Establishing the most important features to measure

Because we are trying to conserve the "full expression of biodiversity of an ecoregion," there is the tendency to include too many biological features to be measured, thus losing the blessing of simplicity in design and implementation. We address this concern by stating the following working assumption or hypothesis: we can typically select 8 or fewer biological features in any ecoregion whose successful conservation will reflect overall success in ecoregion conservation. Usually, these features, be they umbrella species or keystone habitats, representative habitat types in protected areas, or a fundamental ecological process, are vital to our efforts because they also have a disproportionately greater umbrella effect in determining conservation success; i.e., conserving or restoring these features will allow you to conserve many other features not listed in the chart. Second, most ecoregions lack the resources to measure more than 8 biological features over time.

Consider the following example for the Terai-Duar savannas ecoregion in the Eastern Himalayan ecoregion complex of the Global 200. We identified 12 total features for measurement, 6 biological and 6 non-biological:

Biological:

Category: Focal Species
Feature 1. Tigers-Most of the breeding tigers in the Indian subcontinent are restricted to protected areas. Our goal is to grow the population of adult tigers in each of the 11 protected areas of the Terai Arc to reach a viable metapopulation. Restoring and managing this alpha-predator and umbrella species will have a decidedly positive impact on other species with much smaller home ranges.
Feature 2. Greater one-horned rhinos-This species has been the subject of an intensive, science-based recovery program over the past three decades that is now greatly expanding through translocations. That the ecoregion team and the associated governments are able to bring back from extinction one of the most endangered and slowest breeding mammals on Earth shows how hopeful and successful endangered species management can be.
Feature 3. Other riverine and river system megafauna- Swamp deer are one of the most important prey items for tigers in Asia in that tigers reach highest densities in reserves where they overlap with large populations of this species. Here the goal is translocation of this endangered deer species to repopulate it as best as possible. Swamp deer serve as proxies for hispid hare and pygmy hog, two endangered, endemic mammals that share the same habitat.

Category: Habitat Representation
Feature 4. **Saccharum spontaneum** *grasslands*-These alluvial grasslands are the keystone habitats of the entire ecosystem and are the most threatened. They occupy the thin margin along major river systems. They harbor the highest concentrations of tigers and rhinos on earth, easily ten times more productive than the most widespread natural habitat—sal forests—and are vital for the conservation of many other endangered species as well. These grasslands recover from disturbance from cattle grazing in one or two years but are valuable sites for paddy cultivation. The easiest way to achieve the numerical targets for the tiger and rhino features is to protect these grasslands inside reserves and provide incentives to encourage their restoration along rivers in areas managed by local communities.

Category: Ecological Processes
Feature 5. Connectivity between protected areas-Tigers, despite their large size, are notoriously poor dispersers. Connecting core breeding areas and buffer zones through locally managed community forests is essential to meet the goal of managing tigers as a metapopulation, a population linked by dispersal, and our numerical targets. The scientific blueprint of the Terai Arc conservation plan is set up to address the

dispersal requirements of the top predator in this system and the most area-sensitive species. It is the major investment in the Terai Arc Landscape.

Feature 6.Freshwater connectivity-Lobbying to prevent additional dams, irrigation schemes, and other activities that will disrupt continuity and destroy or severely degrade flood plains is essential. Historically, several fishes, dolphins and presumably invertebrates would migrate along the rivers and streams for breeding. However, deforestation of the watershed has led to unregulated and extreme flow events that disrupt these movements and dams have disrupted the continuity.

Non-biological:

Category: Threats

Feature 7. Poaching of tigers-Expanding habitat for endangered tigers and their prey will have no effect if tigers are commercially exploited and are not vigorously protected. The most rapid way to bring back tigers is to eliminate adult mortality from poaching. Tigers breed faster than their natural prey. Ample data show that populations rebound dramatically when poaching is brought under control and natural prey are in sufficient numbers.

Feature 8. Poaching of rhinos-Unlike tigers, rhinos recover much more slowly from major poaching episodes. Rhinos, in particular their horns, are much more valuable than tiger parts. Rhinos are also often shot by poachers whereas tigers are poisoned. Thus, we separated tracking recovery efforts for these two endangered species.

Feature 9. Livestock grazing-The number of domestic livestock exceeds the human population in the ecoregion. Domestic stock replace wild ungulates that are needed to feed a growing tiger population, and they usrp rhinos from key grazing areas. Yet most of the cattle grazing in the Terai are unproductive and contribute to tiger-human conflict when tigers kill livestock. The win-win solution is to promote incentives to encourage stall-feeding of livestock rather than allowing them to roam freely into reserves and other areas zoned for conservation. A promising start has been made, but the targets identified here would go far to remove pressures impinging on species and habitat recovery.

Category: Key conditions

Feature 10. Financial mechanisms-We are trying to undertake a major conservation experiment in one of the poorest ecoregions in the world. The need to create a Trust Fund for the Terai Arc, as has already been done for Bhutan as part of another ecoregion in this complex, is essential to finance a realization of the long-term vision.

Feature 11. Policy-Because governments manage most of the land required to connect corridors in the Terai Arc Landscape plan and in the North Bank Landscape of this ecoregion, it is essential that the conservation plans become part of the government's development plans for the region. The Terai Arc landscape plan has already been ratified as part of the Nepal government's new 5 year plan

Feature 12. Valuation of Ecological Services-The Terai Arc remains the rice bowl of South Asia because of the watershed protection provided by the forests of the Churia Hills and the forest reserves. The community forestry efforts that are the basis of the corridor restoration programs must be given greater value by the governments of Nepal and foreign aid donors.

We feel strongly that giving emphasis to the targets outlined for these 12 features would go a long way to meeting or exceeding most of the other targets we could name. For this ecoregion, we identified at least one feature in each of the five categories. This is not a prerequisite; in other ecoregions, the distribution might be different.

Prepared by Eric Dinerstein, Ph.D.
Chief Scientist and Vice-President for Science
in consultation with the Conservation Science Program, WWF-US, Endangered Spaces Program, and WWF-I ecoregion and species field staff