Reporting on climate solutions in institutional, Indigenous, and climate-focused news outlets

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This study focuses on the portrayal of climate problems, climate solutions, and climate problem-solvers across several types of U.S. news outlets, with particular attention to representation of Indigenous peoples. We sample coverage of strategies to address climate change from institutional, climate-focused, and Indigenous-focused news outlets, and analyze how stories frame problems, solutions, and the people responsible for and affected by them. We find that climate-focused and institutional news coverage of climate solutions is broadly similar, but both differ significantly from Indigenous journalism. Indigenous journalism is more likely to present benefits of solutions (rather than only harms they aim to prevent), consider holistic solutions that address both adaptation and mitigation, identify victims of climate change, focus on Indigenous people in all roles, and highlight traditional knowledge. We close with discussion of how institutional news outlets might incorporate these perspectives to challenge their audiences' stereotyped knowledge around climate problems, solutions, and problem solvers.

KEYWORDS

climate change, journalism, content analysis, news media, climate solutions

1 Introduction

The climate crisis is negatively impacting areas as wide-ranging as health, housing policy, urban planning, transportation, and infrastructure (Niepold et al., 2022). The broader public is aware of at least some of that breadth. In 2023, about two out of five US adults said that they had personally experienced the impacts of climate change (Leiserowitz et al., 2023), and a comparable number said that climate change would make their local area a worse place to live in the next 30 years (Tyson and Kennedy, 2023). Three in four said that many kinds of plants and animals would become extinct, while two in three saw impacts on housing and other buildings, and about three in five thought large numbers of people would need to move (Tyson and Kennedy, 2023). All the same, those findings suggest large numbers of people still view the climate crisis as narrow in scope.

Yet this narrow perspective may be relatively recent. Indigenous scientists were here "long before Western science came to these shores, [...] engaged in the creation and application of knowledge which promoted the flourishing of both human societies and the beings with whom we share the planet" (Indigenous Science Statement for the March for Science, 2017). They have long engaged in sciences, and science communication, that "recognize responsibility and reciprocity as key to the relationship between human society and the nonhuman world" rather than "human dominion over nature" (Corwin and Janoff-Bulman, 2023). Some long-

standing examples include fire management, crop rotation, and building materials that are adapted to local climates.

We are journalists[1] and researchers from three institutions: an Indigenous-led and Indigenous-focused news organization[2]; a legacy news organization whose coverage is considered centrist; and a research group focusing on applied social science. Journalism is adults' primary source of informal learning (Maier et al., 2014; Takahashi and Tandoc, 2016), and a major goal of our collaboration is to identify, and change, stereotyped knowledge[3] about both climate change and Indigenous peoples through better climate journalism. We build on a tradition of communications research focusing specifically on climate justice, which draws connections between climate change and systemic forms of inequality (Fine, 2023; Roosvall and Tegelberg, 2015).

To date, very little of the vast body of research on climate journalism (e.g., Guenther et al., 2023; Nisbet, 2009) has focused on the perspectives of Indigenous peoples. In general, what research does exist has found that the non-Indigenous news media has persistently ignored Indigenous perspectives around climate change (Belfer et al., 2017; Roosvall and Tegelberg, 2013, 2015). Moreover, non-Indigenous outlets frequently dismiss the value of Indigenous knowledge, particularly when it conflicts with Western science or its underlying values (Belfer et al., 2017). Examples in our corpus include local harms of rare-metal mining for batteries required for large-scale electrification, wind farms that disrupt reindeer grazing grounds, and nature preserves that displace long-standing communities.

Our efforts focus on the representation of Indigenous peoples, climate problems, and climate solutions in news stories across several different types of U.S. news outlets. Across different types of outlets, we ask:

RQ1: How are stories that include climate solutions framed? Specifically, do they open with a focus on providing benefits or preventing harms, and for individuals or collectives (cf. Janoff-Bulman and Carnes, 2018; Thomas et al., 2023)? Do they focus on mitigation (i.e., addressing causes of climate change) or adaptation (i.e., addressing harms) (Swain, 2022)? Who are positioned as the primary causers, solvers, and sufferers of climate problems? What kinds of solutions are focused on? And how, if at all, do stories represent traditional knowledge (Belfer et al., 2017; Roosvall and Tegelberg, 2013, 2015)?

RQ2: Who is positioned as an expert, and particularly as a problem-solver? Journalists rely heavily on expert sources, and they also play a key role in positioning certain types of people as experts and certain types of knowledge as expertise (Albæk, 2011; Boyce, 2006). Who do journalists quote, either directly or indirectly (Calsamiglia and López Ferrero, 2003)? Do journalists characterize them by demographic or personal characteristics, professional characteristics, institutional characteristics, credentials or accomplishments, relationships to others, or some combination of these? And how do these journalistic choices contribute to stereotypes about climate problems, climate solutions, and climate problem solvers?

1.1 Types of outlets

Belfer et al. (2017) examined reporting on climate change and Indigenous peoples from four English-speaking countries between 1995 and 2015. They found several widespread trends across countries: First, news coverage largely treated Indigenous people as "intermediaries of urgency" (Roosvall and Tegelberg, 2013) who experience climate change most directly, rather than agents in their own right. Second, coverage was narrowly scoped; there was little to no context about colonialism and marginalization as core vectors of vulnerability that might themselves require a response. This absence frequently led to writing that treated Indigenous communities as responsible for choices that were made under duress, such as living in remote locations. Third, while many news reports mentioned traditional or Indigenous knowledge, it was nearly always treated as subordinate to scientific ways of knowing.

Belfer et al. (2017) called for an expansion of this research to compare different types of media, particularly outlets across the political spectrum. We respond to this call by comparing institutional U.S. media[4] with different ideological leanings as well as two types of specialized outlets: those focusing on climate, and those focusing on Indigenous peoples. The modern media landscape is routinely described as high-choice, and the topic of climate is no exception. Climate change has become profoundly politically polarized in the US since the 1990s (Nisbet, 2009), and exposure to news sources with different political leanings has been linked to distinct climate attitudes (Newman et al., 2018). In addition, specialized sites that report primarily or exclusively on climate play an increasingly important role as a source of news (Painter et al., 2022; Russell et al., 2023). Meanwhile, Indigenous researchers have found that Indigenous publications are far more likely than non-Indigenous ones to frame COVID-19 stories thematically, grounding them in cultural context rather than focusing on communities' lack of resources (LaPoe et al.,

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1 Here and throughout this article, we use the term "journalists" broadly to refer to all of the people involved in producing and distributing news, especially reporters, editors, and producers.

2 We use the term "Indigenous" both as a matter of preferred self-reference for consistency with previous literature.

3 The term "stereotyped knowledge" refers not only to social groups (e.g., Hinton, 2019; Lippmann, 1922), but also to simplistic, rule-based category distinctions assigned to different objects and events [for an extended investigation of rule-based categories, see Bruner et al. (1956)]. Specifically, stereotyped knowledge is a cognitive representation that has several traits: (1) it is shared between members of a particular social group; (2) it assumes simple and strong correlations between a single feature (which is often used as a label) and all other features; (3) it is used to draw (often negative) contrasts between one thing and another; (4) it is not based on direct observation; (5) it is applied uniformly; and (6) it is treated as inviolable and often revealed only in violation. News and other media provide a window onto the landscape of stereotyped knowledge by illustrating the common roles that particular social actors play (see, e.g., Carvalho, 2008).

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4 We refer to "institutional media" to highlight the relative power of legacy media organizations as well as to avoid the Othering assumptions inherent in the term "mainstream media." (See Klaproth, 2023, ch. 4 for further discussion).

2022); we anticipated the same trend would hold for climate change. Moreover, there has been almost no research on how climate change is reported in news media by and for ethnically minoritized communities [but see Takahashi and Salas (2024)], despite racialized differences in how people understand environmental issues (Song et al., 2020).

2 Framing

The concept of framing is used across fields, albeit sometimes inconsistently, to refer to the larger way in which issues and actors are presented [see Boykoff (2009), Guenther et al. (2023), Schäfer (2012), and Swain et al. (2022) for climate-specific reviews]. Whether climate change is treated as factual or up for debate is a matter of framing (e.g., Brüggemann and Engesser, 2017), as is who is held responsible (e.g., Liu and Huang, 2023).

Entman (1993, 52) provides one of the clearest definitions of framing: "To frame is to select some aspects of a perceived reality and make them more salient i n a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described."

In the Goffman (1974) ethnographic tradition, we focus on the texts themselves, specifically the linguistic and rhetorical strategies used. We give particular attention to the first paragraphs (in text) or minutes (in video) of news stories, since they set the tone for the rest of the piece.

We treat each of Entman's four goals below.

2.1 Defining solutions—and problems

Broadly speaking, the problems associated with climate change can be grouped into two larger categories: the causes of climate change, and its environmental effects. Similarly, solutions can be broadly grouped into mitigation and adaptation (cf. Swain, 2022).

We focus on solutions rather than problems because there is some evidence that hope-driven climate media may be more effective than media that focuses on fear (Johns and Jacquet, 2018; O'Neill and Nicholson-Cole, 2009), although the evidence remains mixed (Ettinger et al., 2021). In particular, hope-driven communications must be rooted in solutions rather than in the false hopes of denying or minimizing anthropogenic climate change (Geiger et al., 2023). One growing approach, which focuses on solutions rather than simply on problems, is known as constructive journalism (McIntyre and Gyldensted, 2018).[5] Not only does this form of journalism show promise for raising support for collective climate action, perhaps because it expands feelings of control (Their and Lin, 2022), climate change educators are

increasingly learning from its principles (Höhle and Bengtsson, 2023).

2.2 Moral evaluation

News stories often open with some sort of hook—a reason to care. Most research on moral framing leans heavily on moral foundations theory; a recent review argues in favor of including a broader range of moral theories (Brugman, 2024). We are particularly interested in framing that emphasizes duty and obligation either to oneself or others. As such, we focus on "the model of moral motives," which Brugman (2024) specifically cites as a relevant alternative.

Psychologists use the term "moral motives" to refer to human needs to protect and nurture the people around ourselves (Janoff-Bulman and Carnes, 2013), which encompass the full social scale from the self to the societal. (Note that the term "moral" is descriptive rather than evaluative.) The framework assumes that human prosociality is foundational to being human [for theoretical syntheses of evidence see Tomasello (2014, 2019, 2020)] and for human survival (Tomasello et al., 2012). Human prosociality is automatic (Zaki and Mitchell, 2013) and emerges early in development (Hepach et al., 2013), ahead of norm learning and internalization (Warneken and Tomasello, 2015). Scholars have increasingly argued (Thomas et al., 2023) that prosocial motives for learning complement the intrinsic value of science, which was the focus of a landmark 2009 report (National Research Council, 2009) that connected the dots between identity, knowledge, attitudes, and motivations for STEM learning.

In the context of journalistic framing, studying moral motives means asking: Do news stories focus on providing benefits or preventing harms? And for whom? Do they focus on individuals or collectives?

2.3 Causal interpretation: experts and problem-solvers

We see climate solution stories as including up to four primary roles (Figure 1). There are *causers* of climate change, and *solvers*, both of whom are presented as active participants. Then there are those who are most harmed by climate change—and by its solutions. We refer to these roles as *victims* of climate change and *sacrificers* of solutions. None of these roles are mutually exclusive.

Focusing on these roles allows us to identify the types of people and groups that are represented as active participants and those treated primarily as passive recipients of others' actions. Similarly, focusing on people who are quoted in news stories helps us identify the forms of expertise that journalists treat as relevant.

Expertise is not simply a trait of individuals but must be negotiated between parties in a conversation. Having the "right" credentials does not guarantee that one will be treated as an expert in the media (or, for that matter, that one will be interviewed or quoted at all); the interviewer or writer must also communicate the appropriate stance (Calsamiglia and López Ferrero, 2003; Lindwall and Lynch, 2021; Piirainen-Marsh and Jauni, 2012). All people have many different identities, which are made more or less salient in different contexts. Our relationships with these identities are shaped by widely shared

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5   The terms constructive journalism and solutions journalism are frequently used interchangeably. However, many scholars define "solutions journalism" more narrowly: not only does it focus on tangible responses to problems, it must also provide reliable data on their effects and include mobilizing information for audiences (McIntyre & Lough, 2021).
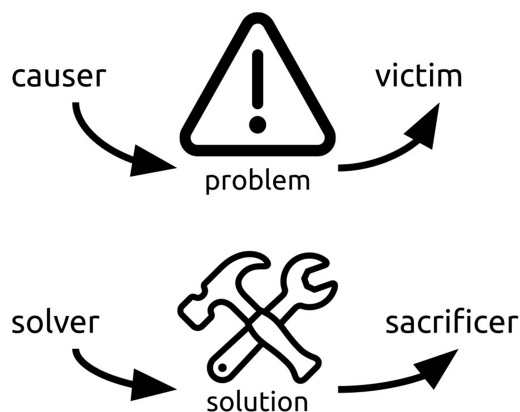
FIGURE 1
Primary roles in climate solutions stories.

narratives seen in news media and other pervasive cultural discourses (McAdams, 2019; McLean et al., 2018).

A single person might be a wife and mother, a citizen of the Navajo Nation, and a climate scientist who works for the state government. Choosing which of these to mention is one way in which journalists attribute the expertise of the people they quote, because of normative assumptions that all pertinent information, and only pertinent information, will be shared (cf. Grice, 1989). Focusing on these choices allows us to analyze discursive choices by which people (in this case, journalists) confer or withhold structural power from individuals and groups (Bucholtz and Hall, 2004).

3 Methods

We developed a codebook that was heavily informed by the theoretical perspective described above and tested it repeatedly with related stories. Once it was finalized, we sampled stories from the 18 selected outlets, coded all stories, calculated descriptive statistics, and turned to qualitative methods for additional findings.

3.1 Codebook development

Four researchers iteratively developed the codebook based on the considerations and theoretical framework outlined above. In each round, at least two of us would code a small sample of news stories from different types of outlets. Then all four of us would discuss and revise the instructions accordingly.

The full codebook is available as Supplement A.

3.2 Data collection and sampling

We sampled stories published in 2023 from six outlets in each of the three categories: institutional U.S. media, climate-focused, and Indigenous-focused. The list of institutional outlets was adapted from

a list of the most trusted US outlets as of February 2022 (Morning Consult, 2022), with attention to maximum variation in terms of medium, ideological leaning, and prestige.[6] We initially attempted to include Fox News in our data set, but none of the stories met our inclusion criteria, as climate solutions were not substantively discussed in any story returned by our search procedure.

The lists of specialist climate- and Indigenous-focused outlets were developed in dialogue among the three collaborating organizations. The list of climate outlets was also informed by others' research (especially Russell et al., 2023). The list of Indigenous outlets was led by the Indigenous journalists on our team and further informed by work in Indigenous Standpoint Theory (Azocar et al., 2021; Carter Olson et al., 2022; LaPoe et al., 2022).

No single database contained all selected outlets, and many of the smaller outlets were not represented in news databases at all.[7] As such, we used a discrete sampling strategy for each category.

We searched each individual *institutional* outlet in Factiva for stories published in a consistent one-year interval (i.e., 01/01/2023–12/31/2023), using a query incorporating several climate solutions-related terms, which differed slightly for print and broadcast outlets (see Supplement B). Prior to sampling, we tested potential queries to ensure that a reasonable number of search results appeared to deal with solutions to climate problems even when not sorted by relevance. The query, date range, any other filters, and the sort order used for results were recorded for replicability (Supplement B). We then randomly sampled stories from each outlet and analyzed the first 8 which met our criteria for solutions-focused stories.

For *Indigenous* news outlets, the number of stories tagged as "environment" or "climate" (or appearing in a search for these terms, depending on the site) is low enough that we manually screened the full set of results from the one-year window for solutions-focused stories and sampled from those.

For *climate* news outlets, story volume is higher overall, and solutions-focused stories are also more frequent. In this case, we generated a list of 10 random dates and included the most recent five

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6   The top ten outlets on that list were ABC, CBS, NBC, Google News, USA Today, The New York Times, CNN, The Wall Street Journal, Fox News, and The Washington Post, respectively. Because Google News does not produce news content, we replaced it with the legacy journalism outlet participating in this collaboration. We first reduced the list to seven: because the top three (ABC, CBS, and NBC) are broadcast networks that are similar in tone, we selected ABC since it was the highest ranked and we had the best access to the content. The New York Times and The Washington Post are also somewhat similar; we selected The New York Times for the same reason. We could not reduce the list further without compromising the diversity of sources.

7   See, e.g., Buntain et al. (2023), Gilbert and Watkins (2020), and Gilbert et al. (2024) for discussions of the strengths and weaknesses of various news databases. In this case, our selection was primarily informed by Factiva's inclusion and coverage of specific outlets. We also employed considerable manual processing of search results; see Appendix B. That said, we acknowledge that proprietary contracts between institutions and databases may mean that results are inconsistent even within a specific publication and recognize this as a limitation of the method. We also thank an anonymous reviewer for encouragement to expand our discussion of this point.

stories published on or before each date, then randomized the list to select stories.

In all cases, we excluded letters to the editor, opinion pieces, book or movie reviews, and audio or video over 20 min with no available transcript. We also excluded search results that were off-topic or did not discuss at least one concrete action which is being taken or proposed to proactively address harm or risk posed by the climate crisis.

Supplement B provides further detail about the sampling process, and Supplement C contains the final list of stories analyzed.

3.3 Data analysis

After the researchers independently coded several stories, one researcher coded all remaining stories. A second researcher provided triangulation by reviewing all coding and discussing any questions or discrepancies until both researchers were satisfied with the final codes applied.

We then calculated descriptive statistics. After a preliminary qualitative analysis, we conducted significance testing to confirm whether these observable differences between types of outlets could be attributed to chance. Wherever possible, we made two-way comparisons rather than three-way (pairwise) comparisons, particularly because the largest differences were between the Indigenous sources and the other two types.[8] Even so, some comparisons had very small numbers of observations, meaning a χ^2 test would not be appropriate, so we used Fisher's exact test. A commonly used measure of effect size for this test is the odds ratio (Rudas, 1998), which measures the association of a particular outcome with a particular condition. For example, an odds ratio of 3.0 means that the odds of an event occurring are three times higher in one condition than another. (Note that the odds ratio is not a measure of risk.)

Last but not least, we turned to close reading, narrative analysis (De Fina and Georgakopoulou, 2012; Ochs, 2005), and collaborative dialogue to shed further light on some of the compelling patterns we saw in our initial analysis. Narrative analysis provides systematic methods for identifying temporality, causal relationships, actors, and power dynamics in stories, both those told by individuals in interaction and more formal stories like news reports.

4 Results

There was considerable qualitative variation within the three broad categories of outlets.

The institutional outlets were split between primarily text (*The Wall Street Journal*, *The New York Times*, *USA Today*) and primarily video (*CNN*, *ABC*, *PBS News Hour*) outlets, while all other types of outlets were primarily text outlets. While USA Today focuses on news-you-can-use (Brockus, 2008), the other two print sources are considered part of the prestige press. Moreover, our Factiva search for ABC returned many more results for "Good Morning America,"

which focuses on soft news and human interest, than for their hard news shows, which were also incorporated in the database.

The Indigenous outlets largely publish stories about a broad range of topics. Some smaller sites, like *Indianz.com*, publish relatively little original content but syndicate articles from across the internet. Others, like *NDN Collective*, are primarily advocacy organizations, but they serve a secondary function of providing news to Indigenous audiences. *Underscore* has a regional focus on the Pacific Northwest and *APTN* focuses on Canada, while the others have a broader North American focus.

The climate outlets differed from one another in their intended audiences. While *Grist*, *Inside Climate News*, and *EcoWatch* all report on climate for the general public, *Climate Central* works to support journalists with their research reports and issue briefings, *Climatewire* has a heavy focus on policy, and *Earth News* focuses on research for a scientific audience.

4.1 Moral framing

The most common appeals to moral motives across all types of outlets focused on harm to collectives (Table 1). Climate change "wreaks havoc across the globe" (Good Morning America, 2023a, 23 September 2023); it threatens "human life, tribal facilities, and overall infrastructure" (Celestine, 2023); it will even "increasingly exacerbate risks to U.S. national security interests" (Cho, 2023). Solutions are largely discussed in terms of the protection they offer against these harms, rather than additional benefits they might offer.

In institutional stories, benefit framing typically appeared in stories about consumer-facing solutions like carbon-friendly cruise ships (Diller, 2023) and ecological gardening (Roach, 2023). Meanwhile, only a single climate outlet, *Inside Climate News*, used benefit framing at all. These stories also focused primarily on consumer-facing solutions, including subsidies for rooftop solar (Gearino, 2023a) and cars built with low-emissions steel (Gearino, 2023b). In fact, climate specialist outlets were less likely ($p = 0.013$, odds ratio = 0.375) to appeal to moral motives at all, frequently opening with a dispassionate and technical introduction to the problem and solution at hand.

Indigenous outlets included more stories with a focus on collective benefits ($p = 0.012$, odds ratio = 3.91) than the other two types, particularly in stories focusing on the interdependence of people, animals, and land. In particular, a number of stories about Indigenous stewardship, food sovereignty, and land management—a common topic only in the Indigenous outlets—highlighted the benefits to people and animals alike.

4.2 Problems and solutions

Institutional and climate journalism appear to focus on similar problems (Table 2): these two sets of stories were roughly equally likely ($p = 0.62$) to focus on mitigating the causes of climate change and on adapting to a changed climate. Meanwhile, Indigenous outlets were much more likely ($p = 0.006$, odds ratio = 3.18) to tell stories about solutions that brought adaptation and mitigation together—and much less likely ($p < 0.001$, odds ratio = 0.262) to consider mitigation in isolation. The relative prevalence of stories about stewardship,

8   Pairwise comparisons are available in Supplement D.

TABLE 1 Moral motives framing used, by outlet type (N = 48 stories per outlet type).

Moral motives	Institutional	Climate	Indigenous
Harm to "you"	1	1	0
Harm to individuals	2	2	1
Harm to collectives	21	13	19
Benefit to "you"	4	1	0
Benefit to individuals	0	0	1
Benefit to collectives	3	3	10
None	12	22	11
Other	5	6	6

described above, contributed to this difference. We also observed during the development of the data set that many of the institutional and climate outlets provided considerable episodic reporting on environmental issues like clean water and animal wellbeing, while the Indigenous outlets chose to contextualize these kinds of topics in broader climate issues.

All three types of outlets displayed a similar balance between "soft" (policy, administrative, or fiscal) solutions and "hard" (technological, including old technologies like planting trees and seeding oyster beds) ones (Table 3). However, Indigenous outlets were far more likely ($p < 0.001$, odds ratio = 54.00) to mention traditional or Indigenous ecological knowledge than the other two types: 38 of the 48 stories in Indigenous outlets did so, compared with just four stories in institutional outlets and two in climate outlets.

Two of the four institutional stories were *USA Today* pieces about Indigenous stewardship of the Klamath river, which were written by a single Indigenous journalist (Krol, 2023a,b); the third and fourth were *New York Times* pieces, one about a relocation agreement between Tuvalu and Australia (Frost N., 2023) and the other about Canadian approaches to wildfire prevention (Isai and Austin, 2023). Meanwhile, the two stories in climate outlets focused on silvopasture, or using the same land for tree planting and animal grazing (Chilukuri, 2023), and Colorado River water rights (James, 2023). Of these six, only the *USA Today* stories had a central focus on Indigenous practices and knowledge; in several of the others, it was mentioned only in passing. For example, the only reference to traditional knowledge in one story was a brief aside: "A USDA survey from 2017 showed that only 1.5% of U.S. farmers practice any kind of agroecology, the ancient regenerative farming movement that includes silvopasture" (Chilukuri, 2023).

4.3 Roles and problem solvers

Because of the types of stories we excluded from our data set, nearly every story from every outlet identified a problem-solver (Table 4). On the other hand, only half of stories across types of outlets identified actors who were primarily responsible for climate change. Climate outlets' stories had fewer victims of climate change than institutional stories, and Indigenous outlets identified victims more often than the other two types, but both of these results could be attributed to chance ($p = 0.41$ and 0.074, respectively).

In general, victims were much more likely to appear in stories about adaptation solutions ($p < 0.001$, odds ratio = 7.30) whether they included a mitigation component or not, than stories that were

TABLE 2 Types of problems addressed, by outlet type (N = 48 stories per outlet type).

Problem type	Institutional	Climate	Indigenous
Adaptation	13	9	14
Mitigation	28	26	12
Both	5	9	17
Unclear	2	4	4

TABLE 3 Types of solutions addressed, by outlet type (N = 48 stories per outlet type).

Solution type	Institutional	Climate	Indigenous
Soft	21	21	22
Hard	16	16	19
Both	10	7	6
Unclear	1	4	1

TABLE 4 Roles included, by outlet type (N = 48 stories per outlet type).

Roles	Institutional	Climate	Indigenous
Solvers	46	45	47
Causers	24	25	14
Victims	24	19	34
Sacrificers	17	14	14

exclusively about mitigation (Table 5). This is an expected result, since focusing on impacts rather than causes requires understanding *who* is impacted.

There were few differences between types of outlets in terms of most types of descriptors used for problem-solvers. Institutional outlets focus on individual problem-solvers more frequently than the other two types, but this finding could be attributed to chance ($p = 0.08$). A total of 14 institutional stories focused primarily on individual solvers, compared to seven stories in climate outlets and eight stories in Indigenous outlets. Individual politicians (PBS News Hour, 2023c, March 13, 2023; Davenport, 2023; Frost N., 2023; CNN Newsroom, 2023, September 20, 2023; Good Morning America, 2023b, November 7, 2023; Fareed Zakaria GPS, 2023, July 2, 2023) and CEOs (Dvorak, 2023; *Good Morning America*, May 8, 2023)—as well as the reader, indicated by the second-person pronoun "you" (Fenton, 2023; Frost A., 2023; PBS News Hour, 2023b, January 19, 2023; Good

Morning America, 2023c, December 26, 2023)—comprised most of the individual solvers in the institutional stories, rounded out with two stories about individual activists. Second-person solvers did not make an appearance in the other two types of outlets, while researchers joined the types of leaders highlighted.

The authors found the relatively high number of individual solvers somewhat surprising. Since nobody can truly solve a problem of this magnitude alone, presenting problem-solvers in this way presupposes an individualistic approach to achievement [compare Echterling (2016)]. Even policies, a prototypical collective solution, were regularly framed as the accomplishment of a single named political leader, rather than ideas put forward and operationalized by coalitions.

4.3.1 Indigenous peoples as problem-solvers

The other major difference between types of outlets was in the presentation of Indigenous peoples. Specifically, the Indigenous outlets were many times more likely ($p < 0.001$, odds ratio = 41.6) to focus on Indigenous problem solvers than either of the other two types of outlets (Table 6). Not a single story in any climate outlet focused primarily on an Indigenous problem solver, and only three institutional stories did. Note that these results do not suggest that climate outlets never publish stories about Indigenous problem solvers, but simply that they are far outnumbered by stories about non-Indigenous problem solvers. *Grist*, for example, has an Indigenous desk that publishes frequency, yet we still saw no Indigenous problem-solvers among the Grist stories.[9]

The only three institutional stories with Indigenous solvers were described above because they contained references to traditional knowledge (Frost N., 2023; Krol, 2023a,b). By contrast, *most* of the stories from Indigenous outlets featured Indigenous solvers. And the nineteen stories that did not feature Indigenous solvers were largely critical in tone, frequently highlighting the solutions' disproportionate impacts on Indigenous communities.

No story in any outlet focused on Indigenous peoples as primary *causers* of climate change, and none of the stories from climate outlets in our sample focused on Indigenous peoples in *any* role (Table 6). On the other hand, Indigenous outlets were much more likely to feature Indigenous people in all roles (except as causers of climate change) than the other two types of outlets ($p < 0.001$, odds ratio = 21.9 for victims, 46.8 for sacrificers). This finding is not particularly surprising, given that these outlets focus on reporting by, for, and about Indigenous communities, but it does highlight their erasure in the institutional outlets. Consistent with previous research (Roosvall and Tegelberg, 2013; Belfer et al., 2017), Indigenous people constituted about twice as large a proportion of primary victims as of primary solvers in institutional outlets' stories, whereas they were a slightly larger proportion of primary solvers than of primary victims in Indigenous outlets.[10]

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9   For example, suppose one in every twenty stories focused on an Indigenous problem solver. In that case, two-thirds of all randomly selected samples of eight stories would contain no stories with Indigenous problem solvers.

10   Because of the nature of our sample (which excluded stories that did not focus on solutions), we cannot draw meaningful statistical inferences here. That is, the balance of roles in our sample is unlikely to look like the balance of roles in a broader sample of climate journalism.

TABLE 5 Stories with a primary victim, by outlet and solution type (N = 48 stories per outlet type; "Total" row indicates number of stories identifying a primary victim).

Problem type	Institutional	Climate	Indigenous
Adaptation	12 (of 13)	6 (of 9)	13 (of 14)
Mitigation	8 (of 28)	7 (of 26)	6 (of 12)
Both	4 (of 5)	5 (of 9)	12 (of 17)
Unclear	0 (of 2)	1 (of 4)	3 (of 4)
Total	24	19	34

TABLE 6 Indigenous people in focal roles, by outlet type (N = 48 stories per outlet type).

Roles	Institutional	Climate	Indigenous
Solvers	3 (of 46)	0 (of 45)	28 (of 47)
Causers	0 (of 24)	0 (of 25)	0 (of 14)
Victims	4 (of 24)	0 (of 18)	24 (of 34)
Sacrificers	1 (of 17)	0 (of 14)	9 (of 14)

TABLE 7 Who is asked to make sacrifices to respond to climate change, by outlet type (N = 48 stories per outlet type; "Total" row indicates number of stories identifying a primary sacrificer).

Problem type	Institutional	Climate	Indigenous
Sacrificer is causer only	10	7	4
Sacrificer is victim only	2	2	6
Sacrificer is both	2	1	0
Sacrificer is neither	3	4	4
Total	17	14	14

4.3.2 Characterizing climate problem-solvers

Our second research question focused on the types of people and institutions that journalists position as problem-solvers, and how they are characterized.

We found the different types of descriptors less valuable than we had initially anticipated, because the major players were described in multiple ways in most stories. Professional and institutional descriptors co-occurred constantly: it was rare to see a person's title without their organization, and many organizations have names that clearly indicate their field.

Demographic characterizations of non-Indigenous problem solvers were relatively rare in our data set. (Since we only categorized solvers as Indigenous if they were identified as such, *all* Indigenous solvers were characterized demographically.) The location of city, state, and local governments was the most common demographic characterization of non-Indigenous problem solvers. Location (city or nationality) was also provided for some individuals, as was age. Our data set includes *no* examples of a non-Indigenous person explicitly categorized by race or ethnicity, although names were sometimes strong cues in this regard. There is also at least one example where an individual is not explicitly identified as Indigenous (Schwartz, 2023), although their given name and hometown suggest as much to readers with relevant knowledge, and they are identified as Indigenous in other sources outside this data set.

We observed some patterns in broader categories of problem-solvers, which appeared across all categories of outlets: government agencies and politicians, corporations, researchers and academic institutions, and non-profit organizations and activists.

Stories in Indigenous outlets had more government problem-solvers than any other type of outlets, and many of these were tribes and tribal leadership. This category also included Indigenous analogues of government agencies, such as the Columbia River Inter-Tribal Fish Commission and the Northwest Indian Fisheries Commission. Moreover, the *only* Indigenous problem solvers featured in institutional media were tribal governments and Indigenous political leaders, while Indigenous media also included researchers and non-profits among the Indigenous problem solvers.

Institutional media included more stories about corporations as problem-solvers than the other two types of media, while Indigenous media was almost entirely critical of the solutions led by corporations. The following section focuses on the most widespread critique.

4.4 Overarching narratives

There was one overarching narrative that appeared at least once in every single Indigenous outlet, as well as in the two Indigenous-authored USA today stories: "green colonialism." When institutional or climate publications critiqued proposed solutions, it was typically for reasons of economic or practical feasibility. In contrast, the Indigenous outlets frequently reported on the colonial logics underpinning climate projects: building windmills on Sámi land without permission disrupted reindeer herders' ability to do their work (Rasmussen, 2023); rare-metal mining operations did not take appropriate care of Indigenous sacred sites (Ricketts, 2023); cost–benefit analysis does not appropriately value relationships with land (Estus, 2023). Only the Indigenous outlets were unequivocal that just and ethical climate solutions require the partnership of Indigenous people who care for the land that provides resources. On the other hand, stories in our data set from institutional outlets rarely centered the perspective of Indigenous people, even on topics where they have been publicly vocal about their rights, such as the ongoing debate over Colorado River water use (*PBS News Hour*, February 3, 2023).

Indigenous outlets also told more stories where the sacrificers of solutions were victims rather than causers of climate change (Table 7). That is, the people being asked to give something up to respond to climate change were those who were disproportionately harmed by it, rather than those who were directly responsible for it. For example, a story about the Bureau of Land Management's proposed changes to oil and gas leasing, noted that the changes violate treaty rights despite awareness of disproportionate climate impacts on Indigenous communities (NDN Collective, 2023). In contrast, institutional outlets were much more likely than Indigenous outlets to focus on sacrificers who were themselves causers of climate change ($p = 0.032$, odds ratio = 5.62), particularly in stories about the transition away from fossil fuels. In this case, fossil fuel companies would lose out—but their loss was largely presented as appropriate, even just.

5 Discussion

5.1 RQ1: how are stories that include climate solutions framed?

Across institutional, climate-focused, and Indigenous news outlets, most stories that appealed to moral motives focused on how climate change harms groups of people. Out of the three outlet types, Indigenous outlets were most likely to highlight how a solution benefited others (for example, tribal stewardship of land benefiting the people and wildlife living there). Meanwhile, climate-focused outlets were less likely to use moral motives framing to draw in their audience.

Indigenous outlets were more likely to tell stories about solutions involving both mitigation of further climate change and adaptation to its existing effects, rather than one or the other. Across outlets, "soft" (policy and economic) and "hard" (technical) solutions occurred with roughly equal frequency. Traditional knowledge was rarely mentioned outside of Indigenous outlets.

5.2 RQ2: who is positioned as an expert, and particularly as a problem-solver?

While nearly all solutions stories identified an individual or group as responsible for the solution, fewer pointed to specific causers or victims of climate problems. Institutional outlets were more likely to identify individuals as problem-solvers than the other outlet types, and most of these individuals were politicians.

Indigenous outlets were far more likely to include Indigenous problem-solvers in climate stories. Outside of Indigenous outlets, Indigenous groups were rarely portrayed at all. Indigenous outlets also represented a much more diverse set of Indigenous people than other outlet types.

While all outlet types were equally likely to highlight how certain groups might be harmed by a proposed solution, institutional and climate outlets tended to identify companies and countries reliant on fossil fuels as sacrificers. Stories from Indigenous outlets identified how solutions examined uncritically in other outlets, like rare-earth mining for battery production, could still harm people who are already disproportionately affected by climate change.

5.3 Limitations and caveats

Our data set was relatively small, comprising eight stories per outlet and six outlets per type. Moreover, we included stories that appeared in an outlet regardless of where they were produced, based on our knowledge of news users' behavior. Partnerships and co-production and co-licensing agreements are common, however, and in practice, some stories that were produced by outlets in one category were analyzed as part of another category. Consider *Grist* as an illustrative example: although their overall focus is climate issues, and we categorized them as a climate outlet, they have a dedicated Indigenous affairs desk, and their stories regularly appear on Indigenous sites.

5.4 Implications

When it comes to climate solutions, climate journalism looks more like institutional journalism than either one looks like Indigenous journalism. Indigenous journalism is more likely to open with benefits, consider holistic solutions that address both adaptation and mitigation, and identify victims of climate change. Indigenous journalism is also much more likely to focus on Indigenous people in all roles, and to highlight traditional knowledge. These strategies are consistent with those Fine (2023) identifies for communicating about climate justice to social justice advocates who are not working on climate specifically: highlighting intersectional impacts and benefits of climate solutions to impacted communities.

The differences between institutional and climate outlets on the one hand, and their Indigenous counterparts on the other, illustrate some powerful stereotyped knowledge around climate problems, solutions, and problem solvers. Social stereotyping is both a strength and a weakness of human cognition; it has allowed us to function collectively by delegating some of our thinking to others, and it can both support and hinder learning. Stereotype violations likely function as "minimally counterintuitive stimuli" (cf., Upal, 2011). Minimally counterintuitive stimuli tend to be better remembered (Boyer and Ramble, 2001; Norenzayan et al., 2006) and elicit greater curiosity (Lewry et al., 2023), both of which may be key first steps for learning via updating false beliefs (Upal, 2010). The audiences of these outlets suggest parallels with climate advocates who are not engaged with social justice. Here, Fine (2023) argues for emphasizing local issues, promoting empathy, and advocating for systemic solutions.

Given the constraints specific to journalism, we suggest that institutional news can learn from Indigenous news in this area. Specifically, institutional outlets ought to consider:

5.4.1 Recognize that humans are part of nature

Institutional outlets typically focused on solutions that treated land as a resource that could either be exploited (through mining or gas extraction, for instance) or left fully alone (as a nature preserve). Meanwhile, Indigenous outlets focused on solutions that involved light-but-sustainable uses of land, like farming endemic plant species or cooperative fisheries management. These sustainable practices largely recognized humans as a key part of local ecosystems, not just a threat to them.

5.4.2 Take a holistic perspective

Indigenous outlets focused on many solutions that could both cut emissions and make it easier to live in a warming climate, while the other outlet types primarily considered mitigation and adaptation in isolation. Moreover, the Indigenous outlets consistently treated climate (change), nature, and the environment as a single phenomenon; this approach was rare elsewhere.

5.4.3 Seek out Indigenous perspectives

Perhaps the biggest difference of all was that Indigenous outlets took for granted that Indigenous people are primary rights holders, while institutional media rarely even recognized them as stakeholders or experts. This recognition typically went part and parcel with the idea that all humans are part of natural ecosystems, and has implication for sourcing practices.

5.4.4 Consider all four roles

Our role framework (causers, victims, solvers, and sacrificers) provides a reminder that can help journalists tell more nuanced and holistic stories. We encourage journalists to ask themselves if they have considered all four roles in their work and included all four among sources. The same people and groups may hold multiple roles, and understanding their relationship to both the problem and the solution can help make sense of a complex issue.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

JB-L: Investigation, Supervision, Funding acquisition, Conceptualization, Writing – original draft, Methodology. JV: Methodology, Writing – review & editing, Conceptualization. BA: Data curation, Formal analysis, Writing – review & editing, Methodology. NL: Project administration, Methodology, Writing – review & editing. RS: Methodology, Writing – review & editing. SV: Conceptualization, Writing – review & editing. PP: Writing – review & editing, Funding acquisition, Conceptualization. JB-B: Funding acquisition, Conceptualization, Writing – review & editing.

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Conflict of interest

Authors SV and JB-B were employed by ICT News. Author PP was employed by PBS News.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The authors declare that no Gen AI was used in the creation of this manuscript.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fcomm.2025.1617150/full#supplementary-material

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