

Risk Management Matrix

1. Determine the Hazard Severity Rating based on figure 2-10 below: Catastrophic, Critical, Marginal or Negligible.
2. Determine the Hazard Probability (frequency) from 2-11 below: Frequent, Likely, Occasional, Seldom, or Unlikely.
3. In figure 2-12 below, pick a Severity row: Catastrophic, Critical, Marginal or Negligible.
4. In figure 2-12 below, pick a Probability column: Frequent, Likely, Occasional, Seldom, or Unlikely.
5. The intersection of the Severity row and the Probability column contains the Risk Category: Extremely High, High, Moderate, or Low.

The following is excerpted from US Army Field Manual 3-100.4, from the GlobalSecurity.org web site.

Catastrophic - irreparable damage, total loss of the site, complete destruction, irreplaceable, and anticipate widespread public concern. Will require notification of higher HQs, public affairs, and outside agencies.

Critical - major physical damage to historical/cultural structure. Restoration is difficult, long-term, costly, and will require assistance and notification of higher HQs, public affairs, and outside agencies.

Marginal - minor physical damage to historical/cultural structures which can be restored with outside assistance. Unit must report damage to higher HQs.

Negligible - surrounding site damage from individual and vehicular activities easily repaired or restored by the unit; no physical damage to structures; unit must report damage to higher HQs.

Severity Rating	Definition
Catastrophic (I)	Loss of ability to accomplish the mission or near mission failure, death or permanent total disability (accident risk), loss of major or mission-critical system or equipment, major property (facility) damage, severe (strategic) environmental damage, mission-critical security failure, unacceptable collateral damage
Critical (II)	Significantly (severely) degraded mission capability or unit readiness, permanent partial disability, temporary total disability exceeding 3 months time (accident risk), extensive (major) damage to equipment or systems, significant damage to property or the environment, security failure, significant collateral damage
Marginal (III)	Degraded mission capability or unit readiness, minor damage to equipment or systems, property, or the environment; lost days due to injury or illness not exceeding 3 months (accident risk); minor damage to property or the environment
Negligible (IV)	Little or no adverse impact on mission capability, first aid or minor medical treatment (accident risk), slight equipment or system damage but fully functional and serviceable, little or no property or environmental damage

Figure 2-10. Hazard severity

Frequent (A) occurs very often, continuously experienced	
Single item	Occurs very often in service life, expected to occur several times over duration of a specific mission or operation, always occurs
Fleet or inventory of items	Occurs continuously during a specific mission or operation or over a service life
Individual soldier	Occurs very often in career, expected to occur several times during mission or operation, always occurs
All soldiers exposed	Occurs continuously during a specific mission or operation
Likely (B) occurs several times	
Single item	Occurs several times in service life, expected to occur during a specific mission or operation
Fleet or inventory of items	Occurs at a high rate, but experienced intermittently (regular intervals, generally often)
Individual soldier	Occurs several times in career, expected to occur during a specific mission or operation
All soldiers exposed	Occurs at a high rate, but experienced intermittently
Occasional (C) occurs sporadically	
Single item	Occurs some time in service life, may occur about as often not during a specific mission or operation
Fleet or inventory of items	Occurs several times in service life
Individual soldier	Occurs some time in career, may occur during a specific mission or operation, but not often
All soldiers exposed	Occurs sporadically (irregularly, sparsely, or sometimes)
Seldom (D) remotely possible; could occur at sometime	
Single item	Occurs in service life but only remotely possible, not expected to occur during a specific mission or operation
Fleet or inventory of items	Occurs as isolated incidents, possible to occur some time in service life but rarely, usually does not occur
Individual soldier	Occurs as isolated incident during a career, remotely possible, but not expected to occur during a specific mission or operation
All soldiers exposed	Occurs rarely within exposed population as isolated incidents
Unlikely (E) can assume will not occur, but not impossible	
Single item	Occurrence not impossible, but may assume will almost never occur in service life, may assume will not occur during a specific mission or operation
Fleet or inventory of items	Occurs very rarely (almost never or improbable), incidents may occur over service life
Individual soldier	Occurrence not impossible, but may assume will not occur in career or during a specific mission or operation
All soldiers exposed	Occurs very rarely, but not impossible

Figure 2-11. Hazard probability

2-70. Using the defined degrees of probability and severity, an individual can determine the overall environmental-related risk level from the intersection of the two in the risk assessment matrix shown in [Figure 2-12](#).

Risk Assessment Matrix					
	Probability				
SEVERITY	Frequent (A)	Likely (B)	Occasional (C)	Seldom (D)	Unlikely (E)
Catastrophic (I)	E	E	H	H	M
Critical (II)	E	H	H	M	L
Marginal (III)	H	M	M	L	L
Negligible (IV)	M	L	L	L	L

Risk Category
<p>Extremely High (E)</p> <p>Mission failure if hazardous incidents occur during mission. A frequent or likely probability of catastrophic loss (IA or IB) or frequent probability of critical loss (IIA) occurs.</p>
<p>High (H)</p> <p>Significantly degraded mission capabilities in terms of required mission standard or not accomplishing all parts of the mission, not completing the mission to standard (if hazards occur during mission). Occasional to seldom probability of catastrophic loss (IC or ID). A likely to occasional probability of a critical loss occurring (IIB or IIC) with material and soldier system. Frequent probability of marginal (IIIA) losses.</p>
<p>Moderate (M)</p> <p>Expected degraded mission capabilities in terms of required mission standard. Will have reduced mission capability (if hazards occur during mission). Unlikely probability of catastrophic loss (IE). The probability of a critical loss occurring is seldom (IID). Marginal losses occur with a probability of no more often than likely (IIIB or IIIC). Frequent probability of negligible (IVA) losses.</p>
<p>Low (L)</p> <p>Expected losses have little or no impact on accomplishing the mission. The probability of critical loss is unlikely (IIE), while that of marginal loss is no more often than seldom (IIIB through IIIE).</p>

Figure 2-12. Risk assessment matrix (continued)

2-71. A practical example of assessing environmental-related risk is provided in [Appendix G](#).

Develop Controls and Make a Decision

2-72. Develop controls to eliminate or reduce the probability or severity of each hazard, to lower the overall risk. Controls include one of the following categories:

- Educational.
- Physical.
- Avoidance.

2-73. [Figure 2-13](#) provides environmental-related control examples. The checklist in [Appendix E](#) provides additional means for addressing and reducing environmental risk through the use of effective controls.

Control Type	Environmental-Related Examples
Educational	<ul style="list-style-type: none"> ● Conducting unit environmental awareness training ● Conducting an environmental briefing before deployment ● Performing tasks to environmental standards ● Reviewing environmental considerations in AARs ● Reading unit's environmental SOPs and policies ● Conducting spill prevention training ● Publishing an environmental annex/appendix to the OPORD/OPLAN
Physical	<ul style="list-style-type: none"> ● Providing spill prevention equipment ● Establishing field trash collection point and procedures ● Establishing field satellite accumulation site and procedures ● Policing field locations ● Practicing good field sanitation ● Filling in fighting positions ● Posting signs and warnings for off-limit areas
Avoidance	<ul style="list-style-type: none"> ● Maneuvering around historical/cultural sites ● Establishing refueling and maintenance areas away from wetlands and drainage areas ● Crossing streams at approved sites ● Preventing pollution ● Limiting noise in endangered and threatened species habitats ● Avoiding refueling over water sources ● Curtailing live vegetation use for camouflage

Figure 2-13. Environmental-related controls

2-74. Many environmental risk controls are simply extensions of good management, housekeeping, operations security (OPSEC), and leadership practices. Risk reduction controls include conducting rehearsals, changing locations, establishing procedures, and increasing supervision.

2-75. Once all feasible risk control measures are in place, some risk will always remain. This residual risk requires leaders' attention. Unit leaders inform their chain of command of the residual risk and its implications on the operation. Unit leaders also inform their subordinates and focus C² efforts on those portions of the operation. The commander alone decides whether or not to accept the level of risk. He may also direct his staff to consider additional controls or a change in the COA based on environmental risk.

Implement Controls

2-76. Inform subordinates, down to individual soldiers/Marines, of risk control measures. State how each control will be implemented, and assign responsibility. For example, if the control measures for a fuel spill hazard are to ensure that operators are properly trained to dispense fuel and appropriate spill equipment is available, then leaders must ensure that these controls are in place before the operation begins. This preparation requires leaders to anticipate environmental requirements and incorporate them into long-, short-, and near-term planning as described in [Chapter 3](#). The key to success is identifying the "who, what, where, when, and how" aspects of each control.

Supervise and Evaluate

2-77. Leaders and staffs continuously monitor controls throughout the operation to ensure their effectiveness and to modify controls as required. They also make on-the-spot corrections, evaluate individual and collective performance, hold those in charge accountable, and require that all tasks be performed to applicable environmental standards. Leaders ensure that the AAR process includes an evaluation of environmental-related hazards, controls, soldier/Marine performance, and leader supervision. Finally they ensure the development of environmental lessons learned for use in future operations.