Churdhar Wildlife Sanctuary – Research Methods Summary

Overview

This one-page summary highlights the methodological framework used in a multi-taxa biodiversity assessment of Churdhar Wildlife Sanctuary, Himachal Pradesh. The study integrated modern field techniques, spatial analysis tools, and quantitative ecological methods to document mammals, birds, vegetation, and herpetofauna.

Mammal Survey Methods

• Grid-based camera trapping using unbaited traps placed along trails, drainages, and animal movement routes.
• Spatially Explicit Capture-Recapture (SECR) models applied for density estimation of identifiable carnivores.
• Camera Trap Distance Sampling (CTDS) used for unmarked species using calibrated radial distance regression.
• Trap effort metrics (RAI1, RAI2, RAI3) calculated to quantify detectability and sampling efficiency.
• Abundance and detection timelines assessed across two field seasons.

Bird Survey Methods

• Point count surveys conducted along 2 km transects in four habitat types across seasons.
• Visual detections within a 50 m radius; photographic documentation for verification.
• Feeding guild assignment via direct foraging observations.
• Density estimation performed using point-transect distance sampling in DISTANCE software.
• Diversity indices (Shannon, Simpson, Evenness) computed to compare habitats.

Vegetation Survey Methods

• Multi-scale quadrat sampling: 10×10 m for trees, 5×5 m for shrubs, 1×1 m for herbs across 230 sites.
• Tree measurements included circumference at breast height (CBH) for basal area and density calculations.
• Environmental parameters (elevation, slope, aspect) extracted from DEM using ArcGIS 10.6.1.
• TWINSPAN applied to classify vegetation communities; dendrograms generated via R (factoextra).
• Disturbance quantified through tree lopping, livestock signs, tourism pressure, and invasive species presence.

Herpetofauna Survey Methods

• Stratified site selection across streams, forests, and open habitats.
• Visual Encounter Surveys (VES) using time-constrained searches during both day and night.
• Eye-shine detection with waterproof flashlights for amphibians.
• Opportunistic sampling for rare species, with genetic sampling for difficult identifications.

• Encounter rates and species accumulation curves used to evaluate survey adequacy.

Summary: The study combines rigorous field ecology protocols, quantitative biodiversity assessment tools, and geospatial analysis, creating a robust framework for long-term monitoring and conservation planning in mountain ecosystems.