increasingly intermingled or integrated. New frameworks, paradigms or even disciplines can form sustained interactions across multiple communities.

Navigating the New Arctic (NNA) meeting participants also characterized Convergence Research as:

- Focusing on urgent &/or emergent issues and allowing those problems to drive the research activities rather than the disciplinary lens of the researcher.
- Finding the edges between disciplines and using other peoples tools, languages, metrics, data interpretations, or ways of thinking to solve problems within your own problem set.
- Including the users of information in the research process.

# What Recommendations do NNA Investigators Have for Doing Convergence Research Successfully?

## Developing a Foundation for Strong Working Relationships

- Having a common focus such as "risks" makes developing convergence research projects easier.
- Take time to immerse yourself in other disciplinary viewpoints..
- Be considerate of Indigenous/local perspectives and what those communities want and need.
- To do convergence research and to do it well it takes time. Time for a group of people to develop a shared understanding of convergence, time to develop a common language across disciplines, and time to build trust. More time than you think and usually more time than you budgeted for.

## Developing Research Questions

- Identify who else is working on similar problems or conducting research in the same region.

- Explore creative ways to get people out of their own disciplines and to bridge social and natural sciences.
- Recognize the importance of spending time communicating the basics and background of a discipline.
- Identify boundary objects (e.g., event, document, person, a geo-database that links all the data of the team using GIS, etc.). Focus team efforts around this object and work together to build/expand on it.
- Create a glossary of shared terminology &/or playlists of brief videos to help explain disciplinary concepts relevant to other team members.

## Designing the Project & Research Proposal

- Your project timeline and budget should account for the time and effort required for team-building. It will likely take more time and resources than you think!
- Build in time for your project team to spend time together in-person (e.g. through regular meetings).
- Invest time and resources on developing mutual understanding across project partners. Holding cross-disciplinary training workshops might be one way to achieve this. Pre-plan for these needs/efforts and put them into your proposal budget.
- You might include someone on your project team who specializes in communication and/or how people learn.
- Include early-career project participants who are in/trained in an interdisciplinary program (ie. IGERT programs).
- Be inclusive of stakeholders that aren't normally engaged in Arctic research.
- Be prepared to bring in additional expertise as projects develop.
- Invest time in developing milestones, metrics, workflows to illustrate how the team will work together to solve the complex problems challenges of the project.
  - One way to approach this might be to identify a set of node points representing key aspects of each discipline and then asking project participants to draw links between various nodes. The diagram produced will help to identify critical nodes/points of convergence and suggest opportunities for team members to work together.
- Provide opportunities for interdisciplinary mentoring across the project team.
- Identify mechanisms to collect, store, share, and use data from diverse sources. Keep in mind that there may be very different rules and requirements governing data activities across disciplines.
- Identify and address the diverse "end points" or outcomes that each member of your team is there to achieve.

- Consider how the project team will consolidate and share a final product of data resulting from the different disciplinary efforts of the research project.

### Project Facilitation & Data Collection

- Employ virtual collaboration platforms that help promote interaction and that are familiar to those involved (e.g. Slack).
- Work hard to over-communicate with the project team (e.g. through regular team calls/meetings).
- Include all project team members on Institutional Review Board (IRB) applications for research projects involving human subjects and plan on the natural scientists on your team taking part in community interviews.
- Use disciplinary experts to help identify data sources and quality/availability of data.

### Communicating Results

- Encourage early-career team members to play active communication roles in the project (e.g. by regularly presenting at team meetings).
- Remain sensitive to the opposing desires to publish natural data and protect human data
- Connect with consultants who can help implement proposed solutions.

### Post-Project Needs & Considerations

- Continue to educate the broader research community on the value of convergence and interdisciplinary research. Seek support from higher level administrators in academic institutions to employ convergence approaches to address new/emerging research directions.

# Session 2.1: Addressing Current Challenges

## What Challenges Are NNA Investigators Currently Facing?

## COVID-19 Challenges, Impacts, & Restrictions

- Travel restrictions and field research cancellations/uncertainty are making it impossible for some project teams to adhere to their original research plans and IRB permissions.
- Local preferences for outsider visitation to rural Arctic communities may differ from NSF or other research institution policies. This creates concern that some researchers may attempt to travel to field sites before local communities are willing to allow outside access. There is also concern that communities will see a flood of research pressure once travel restrictions are lifted.
- Some communities/governments (particularly at a local level) view long-term data collection as non-essential.
- Research collaborations are challenged when you can not attend meetings, workshops, or meet with members of the community in-person.
- COVID-19 will result in other long-term impacts to Arctic communities (e.g. flights to villages greatly reduced, economic impacts, other things we don't know about yet) and it will take time for a "new normal" to be established.
- Limits on virtual connectivity in, with, and across Arctic regions (e.g. timezone challenges, limited bandwidth, limited infrastructure, lack of technical equipment &/or knowledge about how to use that equipment, cultural/generational communication norms) means moving work to virtual platforms is not always possible or equitable.
- Having to suddenly move many different professional activities to online environments has also been challenging and time-consuming for Investigators.
- Some projects rely on access to infrastructure/ships and moving to virtual platforms &/or requesting local support for data collection will not be enough to support the continuation of these efforts.
- There is lack of clarity and/or regulatory volatility around COVID-19 policies.
- How funding can be re-budgeted &/or used given current circumstances and needs is often unclear. In some cases, research budgets have also been entirely frozen by their institution's upper administration.
- There is fear surrounding the impact that current delays will have on the professional advancement of early-career researchers.
- Institutional hiring freezes have made it impossible to bring on necessary project staff (e.g. post-docs).
- Project participants are facing both potential and actual losses of income.
- COVID-19 has become the dominant community focus and concern; less bandwidth/attention is available for environmental/climate research. This also

reflects the necessity of individual researchers to shift their own priorities to address the impact of stay-at-home orders on their own lives and families.
- Offices, labs, and other facilities have been closed and researchers are unable to access key equipment while working from home.
- New barriers to international collaboration have emerged and there is a danger that some pan-Arctic observations will be lost.
- When delayed field research projects do come back online they will be operating in a context of reduced situational awareness.

## General Challenges Related to Working With Arctic Communities

- Community challenges are different in different regions.
- Adversarial relationships also exist across Arctic communities.
- Funding mechanisms to support community partners (particularly in international countries) are lacking.
- Many of the people and organizations who play key connector roles between researchers and local communities have been overwhelmed by the demands/collaboration pressures of multiple projects.
- Some members of the NNA investigator community have been working to address the challenges associated with local and Indigenous community research collaboration for many years. Why these challenges continue to persist is another topic worthy of consideration.
- It takes time to develop common understanding and trust with communities and other research partners and this is hard to achieve with short-term projects.
- Emphasizing co-production with Arctic Indigenous communities over collaboration with all Arctic communities may risk reduced buy-in and support for Arctic research with broader audiences.

## General Challenges Associated with Convergence Research

- A shared community concept of what is meant by convergence research has not yet been developed.
- Tensions exist between the acquisition and use of natural science vs. human subjects data.
- Current competitive research norms encourage researchers to remain protective of their data. Institutional change may need to be encouraged to promote greater data sharing in support of convergence research projects.

- Pressure is often placed on social scientists to fulfill multiple functions/roles within convergence research teams that may have little to do with their disciplinary background or expertise (e.g. science communicator, community outreach, etc).
- Researchers can experience fatigue/burnout when faced with the need to learn and engage across all the different platforms/tools that have been set-up to encourage collaboration.

## General Challenges Associated with NNA

- The NSF NNA research process is simultaneously collaborative and competitive. Competition is not always helpful in enabling collaboration. In some ways, the NSF NNA model is working against itself because the different NNA grant tracks are making it difficult for Investigators to feel open about sharing ideas.
- New NNA proposal development is currently happening in relative isolation, projects are not aware of each other or incentivized to collaborate/share ideas across the NNA investigator community.
- There is uncertainty around how the current NNA award cycle is intended to move everyone toward specific goals with regard to both research outcomes as well as outreach and engagement.

# How Are NNA Investigators Working to Overcome These Challenges?

## COVID-19 Challenges, Impacts, & Restrictions

- Taking time to identify and understand the evolving institutional policies, travel restrictions, and community concerns/perspectives/history shaping decisions around travel to field research sites and Arctic communities.
- Seeking invitations for rural Arctic travel directly from the communities.
- Changing project plans and working with NSF to identify appropriate opportunities to extend and or/combine project efforts to reduce research fatigue in local communities, including better integration with the next round of funded NNA projects.
- Connecting with other NNA project investigators and logistics support providers to better coordinate research/data collection efforts and to identify opportunities to make field campaigns more productive once travel restrictions are lifted.

- Using data coordination efforts to help address the potential rush of NNA projects to communities once travel restrictions are lifted.
- Using the situation to explore new research questions and emerging issues.
- Moving travel funds to other project budget line items such as building the virtual meeting &/or data collection capacities of local community partners.
- Exploring opportunities to collect data autonomously, through remote sensing, and/or to expand the responsibilities of local observers, citizen science networks, &/or contract partners (e.g. hiring UAF researchers to collect data).
- Fostering independent research nodes that can continue to operate independently.
- Designing pay scales and direct payment platforms to better enable the hiring of local people who are willing and interested in supporting data collection/monitoring activities.
- Considering additional ways to "buy local" &/or use Arctic research logistics investments to better support Arctic communities once travel resumes (e.g. using extra room on chartered flights to bring in medicine/other cargo needed by the community).
- Finding proxies for new data collection; relying more heavily on existing data and outputs from meetings that have already happened.
- Investing time in data discovery &/or using data from previous field seasons to work on data processing, learning new techniques for analysis, and to refine models.
- Adapting field research plans to reduce contact with local communities (e.g. using tent camps instead of staying at hotels).
- Working with different community groups and field sites than originally planned. .
- Sharing data, shifting meetings, and communicating through online/remote tools (iCloud, Zoom, Google, Facebook, interviews by phone)
- Using the situation to approach industry partners to help address challenges (e.g. contacting telecom providers about broadband access in partner communities)
- Taking more time to build and test instruments and technology that will later be used in the field.
- Taking more time to focus on building genuine relationships in communities &/or share information about NNA and the research project.
- Taking more time to conduct literature reviews and learn more about field sites before visiting the area.
- Taking more time for the training of students, other project members, and to develop online curriculum that can be shared more widely.
- Taking more time to work on manuscript development.
- Taking more time to think about how the research applies to other issues.

- Refocusing project timelines to address the broader impacts components of the project at the beginning.
- Connecting remotely to schools.
- Connecting more regularly with NNA colleagues and others to identify and apply lessons learned.

# Session 2.3: Data Sharing & NNA Community Office Requirements

## What Strategies For Data Sharing Across the NNA Projects Need to Be Implemented?

- Coordinate protocols and data collection efforts before people start collecting data.
- Begin with a clear understanding of the NNA program goals and learn from what has been done before/don't reinvent the wheel unnecessarily.
- Identify who is doing what and where and develop a guide to what data is being collected. This is a precursor to data sharing.
- Establish high metadata standards/common metadata formats that are agreed upon across all NNA projects. Make sure primary data producer contact information is prominently displayed.
- Identify who else might need or want to use certain kinds of data (including the communities where data is being collected).
- Introduce the idea of data clusters across projects.
- Identify best practices for capturing and sharing the qualitative input from NNA planning grant efforts.
- Identify opportunities to combine social science data collection efforts (e.g. sharing interview questions)
- Identify any data that is particularly expensive/costly to collect.
- Outline the ethics involved in the handling of Indigenous knowledge and the different policies that govern the use of human subjects vs. natural science data.
- Give forethought to data sovereignty issues as well as the data ownership and attribution preferences of community partners. Create data stewardship agreements where needed.
- Encourage the adoption of CARE Principles around Indigenous Data Sovereignty/Governance: https://www.gida-global.org/care

- Assess the need for additional or adapted IRB-type reviews to address the unique concerns surrounding the collection and use of Indgenous knowledge.
- Where possible, plan for open-access to the data; particularly for data associated with research still in-progress. Be aware that this may require a cultural shift for many researchers who may be concerned about sharing data in advance of publication or while competing for NNA grant awards.
- For sensitive or proprietary data, consider who will have access and how that access will be regulated.
- Identify how data might be accessed/shared before it is archived at the Arctic Data Center.
- Establish a shared database that can be used to search for and access data/metadata and other project information (including for planned projects). Incorporating a Slack-style tool into this portal would also be useful.
- Identify best practices for data collection and use across the many different NNA disciplines, knowledge systems, and policy environments (e.g. places like Russia where there is no IRB review).
- Identify what data being captured within the NNA community can be standardized and what can not; promote disciplinary data/method standardizations.
- Develop processes for integrating/assimilating/accessing international data.
- Ensure all data is being submitted to the Arctic Data Center.
- Ensure data—and information about how that data is being used—is also being shared with the local/Indigenous communities where it was collected.
- Consider the different data sharing strategies needed for different project stages (including how analyses will be shared).
- Consider ways to optimize data synthesis to promote wider use.
- Consider how data outside the NNA community will be incorporated and how any expansion of the data network will be handled.
- Consider using AI to help make connections between people, projects, and data.
- Think about how to deal with the extreme range of data sharing capacities involved in NNA projects (from the petabyte data stored in massive University systems to the extremely low bandwidth capabilities of Arctic communities).
- Plan for future training around NNA data sharing and use.
- Create shared bibliographies (e.g. using Zotero, Mendelay, Endnote) and document libraries that can also be shared across the NNA project teams.

## What Data/Information is Needed to Move the Work of NNA Investigators Forward?

- High quality shoreline/data projections for Alaska
- Local observing network data
- Physical data (temperature, soil moisture, etc) for infrastructure projects
- Bathymetric maps
- Fish location data
- Vegetation maps
- Permafrost thickness maps
- COVID-19 related data gaps
- Documentation of the hazards that are impacting communities most &/or help identifying the right people to contact about this question.

## What Role(s) Would NNA Investigators Like to See The NNA Community Office Play?

### Data Coordination & Consultation

- Serve as the clear point of contact for data consultation who can help investigators navigate existing datasets. This should be someone both scientists and communities can reach out to for data and who can provide advice on how to share, use, and store data.
- Help researchers identify new ways to interpret and use data from one discipline to solve problems in another discipline.
- Help identify how NNA projects are related and establish the work flow for sharing data across the projects. Similarly, assist in identifying how one discipline's data feeds into other discipline's works for specific projects.
- Help address the mismatches between the way natural data and human data are used and managed, helping to also address the many ethical/IRB concerns associated with the use of Indigenous knowledge.
- Communicate the availability of data across NNA projects and with the communities and engage with other disciplinary experts to identify additional data sources and quality/availability of data.
- Create, manage, and maintain the portal/database/collaboration platform where people can go to access project data and other relevant project info. (e.g. being able to query by communities/geographies and other project categories).

- Produce annual data reports to summarize the status of projects and NNA goals.
- Lead the development of visual tools for data exploration.
- Support PIs across all stages of the NNA proposal/award in understanding the range of data policies/requirements that Arctic scientists might encounter as part of their project (including project's with international components). Provide help formulating data policies and best practices for PIs working on proposals.
- Manage an NNA Data Advisory Board to assist with data management needs and advise on data use policies.
- Run data exchange/sharing events.

## Community Engagement

- Help NNA projects coordinate around the question "who do we talk to?" with regard to community engagement
- Help coordinate network of local partners that is sustained beyond the lifetime of one NNA grant
- Manage NNA researcher contact with communities to help prevent "research fatigue"
- Help prospective/new NNA Investigators/projects establish good community relationships from the very beginning of a project
- Advocate on behalf of the NNA Investigators for the importance of their co-production/convergence research activities (e.g. w/ academic leadership, research networks, discplinary unions, funders, etc)
- Facilitate an NNA advisory board of Indigenous representatives, a network of "community liaisons", &/or a network of regional and local advisory groups
- Help identify regional research priorities/needs within communities
- Help address community concerns about "what happens when NNA goes away"
- Help manage expectations between communities looking for tangible results and scientists looking for ideas/new knowledge
- Help develop a platform for local communities/indigenous partners to share ideas
- Create a system to pair researchers (esp., early career) with communities
- Develop best practices for working with communities, sharing information/data with communities, etc. and develop a resource bank of these types of documents.
- ID and broadly articulate what NNA projects are happening in different communities and help "curate" new community engagement activities,
- Lead cultural competency trainings.
- Provide support for indigenous scholars/community members to participate in NNA meetings.

- Integrate NNA projects with programs like the ARCUS Indigenous scholars program.
- Help NNA take advantage of existing networks
- Keep community partners informed about NNA decisions/plans/opportunities
- Reach out to new Arctic community contacts to inform them about NNA
- Develop better mechanisms to help compensate residents and community leaders.
- Help coordinate outreach activities across NNA projects such as the UIC Science science fair model that brings multiple researchers to the community at the same time.
- Help engage non-native communities (e.g. industry, other federal partners)
- Encourage industry to share data
- Advocate for better internet for rural communities.
- Create a peer support group for community partners affiliated with NNA research projects.
- Serve as a point of contact for local communities to share their input regarding NNA with NSF.
- Develop an online platform to help educate and orient researchers about specific villages and communities.
- Create a clearinghouse of community needs that would benefit from research.

## NNA Logistics

- Help map when/where people are working
- Develop milestones, metrics, workflows
- Help coordinate NNA research travel and logistics
- Provide support for working in global field stations
- Organize NNA Investigator visits to different locations at the same time
- Facilitate coordination of communication between projects
- Track metrics against a baseline.
- Develop and maintain templates for common policy and procedural documents that can be used across multiple project teams (e.g. collaboration plans, data policies, authorship guidelines, etc).
- Help track NNA project MOUs, letters of permission, collaboration plans etc.
- Coordinate broader impact activities between projects &/or aggregate the broader impacts activities of individual projects across the entire NNA program
- Facilitate pop-up meetings on behalf of NNA Investigators
- Share effective models for online collaboration.

- Develop a more centralized way to enter communities similar to the Antarctic program's curriculum for entering the field. (e.g. health testing & cultural sensitivity training prerequisites, monitoring for local invitation letters for rural travel, etc.)
- Establish connections to rural campus facilities to help researchers connect with communities.
- Work to increase remote field research capacity by leveraging community/local contacts and service providers.
- Build out the capabilities of local indigenous organizations to gather traditional knowledge through in-person conversations.
- Provide projects with Zoom support and meeting space.
- Help lower the administrative burden of participating in NNA.

## NNA Community Leadership & Integration

- Develop familiarity with all NNA projects and contacts.
- Provide pre-proposal support and coordinate existing projects with new collaborations early in the proposal writing phase.
- Provide thought leadership around how NNA moves things forward from previous states of research, outreach, and engagement.
- Establish and hold a vision for where the NNA community wants to go.
- Host more "campaign" style (versus "collective" style) initiatives; i.e., gather proposals together then reconfigure to a common "super" goal.
- Help get everyone on the same page w/ regard to goals/limitations/larger questions.
- Help facilitate knowledge sharing across the disciplines represented in NNA projects
- Build a research core of convergence & co-production research experts
- Facilitate working groups focused on NNA PI/Co PI topics of interest &/or organized around regions of operation.
- Assistance with the synthesis of NNA project results.
- Facilitate development & adoption of a shared code of ethics and intellectual property protection.
- Develop a repository for best practices for working in certain communities.
- Host workshops so that funded projects with common themes/goals can work together
- Help the NNA community address the Big Idea goal to understand the global effects of Arctic change, including pan-Arctic research and impacts to mid-latitudes.

- Assess the needs of the NNA community from a from a network/structural perspective.
- Facilitate substantive interactions among the NNA projects and promote these interactions to the public.
- Help NNA Investigators leverage the skills, knowledge, experience, connections, resources of the extended NNA community more easily.

## Professional Development & Training

- Help early career researchers develop relationships with community partners
- Build an early career community (inclusion of ANSEP, middle/high school also)
- Develop a "cohort" model for graduate students just entering into NNA projects now (following IGERT-type or NRT model).
- Develop courses/certifications to increase Investigator skills/knowledge around community development/engagement
- Develop curricula in Arctic Systems Science/NNA via coordinated on-line courses.
- Make sure people engaged in convergence research efforts are rewarded (awards/grants/promotions/tenure).
- Host a publicly accessible NNA postdocs, students, and job board
- Facilitate student activities and mentorship across projects to provide more experience.
- Provide travel support for early-career NNA Investigators and students to participate in meetings.
- Provide training and guidance for those who would like to do research in the Arctic to encourage better NNA proposals.

## Liaison with NSF/Other Agencies

- Help navigate/communicate the different government/policy layers surrounding NNA research (from Federal to local level)
- Work on coordination across agencies (NSF, NASA, NOAA, DOE)
- Advocate for better IRB practices
- Mitigate the divergent request by NSF to build an NNA community while there are competitive funding issues/concerns preventing many of the NNA Investigators from wanting to come together or collaborate.
- Help integrate insights from earlier NNA projects into future RFP solicitations.
- Advocate for helpful shifts within NSF/scientific community culture (e.g. encouraging norms to reduce barriers to data sharing)

## Raise the Visibility of the NNA Projects/Community

- Host NNA seminars/webinars
- Make sure NNA projects are included in the Arctic Research Mapping Application (ARMAP, armap.org) and the Arctic Observing Viewer (AOV, www.arcticobservingviewer.org)
- Find ways to leverage existing organizations/frameworks
- Dissemination of project results to the broader Arctic research community
- Dissemination of project results to the public via the media and social media
- Facilitation and organization of NNA related sessions at national/international society meetings
- Organize special journal/publication opportunities highlighting convergence NNA work.
- Encourage professional societies to serve as a platform for engagement around convergence research.
- Link with other non-Arctic NSF initiatives as well as participate in international dialogues on Arctic Change
- Help elevate Arctic voices from other communities and countries represented by NNA projects.

## What Would NNA Investigators Like to See Happen In Advance of the Next NNA Investigators Meeting &/or Before the NNA Community Office Is Established?

- Development of a project map.
- "IPY Honeycomb" type organization &/or gap analysis of current NNA projects.
- Help incentivizing the development of collaboration teams among/across the NNA projects. Funding for this work is not currently part of the NNA awards.
- Continue the discussion around how best to avoid the rush into communities once travel restrictions are lifted.
- Continue efforts to develop an NNA community plan/policies for data sharing
- Trainings/presentations on topics such as:
  - Use of the Arctic Data Center platform/tools and an introduction to their handling of social science data/traditional knowledge.
  - NSF's response to the Kawerak et al. letter & updates to COVID-19 responses.

- Additional training around cultural awareness, co-production of knowledge, differences across Arctic communities (including international), how lessons that are being learned through co-production of knowledge with communities in Alaska can be applied to starting relationships with communities throughout the Arctic.
- Outreach/communication training on how to better produce outputs for communities (infographics, story maps).

## What Would NNA Investigators Like to See Happen at the Next NNA Investigators Meeting?

- Inclusion of a virtual attendance option
- More targeted break-out groups (geographic, disciplinary, related projects, shared logistics, shared data sources, etc) that people can self-select into.
- A call for breakout sessions.
- More discussion time and free thinking.
- More Indigenous participation.
- More engagement activities and "fun games".
- Inclusion of an in-person meeting component that is culturally relevant to the Arctic (e.g. fish camp).
- Time to learn about the new NNA projects.
- A plenary demo of an NNA projects map &/or collaboration platform
- Explore the linkages between the projects being done locally in Alaska with projects addressing pan-Arctic and global issues resulting from a rapidly warming Arctic.
- provide time to discuss how all this research relates to the global impacts of Arctic change, particularly the impacts on the US "lower 48" at mid-latitudes.
- How NNA can fit it with the broader International efforts to expand Arctic research and collaborations.
- Results of a gap analysis on NNA itself. Topics that are well covered vs. not.
- Pathways for projects to disseminate results to decision-makers and policy makers.
- Education pathways.
- Mentored interactions similar to those in an NSF Ideas Lab to help create new ideas or approaches that can lead to research transformation/convergence.