

# Designing Networks of Protected Areas

There is a need to be more organized in establishing new protected areas, as at present, protected areas are often created in a haphazard fashion. The size and placement of protected areas throughout the world are often determined by the distribution of people, potential land values, the political efforts of conservation minded citizens, and historical factors

# The four R's

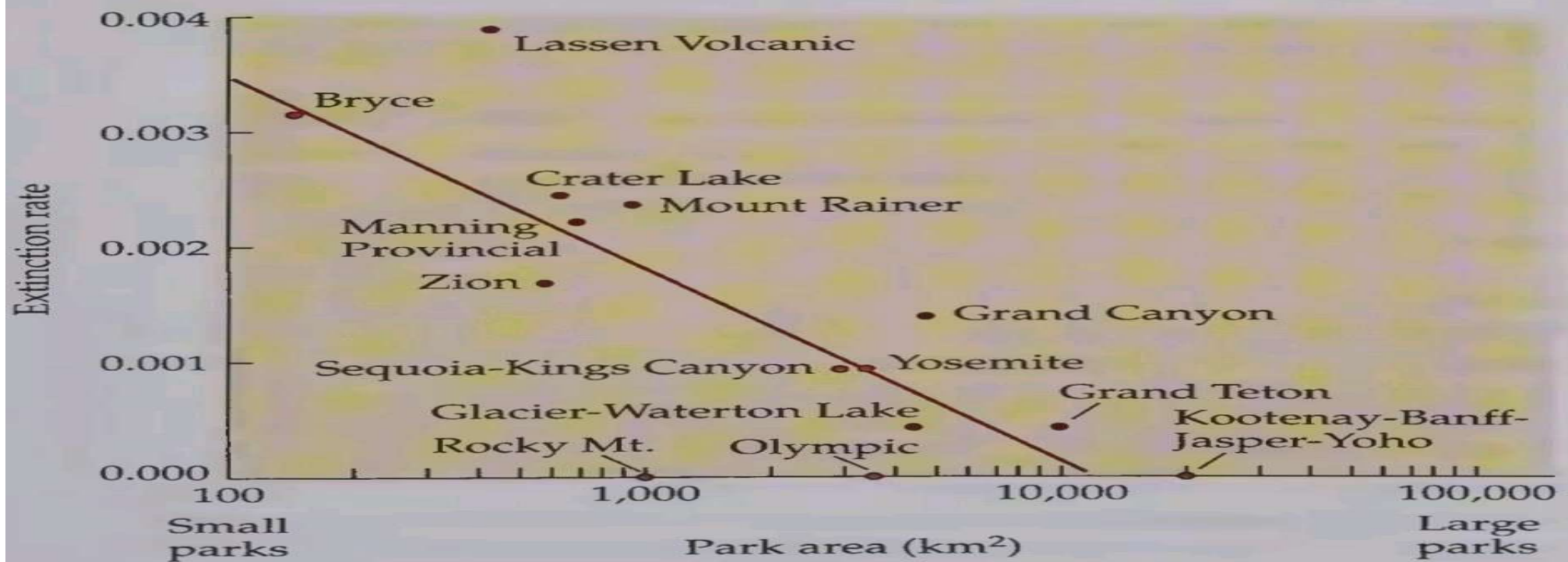
**Representation** The protected areas should contain as many aspects of biodiversity (species, populations, habitats, etc.) as possible.

- **Resiliency;** Protected areas must be sufficiently large to maintain all aspects of biodiversity in a healthy condition for the foreseeable future, including the predicted impacts climate change.
- **Redundancy;** Protected areas must include enough examples of each aspect of biodiversity to ensure the long-term existence of the unit in the face of future uncertainties.
- **Reality;** There must be sufficient funds and political will, not only to acquire and protect lands, but also to subsequently regulate and manage the protected areas.

# Protected Area Size and Characteristics

The advantage of large parks is effectively demonstrated by an analysis of mammal populations in 14 national parks in western North America. Twenty-nine mammal species are now locally extinct

species have recolonized or newly colonized the parks. Extinction rates have been very low or zero in parks with areas over 1000 km<sup>2</sup> and have been much higher in parks that are smaller than 1000 km<sup>2</sup>. Extinction rates have been highest for species--with low population numbers and small size.

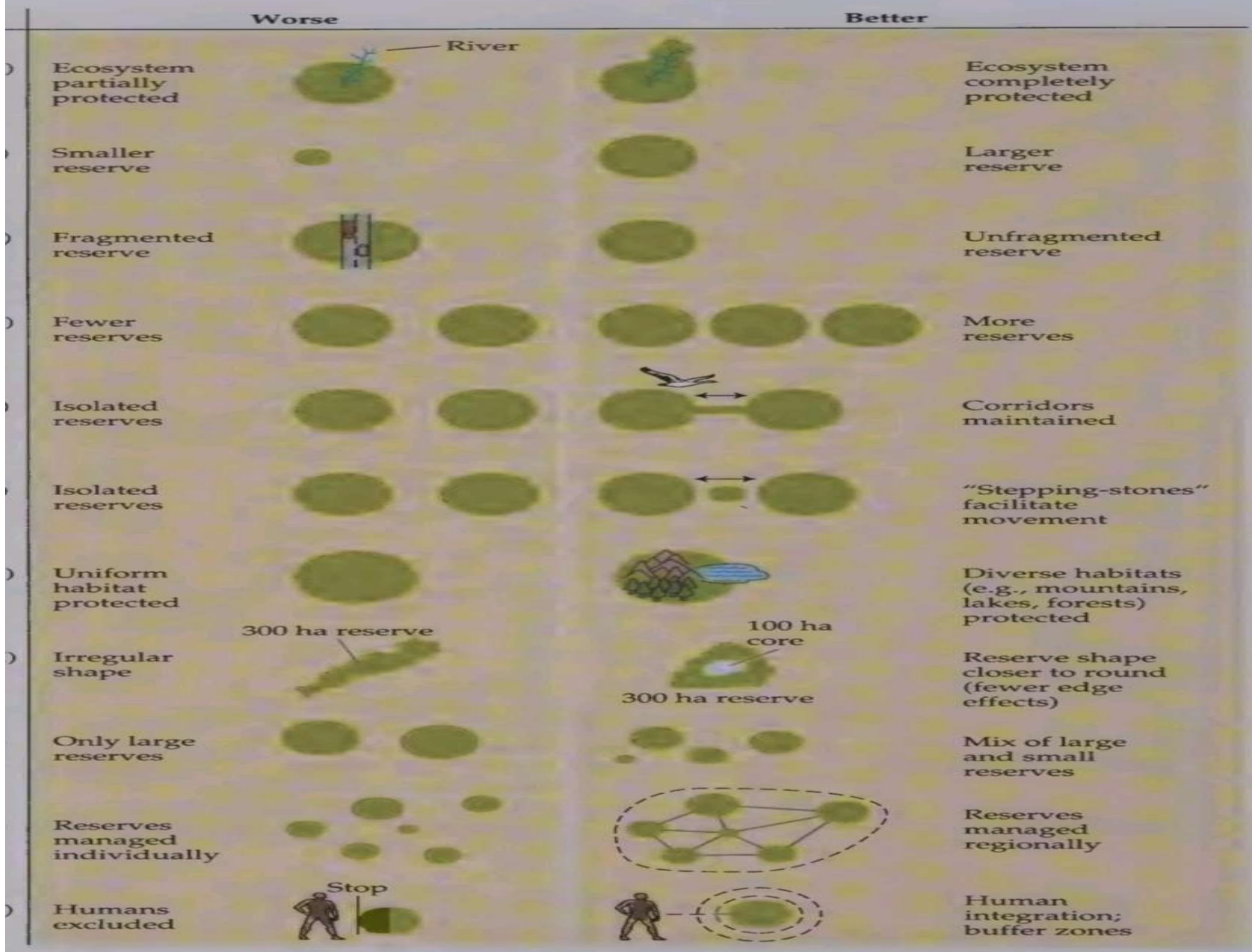


densities on the edges of small reserves, and this could contribute to the higher extinction rates in small parks (Wiersma et al. 2004).

On the other hand, once a park reaches a certain size, the number of new species added with each increase in area starts to decline. At that point, creating a second large park, as well as a third or fourth park some distance away, may be an effective strategy for preserving additional species. The extreme proponents of large reserves argue that small reserves need not be maintained, because their inability to support long-term populations, ecosystem processes, and all successional stages gives them little value for conservation purposes. Other conservation biologists

# Networks of Protected Areas

Strategies do exist for aggregating small nature reserves into larger conservation networks (Wiersma 2007). Nature reserves are often embedded in a larger matrix of habitat managed for resource extraction (such as timber forest, grazing land, and farmland). If conservation biologists can make management for the protection of biological diversity a secondary priority of these areas, then larger habitat areas can be included in conservation plans and the effects of fragmentation can be reduced (Berry et al. 2005). Habitat managed for resource extraction can sometimes also be managed as an important secondary site for wildlife and as dispersal corridors between isolated nature reserves. Whenever possible, populations of rare species should be managed as a large metapopulation to facilitate gene flow and migration among populations.



**16.1** Principles of reserve design that have been proposed based in part on the island biogeography. Imagine that the reserves are "islands" of the original ecosystem surrounded by land that has been made uninhabitable by human activities such as ranching, or industrial development. The practical application of these principles is being studied and debated, but in general the designs shown on the right are considered to be preferable to those on the left. (After Shafer 1997.)



In Ethiopia, this network aims to:

Protect endemic species (e.g., Ethiopian wolf, Walia ibex)

Conserve diverse ecosystems (Afro-alpine, savanna, wetlands, forests)

Support sustainable livelihoods and tourism

# Types of Protected Areas in Ethiopia

Simien Mountains National Park – UNESCO site with endemic species  
Simien Mountains National Park

Awash National Park – savanna and wildlife habitat

Bale Mountains National Park – Afro-alpine ecosystem, Ethiopian  
wolf

Gambella National Park – wetlands and large mammals 

African Parks

Omo National Park, Mago National Park, Nechisar National Park 



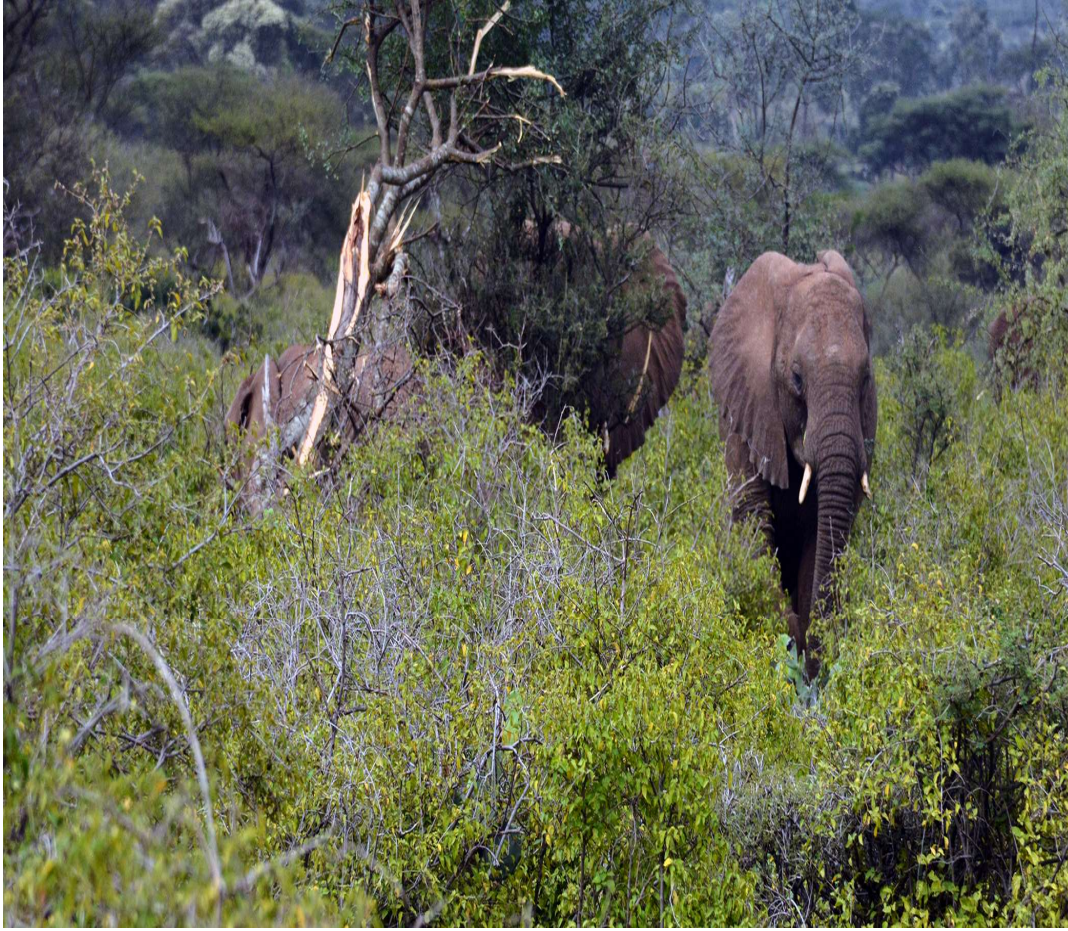
# Wildlife Sanctuaries & Reserves

These protect specific species or habitats:

Babile Elephant Sanctuary – protects elephant populations

Yabelo Wildlife Sanctuary – habitat for endemic birds

Chelbi Wildlife Reserve – protects Grevy's zebra



# Biosphere Reserves (UNESCO-linked)

Lake Tana Biosphere Reserve –recognized by Unisco in 2015

biodiversity hotspot home to unique fish species especially barbs  
place Numerous migratory and resident birds

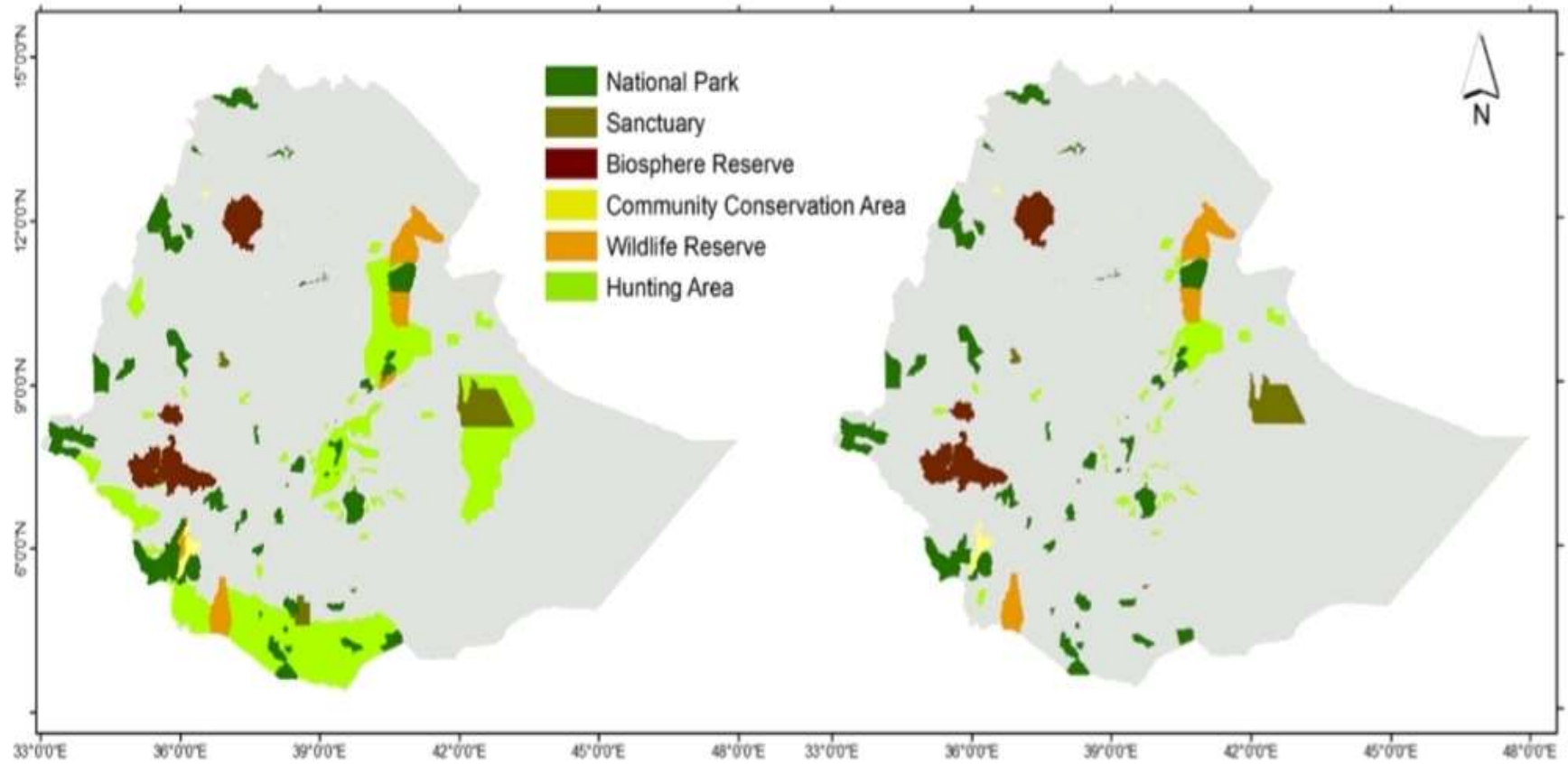
Source of the Blue Nile

These areas integrate:

Conservation

Sustainable development

Research



# Challenges in Ethiopia's Protected Area Network

Human settlement and livestock pressure inside parks

Weak law enforcement

Habitat degradation

Human-wildlife conflict

Limited funding and infrastructure

Example: grazing and settlement have affected parks like Abijatta-Shalla 