

Contested extractivism: impact assessment, public engagement, and environmental knowledge production in Alaska's Yukon-Kuskokwim Delta

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Abstract

For large extractive mineral projects, Environmental Impact Statement (EIS) processes function in part as a procedural tool to adjudicate the legitimacy of divergent environmental truth claims. Successful anti-extraction movements work to litigate divergent knowledge claims in the public arena, but few anti-extraction communities have access to a broad public audience. This article examines the proposed Donlin Gold mine in southwestern Alaska, a locally divisive yet publicly invisible extraction controversy, to understand how communities contest the boundaries of knowledge production and legitimacy set out by EIS procedures without the benefit of broad public awareness. Through a multi-method analysis of the public engagement segment of Donlin's Draft EIS, we find that anti-Donlin activists worked to construct environmental knowledge that drew jointly on claims to local knowledge and scientific expertise through a temporary assemblage of local activists and external consultants. The contested epistemic understandings of residents, expert consultants, and state and federal regulators further reveal the role of regulatory processes in constructing and maintaining boundaries of epistemic legitimacy, while also pointing to emergent possibilities for social action based in locally-situated environmental truth claims.

Key Words: Environmental Impact Statement, mining, truth claims, Donlin Gold mine, Alaska

Résumé

Pour les grands projets miniers, les processus de l'étude d'impact environnemental (EIE) fonctionnent en partie comme un outil procédural pour juger de la légitimité des «déclarations de vérité» environnementales divergentes. Les mouvements réussis contre l'exploitation minière visent à plaider des revendications de savoir divergentes dans l'arène publique, mais peu de ces communautés ont accès à un large public. Cet article examine une mine d'or proposée controversée, la «mine d'or Donlin» dans le sud-ouest de l'Alaska. Nous demandons: comment les communautés contestent-elles la production de connaissances et la légitimité dans les procédures EIS, sans bénéficier d'une large sensibilisation du public? Grâce à une analyse multi-méthodes d'une section du document préliminaire d'EIE de Donlin qui traite de l'engagement du public, nous constatons que les activistes anti-Donlin se sont appuyés sur les connaissances locales et l'expertise scientifique pour créer des connaissances environnementales, en utilisant un assemblage temporaire d'activistes locaux et des consultants externes. Les interprétations épistémiques contestées des résidents, des consultants-experts et des régulateurs étatiques et fédéraux révèlent en outre le rôle des processus réglementaires dans la construction et le maintien des limites de la légitimité épistémique. Ils soulignent également les possibilités émergentes d'action sociale, fondées sur des affirmations de vérité environnementale locales.

Mots clés: Étude d'impact environnemental, exploitation minière, revendications de vérité, mine d'or Donlin, Alaska

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Resumen

Para grandes proyectos de extracción de minerales, los procesos de Declaración de Impacto Ambiental (DIA) funcionan en parte como una herramienta procedimental para adjudicar la legitimidad de afirmaciones de verdades divergentes sobre el medioambiente. Los movimientos anti-extracción exitosos trabajan para litigar afirmaciones divergentes en la esfera pública, pero pocas comunidades anti-extracción tienen acceso a un público amplio. Este artículo examina la mina Donlin Gold propuesta en el suroeste de Alaska, un proyecto de extracción controvertido a nivel local pero públicamente invisible, para comprender cómo las comunidades rebaten los límites de la producción de conocimiento y legitimidad establecidos por los procesos de DIA sin el beneficio de una amplia conciencia pública. Mediante un análisis multi-metodológico del segmento de participación pública del Borrador de la DIA de Donlin, hallamos que los activistas anti-Donlin trabajaron para construir conocimiento ambiental que se basara conjuntamente en los conocimientos locales y científico mediante una concurrencia temporal de activistas locales y consultores externos. Los conocimientos epistémicos disputados por residentes, consultores expertos y reguladores estatales y federales demuestran todavía más el papel de los procesos reguladores en la construcción y el mantenimiento de límites de legitimidad epistémica, a la misma vez que señalan posibilidades emergentes para la acción social basada en afirmaciones situadas de verdad ambiental.

Palabras clave: Declaración de Impacto Ambiental, minería, afirmaciones de verdad, mina Donlin Gold, Alaska

1. Introduction

Environmental Impact Assessments (EIA) of large projects involve a discursive and material process through which mineral resources are given standing and meaning in local, regional, and national contexts. As many have argued, EIAs are a contest over the production and representation of environmental knowledge, institutionalized through the bureaucratic and regulatory structures of the Environmental Impact Statement (EIS) process (Cashmore and Richardson 2013; Chilvers 2008a, 2008b; Höhler and Ziegler 2010; Irwin and Michael 2003). EIA promotes procedural regularity and implies impartiality and fairness (Porter and van der Linde 1995); at the same time, it functions to construct and maintain firm borders around how knowledge is generated and what forms of knowledge are a legitimate basis for environmental decisions (Cashmore *et al.* 2010).

EIS processes thus function as a procedural tool to adjudicate the legitimacy of divergent environmental truth claims. Accordingly, EIS processes work to contain the production of environmental knowledge within a narrow set of onto-epistemic boundaries. Such an approach to environmental assessment necessarily stakes its claim on a singular and cumulative scientific comprehension of an external, objective environment, and makes room for lay, local, Indigenous, or traditional knowledge as forms of contributory expertise only insofar as they might be verified within an established epistemic framework. In contrast, Donna Haraway and other feminist science, technology, and society (STS) scholars argue that knowledge constitutes, and does not merely reflect, a world that cannot be said to be merely "out there" (see Escobar 2010). Indeed, public engagement segments of an EIS process often emerge as sites of onto-epistemic contestation, and subaltern knowledges have gained increasing representation through the expanding codification of public engagement processes (Chilvers 2008b). At the same time, the EIS decision-making structure can also reduce the number and the diversity of involved decision makers through its identity as an analytic – rather than political – set of processes (Whitney 2019).

In particular, a vibrant literature traces the creative efforts of Indigenous communities to contest the epistemic and representational boundaries structured by state-sponsored environmental regulation – an increasing proportion of which focuses on Northern communities and environments (see Hébert 2016; Hébert and Brock 2017; Law and Joks 2019; Panikkar and Tollefson 2018; Spaeder 2005). Scholarly work has primarily focused on highly visible cases where communities opposed to extraction have drawn on political or discursive strategies external to the "analytical arms race" (Owens and Cowell 2011) of the EIS process, in such a way that local claims to knowledge and legitimacy might be adjudicated publicly rather than procedurally. Little research has addressed the processes by which communities might work to carve epistemic space *within* the regulatory structure itself, even as EIS procedures work to streamline and regulate the production of (state-legible) environmental knowledge. Such cases require research on the dynamics of public

engagement and knowledge production in contexts where local communities do not have access to wider networks of public support.

With this in mind, this article examines a little-known, little-studied resource development conflict in the US North: the highly contested debates surrounding the proposed Donlin Gold mine, sited along the mid-reaches of the Kuskokwim River in the sub-Arctic tundra of southwestern Alaska (Figure 1). An exceptionally large, open-pit design, the Donlin Gold proposal inspired deep division in Kuskokwim-area villages and state offices in Anchorage. Due to a relative lack of wider public awareness and external support for anti-extraction activists in and outside the Kuskokwim region, however, public contestation surrounding the mine was primarily channeled through the mandates outlined in the public engagement portion of Donlin's Draft Environmental Impact Assessment (DEIS) process.

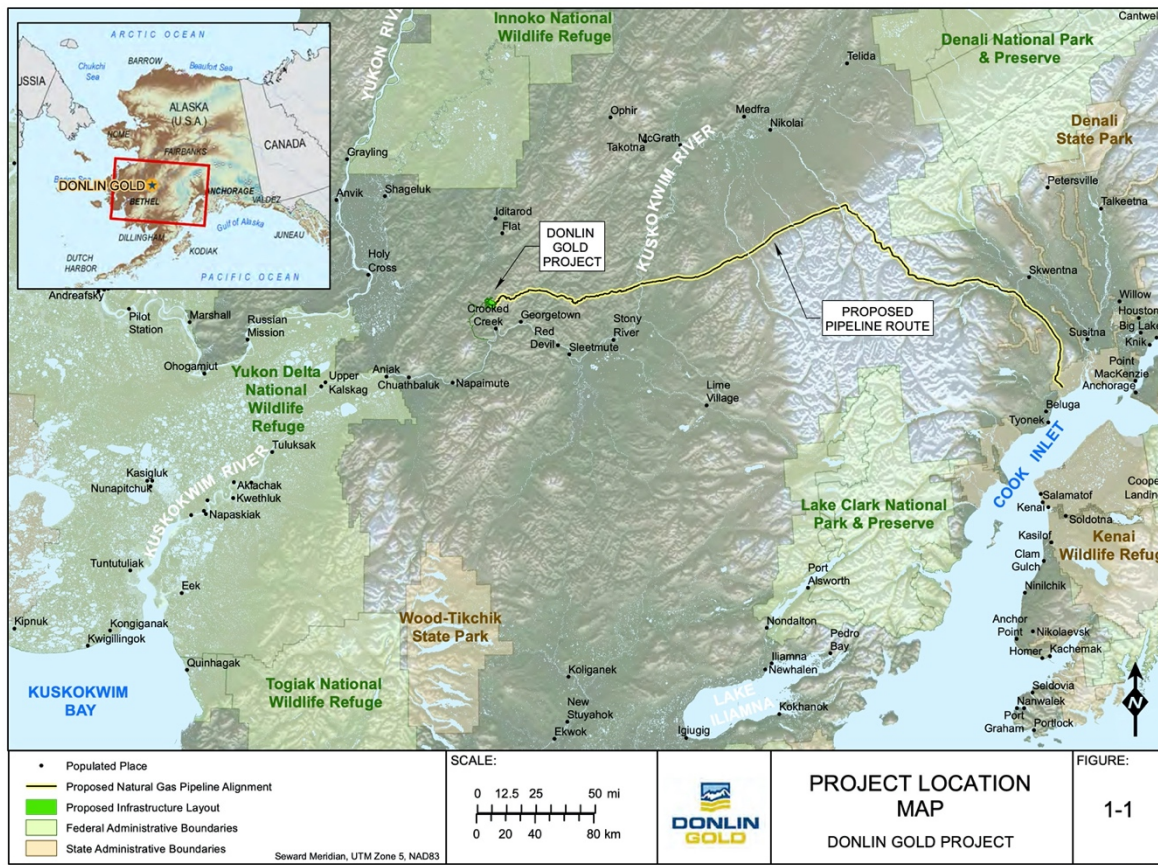


Figure 1: Donlin Gold project area (SRK Consulting 2016: 1-4).

Despite its relative obscurity, the Donlin case is a potential bellwether for resource conflicts to come. As global climate change increasingly opens Arctic regions to resource exploration and extraction, we are likely to see a rise in regulatory controversies surrounding new extractive development in areas with characteristics similar to the Kuskokwim region: that is, primarily-Indigenous regions with heavy reliance on subsistence harvest and few alternative avenues for economic development. It is important, under these conditions, to understand how the state regulatory apparatus structures the adjudication of environmental knowledge, and how communities with little access to alternative avenues for public deliberation make their

environmental claims to the state. Accordingly, drawing primarily on a set of in-depth, open-ended interviews, we investigate three key questions involving Donlin's DEIS public engagement process:

1. How does the DEIS public engagement process structure environmental claims-making?
2. How do anti-extraction communities, which encompass social and political networks within and outside of the Yukon-Kuskokwim region and include both Indigenous residents and non-Native settlers and outside consultants, engage with the state assessment system while simultaneously constructing alternate visions of land use, resource ethics, and approaches to environmental knowledge?
3. How are boundaries of knowledge production and legitimacy drawn and redrawn by communities, consultants, and the state?

This article demonstrates (1) that the public engagement process is explicitly designed to gather a narrow range of information only on possible gaps in scientific data, thereby limiting public engagement to a narrow set of epistemic prescriptions; yet (2) the Donlin DEIS process was also impacted by a coalition of active residents and external consultants who presented public comments that rendered local concerns in a language and method legible to state and federal regulators. The Donlin DEIS debate is not simply about the dominance of extractive ideologies or state-organized epistemologies. Instead, our analysis of the Donlin DEIS public engagement process shows that environmental knowledges are necessarily "situated" (Haraway 1988), even if not considered so by the state regulatory structure; and, additionally, that knowledge producers maintain divergent epistemic standpoints even when enrolled into a formalized and highly regulated state apparatus. Our analysis of the Donlin case, in this way, responds directly to political ecology's longstanding concern with tracing and reconciling divergent epistemic traditions (Bryant 1998: 89) – and, specifically, its focus on understanding the extent to which Western scientific methods and other claims to legitimacy wield authority in the political construction of environmental knowledge and policy (Forsyth 2008: 762).

We begin with a brief section on the status of Northern resource conflicts and the Donlin mine in particular. We then address recent literature on public engagement, knowledge production, and risk, and outline our methodological approach. Results are presented in three sections: First, we outline the structure of the Donlin DEIS public engagement process. We then present our analysis of the DEIS public comment documents, before returning to interview data in order to explain patterns in the public comments. In the discussion section, we present a typology of three approaches to understanding the relationship between epistemic systems in the production of environmental knowledge; we use this typology to examine the theoretical and substantive significance of the Donlin DEIS debate, and to discuss the role of situated knowledges (Haraway 1988) in the struggle for environmental and procedural justice in conflicts over resource extraction.

2. Political ecology in the US Arctic and sub-Arctic

Political ecology and STS scholars are increasingly examining resource development and environmental controversies in the North. This is in part due to increased state and corporate interest in Northern extractive development, accompanied by a growing understanding of the environmental and social impact of climate change and resource extraction on Northern communities (see Sale and Potapov 2010). Recent relaxations in regulatory protection have specifically threatened the environments and communities of the US Arctic and sub-Arctic, from the push to lease large swaths of the Arctic National Wildlife Refuge for oil extraction to the reversal of Obama-era EPA prohibitions against mineral extraction at the Pebble copper, gold, and molybdenum mine in southwestern Alaska.² The effects of anthropogenic climate change have also disproportionately concentrated at Northern latitudes: Retreating sea ice and drastic increases in average yearly temperature destabilize Northern ecosystems and lifeways at the same time as global wind and weather patterns transport airborne toxicants northward (Cone 2005; Overland *et al* 2013; Panikkar *et al* 2018; Stroeve *et al* 2007).

² Pebble's fortunes reversed in November 2020, when the Army Corps of Engineers denied it a key Clean Water Act permit after US President Donald Trump's son retracted his support for the project.

The emergence of Northern resource conflicts as sites of substantive and theoretical interest is also driven by the particular social and political context of the US Arctic and sub-Arctic, especially the unique conditions arising from abutting and overlapping regimes of sovereignty, regulation, and knowledge, including those of local, state, and federal governments, Native Alaskan sovereign governments, and Native Alaskan corporate structures, especially the thirteen Regional Corporations established under the 1971 Alaska Native Claims Settlement Act (ANCSA). The Alaska context is therefore especially vital as a site to understand interactions between, and hybrids of, multiple overlapping land and knowledge traditions: As we recently argued in an analysis of the debate over the proposed Pebble mine near Bristol Bay, resource and regulation debates in Alaska "take place in a hybrid world, where visions of the land as a site of extraction and profit are in continual conversation with other approaches to land and traditional knowledge" (Panikkar and Tollefson 2018: 717). In this way, Alaska presents a particularly important case for understanding the political construction of environmental knowledge and a key site to respond to Forsyth's (2003: 1) call to "see the evolution of environmental facts and knowledge as part of the political debate, rather than as a pre-prepared basis from which to start environmental debate."

Donlin Gold and the Yukon-Kuskokwim Region

The Donlin mine site is marked by an especially complex set of overlapping jurisdictions, and Donlin's divisiveness is undoubtedly due in part to the particular arrangement of land and mineral ownership in and around the Donlin claim and its associated infrastructure sites. The mine itself is under the title of the Calista Corporation, one of the thirteen regional Native corporations chartered under ANCSA in 1973. Operation plans depend on natural gas supplied by a 315-mile (507 km) pipeline from the mine site to ports on Cook Inlet (see Figure 1); the pipeline route passes through Calista land as well as parcels administered by the federal government and by Cook Inlet Region, Inc. (CIRI), another ANCSA corporation (Jason Bruni, interview, 2017). Both the Crooked Creek area, where the Donlin site is located, and the isolated CIRI parcel along the pipeline routing were titled under the post-ANCSA land selection process; like much of the land selected by regional corporations since the ANCSA agreement, both sites were chosen explicitly for their mineral potential (Jason Bruni, interview, 2017; June McAtee, interview, 2017). Kuskokwim-area villages, including Crooked Creek, hold additional surface rights to land in the project's immediate vicinity. This complex of land title and resource rights alters risk-benefit calculations for residents and ANCSA corporation officials alike. Donlin represents a source of potential profit to the Calista and CIRI corporations, as well as a source of potential (short-term) employment for a region in which more than twenty percent of area residents live below the federal poverty line (Howe and Martin 2009). Due to necessity as well as the continued strength of traditional language and culture in the region, Kuskokwim residents have among the highest per-capita subsistence harvest rates in the state (Alaska Department of Fish and Game 2019).

The Donlin proposal has thus seen a divided response in the Kuskokwim area and in state offices in Anchorage, with the employment and infrastructure benefits of the mine counterposed with the potential environmental and health risks posed by Donlin's construction requirements and the large volumes of mining waste that the project would produce. Throughout Donlin's Environmental Impact Statement (EIS) process, which ran from 2012 to 2018, the proposed mine sat at the center of a vigorous local debate over land use, development, sovereignty, and subsistence cultures and livelihoods. We focus on Donlin's Draft Environmental Impact Statement (DEIS) in particular because the DEIS and EIS phases remain the only codified processes in which local communities have the opportunity to engage directly with the state of Alaska, federal regulatory agencies, developers, and other actors, and in which the institutions that govern and develop Alaska's lands and resources are legally mandated to listen and respond to stakeholder communities. Impact assessment thus represents a highly visible battle over the construction of land and resource identities in the North – one that is historically situated and that holds deep material consequence for communities within and outside of potentially impacted regions. And unlike the Pebble case, Donlin's DEIS public process additionally emerged as a primary site in which local activists and residents engaged with state and federal regulators.

3. Theoretical framework

The EIS process and related state-level large project permitting systems were not designed as a forum to explicitly consider questions of sovereignty or settlement history, but rather as a tool to give "the environment" a specific form of social standing in the political deliberations surrounding resource development decisions. Environmental assessment "was introduced to impose upon an oftentimes reluctant bureaucracy...a requirement to consider environmental and/or sustainability concerns where this had been judged to be remiss previously", contend Cashmore and Richardson (2013: 2). Beyond this, insofar as environmental assessment works to reconcile the conflicting aims of influential stakeholders, assessment procedures themselves have a major role in determining the specific arrangement and reach of power in any particular case (Cashmore *et al.* 2008). If "power [is] not a feature of an institution, but [is] defined relationally" through discourse (Hajer 1995: 49), assessment and permitting procedures might be understood as a key mechanism by which particular forms of power are transmitted and exercised (cf. Richardson 2005). EIS procedures thus deserve attention as part of political ecology's broader research focus on how "power relations may be reflected in conflicting perceptions, discourses and knowledge claims about development and ecological processes" (Bryant 1998: 87).

State-sponsored environmental decision-making processes work to construct certain hierarchies of legitimacy out of the shifting, diverse field of land use and knowledge construction practices; these hierarchies, in turn, shape what forms of land relationships and knowledge construction practices constitute legitimate foundations for action. Assessment procedures thus hold decidedly material consequences, and project siting remains necessarily a question of environmental justice: Low-income, Indigenous, and minority communities disproportionately bear the environmental risks and health impacts associated with industrial production and waste (Agyeman *et al.* 2016; Bullard 2003; Pellow 2007), while environmental regulations are often under-enforced on tribal lands specifically (Teodoro *et al.* 2018). Indigenous communities are often especially vulnerable to the impacts of large-scale mining even as the economic benefit of large mineral projects tend to "leak" out of host regions (Horowitz *et al.* 2018: 408). In Alaska, contemporary political struggles surrounding resource extraction must additionally contend with joint discursive-material regional histories that link social and economic vitality – and, indeed, statehood itself – to the private, profitable enterprise of resource extraction, in uncomfortable entanglement with ongoing questions of Native sovereignty. Indeed, as Howitt argues, extractive political-economies depend in part on the construction of "wickedly complex state administrative systems" to ensure the smooth functioning of resource extraction and accumulation (2012: 820). At the same time they enforce market mechanisms as the solution to systemic underdevelopment – even as such mechanisms rely on the appropriation of natural resources for state and corporate profit, with the assumption that "enough of this wealth can be redistributed or will trickle down to local Indigenous communities to constitute 'development'" (2012: 824).

A component of this discursive contention concerns which resources are afforded standing and meaning in local, regional, and national contexts. A critical attention to the materiality of natural resources is useful, here, to understand the specific forms of representational contention in the Donlin case. Resource materiality approaches argue that the social deliberations surrounding permitting and impact assessment allow particular material resources to come to represent particular qualities of a landscape or site in themselves, arguably narrowing the set of possible imaginative boundaries to encompass only those resources which attain a certain social standing (Davidov 2014; Richardson and Weszkalnys 2014). These boundaries are linked, in part, to the natural components that come to be "culturally and politically categorized as carrying value in a national context" – a quality that Davidov (2014: 52) terms "metonymic materiality." The work of charismatic resources to reconfigure nature and the hinterland to become profitable, productive, and valuable is thus a project of social organization that both prefigures and is itself altered by environmental assessment processes; "the meaning(s) ascribed to a place", in this way, necessarily "reflect the dominant social and power relationships in specific context" (Agius *et al.* 2007: 195). (Others have written on the extractive market logics underpinning resource governance in Alaska: see Hébert and Mincyte 2014; Foley and Hébert 2013). If impact assessment processes are concerned in part with reconciling positions held by opposed stakeholders, the EIS process also necessarily functions to assign legitimacy to specific onto-epistemic systems: how a land and region are given meaning through a discursive understanding of particular material resources; what kinds of knowledge might

be afforded legibility; and how knowledge of the land and its resources might be legitimately produced, and by whom.

Impact assessment has increasingly incorporated public participation as an avenue to channel contentions over the construction of land and resources and the production of knowledge, so much so that it is increasingly a "defining feature of the environmental sphere" in the West (Chilvers 2008b: 2990). The rise of public participation in EIA was additionally joined by increasing attention to Social Impact Assessment (SIA) as a field of research and practice, increasingly expressed as the informal requirement for large project managers to gain a "social license to operate" (Vanclay 2019, 2020). One outcome of the ongoing expansion of EIS public engagement processes is a proliferation of the "range of actors, expertise, and knowledges" at the interface of science and policy and science and society, particularly "experts of community" (Chilvers 2008b; Rose 1999), that is, experts who implement participatory processes and represent community interests to regulators and the state, as one product of the public participation complex. "Experts of community" are joined by a parallel class of consultants who are engaged in an inverse project: to represent (decode, translate, provide access to, or provide aid in navigating) the networks of scientific knowledge and bureaucratic processes that make up the environmental impact assessment system for or alongside impacted communities.

But "community" is not a static descriptor; indeed, others have argued that impact assessment and public engagement processes themselves work to construct communities, both temporary and more permanent. Irwin and Michael (2003) identify "ethnoepistemic assemblages" – in Chilvers' terms, "hybrid coalitions of varying 'expert'/'lay' actors" (2008b: 2993) – as key sites of interest. Ethnoepistemic assemblages are characterized by their work to "[establish] knowledge and [produce] knowledge claims" (Irwin and Michael 2003: 85). They might form around a specific issue or moment; they might be ephemeral, or remain active throughout or beyond a particular controversy. Whatever their staying power, what is clear is that public engagement processes enroll particular knowledge actors, whether as an emergent assemblage or as a more formalized node in a network of knowledge production and representation. This article examines one such assemblage that arose in response to the Donlin DEIS process.

Following Beck's argument that cases of distributed environmental risk have the capacity to "open apparently rigid circumstances and stir them up" (1997: 22), environmental risk assessment often presents a generative terrain for community-expert coalitions to challenge established procedures for the production and verification of environmental knowledge. Environmental controversies, in this sense, arguably represent what critical linguists term a "critical discourse moment" in which established interpretations begin to break down (Chilton 1987). Whether as a critical discourse moment or as a consequence of distributed risk more generally, EIS controversies potentially allow for environmental knowledge claims to be made using alternative epistemological approaches or to be organized outside of established channels (cf. Hébert and Brock 2017). As noted above, however, the Donlin context made little room for the emergence of discourses that depart radically from established regulatory procedures for making and legitimating environmental knowledge claims: Making knowledge claims requires legibility, and legibility is defined in part through a set of reductive simplifications that characterize the regulatory orientation of the modern state (cf. Scott 1998). In the case of impact assessment processes, claim-making rests on "expert judgment expressed numerically" (Höhler and Ziegler 2010: 425). In EIS contexts, non-scientists, local, and/or Indigenous contributions are "[pushed] out of the valued domain of technical management and into the messy and problematic realms of community relations" (Howitt *et al* 2013: 129). Further, the very failure of state and corporate institutions to acknowledge Indigenous knowledge *as such* is transformed, in Howitt *et al.*'s analysis, "not only into technical expertise, but also the unquestionably legitimate, authoritative and self-accrediting representation of the interests of the general public" (2013: 129). Counter-discourses are left to find an alternative leverage point to challenge the discursive and material primacy of extractive profit and the epistemic primacy of expert quantification – such as the charismatic wild salmon of Bristol Bay or the well-supported local knowledge production of anti-Pebble activists (see Bristol Bay Land Trust 2013; Panikkar and Tollefson 2018).

Others have challenged the fixity of these definitions, including Hébert and Brock's (2017) research on the Pebble controversy. Their work framed the knowledge produced out of expert-community coalitions (tailored, necessarily, to the demands of the regulatory state) not as a balance between scientific and lay knowledge, or of the simple dominance of scientific representations, but rather as a dual reinforcement: "[A]s

quantification becomes the means through which environmental claims are staked", Hébert and Brock write, "it reinforces the authority of scientific expertise at the same time it foregrounds other ways of knowing and establishing authority" (2017: 56). At the same time, an extractive project might itself gain legitimacy through limited engagement with communities, local concerns, and local knowledges, insofar as "the legitimacy of the process is derived through the involvement of both experts and laypersons" through repeated "hearings and meetings and more meetings" (Hébert 2016: 109). EIS processes in this way "achieve added cultural authority" through the simultaneous assertion of analytical superiority and stakeholder engagement (Whitney 2019). Strategies to make Indigenous knowledges (IK) legible to the state, moreover, do not in themselves work in the interests of Indigenous knowledge and land sovereignty. Sletto (2009: 147), referring specifically to projects that use mapping as a tool to present IK to state actors, argues that abstraction – a core epistemic tool of mapping and scientific knowledge production more broadly – might undermine Indigenous sovereignty by "concealing the complex, lived spaces of Indigenous peoples", with the consequence of "[increasing], rather than weaken[ing], state control of Indigenous lands."

4. Methodology

This research draws upon two dozen in-depth interviews with members of industrial, state, federal, civil, corporate, and scientific communities. Interview data is drawn from three rounds of personal, semi-structured interviews, conducted in Anchorage, Fairbanks, and multiple towns and villages in the Yukon-Kuskokwim, Bristol Bay, and Kenai Peninsula regions of Alaska between 2014 and 2017. Some interview subjects – state and federal employees and representatives from the Donlin Gold, Calista, and CIRI corporations – were selected based on their direct involvement with the Donlin EIS process. Consultants and community members were selected via snowball sampling based in part on information and contacts gained through a set of 80 interviews conducted on the Pebble Mine controversy in 2014. Interviews were conducted in person, except in three cases where it was necessary to interview remotely. With one exception, all interviews were audio recorded.

The University of Vermont Institutional Review Board approved interview questionnaires and all study procedures. An oral consent to participate was sought from each of the interview participants, and all data were de-identified at the time of transcriptions unless the participant has given consent to use their name. All participants were 18 years of age or older.

Interview data is combined with a content analysis of the 526 public comments submitted to the US Army Corps of Engineers (USACE) as part of the Donlin Gold Draft Environmental Impact Statement (DEIS) process. This content analysis allows us to quantify the comments that mention specific components of the DEIS process, as well as to understand the relative importance of different issues as they arose through the lens of the DEIS.

5. Results

Results are presented in three sections below. First, we briefly outline the EIS public engagement process for the Donlin project. This section demonstrates, in short, that EIS public engagement processes work to channel public input through a set of procedural and epistemological bounds. Second, we present an analysis of the 526 DEIS public comments submitted to USACE for review.³ Here, we show that public comment data demonstrates a strong public understanding of technical and scientific knowledge among those opposed to development at the Donlin site. In the final section, we return to interview data in order to understand the social and organizational infrastructure that contributed to producing such a body of technically and scientifically literate comment submissions.

Public engagement

The EIS process seeks to determine the environmental and health impacts of large development projects in four phases: scoping (for Donlin, December 2012 to March 2013), where potential impacts and study

³ Public comment coding and several interviews were conducted by Benjamin Lemmond.

processes are identified for inclusion in the EIS; drafting (March 2013 to November 2015), in which USACE and its contractors conduct an initial impact analysis; the public comment period (November 2015 to May 2016), in which individuals and organizations have the opportunity to respond to the draft impact statement (DEIS); and the final EIS, a revised version of the DEIS that incorporates comment feedback. We focus below on the two primary phases that brought Kuskokwim residents into contact with state, federal, and industry representatives through the formal channels of the EIS process and that temporarily brought anti-extraction assemblages into being (cf. Irwin and Michael 2003): The public meetings conducted as part of the pre-DEIS scoping process and the DEIS public comment period.

Pre-DEIS scoping consisted of a series of community meetings in Anchorage and throughout the Kuskokwim area, conducted by multinational engineering consulting firm AECOM under contract with USACE. In scoping meetings, AECOM contractors presented a broad outline of the project alternatives and gave community members the opportunity to ask questions and respond to different stages of the planning and impact assessment process. The scoping process, according to former USACE Donlin project manager Richard Darden, was aimed primarily at allowing community members to raise issues that may be unfamiliar to state and federal agencies, as well as to gauge the importance of different social and environmental questions to specific communities.

Scoping meetings are not a forum to weigh public support for or resistance to the project as a whole; rather, the meetings are designed to gather information, questions, or concerns relating to the specifics of project design and impact assessment. Public participation processes, including public comment periods such as those initiated under Donlin's DEIS process, seek to navigate the tension between "democratic participation and the elaborate bureaucracy of large electorate government" (National Research Council 2008); in so doing, they necessarily work to bridge certain gaps between the complex, technical expertise that marks large project impact assessment and the needs and knowledges of a less technically adept public. But public comment processes as they emerge today are hardly uncontested. Chilvers identifies multiple tensions in public engagement frameworks that imply three different approaches to understanding the relationship between science, values, and public meaning: maintaining strict division between the analytical and deliberative (that is, keeping "facts" and "values" cleanly separated) (2008a: 446); limiting public involvement to "the extent to which nonscientists possess 'contributory expertise' that can complement or enhance certified scientific expertise" (2008a: 434); and a third approach, which holds that science and the political are not so separable, raising the "need to negotiate public meanings embedded in science" (2008a: 434-455). Of these three approaches, the public engagement process for Donlin's DEIS operated largely according to the second framework, as described by the project manager:

[Scoping meetings are] everyone's chance to address what they think should be in the EIS. We're coming at it from: what are the things that we may not recognize as being important, as being of interest. Sometimes you can predict that, and sometimes you're surprised to recognize that an issue that you didn't think was a big one is more in the public concern than you realized – and you say, ok, we should elevate our evaluation of this particular issue, because this is what people are about. (Darden, personal interview, 2017)

Scoping procedures explicitly allow for some forms of local intervention in the DEIS and EIS process. But those interventions, as Darden makes clear above, are limited to providing minor additions to existing data gathering operations – to identify sources of information or study locations that regulatory agencies and scientific consultants may have missed. Still, local activists were, at times, able to influence the process by which the state gathered information from Kuskokwim-area communities. Lisa Feyereisen, who served on the board of the village of Chuathbaluk and was involved in Donlin's DEIS process through the village's role as a cooperating agency, recalled one case in which she and other Aniak-area community members were able to slightly alter the federal and state engagement process:

I got a little grant to bring the agencies out to Aniak. We brought elders from the rivers to talk to them. They made two extra meetings for us, to listen to our elders. That was important. (Feyereisen, personal interview, 2017)

This is not to say that state-channeled scoping meetings were ineffectual within the bounds of their design. One interviewee remembered a moment in which community feedback at the early scoping meetings contributed to shifting, slightly, the role of traditional knowledge in the DEIS data collection process:

One of the issues that came up during scoping was subsistence impacts, cultural, traditional knowledge, and the agencies determined, they looked at all the data and said, "well, you know, here's a data gap. There is limited Traditional Knowledge information." So they had a number of workshops in Anchorage where they brought elders in, Knowledge Bearers in from tribes, to talk to them about Traditional Knowledge, their experience, and the wisdom that they have about the land, and what they saw that the potential impacts could be, both positive and negative. (Personal interview, 2017)

Such alterations aside, public engagement processes set clear bounds as to what forms of engagement are considered a legitimate form of participation. These bounds necessarily rest on a particular onto-epistemic position: One that looks primarily to knowledge produced by scientific experts uninvolved in the life or lifeways of in-region communities – in Hohler's (2010: 425) analysis, "expert judgement expressed numerically." This requirement places the burden on anti-extraction commenters to draw upon scientific and technical data to present environmental knowledge claims to the state. Our public comment analysis, below, explores how Kuskokwim-area communities navigate the procedural and epistemic requirements of the EIS knowledge production apparatus.

Public comment analysis

We conducted a detailed content analysis of the 526 public comments associated with Donlin's Draft Environmental Impact Statement (see Appendix for content analysis tables). Comments were coded according to their substantive concerns; each comment may contribute tallies to any number of statements, such as "Donlin will impact subsistence" or "barging will have minimal impact." Supporters were inspired by the benefits the project may bring to local employment, infrastructure, and economies, while opponents favored the "no build" alternative on the grounds that the project implied an unacceptable level of risk to local people and ecosystems. Supporters also emphasized the long presence of Donlin Gold in the region as well as the technical skill of state and federal regulators; those who opposed the project, meanwhile, expressed concerns with the limitations they saw in the DEIS process.

Comments also show the diversity of individuals and organizations involved in the discussions surrounding large rural development projects – including a number of ANCSA Corporations and nonprofits – as well as federal offices such as the Bureau of Land Management. The Calista Corporation alone was responsible for seventeen comments submitted by individual employees. Comments ranged from line edits (Thorpe 2016); to requests for documentation (Heisler 2016); to qualitative statements about the impact of the project on the region (Clautice 2016). One comment, submitted by research and advocacy organization Alaska Community Action on Toxics (ACAT), consisted of a 307-signature petition against the project; many signatories included specific, shorter comments of their own (Thornton 2016). Community-based clean water and salmon advocacy group Cook Inletkeeper submitted a fifty-page expert analysis, principally arguing that the DEIS failed to consider alternatives that significantly deviate from the proposed design and operation (Shavelson 2016).

There is much to be written on how public priorities are represented to regulatory agencies through public engagement methodologies. For the purposes of this article, however, we focus on one trend visible in the public comment data as a whole: the technical familiarity displayed by lay commenters with little formal education in geology, hydrology, or other technical fields. Comments mentioned specific components of the

project design, including mercury risk and emergency response plans, as well as gaps in environmental risk data, including information on groundwater hydrology and fish ecology. As the comment analysis tables indicate, commenters identified specific technical concerns with multiple components of the project and the impact assessment process. Comments also, at times, provided supplemental data that challenged the information or interpretations of the DEIS document. Dave Cannon (2016), a former Department of Fish and Game official for the Aniak area who continues to live in the center of the village, provided one such submission:

Section 3.13-109 [of the DEIS] states: "Should the underlying geology of Crooked Creek reflect a high level of hydraulic conductivity, flow reductions in Crooked Creek between American Creek and Crevice Creek could be as high as 85 to 100 percent during Year 20 of operations. Farther downstream in Crooked Creek, flow reductions of 40 to 31 percent could occur near Getmuna and Bell creeks, respectively (BGC 2015c). In this case, predicted streamflow reductions of such a high intensity would result in major impacts to salmon production in the middle and lower reaches of Crooked Creek." Tom Myers (May 2016) notes that much of the area is geologically heterogeneous and that high K fault areas coupled with high K bedrock values could actually result in water losses of over three times that of the modeled scenarios provided by Donlin Gold.

While trends that indicate the divisiveness of the project or the diversity of commenters are easily predicted given Donlin's social and economic context, the emergence of technically literate public comments that directly address specific components of the DEIS is not so obvious an outcome. Interviewees, in fact, uniformly listed the technical and specialized nature of the DEIS process as a significant barrier to public participation, and multiple organizations submitted requests to extend the public comment period beyond its initial 30-day limit to allow additional time for public education and participation. The technical familiarity among public commenters displayed by the comment analysis above therefore requires explanation. To do so, we return to interview data to understand the process by which technically literate comments were produced.

The role of technical consultants and community organizers

The forms of technical familiarity demonstrated above are a recognized, requisite part of the public engagement process, in that public comments must respond directly to particular components of the DEIS document (Darden, personal interview 2017). But how did anti-extraction communities in the Donlin region come to produce comments that demonstrate both technical expertise and environmental knowledge based in intimate experience?

In a process similar to other controversies over remote resource extraction in Alaska (cf. Hébert and Brock 2017; Hébert 2016), a segment of anti-Donlin activists in and outside the Kuskokwim region engaged with the state process through a temporary coalition of residents, organizers, activists, and expert consultants, many of whom were drawn from outside the region. At Donlin, this coalition was mainly concerned with interpreting the complex bureaucracy of the EIS for local residents and rendering local concerns legible to state and federal regulators – a process necessarily involving significant translation between modes of representation and knowledge production (Bryant 1998) or between "epistemic cultures" (Epstein 2008). We argue that the production of technically literate comments rested, in part, on the construction of this "ethnoepistemic assemblage" (cf. Irwin and Michael 2003) composed of a small group of local and external organizers and technical consultants. As detailed below, this group worked to develop the social and organizational infrastructure to navigate the public comment apparatus and the layers of expertise required to deliver technically literate comments. Here, we turn to a series of interviews with a number of technical consultants to understand the relationship between external experts and community-based organizers who worked to effectively engage with the procedural requirements set out by the Donlin EIS process.

This effort was centered on organizers at the Northern Alaska Environmental Center (NAEC) and at ACAT who worked throughout the DEIS process to connect Kuskokwim-area community members with external scientific and legal consultants. Environmental lawyers at EarthJustice (EJ), meanwhile, worked their way through the DEIS document in search of specific sections that could be leveraged with community and scientific input through the comment process. One expert consultant described the consultant team as follows:

The group kind of coalesced around this interesting mix of advocacy organizations and different experts in the region and outside the region. There were a few biologists from the Kuskokwim River delta area, fish biologists mainly, who used to work for the State, and were obviously interested in how the mine might affect fish populations, and then also some experts from the Lower 48. (Personal interview, 2017)

Consultants largely consisted of trained legal, scientific, and advocacy experts. The consultant team had focused on the DEIS public comment process as a unique moment for dissenting voices to enter the public record. Through sustained conversations carried out over a period of months, the NAEC and its Anchorage allies provided local residents with significant access to material and logistical support. They also supported the Native Village of Napaimute and others in their successful petition to extend the comment period to six months – half of their goal of a full year, but substantially longer than the initial 30-day period (personal interview, 2017). In a case where the collected volumes of permitting and DEIS documents would fill a small bookshelf, the comment extension represented a key procedural victory.

The public comment analysis above demonstrates a strong understanding of the particularities of the Donlin project and the underlying scientific and regulatory questions. Comments in support of and in opposition to the project alike reference specific infrastructure plans, specific segments of the DEIS process, and other components of the scientific and technical foundations of mine permitting and impact assessment. Public comment documents thus emerge as a substantial record of community knowledge production. In comparison, anti-extraction communities in Bristol Bay drew upon upon scientific data (see Ecology and Environment Inc. 2010) to support the traditional knowledge that was at the root of a series of alternative, community-led land planning documents prepared in opposition to the Pebble mine (see Bristol Bay Land Trust 2013; Nushagak-Mulchatna Watershed Council 2007, 2011). The NAEC appears to have performed some of the same functions for residents along the Kuskokwim River, but with a key difference: Instead of providing logistical support to incorporate traditional knowledge and scientific research into a community-driven land planning process, Kuskokwim-area consultants worked to support communities in channeling their knowledge and concerns through the state engagement process.

An expansive National Research Council (2008) study on the design and implementation of public comment processes identifies a number of organizing concepts in the historical debates surrounding public engagement. Proponents of public comment processes hold that they are necessary for democratic engagement and collective action. Additionally, proponents argue that public engagement has the potential to improve environmental decisions by providing a venue to integrate locally grounded, sensitive, contextual information into project design and risk assessment. Others claim that not only is the public often incapable of considering the technoscientific complexities of project design, but that public comment processes are not fully representative of community priorities (National Research Council 2008). But the Donlin case reveals something more complex than a dichotomy of knowledgeable, scientific experts and a technically inept public. It appears instead that the public process itself, through the requirement that comments conform to the technical and scientific regulatory apparatus of the state, spurs the production of a body of knowledge that is both locally-rooted *and* scientifically legible. Residents of Yukon-Kuskokwim area villages, with the material aid of the NAEC and organizations in Anchorage, were able to access scientific and legal expertise at the same time that they were drawing upon their own knowledge of their traditional territory. This is borne out in the public comment data presented above, but it is not necessarily emergent in the way the data may be collected and displayed. While comment data clearly shows residents' familiarity with the complexities of mineral extraction, the scientific and procedural requirements of the impact assessment process fail to assign categorical

equivalence to residents' traditional or experiential knowledges – a dominant imaginary that function in part as the "[reassertion] by state agencies of science as a colonizing tool" (Howitt *et al.* 2013: 129).

6. Discussion: epistemic relations

EIS public engagement processes allow for relatively explicit debate over the content and procedural components of the production of environmental knowledge, in which different interlocutors might be expected to take clear positions on what is known about land, environments, contamination, and the impacts of industrial development, and where that knowledge might come from. Results of our research show that anti-Donlin activists and consultants focused on building knowledge claims that would be legible within the procedures set out by state regulators – in contrast with the strategies deployed by anti-Pebble activists in the Bristol Bay region, who promoted alternative procedures for assessing environmental risk, and whose work led to a set of alternative planning documents that drew upon scientific experts alongside traditional knowledge practitioners and traditional approaches to land management (see Hébert 2016; Hébert and Brock 2017; Panikkar and Tollefson 2018).

For publics to engage with the Donlin DEIS process required tailoring local needs and ways of knowing to the specific epistemic and procedural requirements of the state, a common necessity for local engagement with EIS processes. The Donlin case here is a representative example of how local communities might creatively engage with restrictive state assessment procedures under conditions of limited public awareness and a lack of alternative forums for deliberative decision-making. Nevertheless, following the DEIS debates in 2017 from which this study draws its primary data, and despite the organizational and technical creativity on the part of local organizers and scientific consultants, state regulators went on to approve Donlin Gold's plan of operations with few of the changes demanded by the opposition coalition. As in many other cases, our study may remain a post-mortem.

What is the significance, then, of the strategies employed by the anti-extraction coalition in the Kuskokwim region? And what value might a post-mortem analysis hold for understanding "the political basis of environmental explanations" for large project impact assessment and beyond? The Donlin case, we argue, is significant in its demonstration of the ability of lay-expert coalitions to challenge the boundaries of legitimacy laid out by state regulatory authorities. We illustrate this by briefly outlining three approaches to understanding environmental knowledge production that emerged in the results described above. Each type furnishes answers to three central questions:

- Where does knowledge come from?
- Who can produce environmental knowledge?
- How is knowledge produced through the EIS process?

Despite patterns in which non-state actors contort knowledge production and representation to match state legibility requirements, the epistemic positions described below prove more diverse than would be expected from regulatory approaches that aggregate and adjudicate environmental knowledge according to a limited set of epistemic boundaries.

Type 1: Different levels of understanding

Primarily associated with state officials, a Type 1 approach considers environmental knowledge to consist of a single continuum of understanding; the public engagement process, accordingly, is seen as a vehicle not for the facilitation of public knowledge production, but rather as a tool to elicit public input and solicit public consent. The principal challenge of public participation processes, under a Type 1 understanding, is that local communities either (1) don't have access to public meetings or (2) don't fully understand the public engagement format. In conjunction, these imply a central assumption: that full public understanding of state regulatory processes and regulatory science might help bring about public consent. This is not a cynical position; USACE Donlin project manager Richard Darden, for instance, spoke with great affect about the potential for inclusive public process:

[We could take an approach that we're] "just required to" have scoping meetings, get it over with, we don't care. That is not the way we want to do that. We want to have meetings where people can get to them, won't feel intimidated by technicalities. They'll feel comfortable in a way that helps understand what's our point, [what we're] trying to accomplish. The importance of scoping cannot be overstated. Public involvement makes or breaks the whole process right off the bat.

Type 2: Different approaches to understanding

A second set of representations, primarily (though not exclusively) associated with the accounts of anti-extraction consultants, might be understood as a departure from Type 1 above. Both Type 1 and Type 2 assume a set of common facts "out there": a knowable relation between copper or arsenic exposure and salmon health, for instance. But, unlike Type 1 approaches to knowledge, Type 2 allows for multiple pathways to understand an external factual world.

This difference can be understood partly by comparing two characterizations of the relationship between the environmental knowledge of Kuskokwim locals and knowledge produced by external experts. Darden represented the production of environmental knowledge as a single track: communities vary in their scientific and procedural understanding; the goal of public involvement, therefore, is to increase public understandings on both scientific and procedural metrics. NAEC Clean Water and Mining Coordinator Julia Mickley, in contrast, imagined a knowledge production schema that operates in reverse: She saw her primary role as "provid[ing] scientific support for what [Kuskokwim residents] knew was happening to their land." It's a subtle but essential contrast. Mickley's representation allows for multiple pathways to environmental understanding, inclusive of what locals "knew was happening" as well as knowledge that is produced through state assessment strategies. She described her role as not to increase public understanding, but to organize it in a form that the state could accept as legitimate. In short, differentiating Type 1 and Type 2 approaches hinges on whether local or experiential knowledge is considered to produce things that are "known" or that are merely "suspected"; that is, whether environmental understandings produced outside of expert networks are categorized as "knowledge" prior to, or apart from, state-scientific validation.

Type 3: The need for direct experience

Type 3 approaches to environmental knowledge, like Type 2 above, allow for multiple epistemic pathways. Unlike Type 2, however, Type 3 frameworks treat direct experience as a necessary, though not sufficient, component to understanding social-environmental phenomena. Feyereisen makes this perspective clear:

[State officials] don't live here – they don't know that every year is different. Ice could stay until the second week of June. To not make accommodations for the magnificence of the water changing, the levels changing. This whole island disappears some years. They don't see that.

Under a Type 3 understanding, knowledge that is not paired with some form of direct experience is liable to suffer from significant gaps and inaccuracies. Feyereisen, along with Ester Donhauser-Diehl, a lifelong resident of the middle Kuskokwim and shareholder of the Calista and Kuskokwim Corporations, spoke at length about the discrepancies between the number of river barges that they had seen run aground and state statistics about barge groundings: According to them, only a single barge is publicly admitted to have run aground since 1984, despite the multiple groundings they report witnessing on a yearly basis. As grounding has the potential to spill diesel fuel or barge contents into the river system, grounding statistics emerged as a distinct point of contention through the DEIS process. The excerpt below reiterates the central feature of a Type 3 approach to environmental knowledge production: that, absent direct experience, abstract scientific knowledge is inadequate.

Feyereisen: ...they won't admit that they're gonna have to dredge. Like I said, they [say] there is only one stuck barge, and that was in 1984...It's not a flat river bottom, number one.
Donhauser-Diehl: The channels change.

Significance

The three ideal-typical representations of environmental knowledge described above do not map, perfectly, onto consultant, regulator, and community activist subject categories, nor are they mutually independent. Rather, a key feature of the three type-categories above is a distinct convergence: All three types outlined above make strong claims to a form of externally-verifiable knowledge. Interview subjects all expressed that (1) there is an external, comprehensible set of facts; and (2) there is a clear method by which those facts can be comprehended and expressed. Subjects further represent a variety of methods for the construction and application of environmental knowledge, from those who emphasize direct experience (Feyereisen, for example) to those, like Darden, who emphasize the efficacy of replicable procedures carried out by a clear chain of command.

Though local residents and technical experts do not map entirely to Type 2 and 3 knowledge frameworks, the coalition that resulted from their joint work certainly drew upon both ways of understanding the production of environmental knowledge. Mickley's statement that "we were able to provide scientific support for what they knew was happening to their land" echoes, in part, Feyereisen's repeated invocation that the state and outside interests "don't understand our lives." Both, too, relied upon the joint use of scientific data and a notion of direct collective experience to provide evidence for environmental claims. Despite a stated desire to effectively incorporate public engagement within the DEIS process, however, state regulators operated under an understanding of environmental knowledge production that is largely incompatible with the Type 2 and Type 3 approaches listed above.

Realist critiques of poststructuralist understandings hold that approaches to knowledge production incorporating multiple epistemologies necessarily require giving up the ability to make "strong truth claims" (Escobar 2010: 95). Feminist STS scholars, most prominently Donna Haraway, dispute these critiques, instead arguing that plural epistemological approaches might make strong claims to truth *through* a multiplicity of partial, situated knowledges (Haraway 1988; Young 2019). Haraway's approach to "situated knowledges", here, is decidedly anti-relativist, and rather asks to build connections across knowledges that are "partial, locatable, [and] critical" – a "solidarity in politics and shared conversations in epistemology" (1988: 584). Our results from interviews with subjects who deal with contested and plural environmental knowledge production in practice demonstrate that Haraway's framework "in action" is more than an analytical tool. It is also a means by which knowledge producers build local frameworks for adjudicating and asserting the legitimacy of environmental knowledge claims, both in recognition and through practical application of the understanding that knowledge is "inevitably incomplete" (Simandan 2019).

7. Conclusions: Donlin in context

The public comment process, designed as it is to identify and fill gaps in EIS data, appears in our research to be structurally unable to capture the procedural and political structures that surround community knowledge production. Public input may "make or break the whole process right off the bat", in Darden's words, but it is hardly a forum for deliberative and democratic decision-making. That deliberation takes place in Anchorage office buildings with card-access elevators. Indeed, access to those deliberative forums was one of the major narratives of Kuskokwim-area community engagement, insofar as the village of Napaimute was able to gain cooperating agency status, and in so doing seize the right to contribute to meetings in which USACE, DNR, and other bodies with permitting authority or relevant expertise worked to shape the impact assessment priorities and processes.

In cases where local communities have had access to greater resources and wider networks of public support, however, participation on the terms set out by the state is not so necessary nor so fraught. In Bristol Bay, for example, anti-Pebble individuals and organizations had the capacity to conduct innovative local processes to imagine a wide range of potential futures outside of the state regulatory process. The outcomes of

the local imaginative processes were diverse and creative: In Hebert and Brock's (2017) analysis, these local responses worked to "[assemble] new publics in opposition to resource-extractive designs", through a process that both articulated local knowledges and priorities and engaged effectively with the scientific data gathered by the state and the Pebble Partnership. Given sufficient social and economic resources, anti-Pebble activists were able to construct a particular set of widely-legible resource identities to counter the power of Alaska's extractive ideologies – principally focused on the renewable resource economy of the region's wild salmon industry, expertly married to a discourse that valorized Indigenous subsistence practices alongside the broader economic appeal of Bristol Bay's storied fishing fleet. The generative process in Bristol Bay occurred despite the efforts of developers at Pebble to present risk assessment data as fully elaborated and publicly unchallengeable. Pebble's developers assumed, incorrectly, that participants in pre-permitting dialogues would "interpret the science to reveal the mine as safe"; stakeholders instead "were able to develop their own interpretations" (Holley and Mitcham 2016).

The social and economic context of the Yukon-Kuskokwim affords a very different set of tools for those who sought to halt development at the Donlin site when compared with the possibilities afforded to anti-Pebble activists in Bristol Bay; the intractable logics of economic prosperity, jobs, and progress dominated the Donlin permitting process while limiting the potential of alternate imaginaries that could envision just and sustainable non-extractive material relations. Where activists in Bristol Bay were able to articulate their critique of Pebble's possible human-environmental impact through a process of envisioning locally relevant, community-led development (cf. Bristol Bay Land Trust 2013), the Yukon-Kuskokwim context afforded no such deliberative potential. And where the Bristol Bay community process carved out a space in which participants could jointly consider both traditional and scientific knowledge, the Donlin context required that activists and expert consultants validate local knowledge against state assessment procedures – and, in so doing, necessarily relegate traditional knowledge to a category that is "less than" verified. The inherent hybridity of the knowledge production processes undertaken by Bristol Bay activists and Northern Center consultants alike ("we were able to provide scientific support for what they knew was happening to their land") is hidden, in the Donlin case, through a public comment methodology that is concerned primarily with a certain kind of quantifiable outcome. As Northern regulatory agencies have long been aware of the need to incorporate Indigenous knowledge within environmental assessment (Stevenson 1996), this conspicuous gap is not just an artifact of the public engagement process. Rather, it is a requirement deeply embedded within the epistemic framework of state environmental decision-making (cf. Howitt *et al.* 2013).

As Arctic temperatures warm and the resource extraction frontier extends Northward, the geographic and political shape of Northern development will likely depend, in part, on the relative ability of emergent ethnoepistemic coalitions to challenge "reductive state simplifications" (Scott 1998). Given conditions more favorable than those in the Kuskokwim region, activist-consultant coalitions may have more success in promoting alternative metrics for judging the legitimacy of environmental knowledge claims and non-extractive material relations. Driven by the demands of community coalitions that draw upon hybrid approaches to knowledge production and valuation, impact assessment approaches that acknowledge plural or situated epistemic approaches (as Type 2 approaches do, above) may not only increase democratic public involvement, but might allow for stronger situated claims to truth as well (cf. Haraway 1988).

Such approaches, insofar as they respond to Escobar's call to "[see] both from the center...and from the margins", may also hold a generative possibility, in that "stable categories might be put into question" (2010: 95). Indeed, activists and scholars alike have recognized the significance of land and title negotiations based in "people and relationships" as having the potential to contribute to moves toward reconciliation, in their capacity to protect both sovereignty and epistemic self-determination (Agius *et al.* 2007). Whether deliberative, hybrid approaches to environmental knowledge production gain broad social standing, however, remains a calculus of access to resources and networks of power both economic and social – something that resistance communities along the Kuskokwim, especially in comparison with their counterparts in Bristol Bay, have largely lacked. Under these conditions, public engagement in environmental impact assessment demands that impacted communities tailor local needs and ways of knowing to the specific epistemic and process requirements of the state. While such engagement frameworks are often marked by substantial organizational and technical creativity on the part of local organizers and scientific consultants, state and legal structures

largely fail to adequately consider the knowledge claims of affected communities (Lewis and Owley 2014; Pellow 2017) – arguably a core process of the perpetuation of environmental injustice and the expropriation of land for profit.

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Appendix: Public comment analysis

Table 1: In favor

<u>Category</u>	<u>Statement</u>	<u>Frequency</u>
Economic benefit	Will create local or regional economic benefit	23
		3
	Will benefit people throughout the state / AK economy / ANCSA revenue sharing	13
		2
	Education and/or job training impacts extend beyond life of mine	42
	Will benefit other private companies	21
	Will benefit Calista Corporation	5
Infrastructure benefits	Infrastructure is needed / cost-of-living benefits	80
Minimal impact	Little / no environmental impact, design is good	15
		3
	No cultural heritage (esp. Iditarod Trail) impact	43
	Scale of impacts is small (or reward > risk)	9
Mining companies are benevolent / care about interests of region	Good relationships between Donlin and community, good behavior by Donlin	11
		2
	Other mining projects were good examples (Red Dog, etc.)	33
Opposition is illegitimate	Opposition comes from outside groups	2
Regulations are effective	Regulating agencies effectively protect the environment	34
	Spill response plan by Donlin is adequate	1
	Neutral or net positive impact on subsistence, keep people from leaving region	72

	Will reduce social ills (alcoholism, depression, etc.) through good-paying work	23
	Prevent people leaving the community	15
Sovereignty / autonomy	Indigenous or local autonomy / ANCSA mandate to develop	69
	AK state, US autonomy / mandate to develop	18

Table 2: In favor, DEIS

<u>Category</u>	<u>Statement</u>	<u>Frequency</u>
DEIS is legitimate	Draft EIS is sufficient	11
	NEPA, EIS Process is adequate / gives adequate time	9
Comments on development options	"No Build" / Alternative 1 will have negative consequences	21
	Barging as proposed is not an issue (no Alternative 3A/3B)	18
	No alternate pipeline route (no Alternative 6)	9
	No dry stack tailings (no Alternative 5)	6
	Port location is fine (no Alternative 4)	4
	No diesel pipeline (no Alternative 3B)	2
Regulations are overly limiting	Permitting process takes too long	4
	Health impact assessment is flawed	3
	BLM subsistence report is inaccurate	2
	DEIS inappropriately characterizes impacts on barge traffic (will not create a significant increase)	2
	DEIS overstates environmental impact	1
	DEIS improperly includes 'worst-case scenario' events	1

Table 3: Opposed

<u>Category</u>	<u>Statement</u>	<u>Frequency</u>
Corruption	Concern with influence on Iditarod Committee; other nefarious influences	6
Environmental justice	Environmental justice concerns	7
Environ risk	Concerned with threat to subsistence resources	64
	Environmental risk is too great (risk > reward)	33
	General concern with impacts	24
Health and contamination	Concerns with mercury	22
	Concerns with cyanide	18

	Long-lasting contamination; after mining is finished, locals bear burden of pollution for no benefit	13
	Concerns with fugitive dust	8
	Other human health concerns	7
	Concerns with storing HAZMATs at dock facility	2
Infrastructure concerns	Concerns with Barging	36
	Concerns with pipeline impacts, including impacts to Iditarod Trail	36
	Concerns with waste rock/tailings dam/pit lake	32
Inherent risk	Scale /scope too vast to ever be safe or well regulated - no way to enforce some things (perpetuity) / safe regulation is impossible	19
	Accidents are inevitable	7
Local vs. regional	Economic consequence / increased government interference if borough is established	1
	Will not benefit tribes	1
	Native Corporations do not speak for locals	1
Mines have bad record	Companies / mines have bad track record	23
Negative economic impact	Jobs will not go to locals / negative economic impact from outflow	4
Right to know	Right to Know issues, e.g. identity of HAZMATs on river	2
Social impacts	Concerns with impacts on local population / resource balance, incl. ATVs, etc. that come from increased access	8
	Concerns with mental health, social issues (crime, addiction, etc.), and health care impacts of mine	2
Misc. other concerns	Misc. other concerns	13

Table 4: Opposed, DEIS

<u>Category</u>	<u>Statement</u>	<u>Frequency</u>
Access to information	Need public data reporting on mine once in operation	1
Assurance and mitigation	DEIS does not include emergency response plan / lacks necessary info to inform emergency response plan	12
	Need a better financial assurance	12
DEIS process flawed	DEIS structurally flawed (segmented/not comprehensive)	6

	DEIS makes promises it can't keep about ensuring good behavior	3
	DEIS is too long / difficult to read (but no request for extension)	2
	ACE did not consult with ANCs	1
Missing information	DEIS generally lacking / incorrect in some other area	35
	DEIS doesn't adequately address impacts to stream / groundwater hydrology	15
	Not enough information to compare various alternatives in DEIS / missing options	15
	DEIS fails to or inadequately incorporates climate change / climate change affects level of concern for project	14
	DEIS doesn't adequately address fish ecology	11
	DEIS doesn't address impacts to port of Bethel / local travel along Kuskokwim river	10
	Contradictory findings on subsistence (BLM / DEIS reports differ) – DEIS doesn't address this	7
	DEIS lacking health impact assessment	3
	DEIS inadequately assesses human health impacts	2
Regulations are insufficient	DEIS - insufficient assessment of environmental impact	23
Risk underestimated	DEIS should include 'worst-case scenario' for dam failure	14
	DEIS underestimates tailings dam risk	10
	DEIS improperly characterizes fuel spill risk	6
	DEIS underestimates seismic risk	6
	DEIS improperly characterizes mercury risk	5
	DEIS inappropriately assesses economic impacts and true cost of the mine	4
	Mitigation and/or closure plan is inadequate and/or fails to consider viable alternatives	2
Comments supporting more stringent infrastructure plans	Support Alternative 5 (dry stack tailing)	7
	Support Alternative 4 (Birch Tree Crossing port)	6
	Support Alternative 3A (LNG powered trucks)	4
	Support Alternative 3B (diesel pipeline)	2