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Community-based Polar Bear Risk Perception and Preparedness in Spitsbergen

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ABSRACT

Warming of the Arctic transforms land and icescapes and alters their corresponding biome. Polar bear distributions shift landwards while concurrently human activity intensifies as the Arctic becomes more accessible. These changes heighten the likelihood of human-bear interactions, which may result in negative or fatal consequences for either.

Effective polar bear safety management requires a holistic approach that integrates biophysical and social dimensions. While some biological knowledge on polar bear behavior and habitat use is available, there is a significant lack of community-based research assessing the effectiveness of existing safety regulations and practices. This study explores community perspectives on polar bear safety practices in Longyearbyen and Ny-Ålesund, Spitsbergen, adopting a community-based approach to examine how demographics and experiences influence practices and attitudes towards management. The findings reveal varying levels of preparedness, with key factors including discrepancies in firearm proficiency, outdoor activity patterns, experience with safety protocols, and levels of fear. Enhanced communication and collaboration among individuals and institutions, alongside standardized minimum training, are identified as critical measures to improve safety, preparedness, and community cohesion regarding polar bear practices and conservation. The study underscores the importance of proactive community engagement to foster resilience and effective management in Arctic environments.

Keywords:
Human-bear interactions, Polar bear management, Risk assessment, Community-based research, Arctic safety, Decision making under stress, Training efficiency.

1. Introduction

Between 1971 and 2024, Spitsbergen recorded 139 polar bear incidents, 16 of which were linked to research, four specifically to polar bear research (Sysselmesteren at SIOS, 2024). The Archipelago of Spitsbergen lies within the ranges of the Barents Sea polar bear population, which in 2015 was estimated to have ±250 land residing bears, and ±700 bears using the pack-ice (Aars et al., 2017). The Barents Sea population has been subject to the most rapid sea-ice habitat loss (Aars et al., 2017) and will undergo more profound sea-ice loss compared to other subpopulations (Laidre et al., 2015). The Barents Sea ice cover has reduced 20.2% per decade and the ice-free period lengthened by ±22 weeks since 1979 (Stern & Laidre, 2016; Aars et al., 2017). This ongoing habitat loss profoundly impacts polar bear behavior and shifts distributions landwards, increasing the frequency of human-bear interactions and potential conflict (Atwood & Wilder, 2021).

Historically, human-bear conflicts were minimal due to low human densities and natural barriers created by sea ice. However, as human activity in the Arctic increases and sea ice retreats, the risks of human-polar bear interactions rise, making effective management crucial. While more intensive regulations may be needed, they tend to negatively impact social tolerance toward wildlife, especially large carnivores, and hinder conservation efforts (Atwood & Wilder, 2021). To prevent or mitigate conflicts, a community-based research approach is needed to determine what management tools are effective or fail in mitigating conflicts. Understanding perspectives and concerns of local communities ensures that regulations are effective and socially accepted while contributing to both conservation and safety.

Current knowledge about the biophysical and social factors that influence human-bear interactions is insufficient for effective management (Clark et al., 2012). Improving conservation and safety requires a multidisciplinary approach.

This study focuses on the social factors that influence human-bear interactions and adopts a community-based approach to explore polar bear risk perception and preparedness among residents of Longyearbyen and Ny-Ålesund, Spitsbergen, using a community wide survey. There is a significant gap in community-based studies evaluating the effectiveness of safety protocols and regulations in mitigating human-bear conflicts. By addressing this gap, the study aims to uncover local perspectives on polar bear safety and preparedness,

leveraging community insights to identify gaps in safety protocols, regulations, and training. Such understanding is essential for designing effective strategies to promote human-bear coexistence. The central question is: How are polar bear safety protocols in Longyearbyen and Ny-Ålesund perceived and implemented in practice? Sub-questions explore how individual judgment, experience, fear, and training shape perspectives and influence management effectiveness.

The theoretical framework touches upon the current safety management practices in Longyearbyen and Ny-Ålesund alongside the community dynamics and examines decision making under stress. Subsequent sections detail the survey methodology, results, and their interpretation through the theoretical lens, highlighting discrepancies between local preparedness and regulatory expectations. Finally, the study discusses the identified gaps in management with recommendations for improving polar bear safety strategies in Spitsbergen while underlining the importance of implementing a community-based approach.

2. Conceptual framework

The Governor of Svalbard (Sysselmesteren) manages the safety protocols and regulations for polar bear protection on Spitsbergen. Travelers outside the settlement are required to carry polar bear deterrent equipment, typically a flare gun and a .308-caliber rifle. The effectiveness of polar bear safety equipment and practices depends heavily on local perceptions and preparedness.

2.1. *Knowledge fragmentation and divergence*

Longyearbyen and Ny-Ålesund have small communities with high turnover rates. Preparedness practices in these communities are vulnerable as they rely on social networks (Perry and Lindell, 2003). High population turnover disrupts the continuity of local knowledge, resulting in fragmented knowledge and safety routines. Layers of complexity are added by demographic subgroups (e.g., tourists, short-term and long-term residents, guides, and researchers), organizations and institutions (e.g., UNIS, Hurtigruten, KSAT, Store Norsk) and a strong social hierarchy. Risk perception and preparedness levels vary across social groups and are shaped by factors such as training and experience (Sinclair et al., 2012). Social roles lead to divergent responses to the same threat by influencing individual priorities and decision- making (Comfort, 2007).

Community risk perceptions and adherence to regulations also vary depending on tolerance and knowledge. For example, debates exist about equipment effectiveness, e.g. best practices for flare use. These discrepancies highlight divergent views and a lack of consensus on polar bear safety measures. Lauta et al. (2018) argue that extreme, resource-constraint environments often necessitate low-tech solutions, but without standardization can result in inconsistent outcomes and unintended consequences such as the desensitization of bears to specific deterrents. Such inconsistencies create potential safety hazards and weaken the overall effectiveness of polar bear management. Moreover, inconsistent practices and misaligned perceptions can exacerbate confusion and hinder coordinated responses in high-stress situations (Sinclair et al., 2012). Aligning risk perception with preparedness through education, training, and community engagement is hence crucial.

2.2. *Two-sided communication*

Communication plays a key role in the effectiveness of how regulations are implemented and carried out by the community. Safety training on Spitsbergen is typically offered by receiving organizations, but its content and delivery vary significantly. Standardized training protocols are lacking, and current programs often span a single day, including minimal firearm practice (e.g., firing 2 x 4 rounds) (SIOS, 2024). This is insufficient for developing muscle memory and psychological resilience, critical components for effective high-stress responses (Crichton & Flin, 2001). Klein's (2008) Naturalistic Decision-Making theory suggests that when under stress, individuals with limited training may experience decision paralysis or overreaction when faced with unanticipated threats due to insufficient training and preparation. Consequently, there is a risk of inappropriate responses to bear encounters, whether from lack of training, confidence, or fear response.

To address these shortcomings, simple tools such as standardized questionnaires could be implemented to evaluate the effectiveness of current training programs. Bai et al. (2018) demonstrate that well-designed questionnaires can identify essential factors influencing the transfer of training to real-world situations. In the context of safety training to deal with high stress situations, this method helps gauge the extent of preparedness achieved post-training and identifies specific areas needing improvement. Imaginary examples, which simulate decision-making scenarios, could further

provide valuable insights into an individual's ability to respond under stress, as supported by research on mental simulation (Gaba, 2004; Klein, 1998). These approaches enhance the evaluation of training outcomes beyond traditional assessment. Without this evaluative component, the extent to which training equips individuals to handle real-life situations remains unclear.

2.3. *The media test: a novel framework for evaluating preparedness*

To assess individual preparedness, and control during decision-making under high stress situations, I introduce the media test framework. Inspired by methods used by incident commanders and police chiefs, the framework evaluates an individual's initial cognitive reaction after a high-stress event. This reaction offers critical insights into an individual's situational awareness and emotional regulation, building on the emphasis of Flin et al. (2008) on post-incident analysis and findings of Driskell et al. (2006) on the importance of stress response in evaluating readiness and performance. The media test builds on these principles by incorporating direct questioning and scenario-based evaluation to examine whether individuals can apply learned skills effectively in unexpected situations.

The media test focuses on an individual's first thought following an intense situation. Preparedness is inferred from the content of this reaction: *reactive responses* (e.g., "oh no", "what did I do?", "regret", "relieve") may indicate inadequate training or heightened fear and a lack of control. *Proactive responses* (e.g., "is everyone safe?", "I need to check the person") suggest a higher situational control, preparedness and stress resilience but also indicates the person being in the moment. Whereas a *situational aware response* (e.g., "investigation", "media", "next steps") indicate full control and overview, awareness, and decisive well considered action and decision making under stress. The individual understands the situation and is aware of themselves and others and is able to navigate both immediate actions and long-term consequences. This approach provides a structured lens for assessing preparedness holistically, addressing cognitive, emotional, and technical dimensions.

In this study, the media test is adapted to mental simulations of polar bear encounters, categorizing participants' reactions to hypothetical scenarios to assess their readiness. Prepared individuals may focus on the next steps or reporting procedures, while less prepared participants might display fear-driven responses. Results are analyzed alongside factors like training, experience, and risk perception. While the media test offers practical insights, its reliance on hypothetical scenarios requires careful design to ensure realistic evaluations. By integrating this approach with other evaluative tools, such as surveys, the media test can be used to identify gaps in training and inform improvements in training for preparedness.

2.4. *Theoretical integration and framework*

Effective safety management requires an integrated approach combining social dynamics, perceptions, communication, and training efficiency and evaluation. Integrating theories such as Klein's NDM framework and the use of post-training questionnaires provide valuable insights and improve evaluation of preparedness. Furthermore, using the media-test framework offers a novel method to measure the effectiveness of training and preparedness. By focusing on initial responses to high-stress situations, it provides a holistic view of an individual's readiness.

This study uses these frameworks to analyze survey data from Longyearbyen and Ny-Ålesund, examining whether current safety protocols align with community needs and perceptions. The findings aim to identify gaps in preparedness and refine strategies for improving human and polar bear safety.

3. Methods

A survey was conducted in Longyearbyen and Ny-Ålesund, Spitsbergen, from October 18 to November 7, 2024, to assess participants attitudes, behavior, judgement, stress, fear response, and values related to polar bear safety and preparedness. The survey, available in English and Norwegian, collected both qualitative and quantitative data covering demographics, opinions, hypothetical scenarios, and real-life experiences. To maximize coverage and attempt a census among the population, the survey was made publicly available online through local Facebook and Signal groups, in-person during workshops, and via posters and flyers at community hot spots such as the supermarket, public companies, and the post office. No incentives were given, the survey depended on volunteer responses and therefore no exact response rate could be determined.

A total of 141 responses (104 in English, 37 in Norwegian) were collected, representing 6.4% of the adult population (n=2,217) (Statistics Norway, 2024). Krejcie and Morgan (1970) recommend a sample size of around 335 for a small population around 2.500, to achieve ±5% margin of error for a 95% confidence level (high precision). This survey reached moderate precision with a margin of error of approximately 8.2% at a 95% confidence level. The sample population includes a broad range of individuals but may be skewed toward those more engaged in outdoor activities or interested in polar bear safety. However, as this group is also the most exposed to potential risks, they are particularly relevant for evaluating safety measures and the findings remain valuable for informing safety practices in these communities. Furthermore, there are minor overrepresentations in the data (e.g. female participants; population = 1.030 (46.5%) vs. survey = 74 (52.5%)) (Statistics Norway, 2024) and one considerable (students: population = 350, (15.8%) vs. survey = 55 (39%)) (UNIS, 2025). The sampling biases were considered during analysis and interpretation to mitigate its effect. Given the response count, group distribution, and relatively low margin of error, the model was deemed moderately reliable for the study's purposes.

The survey employed anonymity, neutral question wording, and fostered a safe environment to encourage honest responses and reduce acquiescence bias. Additionally, small independent interviews confirmed that the survey accurately captured community perspectives.

Following data collection, responses were reviewed and analyzed. Open-ended answers were systematically categorized into recurring themes, with their frequency estimated as a percentage of relevant respondents. Media test responses were categorized as reactive, proactive or situationally aware based on emotional content, immediate action focus, and strategic thinking, providing insights into overall preparedness levels. Statistical analysis was conducted in R (R Core Team, 2024, version 4.4.0) by a series of Pearson's Chi-square tests of independence to test associations between target variables (e.g. fear of polar bears, decisions making in scenarios) and predictor variables (e.g., age, gender, experience) followed by post-hoc testing. Bonferroni corrections accounted for multiple comparisons (Holm, 1979) with statistical significance set at $p<0.05$.

4. Results

This study evaluates how polar bear safety protocols in Longyearbyen and Ny-Ålesund are perceived and practiced, focusing on individual decisions, experiences, and factors such as fear, training and demographics. A survey of 141 participants collected both quantitative and qualitative data, with results analyzed through Pearson Chi-square tests and post-hoc testing. Quantitative results are presented in section *4.1-4.5* as response percentages, while significant associations are highlighted. In section *4.6 Community Perspectives*, open-ended responses are summarized in recurring themes, and their frequency is given by a percentage of occurrence in the responses.

4.1. *Experience*

Among the participants, 27% reported to work or volunteer in emergency service roles (e.g. search and rescue). Hiking was common, with over half (57.5%) of respondents having undertaken more than 20 hikes around Spitsbergen. Additionally, 81% possess permits to own or borrow a rifle, though 52% have limited shooting experience, with 2% having no experience, 24% having attended one day of training, and 26% having fired a firearm 1–5 times.

Polar bear encounters were reported by 28% of respondents, with 25% experiencing fear during these encounters. Those who felt fear were less likely to feel prepared for future encounters ($X^2=1.1$, $p<0.01$). However, 85% of those who had encountered a bear reported feeling more prepared afterward. Encounters were more likely among emergency service personnel ($X^2=20$, $p<0.001$), frequent hikers ($X^2=30$, $p<0.0001$), and individuals in education or tourism industry, while students are less likely to have an encounter ($X^2=40$, $p<0.001$).

4.2. *Perceptions*

Most respondents (87%) perceived the likelihood of a polar bear encounter low, with researchers being an exception perceiving the chance high ($X^2=32$, $p=0.002$). Fear of polar bears was noted by 38% of participants, where hunters are unlikely to be afraid ($X^2=21$, $p=0.04$). A sense of safety while hiking alone was reported by 69%. Those feeling safe were more often emergency service personnel, frequent hikers, or experienced firearm users ($X^2=7$-23, $p<0.01$) while those who do not are associated with fear for bears ($X^2=19$, $p<0.001$).

Moreover, 17% of participants believes to survive a polar bear attack without protection. This belief was significantly associated with emergency service members (X^2=6, p=0.01).

While 82% claimed to consider the safety of the polar bear if on a hike without protection, interviews suggested this response may have been influenced by acquiescence bias, as only one participant noted concern for the bear's welfare when deciding not to carry protective equipment.

4.3. *Opinions on regulations*

Most participants (89%) considered current polar bear safety regulations adequate. However, participants aged 46–55 and those with limited hiking experience (1–2 hikes) were more likely to view the regulations as insufficient (X^2=13-21, p<0.04). Two thirds of respondents (66%) felt that newcomers to Spitsbergen are inadequately trained to handle a rifle. Additionally, over half (53%) believed newcomers act unsafely regarding polar bear safety. Regarding the appropriateness of regulations, 65% found them sufficient, 26% felt stricter measures were needed, and 8% believed the rules to be excessive.

4.4. *Decisions*

Outside the settlements, polar bear protection is required. 43% of participants have ventured outside the "safety zone" without protection, with 62% feeling safe doing so. This confidence was associated with frequent hiking and firearm expertise (X^2=7-19, p=≤0.01).

At Varden, a popular viewpoint outside Longyearbyen, where polar bear protection is mandatory, 33% believed it was safe to visit without protection. Those who felt safe were frequent hikers (X^2=17, p=0.005), while those fearing polar bears, those feeling unsafe hiking alone, and those considering regulations inadequate disagreed (X^2=6-29, p≤0.02). When provided with the hypothetical option to carry a flare gun, 62% felt safe going to Varden.

In a low stress scenario, requiring the operation of a rifle to protect oneself from a polar bear, 80% of respondents felt confident in their ability to operate the rifle. Confidence was strongly linked to prior bear encounters, frequent hiking, and firearm experience (X^2=6-38, p<0.01). Conversely, in a sudden close-range encounter scenario with no preparation time, 74% chose to use a rifle, though only 69% felt confident doing so. Of the 9.5% choosing to operate the flare gun, 84% feel confident doing so. Furthermore, 5% expect to freeze, 3% to run and 1% to wait calmly. Fear of polar bears and minimal shooting experience (e.g., one day of training) were significant predictors of lack of confidence in these scenarios (X^2=18-108, p=0.01).

4.5. *Media test*

Responses to the Media Test revealed three distinct reaction patterns. Reactive responses—characterized by emotional distress, shock, fear, and regret—were given by 25% of respondents. Many of these individuals expressed emotional distress (*"I would cry," "Guilt," "Devastation"*), indicating a lack of preparedness or the overwhelming nature of the situation. Others simply showed confusion (*"I don't know what I would do"*), suggesting an absence of a clear mental model for handling high-stress encounters.

Proactive responses—indicating situational control—were the most common, accounting for 55% of responses. These individuals focused on immediate actions, such as ensuring the safety of their group (*"Check that everyone is okay"*), securing the firearm (*"Reload the rifle"*), and notifying authorities (*"Call Sysselmesteren"*). Many emphasized verifying that the bear was no longer a threat before taking further steps.

Situationally aware responses, which reflect a high level of control and strategic decision-making, were provided by 20% of respondents. These individuals considered not just immediate actions but also long-term consequences, such as official investigations, documentation, and ethical concerns. Some responses suggested an understanding of how their actions might be perceived ("I hope this is counted as self-defense"), while others focused on the importance of learning from the incident ("This happened because I did not pay attention").

Situationally aware responses, which reflect a high level of control and strategic decision-making, were provided by approximately 20% of respondents. These individuals considered not just immediate actions but also long-term consequences, such as official investigations, documentation, and ethical concerns. Some responses suggested an understanding of how their actions might be perceived ("Shit, I hope this is counted as self-defense" or "the investigation"), while others emphasized a structured approach to post-incident management ("Take a deep breath, call the governor, document the situation").

Overall, the results suggest that while most respondents demonstrate a moderate to high level of preparedness in their immediate responses, a notable proportion experience emotional distress, uncertainty, or regret. This highlights potential areas for improvement in training programs, particularly in stress management, decision-making, and post-incident response strategies. Statistical analysis (X^2=5, p=0.02) further revealed that individuals with better rifle training, such as hunters and professionals, were significantly less likely to exhibit a reactive response, suggesting that experience with firearms may contribute to greater situational control and emotional resilience.

4.6. *Community Perspectives*

Reviewing the open-ended responses regarding suggestions and opinions, approximately 40-45% of respondents who answered emphasized the importance of training and firearm handling. Specifically, 20-25% stressed the need for more training in rifle use and emergency preparedness, and 10-15% expressed concerns about unsafe firearm handling, particularly among students and newcomers. Additionally, 10-15% suggested implementing mandatory, regular shooting practice to ensure competence under pressure.

A significant portion (15-20%) believed that many people do not take polar bear protection seriously and venture out unprepared, with 10-15% specifically pointing out that temporary visitors and tourists are often less aware of the risks compared to long-term residents. To address this, 5-10% proposed better education and awareness initiatives, such as mandatory airport safety videos, hotel information slips, and awareness campaigns.

The debate over reliance on rifles versus flare guns was also mentioned (10-15%), with respondents agreeing that both should always be carried but noting that many rely too heavily on just one method. Additionally, 15-20% supported the legalization of bear spray in Norway, citing its effectiveness elsewhere, and 5-10% suggested exploring other deterrents, such as whistles, and improving the use of existing tools like flare guns.

Understanding polar bear behavior was another recurring theme, highlighted by 20-25% of respondents. Among them, 10-15% stressed the importance of reading and interpreting bear behavior before reacting aggressively, while 10% noted that bears can often be deterred without lethal action. A smaller group (5-10%) advocated more research into bear behavior and non-lethal deterrence strategies.

Concerns about firearm safety protocols and enforcement were raised by 10-15% of respondents, with 5-10% expressing frustration over individuals disregarding regulations and putting others at risk. Some (5-10%) suggested systematic reporting of violations to authorities. Additional one-time mentioned ideas included employing dedicated polar bear guards for researchers, increasing international cooperation on polar bear safety measures, and organizing more community discussions and workshops.

5. Discussion

To the knowledge of the author, this study is the first-time assessment of community preparedness and perspectives regarding the implementation of polar bear safety protocols in Longyearbyen and Ny-Ålesund. Using a community-based approach, the study investigated the influence of demographics and training on preparedness and risk perception. Additionally, a new theoretical framework, the media test, was introduced as an instrument to assist in assessing preparedness. Here, demonstrating i.e. its use in a scenario concept to indicate a range of diversity of human responses to stressful situations correlated to training and to indicate preparedness.

5.1. *Challenges to evaluate polar bear safety management*

Currently, the effectiveness of polar bear safety management is unknown. The perceived chance of encountering a polar bear is low among residents, despite one in four respondents having encountered a polar bear in the field. Encounters are often nonaggressive in nature and go unreported. Records regarding (harmful) encounters and incidents are often kept within organizations and are not shared. Additionally, mistakes related to safety procedures, such as misfiring during the half-loading step of rifle preparation, are rarely documented. Fear of consequences and a prevailing culture of shame in organizations and the community discourage transparency. For example, local infractions, including fines, accidents, and legal matters, are reported in the Svalbardposten, the local newspaper, and may include names. Despite anonymity, individuals involved are easily identified in a small community. The “everyone knows everything” environment fosters reluctance to openly discuss safety incidences and therefore hinders learning and improvement opportunities in safety practices.

5.2. *Importance of standardized training and policy transparency in polar bear safety*

Preparedness in high-risk areas relies on standardized training and routine practice, particularly in remote populations. This study identified limited training and training inconsistencies as a key factor influencing differences in safety perception, preparedness and decision making among the community. To illustrate, while most respondents possess a permit to carry a firearm for protection, 52% report minimal firearm experience, often limited to half a day of practice. When participants were given scenarios of a hypothetical polar bear encounter, a majority would choose to use a rifle in the event of a charging bear, however, confidence in handling a firearm properly under stress varies greatly depending on experience and fear of polar bears. Newcomers and those with limited training reported feeling particularly unprepared. Even so, nearly half of the participants have ventured beyond designated safety zones without protection, and of those, 62% felt safe doing so. The lack of repeated, practical training undermines the development of muscle memory and stress resilience, which are crucial in handling scenarios under high stress successfully. This study clearly indicates that individuals with more training (e.g. weapon handling, or emergency services), more outdoors experience in the area, or having had a previous polar bear encounter, feel more prepared and confident. Klein's Naturalistic Decision-Making framework stresses the need for repeated exposure to high-stress scenarios to enhance decision-making in critical situations. In the survey, many respondents advocated for improved, ongoing training and stressed the importance of knowledge on polar bear behaviour.

Furthermore, using the media test framework, a large variety in participant responses to polar bear encounters was found, indicating high diversity in proficiency levels and individual beliefs regarding appropriate handling of these situations. The lack of consistent and standardized training is especially challenging in communities with a high turnover, as this disrupts informal knowledge-sharing networks and may lead to fragmented knowledge and inconsistent practices in polar bear safety measures, as seen by Perry and Lindell (2003) in other small communities regarding preparedness for emergency responses. This leaves newcomers less prepared and more prone to unsafe practices, as supported by this study where 66% of respondents felt that new arrivals lacked adequate training and 53% perceived newcomers to engage in unsafe practices., Divergences in community perceptions and practices complicate polar bear safety policy and adherence. For instance, interviews and the survey captured part of the ongoing debate around protective equipment such as the usage and legalization of bear spray. This represents the general lack of consensus on equipment usage, and little to no transparency or democratic involvement in regulation and policymaking, which are neither scientifically informed. Standardized practices are particularly critical in remote, high-risk environments to avoid inconsistent application which negatively affect safety and conservation efforts (Lauta et al. 2018). Clear communication on regulatory decisions could improve understanding and acceptance within the community.

5.3. *Recommendations*

Standardized and accessible safety training, alongside collaboration and knowledge sharing between institutions and among the population can mitigate the effects of high turnover and create consistency in safety practices. Transparent policymaking and community involvement in regulation could enhance adherence and trust in management strategies. Future policies and research should focus on integrating both social and ecological research to improve the effectiveness of safety management, preparedness and conservation efforts (Clark et al., 2012), as well as creating adaptive, evidence-based management strategies that benefit both humans and polar bears.

6. Conclusion

Effective management must ensure safety of both polar bear and human. Current ecological and social knowledge on human-bear interactions is too limited to inform proper management. Measuring the effectiveness is challenging due to a lack of accurate, open data on bear encounters, nature of the interactions, and incident rates. The effectiveness depends on the community's willingness and capability to adhere to regulations.

While currently, regulations are mostly supported, inadequate and non-standardized training leaves many residents feeling unprepared during high stress encounters and causes inconsistencies in risk perceptions and adherence to regulations. Establishing a minimum level of required, standardized safety training, ensuring accessibility, especially for newcomers, and providing ongoing practice opportunities would improve both preparedness and compliance.

Additionally, fostering a safe environment for open knowledge exchange and transparent communication among citizens and institutions, and community involvement in policy making are crucial to create trust and cohesion, and to improve polar bear safety management and conservation.

In this study surveys were used to assess community preparedness, perspectives and training level, and provided insights into the discrepancies between perceived and actual risks to inform on improvements. Furthermore, the media test, a novel method to study post-emergency responses, was introduced. Although more research is needed to further develop this method, preliminary findings indicate its value to evaluate mental preparedness, and responses to high stress scenarios. Future research should implement community-based approaches to understanding preparedness and attitudes towards safety regulations. These social insights should be integrated with ecological data to develop well-rounded, effective and adaptive policies and conservation strategies that can evolve in response to social and environmental changes with the main aim of harmonious coexistence.

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