



ISSN: 2586-6036

JWMA website: <http://accesson.kr/jwmap>doi: <http://dx.doi.org/10.13106/jwmap.2026.vol9.no3.89>

Risk Communication and Public Safety Literacy in Outdoor Leisure Activities: A Convergent Approach to Disaster Risk and Legal Accountability

Yulee SHIN¹

1. First Author Research Fellow, North Korean Law Research Center, Institute of Legal Studies, Kookmin University, Korea.
Email: ssslch@daum.net

Received: June 09, 2026. Revised: June 20, 2026. Accepted: June 30, 2026.

Abstract

Purpose: This study aims to reconceptualize outdoor leisure safety as a preventive public safety governance issue rather than a matter confined to individual caution, recreational participation, or post-accident response. It examines how risks arising from hiking, camping, trekking, cycling, fishing, water-related leisure, and marine leisure may become public safety concerns when they involve foreseeable hazards, insufficient risk information, delayed rescue access, or fragmented institutional responsibility.

Research design, data and methodology: This study adopts a qualitative and design-oriented research approach grounded in legal-institutional analysis, conceptual clarification, and normative policy design. Instead of empirical measurement or statistical accident analysis, it develops a conceptual framework for outdoor leisure safety governance by examining the relationship among disaster risk communication, public safety literacy, preventive behavior, legal accountability, and feedback-based institutional improvement. **Results:** The analysis shows that outdoor leisure safety requires an integrated governance structure linking risk communication, public safety literacy, preventive action, legal accountability, and post-accident learning. It also demonstrates that fragmented approaches based solely on individual negligence, formal warnings, post-accident rescue, or sector-specific regulation are insufficient to prevent avoidable harm in outdoor leisure contexts. **Conclusions:** The study concludes that outdoor leisure safety should be understood as a convergent field of disaster risk prevention, citizen capacity-building, and legally accountable public safety governance. Public authorities and relevant private actors are not required to eliminate all risks inherent in outdoor leisure activities, but they should establish reasonable preventive measures where risks are foreseeable, serious, and institutionally manageable. The proposed framework supports a proportionate safety governance model that protects public well-being while preserving the autonomy and social value of outdoor leisure participation.

Keywords : Outdoor leisure activities; Risk communication; Public safety literacy; Disaster risk; Legal accountability

JEL Classification Code: I18, H51, D81, K32

1. Introduction

Outdoor leisure activities have increasingly become a field in which individual recreation, public safety, disaster risk management, and citizen well-being intersect. Activities such as hiking, camping, trekking, cycling, fishing, rafting,

water-related leisure activities, and other forms of outdoor recreation are generally pursued for rest, health, social participation, and quality of life. In this respect, they are closely connected to the positive dimension of public well-being. However, their legal and policy significance cannot be fully understood if they are viewed only as private leisure

© Copyright: The Author(s)

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted noncommercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

choices or as matters of sports participation. These activities are often conducted in open, natural, or semi-controlled environments, where weather conditions, terrain, water conditions, accessibility of emergency rescue, information asymmetry, and the participant's own risk judgment may directly affect the probability and severity of accidents.

The distinctive feature of outdoor leisure activities is that their risks do not always remain within the private sphere. A risk initially generated by an individual's recreational activity may require the mobilization of public rescue resources, emergency medical services, police or coast guard response, local government coordination, facility management, and post-accident institutional review. In this sense, the safety of outdoor leisure activities is not merely a matter of individual caution or private liability. It is also a matter of public safety governance. When a leisure-related accident occurs in a mountain area, coastal zone, river, lake, campsite, or remote outdoor location, its consequences may extend beyond the immediate participant and activate administrative systems responsible for rescue, emergency response, risk information, and community safety. Accordingly, outdoor leisure activities should be analyzed as a risk-interface domain in which private autonomy and public safety responsibility coexist.

This study does not proceed from the assumption that all outdoor leisure activities should be treated as disasters. Such an approach would be conceptually excessive and legally inappropriate. Rather, the point is that certain risks arising from outdoor leisure activities may become legally relevant when they are foreseeable, serious, and connected to institutional responsibilities for prevention, information provision, safety management, and emergency response. In the Korean legal framework, this understanding can be situated within the broader constitutional and statutory structure of disaster and safety management. Article 10 of the Constitution of the Republic of Korea guarantees human worth and dignity and the right to pursue happiness, while imposing on the State the duty to confirm and guarantee fundamental and inviolable human rights. Article 34(6) further provides that the State shall endeavor to prevent disasters and protect citizens from harm therefrom. Article 37(2) requires that restrictions on freedoms and rights be imposed only by Act when necessary for national security, the maintenance of law and order, or public welfare, and that no essential aspect of freedom or right be violated. These provisions suggest that public safety governance must be designed within a constitutional balance between preventive protection and respect for individual freedom.

This constitutional structure is concretized by the Framework Act on the Management of Disasters and Safety. The Act establishes the disaster and safety management responsibilities of the State and local governments and covers prevention, preparedness, response, recovery, safety

culture, and disaster and safety management for the protection of citizens' lives, bodies, and property. Article 4 provides that the State and local governments are responsible for protecting people's lives, bodies, and property from disasters or various other accidents, preventing such events, mitigating damage, and formulating and implementing plans for prompt response and recovery. Article 4(2) further requires them to actively disclose safety information and make such information conveniently available. These provisions are significant for the present study because they locate safety not only in post-accident response but also in prevention, information access, and institutional preparedness.

A similar preventive logic appears in sector-specific legislation concerning water-related leisure activities. The Water-Related Leisure Activities Safety Act aims to ensure the safety and order of water-related leisure activities and to promote the sound development of the water-related leisure business. The Act structures safety through safety management planning, activity restrictions under dangerous weather conditions, designation of prohibited zones, corrective orders, cooperation among related administrative agencies, information-system functions, safety examinations, and duties of business entities to monitor conditions, provide safety education, secure safety equipment, and take relief and notification measures. Although this statute concerns a specific field of outdoor leisure, it demonstrates that leisure safety law can incorporate risk communication, preventive control, administrative coordination, and legal accountability.

Nevertheless, the legal and policy discussion on outdoor leisure safety remains fragmented. One line of discussion tends to focus on sector-specific regulation, such as safety rules for water-related activities, facilities, equipment, business registration, or administrative inspections. Another line emphasizes post-accident response, search and rescue, compensation, or liability after damage has already occurred. These approaches are necessary but insufficient. They do not fully explain how citizens understand risk information before participating in outdoor leisure activities, how administrative agencies and business operators communicate risks in a practically usable manner, how preventive safety capacity is formed among citizens, and how legal accountability should be structured when risk communication fails. The central issue is therefore not only whether safety rules exist, but whether those rules are institutionally connected to the citizen's capacity to understand, assess, and act upon risk information.

This study therefore introduces the concept of public safety literacy as a key analytical category. Public safety literacy refers to the capacity of citizens to understand safety-related information, assess situational hazards, take preventive action, and respond appropriately in emergencies.

In outdoor leisure activities, this capacity includes the ability to interpret weather alerts, risk signs, route information, water or terrain conditions, emergency contact systems, equipment requirements, and administrative warnings. Public safety literacy should not be understood as a concept that transfers the entire burden of safety to individual participants. Rather, it presupposes that public institutions, local governments, facility managers, and business operators must provide accurate, accessible, timely, and comprehensible risk information. The citizen's responsibility to act safely becomes meaningful only when the institutional environment provides a reasonable basis for informed risk judgment.

The need for a convergent approach arises precisely at this point. Outdoor leisure safety cannot be adequately addressed by a single disciplinary framework. A purely recreational or sports-policy approach may underestimate the public safety implications of outdoor risks. A purely legal-liability approach may intervene too late, after an accident has already occurred. A purely disaster-management approach may overstate public control and insufficiently account for individual freedom and voluntary participation. What is required is a governance model that links disaster risk management, risk communication, public safety literacy, preventive behavior, legal accountability, and post-accident institutional improvement in a coherent structure. Such a model should treat outdoor leisure safety as a preventive governance issue, not merely as an accident-response issue.

The purpose of this study is to develop a conceptual and legal-policy framework for outdoor leisure safety governance based on risk communication and public safety literacy. The study aims to clarify why outdoor leisure activities should be understood as a public safety issue under certain conditions, how risk communication can enhance preventive safety capacity, and how legal accountability can be structured among the State, local governments, business operators, facility managers, and participants. The analysis does not attempt to measure accident frequency or statistically verify causal relationships. Instead, it adopts a qualitative and design-oriented research method grounded in legal-institutional analysis, conceptual clarification, and normative policy design. Its concern lies in constructing an institutionally feasible framework that can improve preventive safety governance without transforming outdoor leisure activities into an excessively regulated domain.

The central argument of this study is that outdoor leisure safety should be reconstructed around a preventive chain consisting of risk communication, public safety literacy, preventive conduct, legal accountability, and feedback-based institutional improvement. Under this framework, the State and local governments are not expected to eliminate all risks inherent in outdoor leisure activities. Such an

expectation would be neither realistic nor consistent with the constitutional protection of personal freedom. However, where risks are foreseeable, serious, and connected to public safety functions, public authorities and relevant private actors should establish reasonable mechanisms for risk identification, information disclosure, safety education, preventive intervention, and post-accident review. At the same time, participants should be treated not as passive recipients of protection but as responsible actors whose safety conduct depends on the quality of risk communication and the level of public safety literacy.

The remainder of this study proceeds as follows. The next section reviews prior discussions on outdoor leisure safety, disaster risk communication, public safety literacy, and legal accountability. The third section explains the research design and methodology, emphasizing conceptual analysis, legal-institutional analysis, and normative governance design. The fourth section presents the main analysis by examining outdoor leisure activities as a public safety issue, the institutional role of risk communication, the preventive function of public safety literacy, the allocation of legal accountability, and the convergent model for outdoor leisure safety governance. The final section summarizes the findings and suggests that outdoor leisure safety should be approached as a convergent field of disaster risk prevention, citizen capacity building, and legally accountable public safety governance.

2. Literature Review

The literature relevant to outdoor leisure safety may be organized around three analytically connected fields: studies on outdoor leisure activities and safety accidents, studies on disaster risk communication, and studies on safety literacy, public safety governance, and legal accountability. Each field has contributed to understanding the risks associated with leisure activities conducted in natural or open environments. However, these fields have not yet been sufficiently integrated into a coherent legal-policy framework that explains how risk information, citizen capacity, preventive governance, and legal accountability should operate together in outdoor leisure settings. The purpose of this review is therefore not to claim the absence of prior research, but to identify the structural gap between activity-based safety management and a broader public safety literacy model.

The first strand of research concerns outdoor leisure activities and safety accidents. Studies in this field commonly approach outdoor leisure as part of sports participation, tourism, health promotion, recreation, and quality-of-life policy. From this perspective, outdoor leisure activities are examined in relation to participation

motivation, user satisfaction, service quality, facility management, accident prevention, and the development of leisure industries. This literature is valuable because it demonstrates that outdoor leisure activities are recurring forms of citizen activity that require organized safety management. At the same time, when outdoor leisure activities are understood primarily as recreation or sports activities, the legal and institutional significance of safety risks may be treated as a secondary issue. Accidents are then often examined through the categories of user negligence, facility defect, business operator responsibility, or post-accident rescue. Such an approach provides useful practical insights, but it does not fully explain how risk information should be communicated before participation, how citizens acquire the capacity to interpret that information, and how public authorities and private operators should be held accountable for failures in preventive safety governance.

This limitation becomes clearer when the statutory structure of outdoor leisure safety is considered. Korean law does not regulate all outdoor leisure activities under a single comprehensive statute. Instead, it addresses different activities through a combination of general disaster and safety law, sector-specific safety statutes, local safety management systems, and operator-centered regulatory duties. The Framework Act on the Management of Disasters and Safety provides the general legal foundation by establishing the disaster and safety management responsibilities of the State and local governments and by locating safety management within prevention, preparedness, response, recovery, safety culture, and information disclosure. Article 4 of the Act is particularly significant because it recognizes the responsibility of the State and local governments to protect people's lives, bodies, and property from disasters or various other accidents and to disclose safety information in a manner convenient for public use. Sector-specific legislation, such as the Water-Related Leisure Activities Safety Act, further demonstrates that leisure safety can be legally structured through safety equipment duties, activity restrictions under dangerous weather conditions, accident reporting, prohibited zones, corrective orders, inter-agency cooperation, operator monitoring, safety education, and emergency notification. These provisions reveal that outdoor leisure safety is not reducible to private caution; it is already partially institutionalized as a preventive safety regime.

Nevertheless, the existing legal structure remains largely sectoral and activity-specific. Water-related leisure activities are subject to relatively detailed safety regulation, but comparable preventive structures may not appear in the same form across all outdoor leisure contexts. More importantly, statutes identify duties concerning information, education, equipment, monitoring, reporting, and cooperation, but they do not by themselves provide a

comprehensive conceptual model explaining how these elements form citizen capacity for preventive safety judgment. This is the point at which outdoor leisure safety research must be connected to the literature on disaster risk communication.

The second strand of research concerns disaster risk communication. Risk communication has long been understood as more than the one-way transmission of warnings or technical information. It involves the production, interpretation, and practical use of risk information among public authorities, experts, businesses, communities, and citizens. In outdoor leisure safety, this means that the mere existence of warning signs, weather alerts, administrative notices, or legal restrictions is insufficient. The relevant question is whether citizens can understand the information, relate it to their specific activity and location, and translate it into preventive conduct. International disaster governance literature, including the Sendai Framework for Disaster Risk Reduction 2015–2030, has reinforced this preventive and participatory orientation by emphasizing the importance of understanding disaster risk, strengthening disaster risk governance, investing in risk reduction, and enhancing preparedness. This perspective is directly relevant to outdoor leisure safety because outdoor activities are often exposed to situational, time-sensitive, and environment-dependent risks such as weather, water conditions, heat, cold, terrain, visibility, and rescue accessibility.

However, the application of disaster risk communication to outdoor leisure activities raises a distinctive legal-policy problem. Much of the risk communication literature has developed in relation to large-scale natural disasters, public health emergencies, technological hazards, environmental risks, and critical infrastructure risks. These risks are often involuntary or collectively imposed. Outdoor leisure activities differ in that they involve voluntary participation, enjoyment of freedom, and the pursuit of recreation. If the State intervenes too weakly, foreseeable and preventable risks may be left to individuals who lack sufficient information or capacity. If the State intervenes too strongly, ordinary leisure activity may be overregulated in the name of safety. The constitutional problem is therefore not simply how to expand safety regulation, but how to design risk communication in a way that supports informed autonomy while satisfying the public responsibility to prevent serious and foreseeable harm.

This constitutional dimension is grounded in the Korean legal order. Article 10 of the Constitution of the Republic of Korea protects human dignity and the right to pursue happiness, while Article 34(6) provides that the State shall endeavor to prevent disasters and protect citizens from harm therefrom. Article 37(2) further requires that restrictions on freedoms and rights be based on law, necessary for public

purposes, and not violate the essential aspect of freedom and rights. These provisions do not justify unlimited administrative control over outdoor leisure activities. Rather, they provide a constitutional basis for reasonable preventive measures where life and bodily safety are exposed to serious and foreseeable risk. For this reason, risk communication in outdoor leisure contexts should be understood not merely as administrative service delivery, but as a legal-policy instrument that mediates between freedom, safety, public welfare, and state protective responsibility.

The third strand of research concerns safety literacy, public safety governance, and legal accountability. Safety literacy is not used in this study as a fixed statutory term. Rather, it is an analytical category developed from the interaction between safety information, disaster safety education, citizen cooperation, and preventive public governance. Public safety literacy refers to the capacity of citizens to understand safety-related information, assess situational hazards, take preventive action, and respond appropriately in emergencies. This concept differs from simple knowledge of safety rules. It includes the ability to interpret warning signs, weather alerts, route or location information, equipment requirements, emergency contact systems, and administrative restrictions in a way that enables actual behavioral adjustment.

Korean disaster safety law already contains elements that can support such a concept. The Framework Act on the Management of Disasters and Safety includes provisions concerning citizen cooperation, safety culture, safety education, safety information, and data-based disaster and safety management. The Water-Related Leisure Activities Safety Act also provides activity-specific examples by requiring safety education for operators and by imposing duties on business entities to provide users with safety education before boarding. These provisions do not expressly define public safety literacy, but they show that the legal system already contains the components of safety capacity-building. The problem is that these components are often treated separately as education, publicity, inspection, licensing, equipment regulation, or liability. They are not yet sufficiently integrated into a model in which risk information is generated by competent institutions, communicated in an understandable form, internalized by citizens as risk judgment capacity, supported by operator and administrative duties, and reviewed after incidents through legal accountability and policy feedback.

Legal accountability is particularly important in this respect. In public law and administrative law, accountability is not limited to compensation after unlawful action. It includes the duty to establish safety standards, disclose relevant information, manage foreseeable risks, coordinate among competent agencies, supervise private operators where legally required, and evaluate whether institutional

failures contributed to harm. In outdoor leisure safety, the more important analytical point is preventive: legal accountability should not be reduced to ex post compensation, but should also guide the design of information disclosure, warning systems, safety education, emergency communication, and institutional review before accidents occur.

Taken together, the prior literature and the existing legal structure reveal a common problem. Outdoor leisure studies have contributed to understanding participation, satisfaction, facility management, and activity-specific safety. Disaster risk communication literature has developed accounts of warning, risk perception, public understanding, and preventive governance. Public law and administrative law have examined state responsibility, protective duties, proportionality, administrative liability, and institutional accountability. Yet the connection among these bodies of knowledge remains underdeveloped in outdoor leisure contexts. In particular, there is still room for a model that explains how risk communication should produce public safety literacy, how such literacy should be supported by legal and institutional duties, and how accountability should be allocated among the State, local governments, business operators, facility managers, and participants.

This study builds on these strands of literature by reframing outdoor leisure safety as a convergent public safety issue rather than as a narrow leisure-management or post-accident liability issue. It does not argue that all risks inherent in outdoor leisure activities should be eliminated by the State. Such a position would be inconsistent with personal autonomy and the social value of recreation. Instead, the study argues that where outdoor leisure risks are foreseeable, serious, and institutionally manageable, safety governance should be organized around a preventive chain consisting of risk information, risk communication, public safety literacy, preventive conduct, legal accountability, and feedback-based institutional improvement. Its contribution lies in translating existing legal duties concerning safety information, education, cooperation, and prevention into an integrated framework for outdoor leisure safety governance.

3. Research Methods

This study adopts a qualitative and design-oriented research methodology based on legal-institutional analysis, conceptual clarification, and normative policy design. The purpose of the study is not to estimate the statistical probability of accidents in outdoor leisure activities, to measure individual safety behavior through survey data, or to verify a causal relationship between a specific regulatory intervention and accident reduction. Rather, the study aims to construct a legal-policy framework through which

outdoor leisure activities can be analyzed as a public safety issue when their risks become foreseeable, serious, and institutionally manageable.

The research design proceeds from the premise that outdoor leisure safety cannot be sufficiently explained by a single disciplinary method. A purely empirical accident-analysis method may identify patterns of harm but does not by itself explain the legal meaning of prevention, information disclosure, or responsibility allocation. A purely doctrinal legal method may clarify statutory duties and constitutional principles but may not fully capture how citizens actually encounter and interpret risk information in outdoor environments. A purely policy-oriented method may propose coordination among administrative actors but may lack sufficient normative criteria for distinguishing reasonable prevention from excessive control. Accordingly, this study combines legal analysis, institutional analysis, and governance design in order to develop a framework that is normatively coherent, institutionally feasible, and suitable for preventive public safety management.

First, the study conducts a conceptual analysis of outdoor leisure activities as a risk-interface domain. Outdoor leisure activities are understood as voluntary activities pursued for recreation, health, social participation, and personal well-being, but their risk structure differs from ordinary private activities because they are often conducted in open, natural, or semi-controlled environments. In such settings, weather conditions, terrain, water conditions, rescue accessibility, communication infrastructure, facility management, and participant judgment may jointly determine the level of safety. The conceptual task of this study is therefore to distinguish ordinary leisure risk from public safety risk. This distinction does not imply that all risks arising from outdoor leisure activities should be transformed into matters of public regulation. Rather, the analysis focuses on situations in which risks become legally relevant because they are foreseeable, serious, and connected to the preventive responsibilities of public authorities, local governments, facility managers, or business operators.

Second, the study conducts a legal-institutional analysis of the statutory and administrative structure relevant to outdoor leisure safety. The analysis does not attempt to provide a comprehensive commentary on every statute that may be related to outdoor activities. Instead, it focuses on the institutional functions necessary for preventive safety governance: risk identification, information disclosure, safety education, administrative coordination, emergency response, and post-accident feedback. In this regard, the Framework Act on the Management of Disasters and Safety provides the general normative foundation because it defines the disaster and safety management responsibilities of the State and local governments and includes prevention,

preparedness, response, recovery, safety culture, and information disclosure within the structure of disaster and safety management. The Water-Related Leisure Activities Safety Act is also examined as a sector-specific example showing how leisure safety can be structured through user obligations, operator duties, administrative intervention, information provision, and inter-agency cooperation.

Third, the study applies institutional analysis to risk communication and public safety literacy. Risk communication is analyzed not as a mere administrative notice, but as an institutional process through which risk information is generated, transmitted, interpreted, and translated into preventive behavior. In outdoor leisure activities, risk information may concern weather alerts, water conditions, route conditions, prohibited zones, facility safety, rescue accessibility, emergency contact systems, equipment requirements, and behavioral restrictions. Public safety literacy is used as an analytical concept to connect risk communication with citizen capacity. It is defined in this study as the capacity of citizens to understand safety-related information, assess situational hazards, take preventive action, and respond appropriately in emergencies.

Fourth, the study applies normative policy design to the structure of legal accountability in preventive safety governance. Legal accountability is not reduced to compensation after an accident. It is analyzed as a broader public law concept that includes the duty to establish safety standards, disclose relevant information, provide or require safety education, coordinate among competent agencies, supervise operators where legally required, and conduct post-accident review. This approach is especially important in outdoor leisure contexts because responsibility is often distributed among multiple actors, including the State, local governments, police, fire authorities, coast guard agencies, facility managers, business operators, and participants. A preventive governance model must therefore clarify not only who responds after an accident, but also who should have provided information, who should have managed foreseeable risks, and who should have reviewed institutional failures after the accident.

The normative design adopted in this study is guided by the principle of proportionality and the logic of reasonable prevention. The study does not assume that public authorities must eliminate all risks inherent in outdoor leisure activities. Such an assumption would be unrealistic and inconsistent with the constitutional value of personal freedom. Instead, the study asks what level of preventive action is legally and institutionally reasonable when a risk is foreseeable, serious, and susceptible to administrative or managerial control. This inquiry requires a balance between under-protection and over-control. Under-protection occurs when public authorities or operators fail to provide reasonable information or preventive measures despite

foreseeable risks. Over-control occurs when safety is invoked to impose excessive restrictions on ordinary leisure activities without sufficient legal basis, necessity, or proportionality.

Based on these methods, the study constructs an integrated model of outdoor leisure safety governance. The model is organized around a preventive chain consisting of risk information, risk communication, public safety literacy, preventive conduct, legal accountability, and feedback-based institutional improvement. This chain is not presented as an empirically verified causal sequence. Rather, it is proposed as a normative and institutional framework for evaluating whether outdoor leisure safety governance is capable of preventing foreseeable harm while preserving the freedom and social value of outdoor leisure participation.

The materials used in this study consist primarily of publicly available legal and policy sources. These include the Constitution of the Republic of Korea, the Framework Act on the Management of Disasters and Safety, the Water-Related Leisure Activities Safety Act, and publicly accessible institutional materials concerning disaster risk management and safety governance. The study also relies on established academic discussions on disaster risk communication, risk governance, public safety, and legal accountability, but it does not use non-public administrative data, unpublished accident records, or independently collected survey data. For this reason, the study does not make factual claims concerning accident frequency, accident causation, or the statistical effectiveness of specific safety measures unless such claims are supported by publicly verifiable sources.

The validity of the study is assessed through three criteria. The first criterion is conceptual coherence: whether the concepts of outdoor leisure risk, risk communication, public safety literacy, preventive governance, and legal accountability are internally consistent. The second criterion is institutional feasibility: whether the proposed framework is compatible with existing legal structures that recognize prevention, safety information, safety education, administrative coordination, and responsibility allocation as components of disaster and safety management. The third criterion is normative adequacy: whether the framework respects the constitutional balance between personal freedom and public safety, avoids excessive administrative intervention, and provides a reasonable basis for allocating responsibility among public authorities, private operators, and participants.

This methodology has certain limitations. Because the study does not conduct quantitative analysis, it does not claim to identify the statistical causes of outdoor leisure accidents or to measure the direct effect of risk communication on accident reduction. Because the study does not rely on field interviews or survey research, it does

not claim to represent the subjective perceptions of participants, operators, or public officials. These limitations reflect the specific purpose of the study. The objective is to construct a legal and institutional framework that can guide future empirical research, policy evaluation, and legislative improvement. In this sense, the study should be understood as a conceptual and normative contribution to preventive public safety governance rather than as an empirical assessment of particular outdoor leisure programs.

4. Results and Discussion

4.1. Outdoor Leisure Activities as a Public Safety Issue

Outdoor leisure activities should be understood as a public safety issue when their risks extend beyond the sphere of individual recreation and require organized preventive, administrative, or emergency-response functions. Activities such as hiking, camping, trekking, cycling, fishing, water-related leisure activities, and marine leisure activities are generally based on voluntary participation and personal autonomy. They contribute to rest, health, social participation, and citizen well-being. However, their legal-policy meaning changes when they are conducted in open, natural, or semi-controlled environments where weather conditions, terrain instability, water conditions, remoteness, limited rescue accessibility, information asymmetry, and inadequate preparedness may intensify the probability and severity of harm. The central issue is therefore not whether outdoor leisure activities are inherently dangerous, but under what conditions their risks become relevant to public safety governance.

The Korean disaster and safety legal framework provide a basis for this public safety characterization. The Framework Act on the Management of Disasters and Safety defines “disaster” in Article 3 as events that actually cause or are likely to cause harm to the lives, bodies, and property of citizens and the State, and it defines “disaster management” as activities for prevention, preparedness, response, and recovery. The same provision defines “safety management” as activities to protect people’s lives, bodies, and property from disasters or various other accidents. This statutory structure is significant because it does not confine safety management to large-scale disasters alone. It also includes various other accidents when the protection of life, bodily integrity, and property requires organized safety functions.

In this statutory sense, outdoor leisure activities occupy an intermediate zone between ordinary private risk and public safety risk. They are not automatically disasters, nor should they be administratively treated as such merely

because they involve some possibility of accident. A mountain trail, a campsite, a riverside area, a bicycle route, a fishing site, or a coastal leisure zone does not become a disaster site simply because citizens use it for recreation. However, when environmental hazards, inadequate risk information, lack of safety equipment, delayed reporting, difficult rescue access, or insufficient coordination among responsible actors combine, the risk may no longer remain a purely private matter. At that point, the activity becomes connected to public safety functions such as warning, access control, emergency rescue, inter-agency coordination, safety education, and post-accident review.

This transition can be explained through the concept of risk externalization. A participant's leisure choice is private at the moment of decision, but the consequences of an accident may require the intervention of fire authorities, police, coast guard agencies, local governments, medical institutions, facility managers, and nearby communities. A hiking accident in a remote area may require search and rescue operations. A camping accident may involve fire, weather, facility, or evacuation risks. A cycling accident may implicate road safety, traffic management, or emergency medical response. Fishing, rafting, boating, and other water-related activities may generate risks associated with water depth, current, visibility, weather alerts, equipment, and rescue accessibility. In such cases, the accident becomes legally important not only because an individual has suffered harm, but because a public safety system must be activated or should have been reasonably prepared before the harm occurred.

The constitutional dimension of this analysis lies in the relationship between freedom and safety. Outdoor leisure activities are expressions of personal liberty and the pursuit of happiness. Article 10 of the Constitution of the Republic of Korea guarantees human worth and dignity and the right to pursue happiness, while imposing on the State the duty to confirm and guarantee fundamental and inviolable human rights. Article 34(6) provides that the State shall endeavor to prevent disasters and protect citizens from harm therefrom. Article 37(2) further requires that restrictions on freedoms and rights be imposed by Act only when necessary for national security, the maintenance of law and order, or public welfare, and that no essential aspect of freedom or right be violated. These provisions suggest that public safety governance in outdoor leisure contexts must avoid both under-protection and over-control.

Under-protection occurs when foreseeable and serious risks are left unmanaged even though public authorities or legally responsible private actors could have taken reasonable preventive measures. Over-control occurs when public authority restricts ordinary leisure activities excessively without sufficient legal basis, necessity, or proportionality. Outdoor leisure safety policy must therefore

be designed as a structure of informed freedom. Citizens should not be treated as passive objects of administrative protection, but they also should not be left alone to bear risks that are foreseeable, serious, and institutionally manageable. The proper legal question is not whether the State must eliminate all risks inherent in outdoor leisure activities. It is whether the State, local governments, facility managers, and business operators have established reasonable conditions under which citizens can understand risks, make informed decisions, and receive timely protection when danger materializes.

Article 4 of the Framework Act on the Management of Disasters and Safety supports this interpretation. Article 4(1) provides that the State and local governments are responsible for protecting people's lives, bodies, and property from disasters or various other accidents, preventing such events, mitigating damage, and formulating and implementing plans for prompt response and recovery. Article 4(2) further requires them to actively disclose safety information and make such information conveniently available. These provisions are directly relevant to outdoor leisure activities because the effectiveness of preventive safety governance depends on whether risk information is disclosed in a timely, accessible, and understandable manner. In outdoor environments, where weather, visibility, water levels, terrain, communication availability, and rescue distance may change rapidly, safety management cannot rely only on general prohibitions or post-accident rescue. It must place greater emphasis on risk information, warning systems, safety education, preventive restrictions where legally justified, and coordination among competent authorities.

Water-related leisure legislation provides a concrete example of this preventive structure. The Water-Related Leisure Activities Safety Act aims to ensure the safety and order of water-related leisure activities and to promote the sound development of the water-related leisure business. The Act also requires the Commissioner of the Korea Coast Guard to formulate and implement a five-year master plan for water-related leisure safety management, including matters relating to the development of a safety management system and public-private collaboration. In addition, the Act structures safety through equipment duties, restrictions under dangerous conditions, accident reporting, designation of prohibited zones, corrective orders, inter-agency cooperation, consultative safety councils, comprehensive information-system functions, safety examinations, and business-operator duties concerning inspection, weather and water-condition monitoring, safety education, emergency rescue readiness, relief measures, and notification. This statutory design shows that leisure safety, at least in the water-related field, is not limited to private user caution. It is legally structured through preventive planning, risk

communication, administrative coordination, operator responsibility, and emergency response.

Although water-related leisure activities are only one sector of outdoor leisure, the structure of the Act provides an analytical model for understanding outdoor leisure safety more broadly. The model consists of several elements: identification of risk conditions, communication of safety information, imposition of participant duties, specification of operator duties, administrative authority to restrict or suspend activities where necessary, inter-agency cooperation, and emergency response. This model should not be mechanically extended to every outdoor leisure activity. Hiking, camping, cycling, fishing, trekking, and marine leisure activities differ in their risk environments, responsible institutions, and forms of participation. Nevertheless, the model demonstrates that where outdoor leisure risks are foreseeable and legally manageable, the law may legitimately shift from an individual-negligence paradigm to a preventive public safety paradigm.

This shift is particularly important because outdoor leisure risks are often hybrid risks. They may originate from natural conditions such as strong wind, heavy rain, heat wave, cold wave, lightning, tidal conditions, waves, fog, or terrain instability. They may also arise from social or managerial factors such as insufficient guidance, overcrowding, inadequate equipment, lack of supervision, poor facility maintenance, unclear warning signs, fragmented jurisdiction, or delayed reporting. For this reason, a simple distinction between natural disaster and human-caused accident is insufficient. Outdoor leisure safety frequently requires a combined analysis of natural hazard, human behavior, administrative preparedness, and institutional responsibility.

Therefore, outdoor leisure activities should be conceptualized as a public safety issue under three cumulative conditions. The first condition is environmental exposure. The activity must be conducted in a setting where natural or spatial conditions may affect life and bodily safety, such as mountains, rivers, lakes, coastal areas, campsites, remote trails, or open roads. The second condition is institutional relevance. The risk must be connected to public or legally regulated functions such as warning, access management, safety education, equipment standards, reporting, rescue, or facility supervision. The third condition is preventability through reasonable governance. The risk must be capable of being reduced through information disclosure, risk communication, safety literacy, operator compliance, administrative coordination, or emergency preparedness. When these conditions are present, outdoor leisure safety can no longer be treated merely as an issue of private choice.

This does not mean that every accident in outdoor leisure activities should be attributed to the State, local

governments, or operators. Participant responsibility remains an important element of safety governance. Citizens who voluntarily engage in outdoor leisure activities must exercise reasonable care, observe safety rules, use required equipment, heed warnings, and cooperate with public authorities. Article 5 of the Framework Act on the Management of Disasters and Safety also provides that people shall cooperate with the State and local governments in disaster and safety management affairs and endeavor to protect buildings and facilities they own or use from disasters or various other accidents. However, participant responsibility should be evaluated in relation to the quality of the risk environment created by public and private institutions. A participant cannot meaningfully exercise responsibility where risk information is inaccessible, warnings are unclear, safety education is absent, or responsible actors fail to manage foreseeable hazards.

The public safety issue, therefore, lies not in replacing individual responsibility with state responsibility, but in structuring responsibility relationally. Outdoor leisure safety requires a multi-actor responsibility model. The State and local governments provide the general safety framework, disclose information, coordinate relevant institutions, and prepare response systems. Sectoral agencies such as the Korea Coast Guard may exercise specialized authority where the activity involves water-related or marine risks. Local governments and facility managers address site-specific hazards, access control, warning signs, and local emergency linkage. Business operators provide equipment, safety education, monitoring, and immediate response duties where commercial leisure services are involved. Participants make informed decisions and comply with safety requirements. The legal-policy problem is how to connect these responsibilities before an accident occurs.

The result of this analysis is that outdoor leisure activities should be placed within a preventive public safety governance framework when their risks are foreseeable, serious, and institutionally manageable. This framework is not identical with disaster declaration or emergency response. It is a prior governance structure that links risk information, risk communication, public safety literacy, operator responsibility, administrative coordination, and legal accountability. The analytical advantage of this framework is that it avoids two inadequate explanations. It rejects the view that outdoor leisure accidents are only private misfortunes caused by individual carelessness. It also rejects the view that safety can be secured simply by expanding administrative control. Instead, it treats outdoor leisure safety as a legal-policy field in which informed autonomy, public responsibility, and preventive governance must be institutionally integrated.

4.2. Disaster Risk Communication in Outdoor

Leisure Activities

Disaster risk communication in outdoor leisure activities should be understood as an institutional process through which risk information is transformed into practical safety judgment and preventive conduct. The mere possession of risk information by an administrative agency, facility manager, or business operator is not sufficient to prevent harm. Risk information becomes legally and policy-relevant only when it is disclosed, transmitted, interpreted, and used in a manner that enables participants to modify their behavior before danger materializes. In this sense, risk communication is not a supplementary administrative service attached to outdoor leisure safety. It is a central component of preventive safety governance.

This point is supported by the statutory structure of Korean disaster and safety law. Article 4(2) of the Framework Act on the Management of Disasters and Safety requires the State and local governments to actively disclose safety information and make such information conveniently available. Article 38 provides for crisis alerts when signs of disaster are identified or when the occurrence of disaster is expected, while Article 38-2 provides the basis for establishing and operating disaster forecast and alert systems where damage to life, body, or property is predicted. These provisions show that disaster and safety management is not confined to internal administrative recognition of risk. It requires a communicative structure through which risk information can be converted into public warning, forecast, alert, and corresponding preventive action.

Outdoor leisure activities make this communicative requirement especially important. In many outdoor settings, risks are dynamic rather than static. Weather, terrain, water level, visibility, crowd density, communication availability, and rescue accessibility may change rapidly. A trail that is ordinarily safe may become hazardous after heavy rainfall or during extreme heat. A campsite may become dangerous when fire risk, strong wind, flooding, or evacuation difficulty is present. A coastal or water-related leisure zone may become unsafe when weather alerts, fog, wind, waves, current, or visibility reduction affect the capacity of participants to move, communicate, or return safely. Therefore, the legal significance of risk communication lies not only in whether a warning exists, but also in whether the warning is timely, location-specific, understandable, and capable of guiding actual behavior.

The concept of risk information should therefore be understood broadly. It includes not only general notices or abstract safety rules, but also concrete information concerning weather alerts, warning signs, dangerous zones, prohibited areas, route conditions, water conditions, visibility, rescue accessibility, emergency contact channels, evacuation routes, and behavioral restrictions. Article 3 of

the Framework Act defines disaster management information as information necessary for disaster management, including information on emergency cases, available resources and facilities, and geographic information. The same provision also defines disaster and safety communications networks as networks built and operated by disaster management agencies, emergency rescue agencies, or emergency rescue and relief support agencies for disaster and safety management affairs or consolidated supervision at disaster scenes. These definitions indicate that contemporary safety governance depends on information, geography, communication infrastructure, and emergency coordination rather than on physical control alone.

In outdoor leisure contexts, warning signs perform a distinct legal-policy function. They mediate between the risk knowledge of authorities or managers and the decision-making of citizens. A warning sign at a trail entrance, campsite, riverside area, coastal zone, or water leisure facility may inform participants of prohibited access, dangerous terrain, sudden weather changes, water depth, restricted zones, emergency contact numbers, or evacuation directions. However, the effectiveness of warning signs depends on their practical intelligibility. A sign that is formally installed but difficult to notice, difficult to understand, outdated, or disconnected from current risk conditions may not meaningfully support preventive behavior. From a legal accountability perspective, the issue is therefore not only whether a sign was present, but whether the warning system was reasonably designed to communicate foreseeable risks to ordinary participants.

The Framework Act recognizes this logic in the context of danger zones. Article 41 allows the establishment of danger zones where it is necessary to prevent harm to life or body or to maintain order when a disaster occurs or is likely to occur. It also requires the relevant matters, including the boundaries of the zone and the details of prohibited or restricted activities, to be posted at a readily accessible place. This statutory structure is significant because it links legal restriction to communicative accessibility. A restriction on access becomes meaningful only when its scope and content are publicly recognizable. In this respect, warning is not merely a formal condition for regulation; it is a procedural bridge between administrative risk judgment and citizen conduct.

Weather alerts provide another important example of risk communication in outdoor leisure activities. Weather-related information is especially significant because many outdoor leisure risks arise from rapidly changing environmental conditions rather than from fixed facility defects. The Water-Related Leisure Activities Safety Act expressly incorporates this logic. Article 22 prohibits water-related leisure activities in areas where at least a watch of a

severe weather alert has been issued relating to typhoon, storm, storm surge, heavy rain, heavy snow, or strong wind, and in areas where fog or similar weather factors reduce visibility to not more than 0.5 kilometers. This provision demonstrates that weather information is not merely background information for leisure participants. In the water-related leisure field, it can operate as a legal threshold that directly restricts participation.

The regulatory significance of weather alerts should not be limited to formal prohibition. Even where the law does not prohibit all forms of outdoor activity, weather information may guide participants to postpone, modify, shorten, or cancel their activities. A severe weather alert known to the competent agency but not connected to the participant's route, location, equipment, or expected exposure may have limited preventive effect. Conversely, when weather alerts are connected to concrete behavioral guidance, such as refraining from entering a trail, suspending water activities, moving away from a coastal area, avoiding camping near waterways, or preparing evacuation routes, they become part of public safety literacy. Thus, weather alerts should be treated as communicative tools that convert environmental risk into practical safety judgment.

Evacuation guidance and emergency communication also belong to the core structure of risk communication. Evacuation cannot be reduced to a command issued only at the final stage of danger. In preventive safety governance, evacuation guidance should include prior identification of safe areas, explanation of evacuation routes, designation of shelters where necessary, and communication of conditions under which evacuation becomes necessary. Outdoor leisure participants may not be familiar with the local geography, may not understand site-specific hazard patterns, and may not know which direction is safe under changing environmental conditions. For this reason, evacuation guidance should be linked to location-based risk information rather than presented only as general emergency instruction.

Emergency communication is equally important because outdoor leisure activities often occur in spaces where rescue may be delayed or communication may be unstable. The relevant legal question is not simply whether emergency rescue institutions exist, but whether participants can transmit and receive necessary information when risk develops. The Framework Act defines emergency rescue as life rescue, first aid, and other necessary emergency measures performed by competent emergency rescue agencies. In the field of water-related leisure activities, Article 24 of the Water-Related Leisure Activities Safety Act imposes accident reporting duties, and Article 44 requires business entities to take relief measures and notify relevant administrative agencies in case of accidents. These provisions show that emergency communication is not only

a matter of post-accident reporting. It is connected to monitoring, education, equipment, and the creation of a safety environment before participation begins.

Location-based risk information has become increasingly important in this context. Outdoor leisure risks are often spatially specific. A general warning about heavy rain, heat, fog, wave height, or strong wind does not have the same meaning in every location. The risk depends on terrain, access routes, drainage conditions, water depth, coastal exposure, rescue distance, communication coverage, and the density of participants. Article 74-4 of the Framework Act authorizes the collection, linkage, analysis, utilization, sharing, and disclosure of disaster safety data for data-based disaster and safety management. Article 74-2 also provides for the sharing of disaster management information among disaster management agencies, emergency rescue agencies, and emergency rescue and relief support agencies. These provisions indicate that risk communication is not only vertical communication from public authorities to citizens, but also horizontal information sharing among institutions.

Institutional fragmentation can weaken risk communication even where each actor possesses some part of the relevant information. A local government may know the site-specific risk of a trail or campsite. A disaster-management institution may possess weather or hazard information. Fire or coast guard authorities may understand rescue accessibility. Facility managers or operators may know actual user behavior and equipment conditions. If these pieces of information are not connected, citizens may receive partial, delayed, or inconsistent guidance. In outdoor leisure activities, such inconsistency can be especially problematic because participants must often make rapid decisions under uncertain conditions. A preventive governance model therefore requires integrated communication among institutions before communication to citizens can become effective.

From the standpoint of administrative law, risk communication also has a procedural and justificatory dimension. It functions as the process through which public authority justifies warning, restriction, access control, evacuation, or emergency intervention. The more seriously an administrative measure restricts leisure participation, movement, or business operation, the more important it becomes that the underlying risk information be clear, legally grounded, and reasonably communicated. At the same time, the more serious and foreseeable the risk to life and body becomes, the stronger the justification for preventive warning, access restriction, or evacuation guidance may be. Article 37(2) of the Constitution provides the general standard for restricting freedoms and rights by requiring legal basis, necessity for public welfare and other constitutionally recognized purposes, and preservation of

the essential aspect of freedom and rights. In outdoor leisure safety, this constitutional framework requires risk communication to serve both protective and justificatory functions.

Risk communication also affects the evaluation of participant responsibility. It would be legally and normatively insufficient to attribute an accident solely to individual carelessness without examining the informational environment in which the participant made decisions. If warnings were inaccessible, unclear, contradictory, or not linked to the specific location and activity, the participant's capacity for informed judgment may have been limited. Conversely, where accurate and understandable information was provided, where prohibited zones were clearly indicated, where weather restrictions were communicated, and where safety education was given, participant responsibility may be evaluated differently. Thus, risk communication forms the evidentiary and normative background against which legal accountability is allocated among public authorities, operators, managers, and users.

However, risk communication should not be converted into a mechanism for shifting responsibility entirely to participants. Providing a warning does not automatically exhaust the responsibility of public authorities, facility managers, or business operators. A legally meaningful warning must be connected to reasonable preventive measures. If a risk is serious and foreseeable, communication may need to be accompanied by access control, activity suspension, equipment requirements, emergency staffing, rescue readiness, or inter-agency coordination. The Water-Related Leisure Activities Safety Act reflects this broader structure by combining weather-based restrictions, prohibited zones, corrective orders, inter-agency cooperation, and operator safety duties. The Act therefore demonstrates that risk communication is one element within a larger preventive regulatory architecture.

The effectiveness of disaster risk communication should therefore be assessed by its function, not merely by its formal existence. A communication system is effective when it allows citizens to answer four practical questions before and during participation: what the risk is, where the risk exists, what action should be taken, and who should be contacted or followed if the situation worsens. These questions correspond to the core elements of outdoor leisure safety: risk information, warning signs, weather alerts, evacuation guidance, emergency communication, and location-based risk information. Where these elements are disconnected, the participant may receive information but remain unable to convert it into preventive conduct.

The result of this analysis is that disaster risk communication in outdoor leisure activities should be designed as a legally accountable and citizen-oriented process. It should begin with the collection and sharing of

risk information among competent institutions, proceed through timely and understandable public warnings, be connected to location-specific guidance and emergency communication, and culminate in public safety literacy that enables participants to make informed decisions. The relevant inquiry should not be limited to whether a participant acted carefully. It should also ask whether responsible institutions generated, shared, disclosed, and communicated risk information in a way that could reasonably support preventive action. In this sense, risk communication is the institutional bridge between public safety governance and public safety literacy.

4.3. Public Safety Literacy as a Preventive Capacity

Public safety literacy should be understood as a preventive capacity through which citizens are able to understand risk information, assess situational hazards, take preventive actions, and respond appropriately to emergencies. In the context of outdoor leisure activities, this concept does not refer merely to general awareness of safety rules or passive reception of administrative warnings. It refers to the practical ability of participants to interpret safety-related information in relation to their specific activity, location, physical condition, equipment, weather exposure, and rescue accessibility. Public safety literacy is therefore the point at which disaster risk communication becomes meaningful for actual conduct.

The concept is not used here as a fixed statutory term. Rather, it is developed as an analytical category grounded in the existing structure of disaster and safety law. Korean disaster safety legislation already contains several elements that support this concept. Article 4(2) of the Framework Act on the Management of Disasters and Safety requires the State and local governments to actively disclose safety information and make such information conveniently available. Article 5 provides that people shall cooperate with the State and local governments in disaster and safety management affairs and endeavor to protect buildings and facilities they own or use from disasters or various other accidents. Article 66-4 further requires central administrative agencies and local governments to conduct activities for safety culture, including safety education, safety training, public relations, behavioral guidelines, safety statistics, safety-related investigation and analysis, and reinforcement of safety management for vulnerable groups. These provisions do not expressly define public safety literacy, but they provide the statutory components from which the concept can be reconstructed.

The legal significance of public safety literacy lies in its mediating function between institutional responsibility and individual responsibility. If outdoor leisure safety is

explained only through individual responsibility, accidents may be too easily attributed to participant negligence without examining the informational and institutional environment in which the participant acted. Conversely, if outdoor leisure safety is explained only through state responsibility, citizens may be treated as passive objects of protection, and the autonomy inherent in outdoor leisure participation may be weakened. Public safety literacy avoids both extremes. It recognizes that citizens must exercise reasonable care, but it also requires that public authorities, local governments, facility managers, and business operators provide the informational and educational conditions that make such care practically possible.

The first component of public safety literacy is information comprehension. Participants in outdoor leisure activities must be able to understand the safety information that is relevant to their activity. This includes weather alerts, warning signs, evacuation guidance, prohibited zones, route conditions, water conditions, equipment requirements, emergency contact information, and location-based risk information. The problem is not simply whether information exists within an administrative system. The problem is whether the information is expressed in a form that ordinary participants can understand and use. A weather alert, warning sign, or safety notice may have limited preventive value if it is technically accurate but practically unintelligible, outdated, insufficiently visible, or disconnected from the specific behavioral choices that participants must make.

The Framework Act's data-based orientation reinforces this point. Article 74-4 authorizes the collection, linkage, analysis, utilization, sharing, and disclosure of disaster safety data for data-based disaster and safety management and provides the basis for an integrated disaster safety data management system. The legal importance of this provision is not limited to administrative efficiency. It shows that contemporary safety governance is increasingly structured around the production and disclosure of usable safety information. However, data-based safety management does not by itself guarantee public safety literacy. Data must be translated into comprehensible warnings, practical guidance, and decision-relevant information. In outdoor leisure settings, this translation is particularly important because participants often make decisions under time pressure, environmental uncertainty, and limited familiarity with the relevant location.

The second component is risk judgment. Public safety literacy requires citizens not only to receive information, but also to assess the meaning of that information in a concrete situation. A participant must be able to determine whether weather deterioration, poor visibility, excessive heat, sudden rainfall, strong wind, unstable terrain, high water level, or remote location changes the safety of the planned activity.

Risk judgment therefore involves the ability to connect general risk information with personal and situational factors. The same warning may have different implications depending on whether the participant is experienced or inexperienced, alone or accompanied, physically prepared or fatigued, close to rescue access or geographically isolated, properly equipped or inadequately prepared. Public safety literacy thus transforms abstract information into situated judgment.

This point is illustrated by water-related leisure legislation. Article 22 of the Water-Related Leisure Activities Safety Act prohibits water-related leisure activities in areas where at least a watch of a severe weather alert has been issued relating to typhoon, storm, storm surge, heavy rain, heavy snow, or strong wind, and in areas where fog or similar weather factors reduce visibility to not more than 0.5 kilometers. This provision legally connects environmental information to participant conduct. It does not merely inform participants that weather may be dangerous; it establishes a legal threshold at which certain activities are restricted. For public safety literacy, the significance of such a rule is that participants must be capable of understanding when weather information changes the legal and practical permissibility of their activity.

The third component is preventive behavior. A citizen who understands risk information and evaluates situational hazards must be able to translate that judgment into preventive action. In outdoor leisure activities, preventive behavior may include postponing participation, changing the route, reducing the duration of the activity, wearing required safety equipment, avoiding prohibited zones, securing communication devices, informing others of one's route, checking weather conditions before departure, or stopping the activity when conditions deteriorate. Preventive behavior is therefore not a moral expectation alone. It is the behavioral output of a properly functioning risk communication system.

The Water-Related Leisure Activities Safety Act provides a useful statutory example. Article 20 requires persons engaging in water-related leisure activities to wear equipment necessary for the safety of human lives, such as life jackets. Article 13 requires persons seeking to obtain or renew an operator license to receive water-related safety education, including education on statutes and regulations governing water-related safety, the use and management of water leisure craft, and other matters necessary for water-related safety. Article 44 requires water-related leisure business entities and their employees to examine craft and facilities, monitor weather and water conditions, take relief and notification measures in case of accidents, ensure users wear safety equipment, and provide safety education before boarding. These provisions show that preventive behavior is

legally constructed through the interaction of user duties, operator duties, safety education, equipment requirements, and monitoring obligations.

The fourth component is emergency response capacity. Outdoor leisure safety cannot be secured only by preventing accidents. Participants must also have a minimum capacity to respond when risk materializes. Emergency response capacity includes the ability to request rescue, communicate location, follow evacuation guidance, provide basic assistance within one's ability, avoid secondary harm, and cooperate with competent authorities. This capacity is particularly important in outdoor environments where rescue may be delayed by distance, terrain, weather, water conditions, or communication limitations. The legal-policy significance of emergency response capacity lies in the fact that the initial period after an accident or danger signal may determine whether harm is contained or amplified.

Emergency response capacity is closely related to statutory duties concerning reporting and cooperation. Article 24 of the Water-Related Leisure Activities Safety Act requires a person engaging in water-related leisure activities to report without delay to relevant administrative agencies, such as coast guard, police, or fire agencies, where certain serious accidents occur, including death, disappearance, serious injury, collision, stranding, or other accidents affecting safe navigation. Upon receiving such a report, the head of the relevant administrative agency must take measures necessary to save human lives and deal with the accident. This provision demonstrates that emergency response is not limited to professional rescue agencies; it begins with the participant's or relevant actor's ability to recognize the seriousness of the situation and activate the public response system through timely reporting.

Public safety literacy is therefore different from simple obedience to safety rules. It is a layered capacity consisting of information comprehension, risk judgment, preventive behavior, and emergency response capacity. These four elements are sequential but also mutually reinforcing. Information comprehension is necessary for risk judgment. Risk judgment is necessary for preventive behavior. Preventive behavior reduces the probability of accidents. Emergency response capacity reduces the severity of harm when prevention fails. A safety policy that emphasizes only one element is structurally incomplete. Warnings without comprehension remain formal. Comprehension without judgment remains abstract. Judgment without preventive behavior remains ineffective. Prevention without emergency response remains fragile when risk materializes.

This concept also clarifies the limits of individual responsibility. Participant responsibility is meaningful only when the institutional conditions for informed conduct have been reasonably provided. If risk information is inaccessible, warnings are unclear, safety education is absent, or

emergency communication is not practically available, it is difficult to treat the participant as fully capable of exercising informed safety judgment. Conversely, where public authorities and operators have provided accurate, timely, understandable, and location-relevant information, participant responsibility may be more strongly justified. Public safety literacy thus provides a normative standard for evaluating how responsibility should be allocated among public authorities, operators, managers, and users after an accident.

Public safety literacy also prevents the misuse of safety education as a formal compliance device. Safety education should not be treated as a mere administrative ritual that transfers responsibility to participants once information has been formally delivered. Under Article 66-4 of the Framework Act, safety education and safety training are part of broader activities for promoting safety culture. This means that education should cultivate practical capacity, including emergency-handling knowledge, behavioral guidelines, and awareness of safety statistics and risk patterns. In the context of outdoor leisure activities, safety education should therefore be evaluated by whether it enables citizens to understand risk information, judge changing conditions, take preventive measures, and respond effectively to emergencies.

From an institutional perspective, public safety literacy should be understood as the citizen-facing dimension of preventive safety governance. Public authorities may collect disaster safety data, disclose safety information, issue alerts, designate danger zones, or coordinate rescue systems. Operators may provide equipment, training, monitoring, and immediate safety instructions. Yet these institutional measures become fully preventive only when citizens can internalize and use them. Public safety literacy therefore connects the supply side of safety governance with the demand side of citizen behavior. It is not merely an educational concept; it is a governance concept.

At the same time, public safety literacy should not be understood as a justification for reducing public responsibility. A literacy-based approach does not mean that the State may simply provide information and leave all remaining risk to citizens. The State and local governments remain responsible for protecting lives, bodies, and property from disasters and various accidents, preventing such events, mitigating damage, and implementing response and recovery plans under Article 4(1) of the Framework Act. The literacy model therefore operates within, not outside, the legal structure of state and local government responsibility. Its function is to make preventive governance more effective by enabling citizens to participate in safety management as informed actors.

The result of this analysis is that public safety literacy should be placed at the center of outdoor leisure safety

governance. A preventive system that lacks public safety literacy may possess laws, institutions, warnings, and response agencies, but still fail to prevent avoidable harm because citizens cannot convert information into action. Conversely, a system that strengthens public safety literacy can reduce the gap between administrative knowledge and citizen behavior. It can also provide a more balanced basis for legal accountability by clarifying what information was available, how it was communicated, whether it was understandable, whether preventive behavior was feasible, and how responsibility should be allocated when harm occurs.

In conclusion, public safety literacy functions as the preventive capacity that connects disaster risk communication with legal accountability. It enables outdoor leisure participants to understand risks before participation, assess changing conditions during participation, take preventive action when danger increases, and activate emergency response when prevention fails. It also provides a legal-policy framework for evaluating whether public authorities, operators, managers, and participants have fulfilled their respective responsibilities. In this sense, public safety literacy is not an auxiliary concept added to outdoor leisure safety. It is a core element of preventive public safety governance.

4.4. Legal Accountability in Preventive Safety Governance

Legal accountability in preventive safety governance should not be understood only as *ex post* liability after an accident has occurred. In outdoor leisure activities, accountability must also operate before harm materializes. It includes the obligation to identify foreseeable risks, provide accessible risk information, establish reasonable safety standards, prepare emergency-response channels, educate participants where necessary, coordinate among competent institutions, and review institutional failures after accidents. This broader understanding is necessary because outdoor leisure accidents often arise from the interaction of environmental hazards, participant conduct, operator control, administrative information, and emergency-response capacity. If accountability is considered only after damage has occurred, the legal system may fail to address the preventive stage at which avoidable harm could have been reduced.

The Korean legal framework supports this preventive understanding of accountability. Article 4 of the Framework Act on the Management of Disasters and Safety provides that the State and local governments are responsible for protecting people's lives, bodies, and property from disasters or various other accidents, preventing such events, mitigating damage, and formulating and implementing

plans for prompt response and recovery. The same provision also requires the State and local governments to actively disclose safety information and make such information conveniently available. These duties show that public responsibility in disaster and safety management is not limited to rescue or recovery. It includes prevention, information disclosure, damage mitigation, response planning, and institutional preparedness.

This does not mean that the State or local governments bear an unlimited duty to eliminate every risk inherent in outdoor leisure activities. Outdoor leisure activities are based on autonomy, voluntary participation, and the social value of recreation. A legal system that treats all outdoor risk as a matter for direct administrative suppression would be inconsistent with the constitutional balance between freedom and safety. Article 10 of the Constitution protects human dignity and the right to pursue happiness, while Article 34(6) provides that the State shall endeavor to prevent disasters and protect citizens from harm therefrom. Article 37(2) requires that restrictions on freedoms and rights be based on law, necessary for public purposes, and not violate the essential aspect of freedom or right. Accordingly, legal accountability in outdoor leisure safety should be framed not as absolute risk elimination, but as reasonable prevention under conditions of foreseeability, seriousness, institutional capacity, and proportionality.

The concept of reasonable prevention is important because outdoor leisure safety is situated between under-protection and over-control. Under-protection occurs when competent public authorities or legally responsible private actors fail to take reasonable preventive measures despite foreseeable and serious risks. Over-control occurs when ordinary leisure participation is excessively restricted in the name of safety without sufficient legal basis, necessity, or proportionality. Preventive safety governance must avoid both failures. It should construct conditions under which citizens can participate in outdoor leisure activities with informed autonomy, while ensuring that preventable and serious risks are not left unmanaged.

In this framework, the accountability of the State and local governments is primarily institutional. It concerns whether the public safety system has reasonably performed the functions of risk identification, information disclosure, warning, coordination, emergency preparedness, safety education, and post-accident learning. Article 66-4 of the Framework Act on the Management of Disasters and Safety requires central administrative agencies and local governments to conduct activities for safety culture, including safety education, safety training, public relations, behavioral guidelines, safety statistics, safety-related investigation and analysis, and reinforcement of safety management for vulnerable groups. Article 66-9 provides the basis for constructing and utilizing safety information

systems. These provisions indicate that public accountability includes the continuous function of producing usable safety information, forming safety awareness, and maintaining institutional capacity for prevention.

The accountability of facility managers and business operators has a different legal structure but performs a closely connected preventive function. Public authorities may establish general safety systems, but managers and operators often control the immediate conditions of participation. They may control access, equipment, schedule, route, boarding, rental, instruction, facility condition, warning delivery, and first response. Where outdoor leisure activities are commercially organized or managed through specific facilities, the operator's responsibility becomes an essential component of preventive governance. The law must therefore distinguish between risks that remain within the participant's autonomous choice and risks that are created, intensified, or controlled by the operator's management environment.

The Water-Related Leisure Activities Safety Act provides a concrete example of operator-centered preventive accountability. Article 43 authorizes safety examinations of water leisure craft and water-related leisure facilities. Article 44 requires water-related leisure business entities and their employees to examine the safety of craft and facilities, monitor weather and water conditions, take relief measures and notify relevant administrative agencies in case of an accident, ensure users wear safety equipment, provide safety education before boarding, and maintain necessary rescue arrangements. These duties show that operator accountability is not merely contractual or compensatory. It is preventive, informational, educational, operational, and emergency-oriented.

Preventive accountability may also include administrative intervention when risk conditions deteriorate. Article 31 of the Water-Related Leisure Activities Safety Act authorizes corrective orders where necessary for safe water-related leisure activities. Article 46 permits the competent authority to order restrictions on business areas or business hours, or temporary suspension of business operations, where weather or water conditions deteriorate or other prescribed risk conditions arise. These provisions demonstrate that legal accountability is not static. The level of required preventive action may change according to environmental conditions, foreseeable danger, and the degree of control exercised by the relevant actor.

The responsibility of users must also be recognized. Outdoor leisure participants are not passive objects of protection. They voluntarily engage in activities that may involve natural, spatial, or physical risk. They must observe safety rules, use required equipment, heed warnings, report serious accidents where required, and cooperate with public

authorities. Article 5 of the Framework Act on the Management of Disasters and Safety provides that people shall cooperate with the State and local governments in disaster and safety management affairs. In the water-related leisure field, Article 20 of the Water-Related Leisure Activities Safety Act requires persons engaging in water-related leisure activities to wear equipment necessary for the safety of human lives, and Article 24 imposes accident reporting duties in specified serious situations. These provisions establish that citizen responsibility forms part of the statutory safety structure.

However, user responsibility cannot be evaluated in isolation from the information and safety environment provided by public authorities, facility managers, and business operators. A participant's self-responsibility is meaningful only when the participant has reasonable access to safety information, warning signs, weather alerts, evacuation guidance, emergency communication, and equipment instructions. If warnings are unclear, safety education is merely formal, prohibited zones are not adequately communicated, or operators fail to monitor foreseeable conditions, it would be normatively insufficient to attribute the entire accident to the participant's carelessness. Conversely, where risk information is timely, accurate, understandable, and location-specific, where required equipment is provided or clearly required, and where warnings and restrictions are practically accessible, user responsibility may be more strongly justified.

Legal accountability should therefore be understood as a multi-actor and relational structure. The State and local governments bear public responsibility for general safety systems, information disclosure, coordination, safety culture, emergency preparedness, and institutional review. Specialized agencies bear responsibility within their statutory jurisdiction, such as the Korea Coast Guard in water-related or marine safety contexts. Local governments and facility managers bear responsibility for site-specific risk identification, signage, access management, and local emergency linkage. Business operators bear responsibility for the risks they organize, commercialize, manage, or control. Users bear responsibility for reasonable care, compliance, equipment use, and emergency cooperation. The central task of law is not to shift responsibility from one actor to another, but to clarify how responsibilities interact before, during, and after risk materialization.

Accountability also has an insurance and compensation dimension, but this dimension should not replace prevention. Article 49 of the Water-Related Leisure Activities Safety Act requires certain owners of power-driven water leisure craft and water-related leisure business entities to subscribe to insurance or mutual aid programs, while Article 50 requires business entities to provide information on such insurance subscription. These provisions are important because they

protect victims after harm has occurred. However, insurance-based accountability is structurally incomplete if it is separated from preventive duties concerning inspection, monitoring, education, equipment, and emergency response. Compensation can respond to damage, but it cannot by itself restore life and bodily safety once preventable harm has occurred.

For this reason, legal accountability in outdoor leisure safety must include a feedback function. Article 69 of the Framework Act on the Management of Disasters and Safety provides a basis for investigating the causes of disasters, while Article 70 provides for the management of records of disaster situations, including disaster situations, countermeasures, actions taken, results of cause investigations, and measures following recommendations for improvement. These provisions show that accountability is not merely retrospective blame. It is also an institutional learning mechanism through which accidents are converted into improved prevention.

The result of this analysis is that legal accountability in preventive safety governance should be constructed as a layered and relational system. The first layer is public accountability, grounded in the responsibilities of the State and local governments to prevent disasters and various accidents, disclose safety information, promote safety culture, and maintain safety information systems. The second layer is managerial and operator accountability, grounded in duties to inspect, monitor, educate, provide equipment, notify authorities, and prepare emergency response. The third layer is participant accountability, grounded in cooperation, compliance, equipment use, reasonable care, and emergency reporting. The fourth layer is feedback accountability, grounded in investigation, record management, data-based improvement, and institutional learning.

In conclusion, legal accountability is the normative structure that prevents risk communication and public safety literacy from remaining merely aspirational concepts. Risk communication becomes meaningful when responsible actors are accountable for the quality, timing, accessibility, and practical usefulness of information. Public safety literacy becomes meaningful when citizens are supported by an institutional environment that enables informed preventive conduct. Preventive safety governance becomes legitimate when public authorities and private actors take reasonable measures against foreseeable and serious risks while respecting freedom and proportionality. Outdoor leisure safety should therefore be governed by an accountability model that connects prevention, information, education, emergency response, responsibility allocation, and post-accident institutional learning.

4.5. A Convergent Model for Outdoor Leisure

Safety Governance

A convergent model for outdoor leisure safety governance should be constructed as a cyclical framework rather than a linear sequence of isolated administrative actions. Outdoor leisure safety cannot be sufficiently secured by a fragmented model in which risk information is produced by one institution, safety education is performed by another actor, emergency response is activated only after an accident, and legal responsibility is examined separately after harm occurs. Such fragmentation weakens the preventive function of safety governance because it separates information from conduct, conduct from accountability, and accountability from institutional learning. The model proposed in this study therefore connects disaster risk communication, public safety literacy, preventive behavior, legal accountability, and post-accident verification into a continuous governance cycle.

The starting point of this model is risk communication. In outdoor leisure activities, risk communication functions as the institutional process through which technical or administrative risk information is converted into practical guidance for citizens. Weather alerts, warning signs, evacuation guidance, emergency communication, prohibited zones, equipment requirements, and location-based risk information all belong to this communicative layer. The legal significance of risk communication lies in the fact that information possessed by administrative agencies or operators does not itself prevent harm. Information becomes preventive only when it is disclosed, transmitted, and understood in a manner that allows participants to modify their behavior before risk materializes. In this sense, the duty to disclose safety information under Article 4(2) of the Framework Act on the Management of Disasters and Safety should be understood not merely as a transparency requirement, but as a foundation for preventive public safety governance.

The second element is public safety literacy. Risk communication can produce preventive effects only when citizens have the capacity to understand and use the information provided to them. Public safety literacy operates as the citizen-facing dimension of disaster safety governance. It enables participants to understand risk information, assess situational hazards, take preventive action, and respond appropriately to emergencies. This capacity is not reducible to simple awareness of safety rules. It includes the ability to interpret weather alerts, understand warning signs, assess terrain or water-related danger, recognize the meaning of prohibited zones, identify evacuation routes, use safety equipment, and activate emergency communication when necessary. Public safety literacy therefore functions as the practical bridge between institutional information and individual conduct.

The third element is preventive behavior. The purpose of risk communication and public safety literacy is not the passive accumulation of safety knowledge, but behavioral adjustment before harm occurs. Preventive behavior in outdoor leisure activities may include postponing an activity, changing a route, wearing required safety equipment, avoiding prohibited zones, checking weather alerts, securing emergency communication, terminating an activity when conditions deteriorate, or cooperating with access restrictions and evacuation guidance. Preventive behavior must be understood as the practical output of a governance system. If risk information is not understandable, if warning signs are not visible, if evacuation guidance is unclear, or if safety education is merely formal, it is difficult to expect participants to act preventively in a legally meaningful sense. Conversely, when information is timely, accessible, and location-specific, participant responsibility becomes more normatively persuasive.

The fourth element is legal accountability. In the convergent model, legal accountability is not limited to ex post liability after damage has occurred. It functions throughout the preventive cycle. Public authorities are accountable for whether they identified foreseeable risks, disclosed safety information, coordinated relevant institutions, and prepared emergency-response systems. Facility managers and business operators are accountable for whether they managed risks within their control, provided safety education, maintained equipment, monitored changing conditions, and activated rescue or notification measures when necessary. Participants are accountable for whether they complied with safety rules, used required equipment, observed warnings, and acted with reasonable care. Legal accountability therefore connects institutional responsibility and individual responsibility without reducing outdoor leisure safety either to state paternalism or to individual blame.

The Water-Related Leisure Activities Safety Act provides a useful example of this layered accountability structure. The Act combines participant duties, weather-based restrictions, operator safety obligations, safety education, emergency notification, administrative intervention, and information-system functions. In particular, Article 20 requires persons engaging in water-related leisure activities to wear equipment necessary for the safety of human lives, Article 22 restricts water-related leisure activities under specified dangerous weather conditions, Article 44 imposes safety duties on business entities, and Article 46 permits restrictions on business areas, business hours, or temporary suspension of business operations where risk conditions arise. These provisions show that leisure safety law can operate not only through post-accident liability, but also through preventive duties, administrative control, risk communication, and emergency

readiness.

The fifth element is post-accident verification and institutional improvement. A preventive governance model cannot be completed by assigning responsibility after an accident. Accidents must be converted into institutional learning. This means that the safety governance system should examine whether risk information existed, whether it was shared among relevant institutions, whether it was communicated to participants, whether warnings and restrictions were clear, whether preventive behavior was feasible, whether emergency communication functioned properly, and whether legal duties were adequately performed. Without such verification, similar risk patterns may recur in another location, season, or activity. Accountability then remains retrospective rather than preventive. The Framework Act supports this feedback-oriented logic through provisions concerning investigation of disaster causes, record management of disaster situations, and data-based disaster and safety management.

On this basis, the model proposed in this study may be described as a circular governance structure. Risk communication supplies citizens with understandable and actionable safety information. Public safety literacy enables citizens to interpret that information in relation to their own activity and environment. Preventive behavior translates literacy into concrete action. Legal accountability clarifies the duties of public authorities, operators, managers, and participants. Post-accident verification and institutional improvement return the results of accidents and near misses to the governance system, thereby improving future risk communication, safety education, administrative coordination, and legal standards. The model therefore does not treat prevention, education, liability, and evaluation as separate stages. It integrates them into a continuous cycle.

The advantage of this convergent model is that it avoids the limitations of three incomplete approaches. The first is the individual-negligence approach, which explains outdoor leisure accidents primarily as consequences of participant carelessness. This approach may be appropriate in some cases, but it becomes insufficient when participants lacked access to clear risk information, when warnings were not practically intelligible, or when operators failed to manage foreseeable hazards. The second is the post-accident response approach, which emphasizes rescue, emergency treatment, and compensation after harm has occurred. This approach is indispensable, but it intervenes too late if foreseeable risks could have been reduced beforehand. The third is the over-regulatory approach, which attempts to secure safety by broadly restricting leisure activities. This approach may undermine the freedom, autonomy, and social value of outdoor leisure if not limited by legality, necessity, and proportionality. The convergent model seeks to overcome these limits by organizing outdoor leisure safety

around informed autonomy and reasonable prevention.

This model also clarifies the proper role of public well-being in outdoor leisure safety. Outdoor leisure activities contribute to well-being because they support recreation, health, social participation, contact with nature, and personal satisfaction. However, public well-being cannot be reduced to the expansion of participation opportunities alone. It also requires an institutional environment in which citizens can participate under conditions of reasonable safety. A policy that promotes outdoor leisure while neglecting risk communication and accountability may increase participation but also expose citizens to preventable harm. Conversely, a policy that restricts outdoor leisure excessively may protect safety in a narrow sense but weaken autonomy and social participation. The convergent model therefore understands public well-being as a balanced institutional condition in which leisure participation and safety protection are mutually reinforced.

The model should not be misunderstood as a proposal to impose identical legal duties on all forms of outdoor leisure activity. Hiking, camping, cycling, fishing, water-related leisure, and marine leisure differ in their risk profiles, responsible institutions, participant behavior, and degree of administrative manageability. A uniform regulatory scheme would be inappropriate. The convergent model is instead a functional framework. It asks whether, in a given activity and location, there is foreseeable and serious risk, whether that risk can be reasonably communicated, whether participants can understand and act upon the information, whether responsible actors have preventive duties, and whether accidents can be reviewed for institutional improvement. The content of regulation may differ by activity, but the governance logic remains consistent.

This functional approach is also consistent with proportionality. Preventive governance should be stronger where risk is serious, foreseeable, and institutionally manageable. It should be more limited where risks are ordinary, individualized, or not reasonably controllable by public authorities or operators. A temporary access restriction may be justified where severe weather, flooding, landslide risk, poor visibility, or water conditions create serious danger. By contrast, broad and indefinite restrictions on ordinary outdoor activities would require stronger legal justification. The convergent model therefore does not expand public authority without limit. It provides a method for calibrating public intervention according to risk severity, foreseeability, preventability, and the availability of less restrictive measures.

The result of this analysis is that outdoor leisure safety governance should be designed as a circular and convergent public safety system. The purpose of such a system is not to eliminate all risks from outdoor leisure activities. Risk is partly inherent in outdoor recreation, and the law should not

extinguish the autonomy and social value of voluntary outdoor participation. The purpose is rather to ensure that foreseeable and serious risks are reasonably identified, communicated, understood, managed, reviewed, and reduced. In this way, outdoor leisure activities can remain spaces of freedom and well-being while being supported by a legally accountable structure of preventive public safety governance.

5. Conclusions

This study has reconceptualized outdoor leisure safety as a preventive public safety governance issue rather than a matter reducible to individual caution, leisure promotion, or ex post liability. Outdoor leisure activities such as hiking, camping, trekking, cycling, fishing, water-related leisure, and marine leisure are based on personal autonomy and voluntary participation. However, their risks may become public safety concerns when they are foreseeable, serious, and connected to institutional responsibilities for risk information, warning, safety education, emergency communication, rescue, and post-accident review. The central finding of this study is that outdoor leisure safety should be understood as an intermediate legal-policy domain between private recreation and public safety governance.

The analysis demonstrated that outdoor leisure accidents cannot be adequately explained by participant carelessness alone. In open, natural, or semi-controlled environments, risks may arise from the interaction of weather conditions, terrain, water conditions, remoteness, communication limitations, rescue accessibility, operator conduct, and administrative preparedness. Where such risks can be reasonably identified and managed, safety governance must move beyond a narrow individual-negligence approach. At the same time, outdoor leisure activities should not be transformed into an excessively regulated domain merely because they involve risk. The appropriate framework is therefore not absolute safety, but proportionate and legally accountable risk reduction.

This study proposed public safety literacy as the key preventive capacity linking risk communication with citizen conduct. Public safety literacy refers to citizens' capacity to understand risk information, assess situational hazards, take preventive actions, and respond appropriately to emergencies. This concept mediates between institutional responsibility and individual responsibility. Citizens may be expected to act responsibly only when they have access to accurate, timely, understandable, and practically usable safety information. Conversely, public authorities, facility managers, and business operators cannot discharge their preventive responsibilities merely by possessing

information or providing formal warnings. Risk communication must be designed in a manner that enables citizens to convert information into practical judgment and preventive behavior.

The study also reconstructed legal accountability as a preventive and relational concept. Legal accountability in outdoor leisure safety should not be limited to compensation or blame after an accident. It includes the prior duties of public authorities to identify foreseeable risks, disclose safety information, coordinate relevant institutions, maintain emergency-response systems, and promote safety culture. It also includes the duties of facility managers and business operators to manage risks within their control, provide safety equipment and education, monitor changing conditions, and take relief or notification measures where necessary. Users also bear responsibility for reasonable care, compliance with safety rules, use of required equipment, and cooperation in emergency situations. However, user responsibility must be evaluated in light of the informational and institutional environment in which the user acted.

On this basis, the study presented a convergent model for outdoor leisure safety governance. The model is organized as a circular structure consisting of risk communication, public safety literacy, preventive behavior, legal accountability, and post-accident verification and institutional improvement. Risk communication supplies citizens with actionable safety information. Public safety literacy converts information into judgment. Preventive behavior translates judgment into action. Legal accountability clarifies the duties of public and private actors. Post-accident verification returns the lessons of accidents and near misses to the governance system so that future risks can be reduced. This model transforms outdoor leisure safety from a fragmented system of warnings, education, rescue, and liability into an integrated preventive governance cycle.

The contribution of this study lies in reframing outdoor leisure safety as a legal-policy field in which public well-being, disaster risk prevention, citizen capacity-building, and legal accountability are mutually connected. Outdoor leisure activities contribute to well-being by supporting recreation, health, social participation, and contact with nature. Yet their public value can be sustained only when foreseeable and serious risks are reasonably communicated, preventable harms are institutionally reduced, and responsibility is allocated in a fair and functional manner. A safety system that relies only on individual caution is insufficient, while a system that relies only on administrative control is also inadequate. What is required is a preventive and cyclical governance model that protects life and bodily integrity while preserving the autonomy, accessibility, and well-being value of outdoor leisure activities.

The proposed framework does not claim to eliminate all risks inherent in outdoor recreation. Nor does it provide an empirical measurement of accident causation or regulatory effectiveness. Its purpose is to offer a conceptual and legal-policy model for evaluating whether outdoor leisure safety governance can reasonably prevent foreseeable harm without extinguishing the social value of voluntary leisure participation. Future research may further develop this framework through empirical analysis of specific outdoor leisure sectors, comparative examination of safety communication systems, and evaluation of how public safety literacy affects preventive behavior in concrete risk environments.

References

- Association of Southeast Asian Nations. (2024). *ASEAN disaster risk communication framework*. The ASEAN Secretariat. <https://asean.org>
- Brussoni, M., Gibbons, R., Gray, C., Ishikawa, T., Sandseter, E. B. H., Bienenstock, A., Chabot, G., Fuselli, P., Herrington, S., Janssen, I., Pickett, W., Power, M., Stanger, N., Sampson, M., & Tremblay, M. S. (2015). What is the relationship between risky outdoor play and health in children? A systematic review. *International Journal of Environmental Research and Public Health*, 12(6), 6423–6454. <https://doi.org/10.3390/ijerph120606423>
- Earth Networks. (2017). *Outdoor recreation: 4 safety tips*. <https://www.earthnetworks.com/blog/4-safety-tips/>
- Graf, J., Renner, R., & Klebel, T. (2026). Bridging warning and adaptation addressing risk communication strategies for short-term natural hazard warnings and long-term risk adaptation: A scoping review. *Progress in Disaster Science*, 29, Article 100515. <https://doi.org/10.1016/j.pdisas.2026.100515>
- Injury Matters. (n.d.). *Keeping safe outdoors: Outdoor recreation and leisure*. Retrieved June 8, 2026, from <https://www.injurymatters.org.au/know-injury/keeping-safe-outdoors-outdoor-recreation-and-leisure/>
- Kim, J. H., & Kim, Y. H. (2022). A study on disaster & safety education based on voluntary leisure activities. *Proceedings of the Korean Society of Disaster Information Regular Conference* 2022, 359–360. <https://www.earticle.net/Article/A420120>
- Kwon, Y. T., & Bing, W. C. (2015). Study on leisure marine activity safety management and safety measures proposed. *Korean Journal of Sports Science*, 24(6), 173–185.
- Lee, H. B. (2020). *A study on revitalization plans for Gapcheon water sports experience center*. Daejeon Sejong Research Institute. <http://www.dsi.re.kr>
- Lee, J. S., & Cho, M. H. (2020). Legal research on prevention and management responsibility of risks. *Northeast Asian Law Journal*, 14(1), 363–394. <https://doi.org/10.19035/nal.2020.14.1.14>
- Lee, K. (2025). A study on marine leisure sports regulations: Focusing on administrative legal issues such as permits, registrations, and marine management plans. *National Public*

- Law Review*, 21(1), 121–154.
<https://doi.org/10.46751/nplak.2025.21.1.121>
- Lindsey, M., Richmond, B., Quintanar, D. R., Spradlin, J., & Halili, L. (2022). Insights into improving risk and safety communication through environmental health literacy. *International Journal of Environmental Research and Public Health*, 19(9), Article 5330.
<https://doi.org/10.3390/ijerph19095330>
- Mata, C., Pereira, C., & Carvalhinho, L. (2022). Safety measures and risk analysis for outdoor recreation technicians and practitioners: A systematic review. *Sustainability*, 14(6), Article 3332. <https://doi.org/10.3390/su14063332>
- Moon, J. H. (2024). A study on the operation and prohibited areas of water leisure crafts for revitalizing water leisure. *Proceedings of the Korea Society of Marine Transportation 2024 Fall Conference*, 6–12.
- Promax Access. (n.d.). *Here's the MEWP weather forecast: How three hurricanes affect your outside access platform*. Retrieved June 8, 2026, from <https://promaxaccess.com/outside-access-platform/>
- Risk Assessment Wizard. (2026). *Hiking safety guide*. <https://riskassessmentwizard.com>
- United Nations Office for Disaster Risk Reduction. (2015). *Sendai framework for disaster risk reduction 2015–2030*. <https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030>
- United Nations Office for Disaster Risk Reduction and CIMA Research Foundation. (2024). *Handbook on the use of risk knowledge for multi-hazard early warning systems*. United Nations Office for Disaster Risk Reduction. <https://www.undrr.org>
- United Nations Office on Drugs and Crime. (n.d.). *Safety governance approach for safe, inclusive, and resilient cities: A practical guide for conducting safety governance assessments in urban environments*. Retrieved June 8, 2026, from https://www.unodc.org/documents/Urban-security/Safety_Governance_Assessment_Guidance_final.pdf
- World Health Organization. (n.d.). *Risk communication and community engagement*. Retrieved June 8, 2026, from <https://www.who.int/emergencies/risk-communications>
- Yoon, J. W., & Nam, K. H. (2025). A conceptual analysis of safety culture literacy. *Journal of Safety Culture*, 45, 265–279.
<https://doi.org/10.52902/kjsc.2025.45.265>