

## RECOVERY CLASS CONCEPT OF MONGOLIAN RANGELANDS

In order to create a national assessment of rangeland health that incorporates variations in ecological potential across Mongolia, standardized “recovery classes” were developed. Recovery class concept is based on information and assumptions about the reference condition or ecological potential of pasture area (the plant communities expected to exist at a site in healthy condition) and the process of recovery with a change in management. The recovery classes are analogous to degradation classes already used in Mongolia but are based on Ecological Site Descriptions (ESDs) and provide information about recovery rates based on quantitative measurements.

Recovery classes, on the other hand, provide a general description of the processes and timelines needed for recovery of healthy states. Recovery classes are used for planning of grazing management and other restoration actions.

**Class I.** The plant community is at or near reference conditions (non-degraded) or requires 1-3 growing seasons for recovery from minor changes (slightly degraded); match stocking rate to forage supply and use temporary seasonal deferment as needed.

**Class II.** The plant community is altered and may be rapidly recovered (3-5 growing seasons) with favorable climatic conditions or a change in management (e.g., stocking rate reduction, seasonal deferment, rotation). The nature of alteration is not regarded as a significant long-term threat to the provision of forage and other ecosystem services.

**Class III.** The plant community is altered and may take 5-10 growing seasons to recover with changed management (stocking rate reduction, seasonal deferment, and long-term rest). Alteration represents a significant loss of important ecosystem services (and are clearly related to anthropogenic drivers), but recovery is possible in time.

**Class IV.** The plant community is altered due to the local loss of key plant species, invasion of noxious plant species, or alteration of hydrology that is unlikely to be recovered for over a decade to many decades without intensive interventions such as species removal, seeding, or manipulations to recover historical hydrological function (i.e. an ecological threshold was crossed). Previous ecosystem services have been lost and are usually costly to recover.

**Class V.** The plant community is altered due to extensive soil loss, accelerated erosion rates, or salinization. Altered plant-soil feedbacks or permanent changes in the soil profile maintain the degraded state. Previous ecosystem services have been lost and it is usually impractical to recover them (often regarded as true desertification).

The recovery class hypothesizes timelines to recovery of the reference state based on vegetation cover and composition data interpreted according to expert knowledge and existing studies when available. For example, the presence of remnant perennial grasses suggests that recovery can occur with several years. The recovery classes allow standardized interpretations across multiple state and transition models to allow for reporting and visualization of rangeland restoration needs.

Examples of recovery classes from states of the Caragana-grass rangeland in deep sandy alluvial plain, dry steppe, Mongolia.



**Class I:** Reference state dominated by *Stipa krylovii* at 35% foliar cover, full complement of species present



**Class II:** *Stipa* cover has declined to 6-10%. *Artemisia frigida* (1-3%) and *Carex duriuscula* (<1%) cover is low. Recovery could occur in a few growing seasons.



**Class III:** *Stipa* cover low (< 6%), but *Carex duriuscula* is dominant (>15%). May take several years to recover high *Stipa* cover.



**Class IV:** *Caragana*, with coppices formed by soil erosion, is dominant and other perennial plants are sparse. Annuals dominate in wet seasons.



**Class V:** Deep gully with extensive soil loss, production of area is permanently reduced.