Genre Mash-Up: When Two Worldviews Collide, the Genre Conventions from Each Undergo a Syncretistic Re-emergence

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ABSTRACT: The current study proposes to trace the process by which genre features get preserved, modified, or discarded when a politically-sensitive topic draws on both scientific and indigenous knowledge. Initially a network analysis is included to demonstrate the extent to which literature exists that draws on either scientific or indigenous knowledge resources as relating to Arctic climate change; that macrostructural analysis demonstrates that while both exist, there are few linkages in citation between the literatures. The authors then look at the negotiation processes involved in trying to bring more indigenous elements into the scientific literature. This was done by studying the full sets of article submission, all reviewer comments, and revised articles. The focus is on an invited article for The International Panel on Climate Change, which had responded to feedback from previous iterations of their annual report by including a specific chapter dedicated to the perspectives of the tribes that live in the Arctic region, a region that is experiencing more rapid climate change than other parts of the globe. The authorship of that chapter was assigned to a group of researchers, primarily housed at University of Alaska–Fairbanks, that includes Alaskan Native researchers (Inupiat and Athabaskan) and an assortment of biologists, ecologists, marine chemists, etc. The chapter has gone through three iterations with reviewers, and additionally the correspondences between the chapter authors were considered. For comparison, an article in the social science disciplines was also considered, with strikingly similar reviewer comments. These compared cases illustrate the themes used to protect/enforce the genre conventions of the scientific article, and thus serve to perpetuate the separations visible in the network data.

KEYWORDS: Alaskan Native, genre conventions, narrative, traditional knowledge

1. INTRODUCTION

Consider, for example, the problem of translating different knowledge claims relating to the complex interrelationships of human (social) and ecological systems in the Arctic north undergoing climate change. The Arctic is warming twice as fast as the global average. Given that the majority of the US population that lives in the Arctic consists of Alaskan Natives, there

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is little room to disagree that the need for translating scientific knowledge into a form more readily usable in indigenous communities is pressing and that there is a similarly pressing need to identify local and traditional knowledge that can inform scientists and policy makers about climate change and its impacts on local people. The primarily indigenous residents of rural Alaska depend on a mixed subsistence and cash-based economy that is strongly affected by changes in their local environments. What can ethical communicators add for insights to make these twinned, interdependent problems less, well, problematic?

There is evidence of some important successes. For example, there are programs in place (e.g., RAHI) working with the rural villages to focus on education, particularly targeting early high-school-aged students, and which have achieved a seemingly sustainable momentum at involving Alaksan Native high school students directly in research projects, useful both for gathering data in a convenient form in otherwise difficult locations to place observers, and useful for encouraging more Alaskan Native science majors. But outside of the limited capacity for this type of interpersonal communication, there are gaps in the mediated forms of communication that are relied on by anybody wanting to do searches for information when not already enmeshed in living in the region.

A bibliometric network analysis can serve to illustrate the problem. The Alaskan Native authors (such as are currently writing) are more likely to publish in books (not indexed in journal databases) or in policy reports. The scientists doing research in the region are more likely to communicate their findings via the normal (and normative) peer-reviewed journal format. The two communication types have very few interlinkages, as can be illustrated by network analysis of their citation patterns.

2. THE MACROSTRUCTURAL PROBLEM

This investigation depends on a network-analysis approach to frame the current state of traditional knowledge integration in literature surrounding environmental change research in Alaska. A unique network was constructed for each. Networks were bounded by results returned from select keyword searches limited to the online database Web of Knowledge. Cited sources for each returned result were then identified and used to create a 2-mode network. Each 2-mode network was analyzed for a suite of centrality measures and structural relationships. This information was used to identify key pieces of literature for further qualitative content analysis.

The network was developed using the following methods with the intent to define a limited, yet representative body of literature for the spheres of knowledge discussed above. In this situation, the absence of information may be as telling as its presence. The process for developing the network for each body of knowledge has two major steps. These steps correspond to the individual development for each mode in the 2-mode network analysis that will be discussed below.

Defining the primary mode network elements is the first step. To do this, a question must be developed that defines each network respective to the pools of knowledge being studied. Next, a set of salient search terms must be identified for each question. For this study, these terms were developed based on relevance to the defining question and the sample size of search results (too big required more selectivity in term selection, too small meant terms of more inclusivity). Searches were conducted using the Web of Knowledge (WoK) database. A final filtering of raw search results was conducted based on relevance to defining question.

Search results were screened to achieve a sample size of approximately 50 for each defined pool of knowledge. A list of the final results can be seen in the Appendix. These results represent the initial or primary mode of network entities to be assessed in the network analysis. The secondary mode of network entities are easily defined as all cited references listed on WoK for primary mode elements (in most cases scholarly articles, but not always).

Taken individually the bodies of knowledge illustrated in each of the two modes of the network represent two scales of information relevant to traditional knowledge integration in Alaskan environmental change research. The primary mode is very specific, or local to the research question(s), while the secondary is more general, or global to the question, and represents the knowledge pool that Alaskan-specific researchers are drawing from. Each is clearly linked through this form of network conceptualization.

The network was analyzed using procedures that combined visualization and analytical techniques to determine a suite of important articles for qualitative content analysis. All network visualization and analysis was conducted using UCInet and Netdraw software packages. The initial step in the process required first cleaning all pendant nodes from the graph and underlying matrixes. Next centrality measures were calculated and the graph was revisualized using a spring-embedded algorithm. Finally, select articles were identified for content analysis based on betweeness scores and structural position. Articles were classified into a discreet structural naming scheme to aid analysis. This methodology allows for an analytical framework to aid in understanding the thematic content of individual nodes (articles). There is a potential methodological bias in the order of these procedures that tends to influence content analysis toward "fitting into" the analytical framework. While recognized, for the purpose of this study this is an acceptable flaw.

Initial removal of pendant nodes in this type of 2-mode network only effects secondary mode elements. Or in other words, secondary elements are the only network entities removed from analysis in this step. Sequence of analysis matters here, and this statement is not true if pendants are removed later in the analysis process. However, this is deemed a necessary and justifiable first step. The result is to clear the graphs of elements unique to each research effort represented in the primary nodes. As an example, a study on beluga whale populations that purports to utilize traditional knowledge in its methods will cite traditional knowledge sources, but it will also have a number of references that pertain to research on marine mammal ecology. At the same time, a study on the effects of oil field exploration may also depend on traditional knowledge but will have auxiliary cited references that are tied to developments in petroleum engineering and energy policy. Removing pendants as a first step broadly filters the reference network of these two articles and focuses the network onto the shared elements of both studies. In this example, traditional knowledge is the common element and so relevant sources would remain in the network. It is after this initial cleaning step that empirical analysis of the newly filtered network is calculated. Some situations could be envisioned where a primary node would cite a unique and relevant source that no other primary node cited as well. This relevant data would be lost with the methods used for this study. However, this scenario is considered sufficiently rare to be discounted for the purposes of this work.

Centrality measures are of greatest interest in this study. This class of network analytic is typically thought to represent node level influence within the network. For this work, these measures act as indicators to the relative importance of individual articles in each of the three bodies of knowledge. Centrality measures broadly function by looking at the number of ties a node shares with the rest of the network, the basic form of which is "degree," and is a simple

count of ties to other nodes. Degree, betweeness, closeness, and eigenvector were all calculated in this study. The 2-mode nature of this study requires thought when interpreting these results, however. This is complicated by the fact that while in most 2-mode networks ties within modes (i.e., primary mode to primary mode) cannot exist, in this case they can (i.e., a primary article may cite another primary article). This creates a hybrid network form where analytical routines designed for 1-mode networks are not a clean fit, yet neither are methods designed specifically for 2-mode networks.

Given this situation, the underlying motive behind each measure must be explored to determine which method is most appropriate to the research question. In specific cases, 1-mode analytics have been show to be effective measures for 2-mode data (Borgatti, 2010). Betweeness is a measure that explores the relationship a node has to pairs of nodes across the network. Therefore, the betweeness measure is testing the relative importance of a node in connecting pairs of nodes across the network (Hanneman & Riddle, 2003). It is a measure that indicates how important a node is in making connections between its neighbors. In the networks developed for this study then, the betweeness score for a primary mode article will flux dependent on the structural position of the secondary mode references it cited. If cited references have a high-degree structural position then the betweeness score of the primary mode article increases. This method weights the quality of a nodes connections rather than quantity in drawing or disseminating information across a network. Primary nodes are biased in this measure by allowing the possibility that they may be connected to each other while secondary nodes may never connect to one another. This is deemed reasonable based on the idea that the primary nodes are, by definition, the most relevant aspects of the network in addressing the research questions. This methodology biases results toward highlighting the relative importance of these nodes across the network.

Visualization of the network was achieved using a standard "spring-embedded" algorithm. This method places network nodes and ties on a 2-dimensional, geodesic, coordinate system. Geodesic distances are measured as steps between nodes in a network and not distance across space. Therefore, two nodes directly connected would have a distance of 1, while two nodes that had to step through a third node to reach each other would have a distance of 2. Spring- embedded visualization attempts to place nodes with similar geodesic distances to one another closer together on the visualized network map (Hanneman & Riddle 2003). It's worth noting that in a pure 2-mode network the shortest possible distance is 2, since the primary mode can only connect to the secondary mode (and vice versa). But again, in the hybrid networks of this study, some caution must be used when inspecting the graphs as primary nodes can directly connect to one another with a path length of one. Secondary nodes can still only do so with a path length of two, and these must pass through a primary node. Superimposed on this nodal spatial arrangement, betweeness measures are visually identifiable based on node size. Primary nodes are indicated by circles while secondary nodes are shown as squares.

Final analysis was conducted by creating a series of network images bracketed by restricting the network to nodes of successively higher and higher betweeness scores. This series of images allows analysis of the network based on structural relationships as the core of the network evolves with the inclusion of more peripheral elements. The combined end results of this "hierarchical reduction" process is a map series indicative of influence levels in the network (Hanneman & Riddle, 2003).

Using these methods, structurally and analytically interesting network elements were identified for content analysis. A unique naming scheme was devised for each network and used as a framework for understanding the underlying trends and patterns of thought within each body of knowledge.

2.1 Results of Network Analysis

In order to define the traditional knowledge network, the following working question was developed: "How has traditional knowledge been utilized in understanding environmental change in Alaska?" Key word searches were constructed around this question combining the term "Alaska" with 1) "traditional knowledge," 2) "local knowledge," 3) "indigenous knowledge," and 4) "traditional ecological knowledge." The differences between these terms warrant definition. Local knowledge is the foundation. It focuses attention on knowledge gained by an individual through lived experience in a limited geographical region. The salient feature to this definition is a focus on the individual and knowledge gained through that individual's experience with their environment (note: nothing is assumed about the nature of the environment—built or "natural"). Traditional knowledge ("TK"), on the other hand, is generational in nature. Consequently, it represents knowledge gained through a person's individual environmental interactions and tempered by knowledge accumulated through generations of lives living in the same region (and/or conducted through similar lifeways as generations previous). Indigenous knowledge is summed up as traditional knowledge that is held by indigenous peoples of the world—with distinctly different worldviews than Western societies that (can) result in equally distinct approaches to understanding the environment. Traditional ecological knowledge is a Western concept that attempts to isolate the many-faceted cultural manifestations of a people's environmental knowledge and align it to purely Western concepts of relevance to ecological questions and observations (as well as cause-and-effect relationships). This term, while common in current literature, is inaccurate in describing human-environment relationship and implies a certain degree of cultural elitism that can blind researchers to key observations. Differences between these terms are subtle but profound and highly relevant depending on the temporal scale of environmental change being considered. Local knowledge would have a relevance to changes that occurred across a single lifespan's awareness, whereas traditional and indigenous knowledge have the potential to reach across lifetimes and detect slower rates of change (as does traditional ecological knowledge). Unfortunately, distinction between the terms are not widely appreciated and they are often used interchangeably by researchers; thus, all were included in the Web of Knowledge word search.

Nineteen results were returned for the combined "Alaska" and "traditional knowledge" word search, eight for "Alaska" and "local knowledge," thirteen for "Alaska" and "indigenous knowledge," and twenty-seven for "traditional ecological knowledge." The network produced by these searches can be seen in Figure 1.

As can be seen, visualizations of this network produced an interesting dual-limbed cluster pattern that originates close to the core of the network and (in this visualization) radiates to the left. A more diffuse, balanced region of the network develops on the right-hand side further from the core. The core of the network here is defined as those nodes with the highest betweeness scores. (Note: A factor outside the defined system of this network, as developed, is article publication date. This will have an impact on betweeness scores. Detailed treatment of this issue, however, is better suited to a temporal network study. This would be a

beneficial parallel study to run, but beyond the consideration of this analysis.) At the highest levels—greater than 1700— a cluster of primary nodes connect to a single secondary node (Co1 in Figure 2). Two distinct and mutually-disconnected primary nodes are evident and help to form a slightly disconnected core. Walking out from this core—betweeness >1000—this pattern of a developing, connected, central core with disconnected peripherals persists with each successive betweeness step.

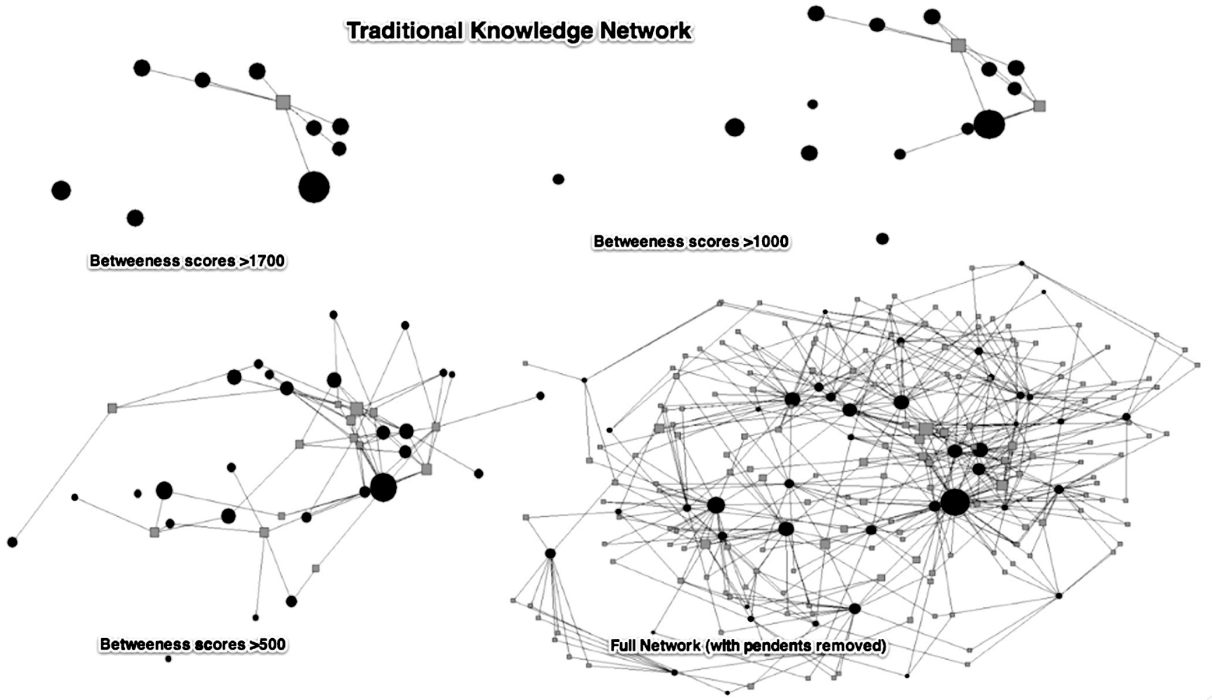

Fig. 1. This series of graphs represents the development of core-peripheral relationships as defined by betweeness scores.

As mentioned above, an interesting limbed structure radiates out of the main cluster of nodes in this network. This can be seen most predominately in Figure 2 by the nodes labeled A2–6 and B1–8. The more diffuse right-hand section of the network mentioned above is characterized by nodes labeled D1–4. The Appendix lists corresponding article titles and thematic content. Articles in cluster A are heavily concerned with topics related to climate change and driven by Western researchers seeking context to instrument-based observations. TK seems to be approached in this portion of the network as a tool to incorporate into the Western scientific process. Structure B, however, which is interestingly the section of the network with the strongest developmental pattern of a connected core with disconnected peripherals, is less thematically connected. Areas of focus in this structure vary from climate change to resource management, but an underlying theme seems to be that researchers are trying to understand TK as an additional and distinct way of knowing. Structure D is harder to thematically group, as might be expected given its diffuse network nature, but broadly, might be characterized as research that explores how TK is transferred—both within and between cultural groups. As can be seen in Figure 2, nine isolate nodes exist in this network that are completely disconnected from the main network component. These nodes do, however, seem to be thematically linked

by a focus on site-specific issues and challenges, and they seem to be the products of workshops or planning events rather than discrete academic-based research efforts.

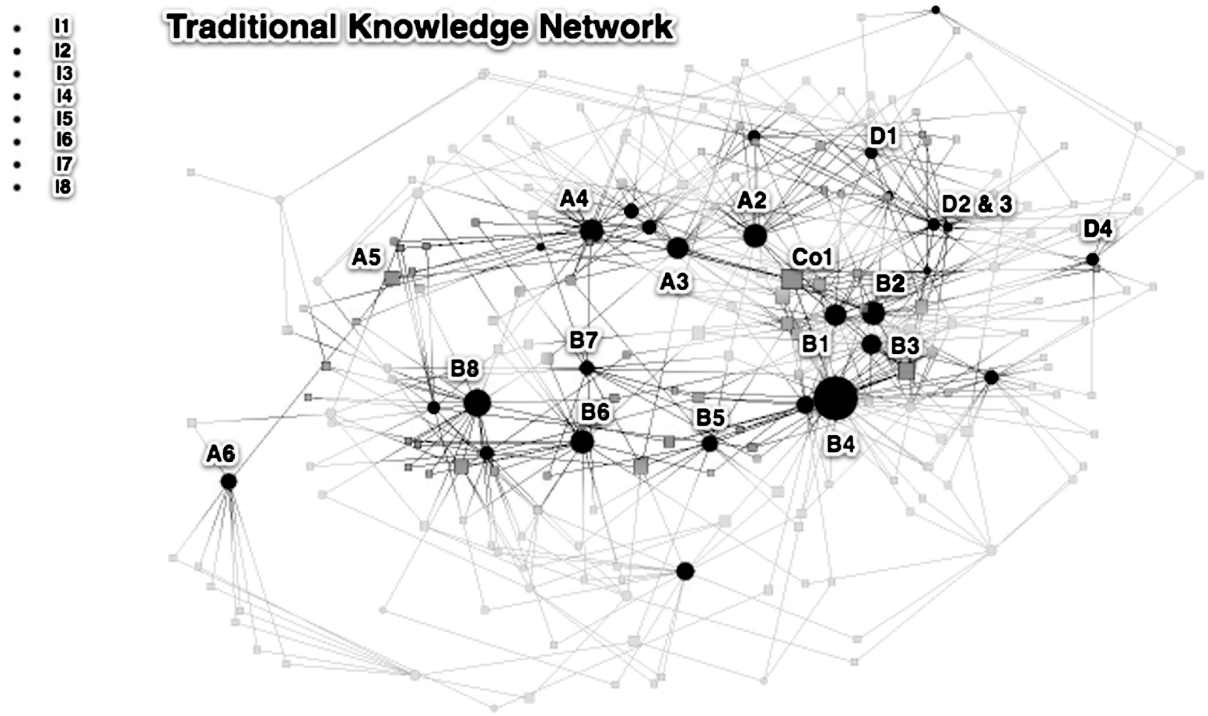

Fig. 2. Traditional knowledge network. Circles represent articles returned in the original word search. Squares are sources cited by those original returns. The brighter, more distinct portions of the network in this figure represent sections of the overall graph selected for qualitative review of articles based on combined assessment of structural location and centrality measures. Naming scheme correlates to Appendix.

2.2 Significance of Network

The results from the combined network and content analysis would indicate four main ways that work involving TK is being applied in Alaska. Each is predominately concerned with understanding and responding to rapid environmental changes. The first, represented by structure A, is focused on identifying indicators of climate change. These articles, generally, utilize (or hope to use) TK as a supportive tool in corroborating instrumental observations and theoretical results of climate warming in the state. The second, represented in structure B, is less cohesive in specific study questions (visible in the network through the less-connected nature of this limb) but more unified in the approach to considering TK as an unique way of knowing that adds depth to Western understanding rather than as simply another data source to be incorporated into ongoing studies. More interest seems to be focused on how TK can inform pertinent study questions early in the research process. Structure D seems supportive of these other two structures through a focus on understanding the transfer of TK-related thought. The fourth, represented by the isolates, is concerned with regional and local solutions to human-environmental issues. The disconnected nature of these works is likely a function of citation

practices between the formats of the report styles rather than a disconnect between bodies of knowledge drawn upon as information sources.

The very fact that each structure identified is tied to a theme of Western science is suspicious and suggests potential for unconscious bias in the network development and analysis outlined above. However, the results are still useful in placing work in context to others' efforts through the structural differentiation of themes. Additionally, a large portion of the bias mentioned above may simply be attributable to the Web of Knowledge database sourced in this study. Absent in the results is a strong Native voice; because of this, it is likely this network is most representative of Western efforts at understanding the role TK can play in the development of a predominately Western understanding of human-environmental interactions.

3. CLOSE READING THE PROCESS OF THE PROBLEM

The macro-structural results indicating the nearly complete separation of Alaskan Native voices except when part of a research team led by white scientists begs for a closer investigation of the processes that lead to this network structure. If it is true that greater integration or translation across different knowledge claims is a goal for everybody, then what are the (presumably structural) processes that lead to the isolation of key texts that attempt to accomplish the goal? To address this question, the micro-practices of journal publication are the most obvious place to begin.

For comparison, we will critique two articles submitted to journals in different disciplines: communication (sub-discipline rhetoric) and ecology. Each article attempted to incorporate elements of Alaskan Native knowledge. Each article elicited negative responses, and in each case the reviewers raised similar objections. The parallel objections, in spite of the dissimilar disciplinary backgrounds and publication contexts, suggest that there may be obstacles that are visible at the macrostructural level which are constructed by individually well-intentioned and conscientious researchers/reviewers.

The rhetoric article was a traditional blind peer-review journal submission for a mid-ranked journal. The ecology article is a slightly different question because it was invited as a contribution to a special issue about Native contributions to climate-change science—an outgrowth of a national assessment of the impacts of climate change in the United States. The authorship team was also identified by the request of the editors of the report, though questions of authorial order were negotiated by the individual researchers involved. The rhetoric submission was rejected, though it is important to note that every reviewer urged that the research line be continued (thus supporting the opening assumption that there is little disagreement as to the importance of attempting to integrate non-scientific knowledge claims into our research communication channels). The ecology article was returned to the authors with instructions for revision and resubmission. Given these dissimilarities of article authorship, purpose, response, and discipline, the only reason to consider doing a comparative critique is the similarity of the objections raised by the reviewers. There are differences across reviews as well, and I do not mean to claim that the differences are somehow not important or less significant than the similarities. But the similarities suggest that there is a potential contribution here for ethical science communication scholars to improve efforts toward agreed-upon goals.

The articles themselves were coded using AtlasTI. The coding was intended to indicate some of the stylistic mechanics by which the Alaskan Native component of the knowledge claims can be recognized. The stylistic mechanisms are important because that's essentially what we mean when we refer to the "translation" of knowledge claims from one epistemic system to another. There can also be quite literal translation issues; the Alaskan Native languages are still spoken to one extent or another, though very few individuals are not bilingual at least (or effectively monolingual English speakers). However, as the question of different languages would be preliminary to any process of research article construction, it does not get considered here.

The coding that we used to mark for Alaskan Native discourse characteristics include holism, social emphasis (marked for example by use of pronouns), emotion, language, narrativity (including giving an example and then drawing a conclusion), and integration of self with environment. Any single one of these could certainly be debated as to whether or not it is fair to consider representative of Alaskan Native cultures, and, yes, there absolutely are differences across the tribal groups. Nevertheless, each of these elements is important as a way in which the value patterns appear and can be observed.

The coding that we used to mark for scientific discourse characteristics include third person, numerical and visual representations, specificity (for example, long noun-phrases to narrow claims), argumentation structure with a clear thesis followed by supporting materials, and headings that break the document into distinct parts.

It comes as no surprise that coding reveals that the final form of documents that reach publication resembles traditional scientific discourse more than traditional Alaskan Native discourse. That disconnect gets negotiated in the micro-processes of the review process, as it was also observed at the macro level of the network structures of publication and citation.

Elements of the coding scheme are drawn from a variety of sources. My primary sources for the characteristics of scientific writing are Gross's (2002) book, Myers' (1990) "Writing Biology" and Montgomery (2002). My primary sources for the characteristics of Alaskan Native knowledge are most importantly Kawagley's (2006) first-hand account, with additional insight into strategies of verbal expression drawn from Endres' (2009) chapter, Sunwolf (1999), and Einhorn (2000).

The rejected article showed more of the characteristics of non-scientific writing norms. The earlier version of the ecology article shows more characteristics of non-scientific writing, particularly in terms of pronoun usage and emotive terms. The good news is that there are still distinct elements of Alaskan Native-style characteristics even in the complete and finally published version of the ecology research article.

3.1 Results of Coding

Two particular lines of objection are apparent in every single review, across both articles. The reviewers express discomfort with lack of specific tribal identifiers and with the political/emotional "tone" of the writing. The concern for identifying specific tribes is perhaps laudable. The reminder that Native Americans, even just the sub-set of Alaskan Natives, are not a single monolithic culture is important so that we avoid making assumptions about all based on experiences or knowledge of one tribe among the many. The separate identification of tribes is valuable also in that it reminds us somewhat of the dearth of knowledge contained in any single study compared to the richness that could be tapped if multiple tribes could

contribute, both comparatively and cooperatively. Personally, I believe there is also an enjoyment of learning and hearing/reading the evocative names of different tribes and their phonetic combinations that are sometimes distinctive. So the request by reviewers to use tribal identifiers can and should be understood as a desire based in good intentions and backed up by good reasons.

Nevertheless, there is some sense in which the repeated insistence on tribal identifiers, across different disciplines and different communicative forms, is not conducive to actually increasing the representation of indigenous knowledge in forums that combine it with scientific knowledge. At least two potential concerns arise when reviewers repeatedly use tribal-identifier concerns to reject or require revision. The first is practical: in many cases it is not clear which tribe "owns" a given practice or knowledge claim. In the modern-day world, Alaskan Natives intermingle across tribal boundaries freely. Institutionally, there is little practical differentiation across tribes; the native health services organizations serve all the tribes equally, the Alaska Department of Fish & Game regulates subsistence hunting and fishing the same regardless of tribal identity, and the most important political decision-making body for the Alaskan Natives is the annual gathering of the Alaskan Federation of Natives. In terms of scholarship, if a person is born of an Athabaskan mother and a mixed Inupiat/Aleut father, what is the correct tribal identifier to use when referencing quotes from an interview with them? Would that be different if the person is an uncertain mixture of some white ancestry and some Alaskan Native ancestry from an individual raised in one of the federal boarding schools imposed earlier, which pulled children away from parents and grouped them together regardless of tribal identity? Or at a group level, if a particularly interesting adaptation for dog sleds has been found useful for dealing with the earlier ice break-up, and it is practiced in villages that are Athabaskan, Yupik, Tlingit, and Aleut, what is the point of specifying those tribes instead of simply noting that it functions as a part of Alaskan Native cultures that are living in the changing climate conditions?

This leads to the second concern that should be raised when reviewers reject or require revision based on tribal identifiers, and that is the political ramification of such identifiers. This insistence on tribal specificity perpetuates a divide-and-conquer strategy that has been dangerously effective in creating a presumption of disunity, when Alaskan Natives are already struggling to achieve representative parity. The continuing, incessant struggle to achieve effective representation is one element of why institutionally the Alaskan Natives most often work across tribes. The extent to which individuals choose to self-identify as tribal members or as Alaskan Native is an interesting question. Personal, anecdotal experience suggests that when dealing with outsiders (whites, scientists) the tribal identification is often omitted in initial introductions, though sometimes included in more formal settings. Certainly, there are institutional as well as cultural elements that are still decidedly distinct across tribes. The organizational element can be seen most clearly in the separate Native Corporations (though, I might point out, that differentiation was one imposed by whites and again perpetuates in this case deliberately a divide-and-conquer strategy). And there are topics where the tribes have markedly different, even oppositional, interests. Caribou management is one of those topics, for example. But if a scholarly article for peer review is submitted that does not deal with a topic where there are inter-tribal differences, what is the point of requiring specific tribal identifiers, when most audience members will probably not know enough about the differences for such identifiers to matter, and when the side effect is to make each individual tribal voice more easily dismissed as non-representative and not significant?

The second notable argument in the reasons for rejection that appear across disciplines is a discomfort with a perceived level of anger that comes across in the scholarly writing. The discomfort is expressed in terms of requiring authors to remove the "us-vs-them political tone" or to "support your opinions." In other phrasings, the requirement appears in the form of demanding that the authors develop the sections that express "positive" or hopeful examples of interactions. Scientific rhetoric has adhered to a norm of "objectivity" for centuries, so this argument can be understood as a predictable enforcement of academic standards. Any mention of political context is regarded as a violation of "doing good science," and most elements of social/natural interdependence (holism) will make that impossible. The political context in question in the expression of local knowledge of Alaskan Natives is also going to come across as expressing some degree of anger. The expression of anger is a particularly problematic form of emotional display under any circumstances, not just in academic writing. Personally I believe we should shy away particularly from anger that will come across as sounding like blame when the specific audience in question is not deserving of blame and is indeed trying to reach out to redress past ignorance.

The specific phrasing might be suspect in this case, though, as a reason to reject or write-out an element of Alaskan Native expressions of knowledge claims. For one thing, given that one of the distinctive charcteristics of traditional knowledge is holism, political context is necessary for understanding; to remove the social is to alter the possibility of "knowing" in this way. The reviewers' perception of that political context as anger is accurate, in that a certain amount of anger is surely an understandable, perhaps even necessary, reaction when recognizing the extent of the problems confronted by Alaskan Natives. The discomfort is natural, but ought to be able to be set aside. The counter-argument is that the understanding of political context can be achieved elsewhere rather than taking up the limited space available in journals, but even if the authors merely hint at sketching out the political context, the emotion still tends to be recognizable. It might be useful for audience members unfamiliar with the current status of Alaskan Natives to be referred to another source, such as Case (2012), rather than including such details in an article for a discipline-specific audience, but that context is valuable for understanding specifics, so faulting authors for including more of it has an unfortunate side effect of again reinscribing and refragmenting scientific disciplinary boundaries and norms that are so antithetical to other ways of knowing.

The insistence on minimizing emotional elements, indeed any elements that show "bias" or authorial positionality, is counter to the values that are intrinsic in Alaskan Native knowledge (or "local" or "traditional" knowledges, for that matter). The cleaving of human from nature is achieved by means of such discursive practices. There have been numerous critiques of the problems created by that cleaving of human versus nature (see, e.g., McPhee, 1989). If we perpetuate that discursive practice, it is unsurprising that traditional knowledge and scientific knowledge will be irreconcilable. Compromises such as those achieved by the ecology article are still at best only partial translations, therefore, though they are undoubtedly a sign of progress and the product of considerable effort on the part of many people working with good will.

4. CONCLUSION

There is a great deal that can be gained from communication that can function across different forms of knowledge claims. Climate change is not the only example of a topic that is complex

and requires insights from different perspectives to understand. Moreover, there is some urgency motivating our efforts to do better at communicating across epistemic systems. Policy of any sort today is inextricably bound up with scientific and technical concerns, but that means that it becomes increasingly important to not exclude any voices from the set of interactions through which we try to figure out those scientific and technical components. Alaskan Native traditional knowledge is not endangered in the way that other indigenous knowledge might be endangered, but the more rapidly we can establish ways of communicating that include it, the better we might be able to recognize changes over time and changes across different groups. The combination of more emotive terms, a greater use of pronouns, and other indicators of the human relation with the topic being written about and subsections following a narrative format within a larger framework of hypothetico-deductive organization provide some elements for a genre that can serve as a good compromise.

As an initial step, it also seems reasonable to ask journal reviewers to educate themselves as to important characteristics that mark the discourses of different knowledge claims and consider greater stylistic flexibility so that the readers of the research articles can in turn begin to become familiar with alternate sets of genre norms. Alternately, we can continue with separate communicative venues in which each type of knowledge claim can flourish, but the effect of this is to put the greater cognitive burden on the "end user" of the research thus being produced. It is more work to research journals and then separately the collection of government documents and books (often from small specialized publishers). It is more work to have to read alternately narrative-structured and then hypothetico-deductive structured research pieces and make sense of how each piece fits together. The work will get done one way or another because it is too important not to. But the question of who does the labor seems one that would be worth discussing explicitly via this type of meta-communication rather than leaving implicit assumptions in place that have unwanted and untoward effects.

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APPENDIX

TEK			
Location	Node	Title	Theme
Core	Co1	Title: Glaciers and climate change: Perspectives from oral tradition	Climate change, local knowledge to inform science, historical perspective, TK as knowledge not data
Struct. A	A2	*Title: Total Environment of Change: Impacts of Climate Change and Social Transitions on Subsistence Fisheries in Northwest Alaska*	Climate change, ethnographic, interviews/participant observation
	A3	*Title: Advancing Landscape Change Research through the Incorporation of Inupiaq Knowledge*	*Climate change (lake drainage), interviews,*
	A4	Title: Perception of change in freshwater in remote resource-dependent Arctic communities	Climate change (prec. & temp.), interviews
	A5	Title: Observational evidence of recent change in the northern high-latitude environment	Climate change, research synthesis of TK, *science tied to TK, modeling support*
	A6	*Title: Modeling sustainability of arctic communities: An interdisciplinary collaboration of researchers and local knowledge holders*	*Climate change, integrated research, sustainability*
Struct B	B1	*Title: Communicating traditional environmental knowledge: addressing the diversity of knowledge, audiences and media types*	*TK as distinct way of knowing, communication modes*
	B2	*Title: Integrating Traditional and Scientific Knowledge through Collaborative Natural Science Field Research: Identifying Elements for Success*	*TK supportive of instrumental observations*
	B3	Title: Traditional knowledge of the bowhead whale (Balaena mysticetus) around St. Lawrence Island, Alaska	TK to identify areas of focus for scientific research
	B4	*Title: Observations on the utility of the semi-directive interview for documenting traditional ecological knowledge*	*TK as distinct knowledge pool, Methods to access, communication modes*
	B5	Title: A Case for Developing Place-Based Fire Management Strategies from Traditional Ecological Knowledge	TK as a replacement of Scientific gaps of understanding, sustainability, place-based
	B6	Title: Sustaining a healthy human-walrus relationship in a dynamic environment: Challenges for co-management	Climate change, social-ecological systems, sustainability, place-place based, resource management

	B7	Title: The significance of context in community-based research: Understanding discussions about wildfire in Huslia, Alaska	Climate change, TK as distinct knowledge pool, resilience/sustainability, communication modes, natural resource management
	B8	Title: Arctic climate change discourse: the contrasting politics of research agendas in the West and Russia	Climate change, resource management, TK as distinct way of knowing
Struct D	D1	Title: Arctic marine mammals and climate change: Impacts and resilience	Biology, marine mammals, sea ice climate change
	D2	Title: Producing an Indigenous Knowledge Web GIS for Arctic Alaska Communities: Challenges, Successes, and Lessons Learned	Technology, communication,
	D3	Title: Transmission of Environmental Knowledge and Land Skills among Inuit Men in Ulukhaktok, Northwest Territories, Canada	TK knowledge transfer
	D4	*Title: Natural history and conservation of the Greenland whale, or bowhead, in the northwest Atlantic*	*TK to fill scientific gaps*
Isolates	I1	Title: Total Environment of Change: Impacts of Climate Change and Social Transitions on Subsistence Fisheries in Northwest Alaska	Repeat- network error in names. See A2
	I2	Title: Proceedings of the North Coast Eulachon Workshop:	Species focused integrated research, TK as distinct way of knowing, place-based
	I3	Title: Alaska communities and forest environments: A problem analysis and research agenda.	Resource management, TK as research consideration, place-based
	I4	Title: The indigenous worldview of Yupiaq culture: Its scientific nature and relevance to the practice and teaching of science	Cultural context to science education, place-based
	I5	Title: Rural participatory research in Alaska: The case of Tanakon village	Local knowledge, place-based, localized research adaptation
	I6	Title: PARTICIPATORY ACTION RESEARCH - THROUGH PRACTICE TO SCIENCE IN SOCIAL-RESEARCH	No abstract
	I7	Title: Development of a community-based monitoring and surveillance database on ecosystem health for interior Alaska.	No abstract
	I8	Title: Partnerships and cooperative resource assessment in Alaska: Developing a shared vision for subsistence fisheries management	No abstract