

# Beyond participation and distribution: a scoping review to advance a comprehensive justice framework for impact assessment

A knowledge synthesis report for Social Sciences and Humanities Research Council and Impact Assessment Agency of Canada



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# Executive Summary

## Background

Industrial projects bring about dramatic social change. With the Impact Assessment Act 2019 there is a greater emphasis on the social impacts of development and on the “meaningful participation” of citizens in impact assessment (IA). It is widely believed that meaningful participation can improve the legitimacy of development and even provide a step towards reconciliation with Indigenous peoples, which is a commitment set out explicitly in IAA 2019.

In order to foster meaningful participation and deliver sound decision-making, impact assessments must also be just. Calls have been made for integrating justice more centrally in impact assessment practice and evaluation but work is needed to inform just IA processes. Our report draws on a framework of justice that emerges from environmental justice (EJ) scholarship and activism and defines it along three interdependent dimensions: distribution, representation, and recognition. Our report tests the hypothesis that there is a gap in research which addresses all three dimensions of this justice framework, and we assess how this gap might translate into a gap in methods for guiding meaningful participation in IA.

## Objectives

The objective of this report is (1) to provide an overview of the ways in which existing approaches to IA address EJ, and (2) to outline what an EJ approach to meaningful participation in Canadian federal impact assessment would entail in practice. Our guiding research questions are:

**To what extent is justice taken into consideration in the literature on impact assessments?**

**What can we learn and adopt from best practices in justice-oriented approaches to impact assessments across other jurisdictions? Secondly, what can we learn from this comparison regarding potential particularities with IA in a Canadian context?**

**What evaluation metrics are being used to advance just impact assessment processes?**

## Methodology

We used a scoping review method which entailed interviewing practitioners to validate or invalidate the results of an initial literature review and produce a final bibliography of sources for analysis. In addition to initial consultations with an international expert on environmental justice (Dr. Gwen Ottinger), we interviewed three IA practitioners as well as three process observers from environmental law agencies to get their input on an initial set of sources derived from keyword searches of Scopus and Web of Science databases. For each database, we first searched ((“impact assessment”OR“environmental assessment”) AND (Justice)) and then we added search terms for each of the three dimensions of justice, selecting synonyms based upon advice from our international collaborators (e.g. “inclusion,” “participation” and “culture”).

## Results

Based upon a review of 593 academic articles, 20 technical reports and government documents, and 2 blogs/media articles, we conclude that articles which address justice in IA typically focus on either its distributional or procedural dimensions.

***Distribution:*** By far, the bulk of our data from the original search described (largely quantitative) approaches to assessing the distribution of environmental benefits and harms in society among different social groups, specifically racial and low-income groups. Most of this literature is situated in the U.S. There is a tension in this literature between standardized methods, and the principles of procedural justice which emphasize the importance of affected communities playing key roles in defining risks, impacts, and vulnerable populations.

***Representation:*** A second substantial set of literature focuses on IA and representation (or procedural justice) which includes articles on public participation used here in a broad sense to include participative, collaborative, and communicative approaches to environmental assessment. Citizen science (defined here as public participation in knowledge production) emerged as an innovative way to bring local knowledge to bear on impact assessments but recent work in this area underscores the importance of IA processes which carefully define, or “frame,” what counts as impact and evidence for assessment.

***Recognition:*** Our search revealed comparatively less work on recognition and that which exists is largely referred to as cognitive, cultural or epistemic justice; moreover, this literature is situated within scholarship specifically in Indigenous knowledge with many insights housed within practitioner communities that have yet to be synthesized into the IA and EJ literature.

## Key messages

- ➔ Impact assessments are foremost issues of justice, not of environmental assessment and management.
- ➔ Just IA needs to account for all three forms of justice as they are interrelated. For instance, literature from the U.S. shows that concern for distributional equity quickly turns towards the issue of unequal power among citizens and decision-makers when defining and measuring distribution.
- ➔ The Canadian context for IA is unique and instructive regarding the importance of recognition dimensions of justice, particularly the cognitive and structural dimensions. What counts as viable knowledge to inform IA processes? How is decision-making authority shared between historically marginalized and dominant groups?
- ➔ There is no “silver” bullet for just IA. Strategic and regional assessments show promise but need more application and study. In the report we give “sensitizing concepts” that practitioners and policy-makers could use at any stage of IA to help them advance meaningful participation. We invite consideration of the following: What assumptions are made about IA processes and to what extent and with whom are these assumptions communicated?

## Recommendations

- 1.** We recommend future research focusing on recognitional justice as this will be helpful for Canadian IA policy and practice where issues of Indigenous sovereignty and claims for self-recognition are front and centre in IA decisions (and disputes over them).
- 2.** We recommend that Canadian best practices be synthesized for practitioner and decision-making communities, and that future scholars work to integrate IA practice perhaps especially that happening in northern Canada.
- 3.** We recommend that scholarship explore the trade-offs of privileging the nation-states’ duty to decide in the broad public interest, on one the hand, and principles of EJ that emphasize community-driven problem definition and decision-making, on the other.

# FULL REPORT

## Background

Industrial projects bring about dramatic social change. A pattern of neglecting social and political considerations in technical policy-making (Jasanoff, 2008; Sarewitz, 2004; Yearly, 2005) has recently given way to leadership by the Impact Assessment Agency of Canada and other federal departments in putting in place new impact assessment legislation. The Impact Assessment Act 2019 places a greater emphasis on the social aspects of impact, notably on “meaningful participation” to improve “social license” around development (Prno & Slocombe, 2012). Moreover, meaningful participation can provide a step towards reconciliation and fostering partnerships with Indigenous peoples, which is a commitment set out explicitly in the Act.

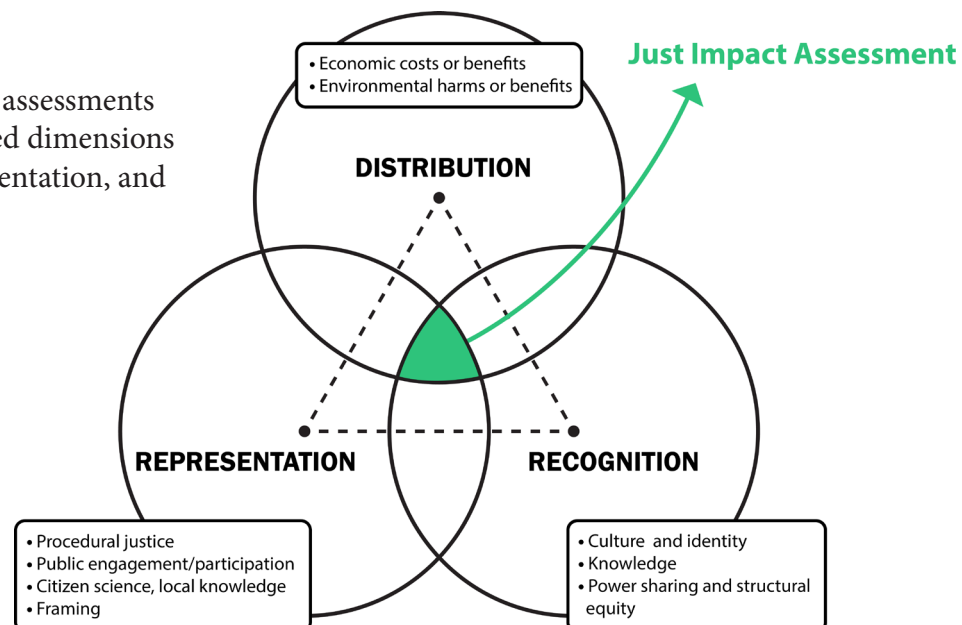
**This report brings a broad theoretical consideration of justice - one which accounts for the complexity of development projects - to a review of impact assessment scholarship and practice.** We start from the presupposition that in order to foster meaningful participation and deliver sound decision-making, impact assessments must also be just. While this is true in general, it is particularly important in Canada as assessments shift from a technical focus on environmental risk to a broader examination of the social, cultural, economic, and health impacts of proposed development projects under IAA 2019. This regulatory change is situated in a long-standing critique of the rationalist model of decision-making that underpins mainstream environmental impact assessment regimes and the recognized need to embrace new ways of thinking and new theoretical frameworks for impact assessment that address political, social and cultural contexts (Morgan, 2012). Many new forms of assessment - including social impact assessment, health assessment, and strategic environmental assessment - have emerged in response to the limitations of conventional technically-oriented approaches to environmental impact assessment. These innovations recognize the political and value-based realities of decision-making that are typically effaced by technocratic models of impact assessment. These initiatives also promote public engagement where stakeholders and communities are brought into decision-making processes. The topic of public participation has developed substantially over the past three decades and is widely recognized as the source of many opportunities but also challenges in existing IA practices. An expansive academic literature assesses the extent to which environmental impact assessment processes deliver meaningful participation and numerous guidelines are available for government agencies and assessment practitioners to improve participatory practice.

In tandem with these innovations, calls have been made for integrating justice more centrally in impact assessment practice and evaluation (e.g. Connelly & Richardson, 2005, Jackson & Illsley, 2007, Walker, 2010) in order to enhance theoretical approaches to IA de-

velopment and assessment (e.g. Lawrence, 1997). Justice provides a conceptual framework that can help identify emerging points of conflict and suggest remedial action. For example, although equity is currently recognized in international guidelines as a first principle of social impact assessment (e.g. Vanclay, 2003), critics argue that Canada's recent impact assessment reform could stop short of acknowledging and addressing the inequitable distribution of hazards and benefits among marginalized communities if attention is not paid to justice (Ginsberg, 2018). It is clear that in Canada, as in other jurisdictions, growing inequalities threaten both social and natural environments, and claims of injustice are increasingly central in conflicts over industrial development. Take, for example, recent disputes over the Coastal GasLink pipeline, the TransMountain pipeline, and regional conflicts over hydraulic fracturing in New Brunswick. These kinds of conflicts stem from long-standing disputes over inequitable resource distribution, settler-colonial dynamics, and regional conflicts, and they illustrate the extent to which it is necessary to bring considerations of justice to the fore at every stage of the impact assessment process - from initial planning and scoping to post-assessment considerations of how environmental, economic, and cultural harms and benefits are distributed (Connelly & Richardson, 2005; Jackson & Illsley, 2007).

We draw on a framework of justice advanced by feminist political theorists (Fraser 2009, 2013; Young 1990) and later adapted as a heuristic for environmental justice (Schlosberg, 2007; Schlosberg & Collins, 2014). This framework defines justice along three interdependent dimensions: distribution, representation, and recognition (see Figure 1) (for a Canada-centered volume on EJ, see Agyeman et al., 2009 or Haluza-Delay, 2007). In addition to being informed by theoretical literature, this tripartite definition of justice emerges from the insights and demands of environmental justice activists and movements.

**Figure 1** Just impact assessments account for interrelated dimensions of distribution, representation, and recognition.





*Distributional justice* refers to the spread within and among people or communities of economic costs and benefits, and environmental harms and hazards. Early work on environmental justice tended to focus exclusively on this dimension (e.g. Dobson 1998), reflecting a concern in contemporary political theory with questions surrounding the equitable distribution of rights, benefits, costs, and harms (e.g. Rawls, 1971). Feminist philosophers argued that this “distributive paradigm” of justice, while important, is limited because its narrow focus assumes that (re)distributional equity can occur within existing social, cultural, and political contexts (Fraser, 2009; Young, 1990). Since maldistribution happens because of institutional, cultural, social and symbolic factors, then existing norms and practices also require attention and redress. Nancy Fraser and Iris Marion Young have argued for a broader approach to justice which extends beyond distribution to include issues of representation and recognition.

*Representation* refers to the political dimensions of justice, and includes issues of fairness, legitimacy, inclusivity and transparency of decision-making. Representation is fundamentally about empowering individuals and communities to access public voice and decision-making by providing a place at the table for everyone, particularly for marginalized individuals and groups. This includes procedural justice but also political struggles over meaning and knowledge, a dimension that Fraser (2009) refers to as framing but in other bodies of scholarship is referred to as cognitive or epistemic justice (e.g. Fricker 2007).

*Recognition* refers to the cultural dimensions of justice and includes acknowledgement of and respect for cultural identity, practices, worldviews, and knowledge. According to Fraser (2009), this type of injustice is structural, involving the norms, language and values that inform the contexts in which particular ways of knowing are privileged and others dismissed and disrespected. Structural misrecognition can take three forms: cultural domination, non-recognition, and disrespect (Fraser, 2009).

Taking this broad view of justice into account has concrete implications for policy-makers and practitioners as ecological hazards do not exist in isolation from social, political, cultural, and economic dynamics. Unfortunately, as empirical research across a range of disciplines demonstrates, a narrow focus on singular aspects of justice - such as procedural fairness or on distribution of risks - can exacerbate social disadvantage (e.g. Ottinger, 2015). In turn, participatory techniques - particularly those that seek consensus - can gloss over existing conflicts by framing community concerns in ways that are more manageable for state governments but that fail to attend to the needs of marginalized individuals and communities. Such conclusions have been reached by IA scholars as well as scholars of public policy, planning, and science and technology studies (Blue et al., 2019; Chilvers & Kearnes, 2015; Eversole, 2011; Ottinger 2015; Welsh & Wynne 2013). These latter literatures underscore how conventional mechanisms for participation have not comprehensively treated the enormous power inequalities which exist within “the public” being invited into decision-making pro-



cesses, and attention has not been given to the role of institutional context in which cultural differences play out and even become exaggerated (McCormick, 2009; Ottinger, 2015).

**Our report tests the assumption that there is a gap in research which addresses all three dimensions of an EJ framework and we assess how this gap might secondarily translate into a dearth of methods for realizing justice in practice, or for guiding evaluations of meaningful participation in IA (Abel & Stephan, 2008; Walker, 2010).** There are inherent challenges to translating theoretical and policy ideals into practice (Hartley & Wood, 2010). Standard evaluation metrics may be inadequate for evaluating the effectiveness of EJ-framed public participation, particularly as regulatory agencies, regulated industries, and affected communities may have very different perspectives on the underlying justice concerns and appropriate policy responses.

## Objectives

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**To what extent is justice taken into consideration in the literature on impact assessments?**

**What can we learn and adopt from best practices in justice-oriented approaches to impact assessments across other jurisdictions? Secondarily, what can we learn from this comparison regarding potential particularities with IA in a Canadian context?**

**What evaluation metrics are being used to advance just impact assessment processes?**

This survey of the literature ultimately seeks to identify best practices and lessons learned regarding IA that foregrounds environmental justice as a framework for assessing meaningful participation. In doing so, it also identifies existing gaps across the literature in order to guide future research and practice.

**We bring an STS (science and technology studies) lens to this justice-oriented reading of the IA literature in an attempt to catalyze practices of reflection that might help refigure participation as constitutive of (not separate from) systems of power (Ottinger, 2015; Chilvers & Kearnes 2016).** We come to this project not as IA scholars per se

but as experts in a cognate domain: what is sometimes called the “public understanding of science” or more often (and accurately) “public engagement with science and technology” (for a history of this scholarship see Locke & Gregory, 2008; Nisbet & Scheufele, 2009). PEST scholars like us who work in the field of science and technology studies (STS) have for at least 10 years now challenged the dominant approaches to public involvement with science, innovation and environmental issues, which have by and large adopted fixed meanings of “participation” and are consumed by questions of method or critiquing the possible limits of democratic engagement (Chilvers & Kearnes, 2019). Current STS approaches offer new insights by thinking about the making, construction, circulation and effects of participation across cultures. If mainstream approaches to public engagement harbor what Jason Chilvers and Matthew Kearnes call “residual realist” assumptions about participation and about those members of the public whom participate, **STS offers what we might call an “epistemic” contribution (Welsh & Wynne, 2013): STS scholars begin either the design or the study of participatory processes by questioning categories that are in other cases assumed a priori to be fixed** such as notions of “the public.” STS scholars ask: Who do we mean by “affected community” (Marres, 2015)? What model for understanding and then measuring risk is being used (Bronson, 2014; Wynne, 1996)? What counts as scientific evidence and how does what counts as evidence relate to historic power structures and injustice (Bronson, 2018)? How are issues framed and how does this framing influence the processes and outcomes of participation (Blue, 2015)? These epistemic lines of inquiry are grounded in a key insight in STS that science and technology are produced alongside a production of power and social order (Jasanoff, 2008).

## Methods

- *Search methods:* We used a scoping review methodology (Arksey & O'Malley, 2005; Levac et al., 2010) to identify knowledge gaps and implications for policy in research and practice vis-à-vis EJ-informed approaches to impact assessments. Scoping reviews provide a synthesis of existing literature, views, procedures, and points of debate on any topic from disparate literatures in order to summarize research findings in areas where there may be incomplete links between scholarship and practice. Unlike systematic reviews, scoping reviews do not assess the quality of publications; rather, scoping reviews map extant literature to identify key trends and gaps.

We followed Levac et al.'s (2010) approach to scoping reviews to guide this research. This framework consists of the following steps 1) identify relevant research questions to guide review, 2) identify relevant studies, 3) select studies by using an iterative team approach, 4) consult with relevant practitioners and experts, 5) repeat 3 and 4 in an iterative process, 6) collate, summarize and report results.

Consultation was a key component of our scoping review method and was used to inform and validate findings. In addition to initial consultations with an international expert on environmental justice (Dr. Gwen Ottinger), we also interviewed three IA practitioners and three process observers from environmental law agencies. These consultations pointed us toward relevant case examples of impact assessments (e.g. conducted by U.S. Environmental Protection Agency), ensuring that the data we surveyed was timely and grounded in current IA cases. An additional advantage of consultation is that it improves knowledge transfer by ensuring that the results of the review are useful and meaningful for end-users.

- *Search strategy:* Working in conjunction with a library scientist at University of Ottawa, we developed and refined keywords on environmental, social, health, and cumulative impact. For the purposes of this review, we defined impact assessment broadly as an umbrella term to capture the process and practices of environmental management - embedded in domestic and international law - that involve assessing proposed actions, including projects and policies, for their social, cultural, health, economic and environmental implications before decisions are made to commit to these actions. This definition was informed by 'state of the art' overviews of IA processes (e.g. Morgan, 2012). Included in this definition are project level impact assessments (environmental, health, social, and cultural), as well as regional, cumulative, sustainability and strategic environmental assessments.

We conducted keyword searches on two databases: Scopus and Web of Science. For each database, we first searched ((“impact assessment”OR”environmental assessment”) AND (Justice)) and then we added search terms for each of the three dimensions of justice, selecting synonyms for each dimension that drew on advice from our international collaborators. In this instance, our search terms were ( “impact assessment” OR “environmental assessment” ) AND ( “inclusion” OR “participation” OR “recognition” OR “fair” OR “fairness” OR “distribution” OR “equity” OR “culture” OR “epistemic justice” OR “cognitive justice” OR “traditional knowledge” OR “Indigenous knowledge” OR “lay knowledge” OR “local knowledge” ) AND ( justice ) (see Figure 2 and Appendix A).

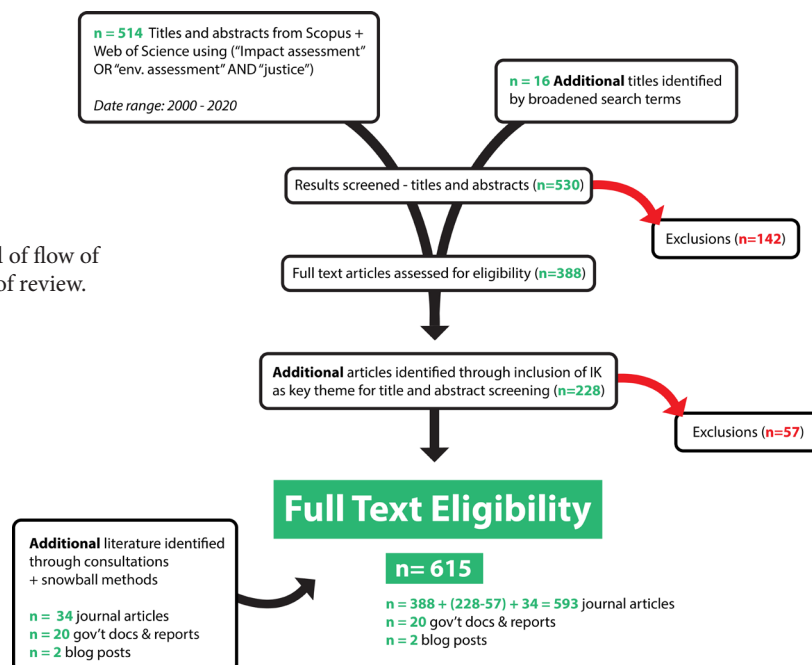
“Justice” was used as a keyword for our primary searches because we were specifically interested in justice-oriented approaches to impact assessments. However, we were also interested in comparing the number of results obtained by either including or excluding “justice” as a search term alongside “inclusion”, “participation”, “recognition”, and the other keywords associated with the trivalent conception of justice we employed in our primary search. We therefore also conducted secondary searches that included these keywords but that excluded “justice” and retained statistics on our secondary search results (see Appendix B).

We imported the results of initial searches that included ‘justice’ in the topic, keyword, title, or abstract into Covidence, a web-based software platform that streamlines the produc-

tion of systematic reviews, for de-duplication and for title and abstract screening. The initial dataset consisted of 530 unique articles (see Appendix A). We screened titles and abstracts to eliminate articles that mistakenly appeared in our results despite being published outside our search timeframe, as well as to remove articles that clearly did not address impact assessment or that did not address at least one dimension of the environmental justice framework. We included articles that discussed formal impact assessment processes for major infrastructure projects, programs, or plans as well as studies conducted by academic researchers or other actors (e.g. NGOs or community groups) that assessed environmental, social, health, or cumulative impacts of projects, programs, or plans at the local, regional, national, or international level.

In parallel, we consulted with impact assessment practitioners and process observers. In each interview, we first discussed the EJ framework and asked interviewees for their views on any best practices to impact assessment vis-a-vis this framework, asking specifically for any examples that would be most relevant to the Canadian context. We also informally canvassed colleagues for suggestions of key academic or grey literature that may be relevant to this review and cross-referenced suggestions with the results of our database searches. From these exchanges with practitioners and colleagues, we identified further literature to add to the dataset as well as new keywords to search in Scopus and Web of Science (see Appendix A). Notably, we conducted an additional literature search that replaced “justice” as a search term with terms related to Indigenous knowledge and local knowledge in impact assessment. In doing so, we added X sources to our dataset (see Appendix A). Consistent with the scoping review method, we proceeded iteratively in this fashion to arrive at our final list of literature and case examples.

**Figure 2** Study Flow: Detail of flow of information through stages of review.



- *Analysis:* Following Arksey & O'Malley's (2005) recommendations, three reviewers read the abstracts and titles of all articles, charting (1) the geographical region it discussed, (2) which aspects of justice it discussed (distribution, representation, recognition), (3) the broad contribution the article made to considerations of justice in impact assessment, and (4) its bibliographic references for additional relevant sources. Key passages were also extracted for further analysis. After reading the full text of 260 articles from this initial dataset, we determined that no additional data was being found, thus we had reached "saturation" with our initial dataset.

## Results

The literature search resulted in 559 articles for full text review, which we supplemented based on suggestions from interviewees and by reviewing the bibliographies of articles in our dataset. In total, we reviewed 593 academic articles, 20 technical reports and government documents, and 2 blogs/media articles. Overall, findings show that applications of EJ to impact assessment typically focus on one or two dimensions (sp. distributional and procedural) even though many of the articles acknowledge the importance of taking a broad approach to justice. In what follows, we categorize relevant articles and approaches according to their emphasis on one of the three dimensions of EJ.

### *Distribution*

**By far, the bulk of our data from the original search described approaches to assessing the distribution of environmental benefits and harms in society among different social groups, specifically racial and low-income groups.** This included, for instance, an article on the first national environmental justice assessment for Australia (Chakraborty & Green, 2014), material on Scotland's efforts to employ Strategic Environmental Assessment (SEA) to achieve EJ aims (Jackson & Illsley, 2007; Illsley et al., 2014; McLauchlan & Joao, 2011), agenda-expanding efforts to integrate EJ into strategic environmental assessments (e.g. Connelly & Richardson, 2005) and numerous case studies of local or regional assessments of disproportionate environmental harm to vulnerable communities in the UK (Jephcote & Chen, 2012; Mullin et al., 2018; Walker, 2007, 2010; Zimmerman & Pye, 2018), France (Occelli et al., 2016; Schaeffer & Tivadar, 2019), and Canada (Gosine & Teelucksingh, 2008; Mascarenhas, 2007; Masuda et al., 2010), and mostly frequently the US as will be discussed below. This finding is noteworthy as it indicates broad concern exists across several countries with issues related to distributional justice.

In the academic literature, the majority of attention to distributive justice is situated in the United States. This is perhaps not surprising given that the most cited evidence

for environmental justice in the US lies with the inequitable distribution of environmental harms for poor communities and communities of color, which mirror broader inequities in socio-economic status. Indeed, reports of these inequalities mobilized the inception of the first American-based environmental justice movement. Civil activism in the US was a critical factor in bringing about Federal Executive Order 12898 on Environmental Justice, promulgated by President Clinton in 1994 (Federal Register, 1994). Based on this directive, the Environmental Protection Agency (EPA) defines EJ as:

*The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socio-economic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies (Council on Environmental Quality, 1997).*

This directive requires all federal agencies to identify “environmental justice communities” that may experience disproportionate environmental and health impacts from their programs and policies, to determine which programs and policies may impose such impacts, and to develop and execute plans to mitigate them. In recent years, the EPA published its EJ 2020 Action Agenda (U.S. EPA, 2016) and Plan EJ 2014 (U.S. EPA, 2014). It also manages a number of funding programs and provides educational and informational resources, including information on a Federal Interagency Working Group on EJ, via a dedicated EJ website (U.S. EPA, 2020a).

The State of California was one of the first states in the nation to codify environmental justice in statute and efforts there remain notable. Other states have adopted EJ-related legislation to varying degrees (see Kim & Verweij, 2016, p.507 for details). EJ-oriented reforms to zoning, land use, and other local policies have also been documented for 23 cities, three counties and two utilities across the country (Baptista, 2019).

A key consequence of these legislative efforts has been substantial work on the part of federal agencies, some state-level agencies, scholars, and other EJ-oriented social actors to develop and refine different approaches to measuring the distribution of environmental harm and, increasingly, assessing the distribution of environmental amenities at different scales using a variety of methods (see Adams & Charnley, 2018 and Holifield, 2014 for short overviews of this body of work). In relation to this work, substantial literature is concerned with tools which help screen and identify “environmental justice communities.” The most prominent tools include the US Environmental Protection Agency’s (EPA) Environmental Justice Screening and Mapping Tool (EJSCREEN) (U.S. EPA, 2020b) and the California Communi-



ties Environmental Health Screening Tool (CalEnviroScreen) (OEHHA, 2018). Other tools and approaches include the Washington Environmental Health Disparities Map (WEHDM) (Min et al., 2019), the Maryland Environmental Justice Screening and Mapping Tool (MD EJ SCREEN) (August et al., 2012; Huang & London, 2012, 2016; Murphy et al., 2018; Sadd et al., 2011; Solomon et al., 2016; Stewart et al., 2014; see especially Alexeeff et al., 2012 for other contributions from California). In some instances, such as in the case of EJSCREEN and CalEnviroScreen, these tools have been developed primarily through the effort of government agencies, with different degrees of public engagement. EJSCREEN, for instance, is part of the EPA's 20+ years of effort to strive for consistent indices and screening tools to measure disproportionate impact and identify environmental justice communities.

Vigorous debates exist surrounding the EPA's efforts, and others that prioritize standardization, with scholars pointing to numerous methodological difficulties, divergent interpretations of policy, and concern that they may be used in ways that increase, rather than reduce, environmental injustices in the country. As Holifield (2014) explains in an overview of these challenges, defining minority and low-income communities is not an apolitical exercise. The common practice of using census tracts as proxies for communities is controversial, as classifications of race and ethnicity are not static, and different class and racial/ethnic groups experience discrimination differently in different parts of the country. Moreover, even though GIS scholarship tries to move beyond simplistic assumptions about the links between proximity to hazards and exposure or human health effects, linking pollution with not only health risks but also to actual exposure and health outcomes is not straightforward. The idea of "disproportionate" impact relative to a reference population has also been shown to vary depending on the scales and resolutions used. As well, there are critiques of the idea of EJ communities as geographic units. As Harper and Harris (2011) point out, for instance, the conventional notion in the US that 20% of a local community should be of a particular minority ethnic group or below a certain income to qualify as an EJ community means that Indigenous communities are often overlooked. It is with this in mind that they point out that "identifying an EJ community by geospatial ethnicity is not the same as identifying a disadvantaged layer coexisting within a community" (p.195 see also Taquino et al., 2002).

In this sense, a key tension described in much of this literature is the desire for standard measures to ease the consistent application of regulations across geographies, on the one hand, and the growing recognition that this form of standardization can itself reproduce certain kinds of environmental injustice. In other words, **associating quantification and standardization with equity and fairness presents significant challenges for approaches to impact assessment that take up a trivalent framework for EJ. In particular, the drive to standardization is currently associated with top-down centralization of decision-maker power in IA, yet principles of procedural justice emphasize the importance of affected communities playing key roles in defining risks, impacts, and vulnerable populations. In**



his 2014 overview of these various methodological debates related to EJ indices, screening tools, and definitions of EJ communities, Ryan Holifield argues that “instead of a single index of disproportionate impact associated with a single type of environmental justice community, regulatory agencies should aim to produce screening tools that incorporate multiple indices of impact and a diverse typology of environmental justice communities” (2014, p.77). This argument aligns with a thread of arguments that has been made consistently over the last two decades in the US even from within bodies like the EPA; however, as Holifield explains in his text, this view has consistently contended with the challenges it poses for nation-wide standards which are to some degree demanded by policy processes.

Some of the most recent efforts to develop EJ screening tools appear to align with integration of a more fulsome EJ framework. The WEHDM, for instance, represents an explicit attempt to integrate procedural justice into the development and implementation of an EJ screening tool. This is a community-academic-government partnership that sets out to map neighbourhood-level information on cumulative impacts of environmental hazards and social conditions by integrating 19 indicators into an interactive geospatial tool that allows for comparisons of cumulative impacts between census tracts. Tool developers worked by negotiating and establishing the goals of the project and did so in partnerships, listening to the experiences of community members at the early stages of tool development. They also remained responsive to community direction (Min et al., 2019). Another example is the Maryland Environmental Justice Screening and Mapping Tool (MD EJ SCREEN) which used a community-driven approach in its development (Driver et al., 2019).

Importantly, it appears that in the US the burden of proof of harm often lies with affected communities (Canales et al., 2012). This situation points towards justice concerns as they relate to financial and other resources available to help communities achieve procedural justice/consideration and thereby concrete improvements in the disproportionate environmental burdens they may bear. The burden of proof is also complicated by the variety of sophisticated approaches to measuring EJ; contestations over how evidence is produced and what it shows are inherent features of the work of assessing the social distribution of environmental outcomes. This is an observation made not only in the US context but also in the UK (Walker, 2010). Meaningful IA - might require broader transformation of processes that rearrange power (see Recognition section below).

More broadly, a concern with distributional justice is also reflected in discussions about sustainability - a concept which is usually understood as including concern for equitable distribution of environmental harms and benefits (Agyeman et al., 2002; for a discussion of how this relates to SEA, see Connelly & Richardson, 2005). This framing of the distributional aspects of EJ in terms of sustainability is consistent with approaches taken in Europe and approaches that draw on international law and agreements, where issues related to dis-

tribution reflected via a heavy emphasis on a sustainability/sustainable development framework, and therefore thought of in terms of inter- and intra-generational equity (c.f. Bérubé & Villeneuve, 2002; Fredericks, 2012; Hermans & Knippenberg, 2006; Lamorgese & Geneletti, 2013).

## **Representation**

A second substantial set of literature situates environmental justice as a dimension of representation (or procedural justice) with a dominant focus on public participation (used here in a broad sense to include participative, collaborative and communicative approaches to environmental assessment). Citizen science (defined here as public participation in knowledge production) emerged as an innovative way to bring local knowledge to bear on impact assessments. Issue framing was reported less frequently as an issue of justice.

- *Public engagement*: The participatory turn in impact assessments reflects broader trends in environmental management and planning, and is in part a response to the limitations of expert-driven technocratic approaches. This subset of our literature takes as a starting point two global initiatives, the 1991 Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) (UNECE, 2017a) and/or the 1998 Convention on Access to Information, Public Participation in Decision-Making and Access to Justice, commonly referred to as the Aarhus Convention (UNECE, 2020).

The Espoo Convention takes up Principles 17 and 19 of the Rio Declaration. These state that (17) “Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority,” and (18) “States shall provide prior and timely notification and relevant information to potentially affected States on activities that may have a significant adverse transboundary environmental effect and shall consult with those States at an early stage and in good faith” (UNECE, 2017a). While parties to this convention are also primarily European and Central Asian, some parties come from beyond these regions - most notably Canada and the US (UN, 2020a). In addition to the Convention, the Protocol on Strategic Environmental Assessment (UNECE, 2017b) is meant to augment Espoo by ensuring that environmental assessment is integrated into plans and programmes at the earliest stages. Research relevant to this review that considers Espoo primarily assesses its potential and limitations in contributing to democracy in transboundary contexts (e.g. Ebbesson, 2011; Healy et al., 2019; Marsden, 2009).

Aarhus takes up Principle 10 of the 1992 Rio Declaration, which identified access to information, access to public participation and access to justice - defined in this case as legal council or the courts - as key pillars of sound environmental governance. Parties to Aarhus

are only found in Europe and Central Asia; however, researchers draw on it as a benchmark when assessing EIA legislation elsewhere (eg: Ajala, 2018 for a study of Nigerian EIA; Dilay et al. 2019 for a study of EIA in India; Mauerhofer & Larssen, 2016 for considerations of Aarhus in East Asia; Zhang, 2017 for discussion related to China). In Europe, the Aarhus Convention has been incorporated into the European Union's EIA Directive (Hartley & Wood 2005).

Researchers writing about approaches to public participation highlight both the opportunities and, importantly, the limits of existing approaches to public engagement. An expansive academic literature in Canada and beyond assesses the extent to which environmental impact assessment processes can deliver meaningful participation and numerous guidelines are available for government agencies and assessment practitioners to improve participatory practice. Key advice for improving participation in environmental impact assessment processes includes: defining outcomes and goals of participation (Glucker et al., 2013; Sinclair & Diduck, 2017); early engagement in decision-making (Sinclair & Diduck, 2017); making information accessible and transparent (open, non-technical, clear) (Hartley & Wood, 2005). In Canada, an expert review panel of federal environmental assessment processes determined that public participation methods used within impact assessment lean towards informing and consulting rather than meaningfully collaborating with affected communities (CEAA, 2017). The panel report recommended early and ongoing public participation, increased funding for public participation, and more accessible and transparent information about engagement and consultation processes. The report also recommends enhancing opportunities to bring Indigenous and community knowledge into impact assessments, along with western scientific knowledge.

Tensions exist in the literature between deliberative ideals that emphasize decision-making driven by public debate, on the one hand, and expert-driven decision-making on the other (c.f. Attardi et al., 2012; Illkley et al. 2014; Petts & Brooks, 2006). This tension has led some to argue that those with more expert-driven visions of good IA advocate for best practices which they feel are incompatible with meaningful democratic engagement (Attardi et al., 2012; Lockie 2007; Patel, 2006). Another point of debate rests with what constitutes good public participation defined either along the lines of power sharing or as civic learning and shared understanding. The former group of scholars use Arnstein's popular metaphor of the ladder of participation, which evaluates public participation based upon the extent to which power is shared between decision making bodies and diverse publics (e.g. O'Faircheallaigh, 2010). Others promote a civics orientation where the focus is on ensuring fairness by incorporating the insights of deliberative democracy, social learning, shared understandings and collaborative engagement (Doelle & Sinclair, 2006; Fitzpatrick & Sinclair, 2003; Sinclair & Diduck, 2017). As Sinclair and Diduck describe, a civics approach offers a "holistic, human ecological orientation to governing interactions between social and natural systems, focusing on goals such as sustainability, equity and heritage diversity" (2017, p. 2). The civics approach

aligns with calls to organize public participation through principles, norms and expectations of deliberative democracy (e.g. Wiklund, 2005, 2011) where procedures are necessary to ensure open, equitable and free speech as the backbone of citizen participation in governance. The civics approach also calls for more attention to outcomes such as sustainability in addition to process and access (Doelle & Sinclair, 2006; see also Noble, 2014). A sole focus on process and access can have the effect of discouraging participation by fostering conflict and distrust (Doelle & Sinclair, 2006). By putting the outcome of sustainability on the radar, proponents, governments and communities can discuss whether the proposed project contributes to shared visions of sustainability.

Research illustrates global gaps in terms of access to information, transparent decision-making processes, and access to the law for affected communities (see especially Mauerhofer, 2016 for a literature review on regional and national differences in access to information, participation, and justice; for specific or regional cases, see also Ajala, 2018; Dilay et al., 2019, 2020; Mauerhofer & Larssen, 2016; Mathiesen, 2003; Parihar, 2014; Park, 2017; Siciliano et al., 2018;). It is in this context that Dilay et al. (2019, 2020), despite recognizing the many criticisms and shortcomings of public engagement and consultation, argue that changes to process present the most viable path to achieving distributive and recognitional EJ as well. In transboundary contexts, legal scholars have pointed out that based on the most recent rulings on landmark cases, existing international IA law achieves procedural but not substantive justice aims (Boyle, 2011; Brent, 2017; Chung, 2011; Escarcena 2012; Langshaw, 2012; Payne, 2010, 2011; Tanaka 2017). They also point out that differences in EIA processes in different countries can lead to the citizens of some jurisdictions having greater access to justice than others and that this fact will tend to exacerbate existing disproportionate distributions of environmental burdens (Healy et al., 2019; Marsden, 2009).

A major thread running throughout this work is the sense that existing processes related to public participation do not enable deliberation about what might be called “big picture issues” (see Szolucha, 2018, introduction). Some scholars suggest that cumulative assessments, strategic environmental assessment (SEA) and regional co-management assessments provide a process-oriented intervention which enables better consideration of the kinds of issues that concern members of the public most and that are often excluded from project-specific IAs. Not only do these approaches address interconnected issues such as climate change, water quality, and food security, they also provide a framework for involving multiple jurisdictions with decision-making authority including Indigenous governments. There is significant scholarly interest in Strategic Environmental Assessment as a vehicle for advancing EJ goals (Attardi et al, 2012; Bunge 2012, 2017; Ebbesson, 2011; Illsley et al., 2014; Jackson & Illsey, 2007; Joao & McLauchlan, 2011; Lamorgese & Geneletti, 2013; Mela & Freire, 2016; Polido et al, 2016, 2018; Polido & Ramos, 2015; Rega & Baldizzone, 2015; Rega et al., 2018; Taylor & Mackay, 2016). At the same time, there is recognition that on the whole

SEA currently has limited influence on decision making (Rega and Baldezone, 2015, 2018). Some scholars have argued that taking up Free Prior and Informed Consent is the next critical move in SEA's evolution (Esteves et al., 2012; Hanna & Vanclay, 2013).

In addition to SEAs, regional scale co-management models also provide promising approaches to enhance participation, particularly for Indigenous communities (Noble, 2014; Udofia et al, 2017). Examples of regional scale co-management assessments include: Canada (the Mackenzie Valley Natural Resource Management Act and the Inuvialuit Final Agreement); New Zealand (regional councils established under the New Zealand Resource Management Act); and Australia (Murray Darling Basin Authority). For a report on best practices in co-management models in Canada and around the world that focus on cumulative effects at a strategic and regional level (see Clogg et al., 2017).

- *Citizen science and community monitoring*: Debates about the relationship between democratic deliberation, expert knowledge, and public participation remain active in IA literature, and this debate comes to the fore within the large body of work examining applications of citizen science, community management of resources, and community monitoring to IA. This literature describes how public engagement in monitoring and knowledge production can enhance democracy and/or social license around IA. As just one example, a US study of seven community-based forestry organizations describes efforts to integrate local ecological knowledge with “conventional” science in forestry management (Ballard et al., 2008). Several articles from around the world focus on citizen participation in different kinds of impact assessment and monitoring activities (e.g. Becker et al., 2003; Brown et al., 2012; Hage et al., 2010; Mansyur et al., 2016; Metzger & Lendvay, 2006; Shrestha et al., 2018; Whitfield & Reed, 2012). One study (Hunsberger et al., 2005) provides a helpful review of citizen-participation in impact assessment and monitoring specific to the Canadian context through to 2005.

While outlining the potential of methods like citizen science for just IA, researchers also document the lack of capacity, funding, and access to expertise as key barriers to meaningful participation especially for members of already marginalized communities (Dilay et al., 2019; Mirumachi & Torriti, 2012; Parihar, 2014; see Darling et al., 2018 for a critical literature review on IA and capacity in the Canadian North). Here, the construction of timelines for IA and the requirements for participation become highly relevant as they can act as barriers for communities. Unresolved here, though, are difficult tensions between national need/public interest, on one hand, and local community priorities on the other (c.f. Aczel & Makuch, 2018; Bérubé & Villeneuve, 2002; Kim, 2018; Mirumachi & Jacopo, 2012; Zanotti, 2015). Also unresolved are the inequitably borne burdens of engagement itself; researchers have documented, for instance, the community costs of consultation such as divided communities, community burnout, and therefore reduced future development capacity (Booth & Skelton 2011; Colvin et al., 2019). In these instances, we see how communities in regions



that are particularly attractive for large scale development are often also regions affected by economic and social marginalization where members can find themselves overburdened by neverending engagement processes.

These observations may help to explain why some scholars state that improvements in procedural justice do not necessarily lead to more desirable outcomes for impacted communities (Fan, 2012, 2017; Leifsen et al., 2017; Zanotti, 2015) when tensions between different forms of expertise take place within power structures that marginalize the knowledge-claims of the already vulnerable. As Leifsen et al. (2017) put it, “[s]cientific technical knowledge, local experiential knowledge and ‘corporate science’ often compete with each other” (p. 1045). In these contexts, while citizen science and co-management may increase citizen participation, its capacity to achieve EJ aims is far from given because equitable collaboration between local communities and scientists is elusive (Ottinger, 2017; Temper & Del Bene, 2016; see Heaney et al. 2007 for best practice models for collaboration between environmental justice communities and scientists).

In particular, citizen science and co-management activities are often limited by the ways that local knowledge is regarded and “framed.” This is especially the case when members of a local community belong to a structurally disadvantaged group “assumed not to be able to offer information of value to collective understandings” (Ottinger, 2017, 96) or when they see their knowledge “welcomed and recognized but framed as something other than insight into scientific or technical issues” (ibid). Addressing this kind of “epistemic injustice” (Fricker, 2007) requires attention to how different forms of knowledge are authorized as offering legitimate contributions to technical decision-making, including attention to who makes decisions about what knowledge is recognized as legitimate, how these decisions are made, and on the basis of what authority. These questions point us towards issues of framing and recognitional justice.

● *Framing*: Much of the scholarship on public engagement in IA tends to assume that public engagement will lead to more equitable outcomes provided that proper procedures for collaborative decision making are followed. However, there are critics arguing that these approaches do not sufficiently account for power relations that prevent participants from entering into meaningful social negotiations about potential future impacts in an equitable way (Richardson, 2005). As Richardson argues, “EA needs to engage with competing multiple rationalities, and...value conflicts and judgements about them are inescapably present in EA” (2005, p. 343). Framing - which includes how issues are defined and agendas set - is one critical but often overlooked site for injustice in IA; Even in instances where access to information, access to justice, and public participation are well established, publics are frequently dissatisfied by public engagement or consultation processes. Publics appear to experience processes for engagement as largely predetermined exercises in which the scope and framing

of the issues at hand are aimed at orchestrating consent rather than bringing community demands into decision-making. For instance, during a landfill siting decision in Lincolnville Nova Scotia in 2006, residents' ability to participate in deliberation and assessment processes were perceived by community members to be circumscribed by inaccessibly scheduled public consultation sessions, jargon-laden informational materials, and the view among project proponents that siting the facility in the largely black community was already a foregone conclusion (Deacon & Baxter, 2013). Similarly, Whitelaw et al. (2009) assessed the assessment of the Victor Diamond Mine in the James Bay region of Ontario and found that restrictive scoping for the EA led to exclusion of several Indigenous groups. These and other examples highlight how not only scoping processes, but also the ways in which issues are framed within them (or IA at large), can have the effect of leaving publics with feelings of exclusion or the inability to raise the issues about projects that concern them most (Attardi et al., 2012; Burger et al., 2010; Bustos et al., 2017; Cole et al., 2004; Dilay et al., 2019; Esteves et al., 2012; Illsley et al., 2014; Lamorgese & Geneletti, 2013; Leonard, 2017; Polido & Ramos, 2015; Rega & Baldizzone, 2015; Sampson et al., 2014; Walker, 2010; see also O'Fairchealallaigh, 2010 for a typology and broader discussion of public participation in IA and Leifsen et al., 2017 for a collection that looks at new mechanisms of participation in extractive governance).

## **Recognition**

**Articles which appeared under recognitional justice were less frequent in our dataset.** Even in instances where all three dimensions of EJ were named by authors (Aczel & Makuch, 2018; Anaya & Espirito-Santo, 2018; Bennett et al., 2019; Bustos et al., 2017; Busscher et al., 2019; Chakraborty & Green, 2014; Curran, 2018; da Costa Silva, 2011; Dilay et al., 2019; Esteves et al., 2012; Fan, 2012, 2016; Harper & Harris, 2011; Lapp-Osthege & Andreas 2017; Leifsen, 2017; Siciliano et al., 2018; Zanotti, 2015), it was not uncommon for issues related to procedural and distributional justice to be emphasized over issues related to recognition.

Interestingly, while there is work on what EJ scholars would call recognitional justice in relation to IA, it is largely referred to as cognitive, cultural or epistemic justice and the vast majority of this scholarship we ultimately found using our interviews because it does not situate itself within an EJ frame per se. While issues of epistemic injustice need not be tied to groups' specific cultural identities, they are when it comes to Indigenous knowledge and in this way procedural justice cannot be divorced from recognition. Initiatives such as the The Indigenous Centre of Expertise for Cumulative Effects Assessment and Management - funding commenced in 2018 - are important for addressing cognitive injustice in relation to Indigenous Peoples.



The literature on citizen-science and co-management does not, as a rule, differentiate between local knowledge and Indigenous knowledge; however, particularly in Canada, the conceptual and legal differences between the two are highly relevant. As one group of authors puts it, it is important to “recognise the differences between local and traditional knowledge, indigenous knowledge and knowledge generally held by citizens. Local and traditional knowledge is held by communities with long-term affiliations to specific landscapes. Indigenous knowledge also has long-term affiliations with landscape but has furthermore a specific legal status being protected under international agreements (Convention on Biological Diversity, Article 8j)” (Danielsen et al., 2017, p.80). In addition to international agreements related to Indigenous knowledge, the United Nations’ Declaration on the Rights of Indigenous Peoples provides a “universal framework of minimum standards for the survival, dignity and well-being of the indigenous peoples of the world and it elaborates on existing human rights standards and fundamental freedoms as they apply to the specific situation of indigenous peoples” (UN, 2020b). In Canada, Aboriginal people also hold Aboriginal title and are guaranteed specific rights under Section 35 of the Constitution, under Section 25 of the Charter of Rights and Freedoms, and, in instances where they exist, under individual treaties or on the basis of specific court cases (UBC, 2009). Areas without treaties (Native Land Digital, 2020) present more complex situations. The legal duty to consult is both a procedural justice and a recognition justice issue where Hodgson (2016) argues that formal consultation can serve a reconciliation role by ensuring that decision-makers reach “rights-compliant” decisions in the first instance but also that they account for Aboriginal rights. The legal context in Canada is tied to work first undertaken in Canada and later taken up around the world.

**That IA literature focusing on Indigenous knowledge does exist but is mostly not presented within explicitly justice-oriented work on IA is itself an important finding: This illustrates that insights on how to work across differing worldviews, cultures, knowledge traditions and governance regimes is not being conceived of within the frame of environmental justice.** Another important result regarding literature dealing with recognitional justice is that in many cases we would not have found literature on this dimension of justice without talking to practitioners. **Best practices and cases identified by practitioners that speak to recognition are not yet reflected in the literature.**

Among the articles found using our keyword search of academic databases discussing the integration of Indigenous knowledges into already established IA processes there is considerable variation in understanding the relationship between Indigenous and western forms of knowledge, with a live critical debate among scholars about exploitative or tokenistic relationships between IA practices and Indigenous knowledge (e.g. Arsenault et al., 2019; Baker & Westman, 2018; Fernandez-Gimenez et al., 2006; Nadasdy 2003b; Sandlos & Keeling, 2016). Some scholars are concerned with exactly how to include traditional ecological knowledge in systematic reviews meant to support “evidence-informed” or “evidence-based”

environmental management efforts (Cooke et al., 2016), while otherwise are primarily interested to validate non-western forms of knowledge (Usher, 2000). Indeed, some scholars have set out to demonstrate the predictive capacity and even superiority of Indigenous knowledge in certain contexts (Chand et al., 2014; Roué & Nakashima, 2002), and others discuss Indigenous knowledge as complementary or supplementary to western knowledge (Evans & Goodjohn, 2008; Gondor, 2016; Kendall et al., 2017; Kwiatkowski & Ooi, 2003; Lyver et al., 2017; Oba & Kaitria, 2006). Some scholars describe Indigenous knowledge as primarily significant as a practice in building trust with Indigenous knowledge holders (LaPierre et al. 2012), and some observe benefits in Indigenous knowledge holders protecting their knowledge to prevent it from being used in unintended ways (Haalboom, 2016). Many scholars have documented the promises, challenges, and shortcomings of efforts to treat knowledge systems on an equal basis with western science (Abu et al., 2019; Bixler, 2013; Diver, 2017; Ens et al., 2010; Fernandez-Gimenez, 2006; Fineup-Riordan et al., 2013; Gummer et al., 2000; Haalboom, 2016; Huntington, 2000; Huntington et al., 2004; Jackson et al., 2014; Johnson et al., 2016; Mantyka-Pringle et al., 2017; Markkula et al., 2019; Metsger et al., 2003; Strangway et al., 2016; Whyte et al., 2016).

**Two recent overviews of efforts to include Indigenous knowledge into IA and risk assessment in Canada provide particularly helpful and timely summaries of the state of research on Indigenous knowledge and recognition in IA (Arsenault et al., 2019; Eckert et al., 2020).** These overviews echo work emphasizing the politics inherent in recognizing Indigenous knowledge in Impact Assessment (e.g. Booth & Skelton 2011a, 2011b, 2011c; Dokis 2015; Durnik, 2012; Fan, 2012, 2016; Lane et al., 2003; Matuk et al. 2020; Mantyka-Pringle et al., 2017; McCarthy et al., 2010; McCreary & Milligan, 2014; Muir & Booth 2012; Nadasy, 2003a; 2003b; Westman, 2013). These articles highlight how dominant worldviews held by those designing and executing IAs are inconsistent with the worldviews, experiential knowledge, and understandings of the environment held by Indigenous knowledge-holders and many Indigenous peoples more broadly. Eckert et al., for instance, identify “fundamental knowledge incompatibilities” (2020, p.74) that stem from the fact that “values that inform Indigenous and western knowledge systems are oftentimes at odds with each other” (p.75). The authors find that throughout the literature “[t]his fundamental disconnect, shaped by divergent worldviews and cultures in which western and IK systems are embedded, comprises a fundamental hurdle in the exercise of invoking IK in federal EAs” (ibid).

Authors taking up these types of issues are forced to confront how much recognitional justice is achieved when Indigenous knowledges must be authorized by processes outside the control of Indigenous peoples or, more broadly, how much recognitional justice is achieved when Indigenous knowledges are incorporated into IA processes in which decision-making power is shared asymmetrically between Indigenous and non-Indigenous peoples. **Of particular concern are the radically unequal power dynamics between state and Indigenous**

**governments and communities, where the structures, languages and values in IA processes favor Western norms and practices and were developed within the context of Western approaches to governance. In addition, some scholars emphasize that within Indigenous communities, those most vulnerable to the adverse effects of a proposed development (notably women, youth, and elders) are among those least likely to be taken into consideration in IA processes.** As one author put it, “[i]f Indigenous people have no power over final decision making, their involvement is not effective” (Nakamura, 2008).

Some studies consider novel approaches to settler-colonial power-sharing in IA. This includes work on co-management and Aboriginal resource planning in Canada - especially but not exclusively in the Canadian North (Galbraith et al. 2007; Gondor, 2016; Mantyka-Pringle et al., 2017; Nadasdy 2003a, 2003b; Paci 2002), as well as in Alaska (Fernandez-Gimenez et al., 2006), and Australia (Robinson & Wallington, 2012; McKemey et al., 2019). Co-management encompasses both procedural (collaborative decision-making) and recognitional issues (power sharing across Indigenous and non-Indigenous communities). Though different in nature from other examples, the First Environment Restoration Initiative in the Mohawk Territory of Akwesasne is also notable for its application of a community-defined model of risk (Arquette et al. 2002).

One notable Canadian example is the Qikiqtani Inuit Association (QIA) submission to the Nunavut Impact Review Board (NIRB) (Qikiqtani Inuit Association, 2019). In 2016, NIRB was commissioned by the Canadian government to conduct a strategic environmental assessment of offshore oil and gas development in Baffin Bay and Davis Strait to provide a template for future development. The QIA put Inuit Qaujimagangit (IQ) front and centre in their submission which was driven by IQ and IQ holders.

In these studies, it may therefore be helpful to understand the application of Indigenous knowledge and management practices as reflecting “the assertion of Indigenous sovereignty and jurisdiction” (Wilson et al., 2018, p.290; see also McCreary & Milligan 2014, Temper, 2019). With this in mind, it is noteworthy that all of the best practices identified by the IA practitioners we interviewed comprised Indigenous-led impact assessments which combine conventional impact assessment frameworks with Indigenous governance processes (Gibson et al., 2018). In these instances, **Indigenous peoples exercised power to authorize knowledge and to make development decisions.**

In a report commissioned by the Gwich'in Council International, the Firelight Group (2018) identified three different Indigenous-led impact assessment models: government to government; proponents and Indigenous parties; and independent Indigenous assessment. The following cases were identified by our interviews with practitioners as examples of best practice, although it is important to note that Indigenous-led assessments are not readily

standardized, and choices among models need to be made with consideration of the needs, capacities, and constraints of individual communities and projects.

*Co-managed with the Crown* (government to government): The Thchq Fortune Minerals Nico mine impact assessment (2012) in the NWT was conducted and approved by the Thchq government. The Mackenzie Valley Resource Management Act (MVRMA) - supported by the Thchq Land Claim and Self-Government Agreement in 2003 - requires the consent of the Thchq government for approval of projects on Thchq lands, treats IK on par with western scientific knowledge, and considers that values are at play in all aspects of IA; for example, the decision about a “significance” measure is a values-based decision. MVRB gives recognition to the importance of TIK in part because of its structure: MVRB is half Indigenous appointees and half territorial government, and it operates like a tribunal (3 year term appointments). The impact assessment of the Nico mine included a traditional use report informed by traditional knowledge which was ultimately used to change the proposal --the proposed **viewshed** and the water quality management strategy--because it revealed a different set of uses based upon downstream users and local and traditional use of land. Moreover, MVRB delayed the final decision in order to allow for the completion of this traditional use report.

As part of the NICO proposal, there was a separate IA of the road (PASR) developed for transporting diamonds from the mine to Yellowknife. The Thchq government put in place a committee to assess the social risks from the road comprising social workers, social programming officers and again historically marginalized community members. MVRB worked with the community to develop “social well-being” indicators and using public dialogues with community members they over time arrived at indicators that included the physical safety of young women (with new contact to a big city) and changes to the perception of land and traditional activities. The inclusion of TU activity, and in this case in particular, caribou hunting, in with social well-being is not customary; but MVRB, in working with community and especially with elders, realized that caribou are not just an ecological object or a resource but caribou health connects to traditional practices. This meant the proponent should consider a range of species (as they impact on caribou and vice versa) as well as the whole caribou territory rather than just that immediately around the 90 km of road. This expanded notion of social and ecological came about because of Indigenous knowledge and involvement in the IA process and it informed a final recommendation of adaptive management and continuous engagement with hunters instead of a stand-alone ecological survey conducted once per year.

*Proponent with Indigenous Party:* In this model, the most important relationship is between the development proponent and the Indigenous government. It involves early engagement to jointly plan projects prior to entering into official impact assessment processes, and requires strong relationships, goodwill and contractual obligations for success. An example is the impact assessment of the Sivumut project extension of the Raglan Nickel mine. Located in the Nunavik region of Northern Quebec, this mine has been in operation since 1997 and currently owned by Glencore. It was the first Canadian mining company to have entered into an impact and benefit agreement (IBA) which requires parties to jointly define impacts, mitigation measures and monitoring requirements. In addition to the proponent, the relevant parties included the Makivik Corporation (a land claim Inuit organization) and two Inuit communities located close to the project (Salluit and Kangiqsujaq). This proposed development required a full environmental assessment as stipulated by the James Bay and Northern Quebec Agreement (JBNQA) and the Raglan IBA agreement of 1995. Two parallel assessments were completed: a crown-led assessment by the KEQC and the proponent-Inuit assessment. The Inuit were successful in changing some of the provisions of the agreement to improve environmental mitigation, financial payments and employment opportunities. Another important outcome of this process was the incorporation of retrospective impact assessment provisions into the assessment of proposed projects.

*Independent Indigenous Impact Assessment:* This model provides the most autonomy for Indigenous communities although it is the most resource intensive route. An illustrative and precedent setting example of how independent assessments can impose particular conditions is the Woodfibre Liquefied Natural Gas (Woodfibre LNG) assessment conducted by the Squamish Nation in British Columbia. The proponent and Crown agreed to abide by the Squamish Nation Process which incorporated Indigenous law throughout the project review. This process took a holistic and integrative approach to assessment that rejected state-based categories (such as “valued components” and “significance”) and instead orchestrated the assessment based on Aboriginal rights and title.

In addition to these examples, the First Nations Major Projects Coalition (FNMPC) has released key principles that emerge from Indigenous ways of knowing which are meant to facilitate the meaningful engagement of Indigenous peoples in assessing industrial developments. Comprising over 60 nations across Canada, the Coalition seeks to facilitate ownership of major resource projects and improve on environmental practices by incorporating Indigenous values and principles into development processes (FNMPC, 2019 with appendix guidelines issued in 2020).

## Key Principles for Indigenous Assessments of Major Project Development (FNMPC, 2019)

- 1 First Nations Rights will be respected, maintained, and promoted.
- 2 First Nations will be fully engaged in assessment and decision-making for major projects, integrating their laws, norms and values.
- 3 First Nations stewardship and governance rights and responsibilities will be respected and adhered to throughout the major project life cycle.
- 4 Ecological values and services will be maintained and if necessary, restored.
- 5 Impacts to Indigenous culture, socio-economic conditions, health, rights, title and traditional use will be properly assessed and managed to the satisfaction of the affected First Nations.
- 6 First Nations will have access to adequate resources, information, and time in order to inform their engagement and decision-making processes.
- 7 The major project assessment scope and process will adhere to agreed upon high quality practices and reflect First Nations values.
- 8 All projects will be assessed using a focus on total cumulative effects loading and best practice of cumulative effects assessment.
- 9 Adequate information will be provided to inform consent decisions made through First Nations' Worldviews.

In summary, **addressing historical injustice in settler-colonial contexts means accounting for Indigenous ways of knowing which often requires Indigenous-led assessments that enable the adoption of Indigenous frames and lenses. Indigenous-led assessments are thus vehicles for operationalizing the principle of “recognition” in impact assessment processes; however, as one practitioner interviewee expressed, significant challenges remain.** In particular, questions remain about who within Indigenous communities should participate in decision-making - political leaders, expert knowledge-holders, or community members? Indeed, as the recent conflict over the Coastal GasLink project has made clear, questions and ambiguities surrounding this issue are real and have material consequences. We may usefully understand this difficulty as reflecting potential contradictions inherent in using western conceptions of “justice” and “nature” in our structuring and evalu-



ation of IA. **For some researchers, there are limits to recognition in relation to Indigenous peoples whose aims are not to be included into (and therefore recognised by) the state but instead to assert sovereignty and jurisdiction via their own governance systems;** for these actors, their “oppression is tied to the existence of the state itself” (Temper, 2019, 99; see also Armstrong & Brown, 2019).

## Implications for Policy and Practice

**Based on our scoping review, we recommend the value of EJ as a framework for structuring and assessing IA. In alignment with calls from environmental justice activists and scholars, this framework should draw on a broad rather than a narrow approach to environmental justice in ways that include not only distribution and participation in decision-making and political processes but also cultural identity and recognition for diverse ways of knowing.** Our scoping review verifies an insight from EJ that is useful for IA practitioners about **the necessity of attending to all three nodes of the EJ triangle as they interrelate in order to meet the conditions for structuring and assessing meaningful participation across social groups.** Just as scholarship that begins with the distributive dimension of EJ leads to concerns related to public participation (sp. Who is able to define what is meant by fair or equitable distribution of environmental harms and goods?), scholarship that begins with questions related to procedural justice leads into questions about how access to justice results in improvements in distribution of harms and goods. Our review of over 500 studies shows that while participation in decision-making and/or ensuring equitable distribution of risks or economic gain from development may in and of themselves be *necessary* for good IA, they are not *sufficient* for a just IA. Scholars and practitioners have for some time now called for wider participation as necessary for meaningful engagement in IA, but there is a cognitive error that appears to be made frequently across the literature wherein it is assumed that engaging affected communities, stakeholder groups, or Indigenous communities is sufficient for just IA. It is only by attending to all three aspects of the EJ justice framework as integrated and mutually dependent that we might prevent the reproduction of inequity *within* marginalized communities, as well as the tendency to treat markers of cultural identity (gender, race, ethnicity, and class) as separate, mutually exclusive categories of experience and analysis (Koshan, 2018) (see Figure 1).

Our findings highlight the need to think about meaningful participation in IA beyond key themes uncovered in our review of the academic literature such as questions of inclusion, representativeness, social learning, and linear impacts of discrete risks coming from development to also think carefully about how participation processes are framed; for instance, what kinds of models of risk assessment are used and what type of knowledge is thereby excluded? As well, our findings suggest that just IA is as much about reflecting on the



systemic and constitutional conditions that are shaping the practice of participation in any development decision; for example, how might certain political cultures and constitutional relations among citizens, science, and the state help to condition who can participate and whether their knowledge is likely to be treated as authoritative?

Drawing on Nancy Fraser's (2009) terminology, efforts to apply a justice framework to IA processes are often *affirmative*, meaning that they retain status quo relations and institutions. Yet, given that these relations and institutions are called out by activists as unjust in their attempts to disrupt development, IA processes and practices might also need to be *transformative* by challenging fundamental assumptions, relations, and institutions. Transformation requires fundamental structural changes to institutional, social and cultural arrangements. As Fraser argues, "overcoming injustice requires social arrangements that prevent some people from participating on par with others, as full partners in social interaction" (Fraser, 2009, p. 14).

**Last, our survey of the IA literature across jurisdictions does highlight value in thinking about the Canadian context as in some ways particular and, moreover, as instructive regarding attention the cognitive and structural dimensions of IA: Right now in Canada we can see issues related to Indigenous title and jurisdiction play out in highly visible conflicts over proposed projects.** Just IA decisions are certainly those which attend to wider and ongoing formations of colonialism; for instance, the NICO mine IA decision can be considered just because it empowered Indigenous communities to lead an influential traditional use study that informed this IA decision. However, IA cannot in and of itself lead to just processes and outcomes. Concerted and broad political effort is required outside of IA processes to resolve outstanding legal questions about jurisdiction, to take up issues related to Indigenous peoples' decision-making authority within their territories, and to establish more equitable sharing of power between Canadian and Indigenous nations. In their case study of uranium exploration and mining in Saskatchewan, Canada, Udofia et al. (2017) comment on "the lack of other viable avenues, outside EA, for Aboriginal communities to raise more strategic issues of concern that affect traditional lands and treaty rights" (p.164) as an existing challenge to meaningful participation for Indigenous communities.

Moreover, in the context of IA, more attention to power imbalances within Indigenous communities is warranted; this can take the form of paying attention to who sits on the governing boards of IA decisions, who is "recognized" as meriting meaningful consultation and openness and transparency around who is not recognized (i.e. Indian Act band councils vs. hereditary chiefs; regional vs. national leaders etc.). The controversy over Coastal GasLink makes this clear. The Gitksan Nation, whose hereditary leaders are aligned with their Wet'suwet'en neighbours in opposition to the Coastal GasLink pipeline, spent years embroiled in an internal dispute over who speaks for the community: their hereditary chiefs or elected

council. This case thus directs our attention to the critical question of who has the authority to decide based upon recognition as a legitimate representative of an entire social group. Just IA also demands of scholars and practitioners a kind of attention to and transparency surrounding (a) the cultural–historical antecedents and constitutional relations among citizens, science and the state that have evolved over time (Jasanoff, 2011), (b) political cultures in which certain knowledge ways and forms of participation become collectively deemed as more credible than others in particular settings (Jasanoff, 2005), and (c) the role of science-led progress in the nation state (Stirling, 2008; Sunder Rajan, 2012; Wynne, 2016).

Ultimately, however, just IA is not a way of escaping politics, nor should it be. Indeed, we suggest that IA scholars and practitioners use visible controversies over democracy and development as instances of informal technology assessment and their own “social learning” (on the part of decision-makers).

**Overall, our review of the literature and our interviews with practitioners indicate that there is no “silver bullet” method for leveraging this comprehensive attention to justice. Rather than a method or even a methodological toolkit, therefore, we draw from our review and our analysis of it to instead provide a set of what might be called “sensitizing questions” for scholars, practitioners and policy-makers to help them advance just IA. These are questions which can be applied in the context of structuring or even ex post facto evaluating meaningful engagement in IA (borrowing from Chilvers & Kearnes, 2019 and Brian Wynne’s seminal work see 1996):**

**What assumptions are being made about the objects, subjects, and models of assessment, at the level of discrete social groups or interrelations in wider systems of participation?**

*Example 1: What model of risk or cost is used to assess adverse effects of this project? What might be some limitations of this model?*

*Example 2: What are the underlying assumptions about political processes which are being used to structure and evaluate meaningful participation, for example, representativeness or social learning. Again, What might be some limitations of this model of good participation (are band leaders, for example, accurately representative of the affected Indigenous community)?*

**Have I openly communicated the assumptions, contingencies, and exclusions with respect to: the underlying purposes; the object of participation; the alternative framings that were left out; the construction and exclusion of particular public groups?**

## Conclusion: Suggestions for Future Research

We draw the following conclusions organized by our original research questions:

### **1 To what extent is justice taken into consideration in the literature on impact assessments?**

Our scoping review reveals a substantial literature on environmental justice and impact assessment with more work to be done to realize a comprehensive justice framework to be used at all stages of impact assessment. Most of the existing IA and justice literature focuses on, or at least centralizes, issues of distribution and representation. This confirms our initial hypothesis. While there is a well-developed subset of the IA and justice literature which focuses on distributional justice - and specifically methods for assessing affected or environmental justice communities - much of this is case-studies based in the U.S. Given policy realities and the nature of environmental injustice in the U.S. as an urban as much as it is a remote community phenomenon this is unsurprising; but this result presents a problem for practitioners and decision-makers operating from other jurisdictions.

**We recommend future research focusing on recognitional justice as this will be helpful for Canadian IA policy and practice where issues of Indigenous sovereignty and claims for self-recognition are front and centre in IA decisions (and disputes over them).** It appears that strategic environmental assessments might offer opportunity for these broader considerations of justice in IA; however, further research on the viability of SEAs as mechanisms for just IA are needed, especially since the papers in our dataset indicate that in practice SEAs have thus far had limited impact on decision-making.

We also recommend that research teams work across disciplines on such studies of recognition in IA because our review shows that the focus of IA scholarship, unsurprisingly, relates to the disciplinary orientation and training of those people doing that scholarship. Historically, legal and environmental impact assessment (as a field) scholars have advanced distributional and procedural justice frames but this disciplinary orientation in IA scholarship has limited attention to other dimensions of justice, something Attardi et al. 2012 call “institutional inertia” in IA.

### **2 What can we learn and adopt from best practices in justice-oriented approaches to impact assessments across other jurisdictions? Secondarily, what can we learn from this comparison regarding potential particularities with IA in a Canadian context?**

The US is noteworthy as a site for best practice in relation to distributional justice and as the source of the vast majority of literature on this theme. However, rather than lessons from elsewhere, we found that those best practices most relevant to Canada were from Canada - cases where Indigenous community members either led or were substantively involved in IA decision-making and, significantly, in structuring the terms of the process (e.g. what knowledge frameworks were to be used) (see Eckert et al., 2019). Best practice suggestions which appear to integrate all dimensions of EJ appear to come from particular Canadian jurisdictions - specifically, Nunavut, the Northwest Territories, and British Columbia - in areas without treaties where Indigenous peoples have greater leverage and political power. This underscores that justice-oriented IA has to include attention to enabling structural changes that enable power sharing among nations, communities and individuals within Canada as opposed to consensus-based deliberations that aim for social learning. Last, most of these best practice cases only came to our attention through our scoping method (interview with IA practitioners and subsequent review of grey literature).

**We recommend therefore that Canadian best practices be synthesized for practitioner and decision-making communities, and that future scholars work to integrate IA practice perhaps especially that happening in northern Canada. This research could centralize recognition**, in particular addressing what Temper (2019) describes as “inherent tensions in the translation of indigenous cosmo-visions into legal systems” based in western values by specifically focussing on cases which entail value conflicts (see Connelly & Richardson, 2005). In doing so, this future work would secondarily **connect what now appear to be disparate academic conversations on IA relating to Indigenous Knowledge on the one hand and environmental justice on the other**. Last, future studies could also work to build off of environmental justice scholarship (much of it also in the US) that has looked at local knowledge and methods like citizen science for incorporating that knowledge into IA; comparative scholarship could chart similarities and differences in incorporating Indigenous knowledge grounded in non-western ontological worlds.

### **3** What evaluation metrics are being used to advance just impact assessment processes?

U.S. IA-based scholarship has developed many mechanisms for environmental justice evaluations of development with recent scholarship arriving at an emphasis on the importance of community-developed metrics (see Min et al., 2019). As an area of further research, **we recommend that scholarship explore the trade-offs of privileging the nation-states' duty to decide in the broad public interest, on one the hand, and principles of EJ that emphasize community-driven problem definition and decision-making, on the other.**

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\*for a complete bibliography of the results from our scoping review please contact authors

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## APPENDIX A: Database Searches Included in Abstract Screening (years searched = 2000-present)

Database	Search Terms	total # of results	# of new articles added after de-duplication
Web of Science (all databases)	TOPIC: ("impact assessment"OR"environmental assessment") AND TOPIC: (justice)	254	139
Scopus	TITLE-ABS-KEY ("impact assessment"OR"environmental assessment"AND TITLE-ABS-KEY (justice)	375	375
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( "inclusion" OR "participation" OR "fair" OR "fairness" OR "distribution" OR "equity" OR "culture" OR "epistemic justice" OR "cognitive justice" OR "traditional knowledge" OR "Indigenous knowledge" OR "lay knowledge" OR "local knowledge" ) AND TITLE-ABS-KEY ( justice )	173	15
Web of Science (all databases)	TOPIC: ("impact assessment"OR"environmental assessment") AND TOPIC: ("inclusion" OR "participation" OR "fair" OR "fairness" OR "distribution" OR "equity" OR "culture" OR "epistemic justice" OR "cognitive justice" OR "traditional knowledge" OR "Indigenous knowledge" OR "lay knowledge" OR "local knowledge") AND TOPIC: (justice)	111	0
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( "inclusion" OR "participation" OR "recognition" OR "fair" OR "fairness" OR "distribution" OR "equity" OR "culture" OR "epistemic justice" OR "cognitive justice" OR "traditional knowledge" OR "Indigenous knowledge" OR "lay knowledge" OR "local knowledge" ) AND TITLE-ABS-KEY ( justice )	174	0
Web of Science (all databases)	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( "inclusion" OR "participation" OR "recognition" OR "fair" OR "fairness" OR "distribution" OR "equity" OR "culture" OR "epistemic justice" OR "cognitive justice" OR "traditional knowledge" OR "Indigenous knowledge" OR "lay knowledge" OR "local knowledge" ) AND TITLE-ABS-KEY ( justice )	112	1
Web of Science (all databases)	TOPIC: ("impact assessment" OR "environmental assessment") AND TOPIC: ("traditional knowledge" OR "Indigenous knowledge" OR "lay knowledge" OR "local knowledge" OR "Inuit Qaujimagatuqangit")	131	64
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( "traditional knowledge" OR "Indigenous knowledge" OR "lay knowledge" OR "local knowledge" OR "Inuit Qaujimagatuqangit" )	170	164

## APPENDIX B: Database Searches Excluded from Abstract Screening (years searched = 2000-present)

Database	Search Terms	total # of results
Scopus	TITLE-ABS-KEY ("impact assessment" OR "environmental assessment") AND TITLE-ABS-KEY ("inclusion" OR "participation" OR "fair" OR "fairness" OR "distribution" OR "equity" OR "culture" OR "epistemic justice" OR "cognitive justice" OR "traditional knowledge" OR "Indigenous knowledge" OR "lay knowledge" OR "local knowledge")	11,964
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( <b>inclusion</b> )	916
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( <b>participation</b> )	1,740
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( <b>participation</b> ) AND TITLE-ABS-KEY ( <b>justice</b> )	75
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( <b>fair</b> OR <b>fairness</b> )	278
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( <b>fair</b> OR <b>fairness</b> ) AND TITLE-ABS-KEY ( <b>justice</b> )	14
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( <b>distribution</b> )	6903
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( <b>distribution</b> ) AND TITLE-ABS-KEY ( <b>justice</b> )	48
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( <b>equity</b> )	391
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( <b>equity</b> ) AND TITLE-ABS-KEY ( <b>justice</b> )	50
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( <b>culture</b> )	979
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( <b>culture</b> ) AND TITLE-ABS-KEY ( <b>justice</b> )	11
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( <b>epistemic justice</b> )	0
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( <b>cognitive justice</b> )	0
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( <b>traditional knowledge</b> )	77
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( <b>traditional knowledge</b> ) AND TITLE-ABS-KEY ( <b>justice</b> )	2
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( <b>indigenous knowledge</b> )	44

Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( " <b>indigenous knowledge</b> " ) AND TITLE-ABS-KEY ( <b>justice</b> )	2
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( " <b>local knowledge</b> " )	69
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( " <b>local knowledge</b> " ) AND TITLE-ABS-KEY ( <b>justice</b> )	3
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( " <b>lay knowledge</b> " )	6
Scopus	TITLE-ABS-KEY ( "impact assessment" OR "environmental assessment" ) AND TITLE-ABS-KEY ( " <b>lay knowledge</b> " ) AND TITLE-ABS-KEY ( <b>justice</b> )	1