Goal 6: Environmental Protection

Ensure the preservation of the lunar environment.

Goal 6 aims to apply the concept of environmental protection to the Moon, to preserve the natural lunar environment and to avoid unnecessary changes or thoughtless pollution, with associated targets and drivers listed in Table 4.7. Most objects left on the Moon are now considered to be of cultural interest for humankind, but an accumulation of these objects (Figure 4.6) could cause environmental disruption. The Moon is an inherent part of Earth life, culture and landscape, but is also a valuable scientific site for discovering more about the solar system, as discussed in Section 2.3. Therefore, protecting it should be regarded as an endeavor complimentary to that of protecting Earth's natural environment.

- Many projects are being developed to implement mining activities on the Moon. These activities entail an essential modification of the lunar landscape by removing, displacing, modifying or dissolving regolith (Satish, et al., 2011). These activities will need to be monitored carefully to avoid unreasonable damage to the lunar environment.
- Humans have left more than 200 tons of waste on the lunar surface, which was mostly produced by NASA, but also by the Soviet Union, China, India, Japan and ESA. The NASA History Program Office has even gathered a comprehensive catalogue which reports that the Apollo missions have left on the surface of the Moon: urine and feces; used wet wipes; empty packages of food and 12 pairs of boots, to name a few (NASA History Program Office, 2012).
- Contamination of otherwise pristine environments may create lasting consequences, as may have occurred during the Viking 1 mission, during which it was thought that a contaminated instrument produced inconclusive results (Levin and Straat, 2016).

Figure 4.6. One of many trash bags that were left behind during the Apollo missions (NASA, 2015f)

Table 4.7. Targets and drivers for Goal 6: Environmental Protection

Targets		Drivers	
6.1	Prevent forward and backward contamination of the lunar surface and of astronauts.	6.11	Increase international involvement in developing and updating planetary protection policies.
		6.12	Commit to not launching Lunar programs that are incompatible with COSPAR technical guidelines on preventing contamination.
		6.13	Commit to necessary testing in order to prevent forward and backward contamination during human operations on the Moon.
		6.14	Commit to current and future safety procedures developed by COSPAR for lunar sample handling.
		6.21	Further develop the scientific understanding of the Moon in order to ensure its adequate protection.
6.2	Preservation of the Moon's natural environment and landscape.	6.22	Limit the light and dust pollution resulting from lunar activities.
		6.23	Encourage lunar actors to commit not to use destructive technologies to reach and utilize the lunar surface, including hard landing transportation systems.
		6.24	Support the established recommendations developed by institutions such as the ITU and Space Frequency Coordination Group (SFCG) to protect future radio astronomy applications on the far side of the Moon and regulate the use of frequencies in space-related activities.
		6.25	Increase international involvement in developing and updating planetary protection policies.
		6.26	Encourage the development of planetary protection policy addressing the need for protecting the natural landscapes of the Moon and other celestial bodies.