

## Human Impact Management Plan Evaluation Considerations & Rubric

**EQ:** How can we design a system to monitor human effects on a natural habitat?

**From NGSS:** “The performance expectations in ESS3: Earth and Human Activity help students formulate an answer to questions such as: “How is the availability of needed natural resources related to naturally occurring processes, How can natural hazards be predicted, How do human activities affect Earth systems, How do we know our global climate is changing?” The ESS3 Disciplinary Core Idea from the NRC Framework is broken down into four sub-ideas: natural resources, natural hazards, human impact on Earth systems, and global climate change. Students understand the ways that human activities impact Earth’s other systems. Students use many different practices to understand the significant and complex issues surrounding human uses of land, energy, mineral, and water resources and the resulting impacts of their development. The crosscutting concepts of patterns, cause and effect, and stability and change are called out as organizing concepts for these disciplinary core ideas. In the ESS3 performance expectations, students are expected to demonstrate proficiency in asking questions, developing and using models, analyzing and interpreting data, constructing explanations and designing solutions and engaging in argument; and to use these practices to demonstrate understanding of the core ideas.”

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept
<p><b>Constructing Explanations and Designing Solutions</b> Apply scientific principles to design an object, tool, process or system. (MS-ESS3-3)</p> <p><b>Engaging in Argument from Evidence</b> Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (MS-ESS3-4)</p>	<p><b>ESS3.C: Human Impacts on Earth Systems</b> Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth’s environments can have different impacts (negative and positive) for different living things. (MS-ESS3-3)</p> <p><b>ESS3.C:</b> Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. (MS-ESS3-3, MS-ESS3-4)</p> <p><b>ETS1.B:</b> Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. (MS-ETS1-3)</p> <p><b>ETS1.B:</b> Models of all kinds are important for testing solutions. (MS-ETS1-4)</p>	<p><b>Cause and Effect</b> Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation. (MS-ESS3-3) Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-ESS3-4)</p>

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept
<p><b>Engaging in Argument from Evidence</b> Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. (MS-LS2-5)</p>	<p><b>LS2.C: Ecosystem Dynamics, Functioning, and Resilience</b> Biodiversity describes the variety of species found in Earth’s terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem’s biodiversity is often used as a measure of its health. (MS-LS2-5)</p> <p><b>LS4.D: Biodiversity and Humans</b> Changes in biodiversity can influence humans’ resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling. (secondary) (MS-LS2-5)</p> <p><b>ETS1.B: Developing Possible Solutions</b> There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (secondary) (MS-LS2-5)</p>	<p><b>Stability and Change</b> Small changes in one part of a system might cause large changes in another part.</p>

Project aspect	Exceeding the performance expectation	Meeting the performance expectation	Approaching the performance expectation	Not meeting the performance expectation
Describes the ecosystem & biodiversity.	Thoroughly & accurately describes the ecosystem’s biodiversity; includes thoughts on the health of the ecosystem.	Includes a straightforward description of the ecosystem’s biodiversity.	Attempts a description of the ecosystem; may not be thorough or complete.	Does not include ecosystem description or description is totally inaccurate.
Describes how humans interact with the ecosystem.	Thoughtfully and thoroughly describes both positive and negative human impacts on the ecosystem.	Provides a succinct, accurate description of how humans interact with the environment.	Description of human impacts is attempted but may have inaccuracies or may lack breadth.	Human interaction section is missing or not relevant.
Provides a method of measuring and monitoring the impact of human interactions with the ecosystem.	Proposed system is practical and effective, including a way to gather data and visuals. Possible constraints are identified and analyzed, and potential impacts are addressed.	Proposed system is plausible and includes a data gathering tool. Some constraints or potential for negative impact are addressed.	An attempt or idea is formulated but may not be realistic or complete.	Monitoring system is very underdeveloped or missing.