

# BISON ECOLOGY AT SCALE: WHAT'S GOING ON?

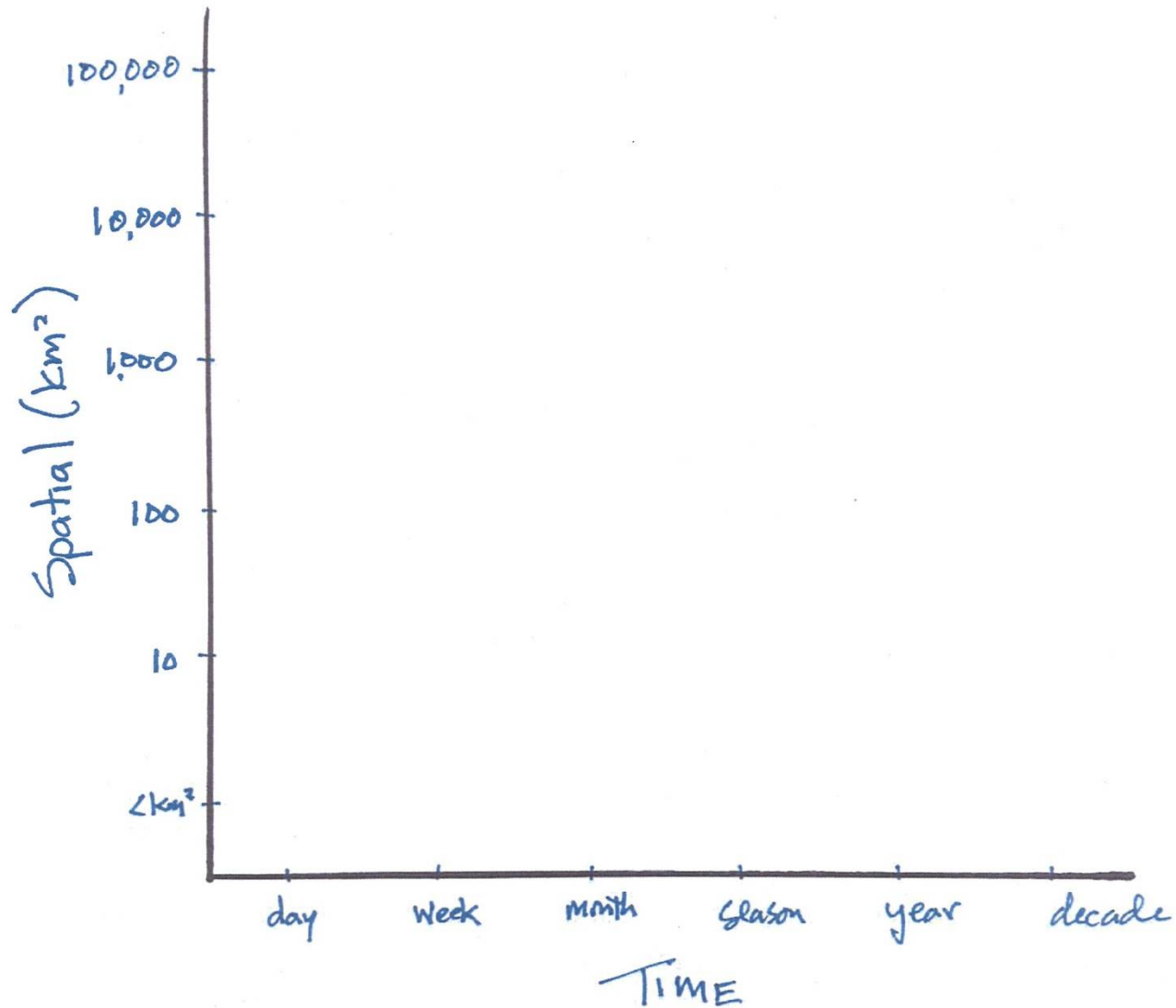
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Chair IUCN Bison Specialist Group





The IUCN Bison Specialist Group (125+ members) serves to facilitate science-based non-prescriptive guidance on how multiple partners can achieve conservation and ecological restoration of bison as wildlife, while respecting the principles of democratic governance, the sustainability of economic use of ecological resources, cultural heritage values, and ecological values of intact ecosystems.

# Bison ecology occurs across time and space





## Ecologic Processes

## Time scale Spatial scale

### Movement

Within feeding patches	Min-hour	1-100m <sup>2</sup>
Between feeding patches	Hour-day	100m <sup>2</sup> -1km <sup>2</sup>
Between seasonal ranges	Month-Year	100-100km <sup>2</sup>
Weather dependent	Min-hour-day	1,000m <sup>2</sup> -1km <sup>2</sup>
Weather dependent	Week-month	100-1,000km <sup>2</sup>
Migration	Month-year	1,000-10,000km <sup>2</sup>
Dispersal	Year-decade	10,000km <sup>2</sup>
Range Expansion	Year-decade	10,000km <sup>2</sup>

## Ecologic Processes

## Time scale Spatial scale

### Activity/ Behavior

Group Size	Week-Month	1-10km <sup>2</sup>
Copulation Tending	Day-Week	1,000-10,000m <sup>2</sup>
Birth Synchrony	Year	1000-10000km <sup>2</sup>
Rut	Year	1000-10000km <sup>2</sup>
Intraspecific Aggression	Hour-Day	100-1000m <sup>2</sup>
Interspecific Aggression	Hour-Day	1000m <sup>2</sup> -1km <sup>2</sup>
Flight	Hour-Day	1000m <sup>2</sup> -10km <sup>2</sup>
Parturition	Hour-Day	100-1000m <sup>2</sup>
Hierarchical Social Dominance	Week-Month	100m <sup>2</sup> -1000m <sup>2</sup>

## Ecologic Processes

Time scale Spatial scale

### Habitat Interactions

Wallowing/Rubbing

Min-Hour

1-10m<sup>2</sup>

Post-Fire grazing

Week-Month

1-100km<sup>2</sup>

Urine & Dung distribution

Day-Month

1m<sup>2</sup>-10km<sup>2</sup>

### Demography/Genetics

Population demography

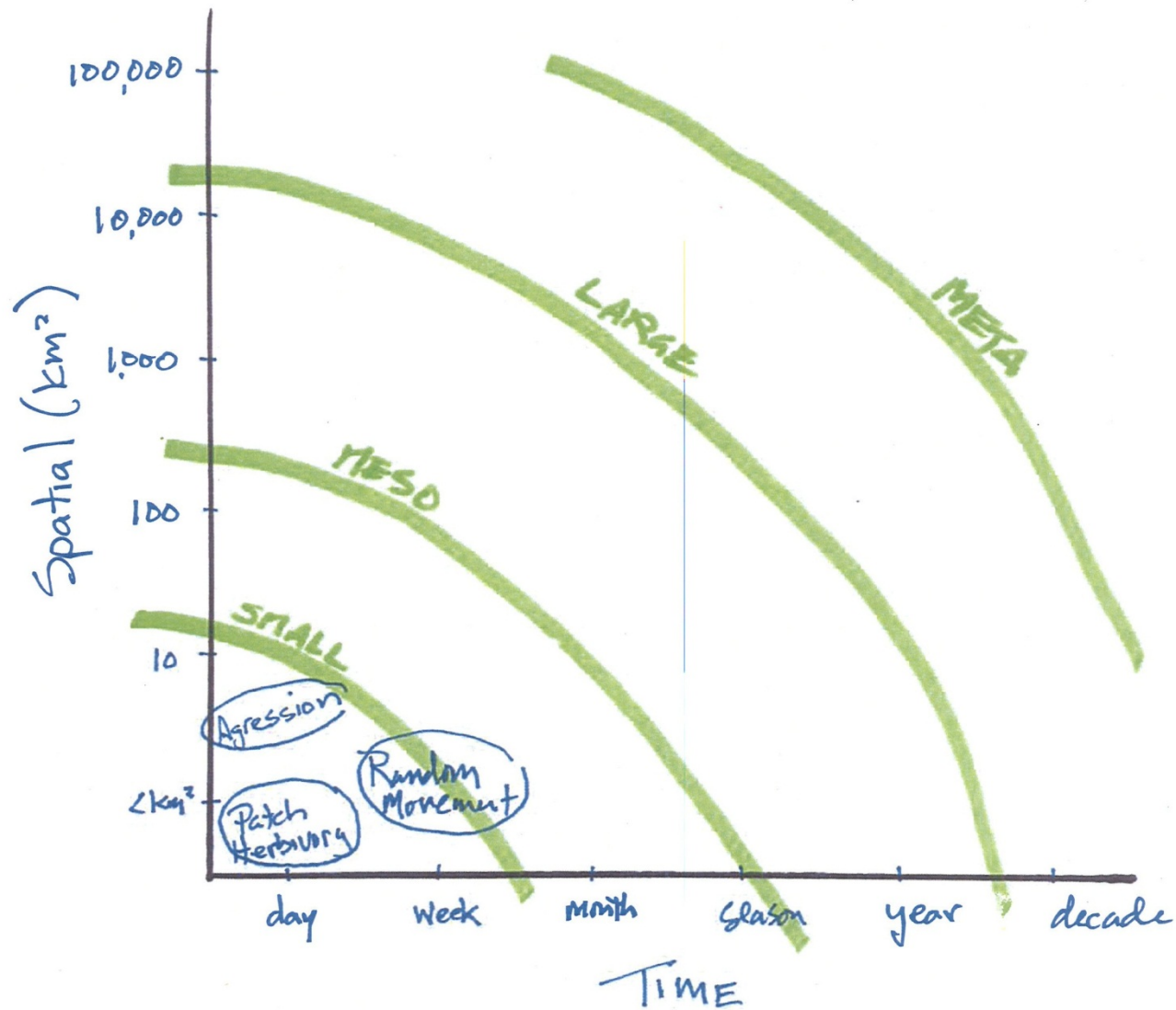
Year-Decade

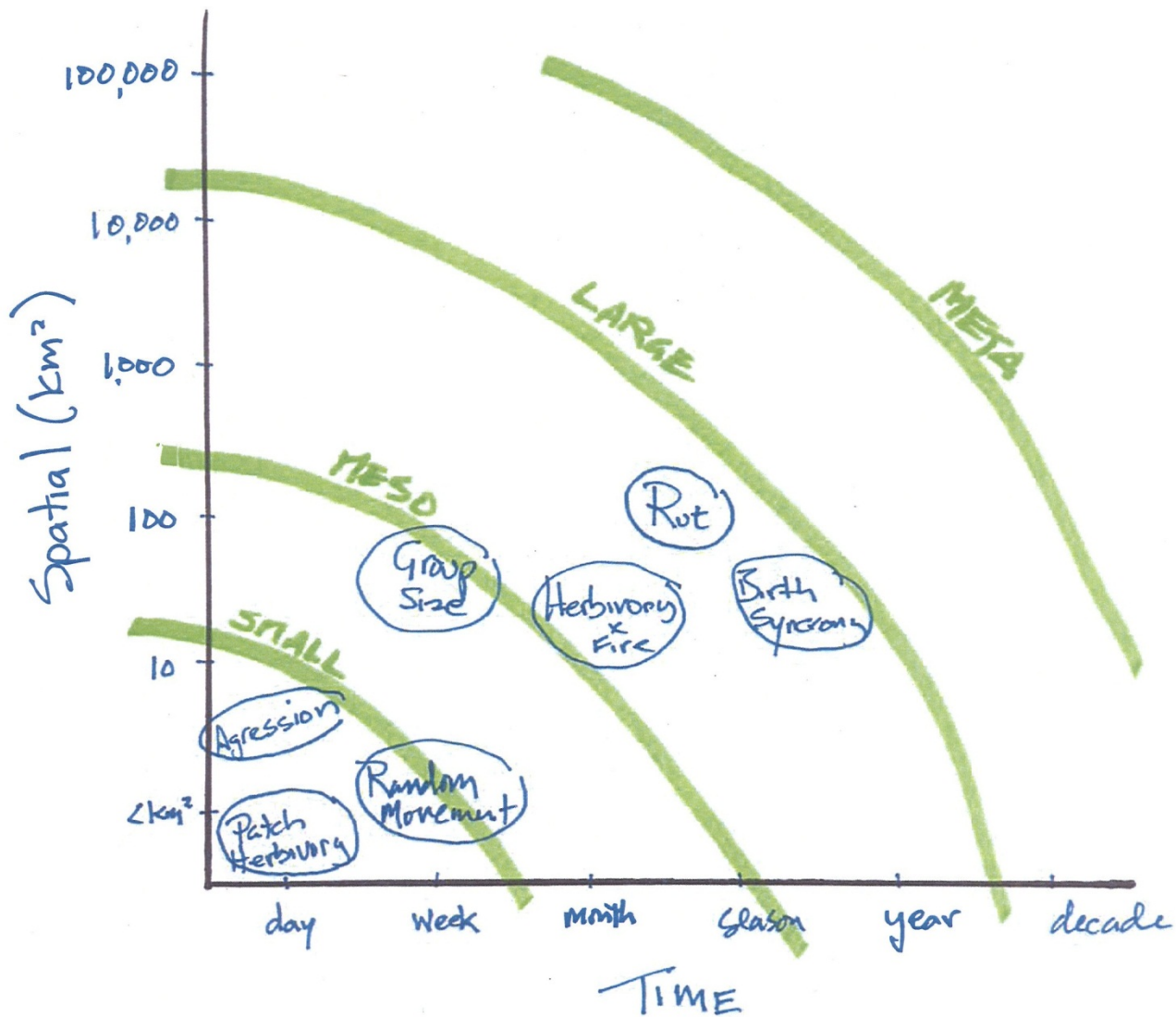
1,000-10,000 km<sup>2</sup>

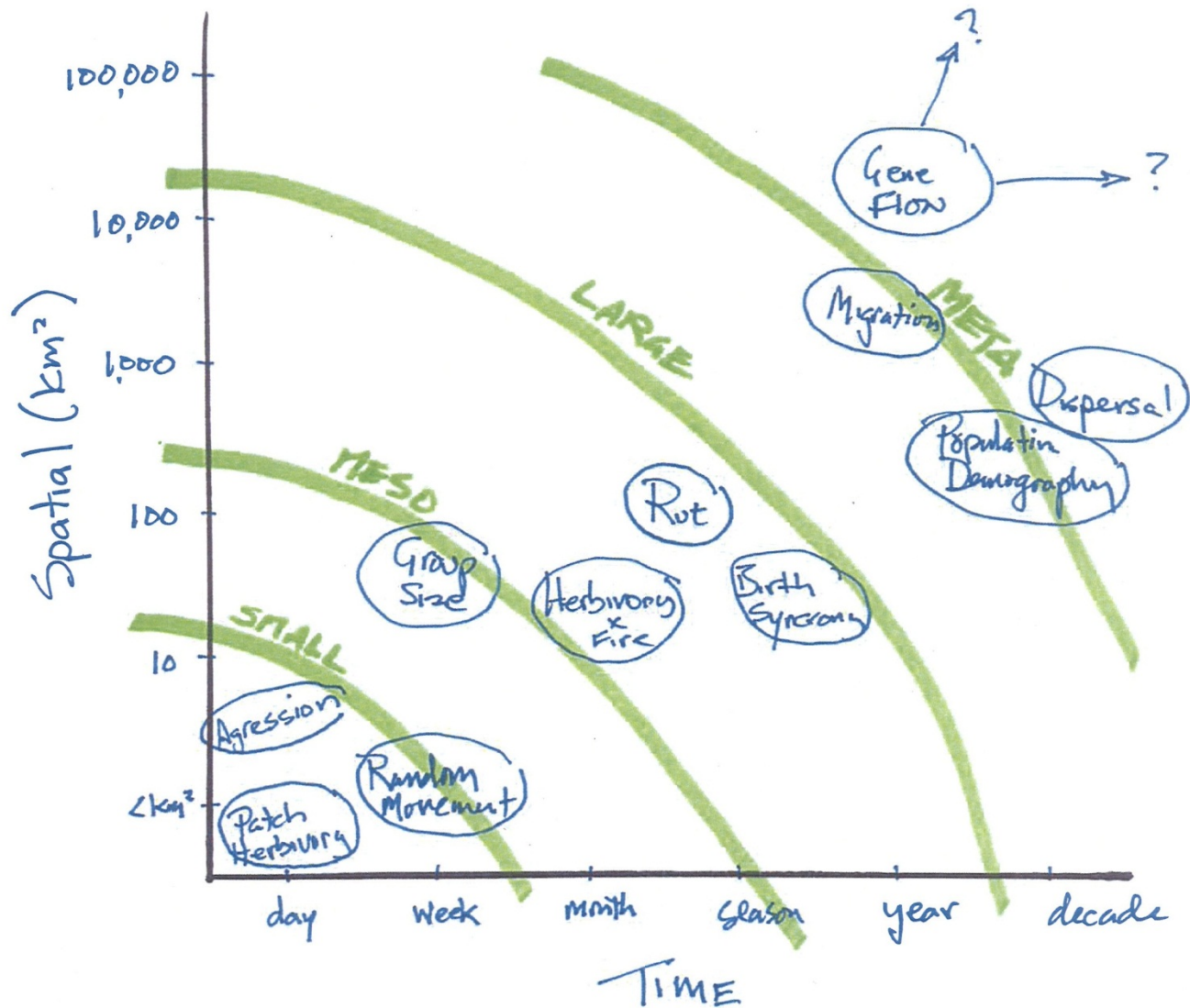
Introgression/Gene flow

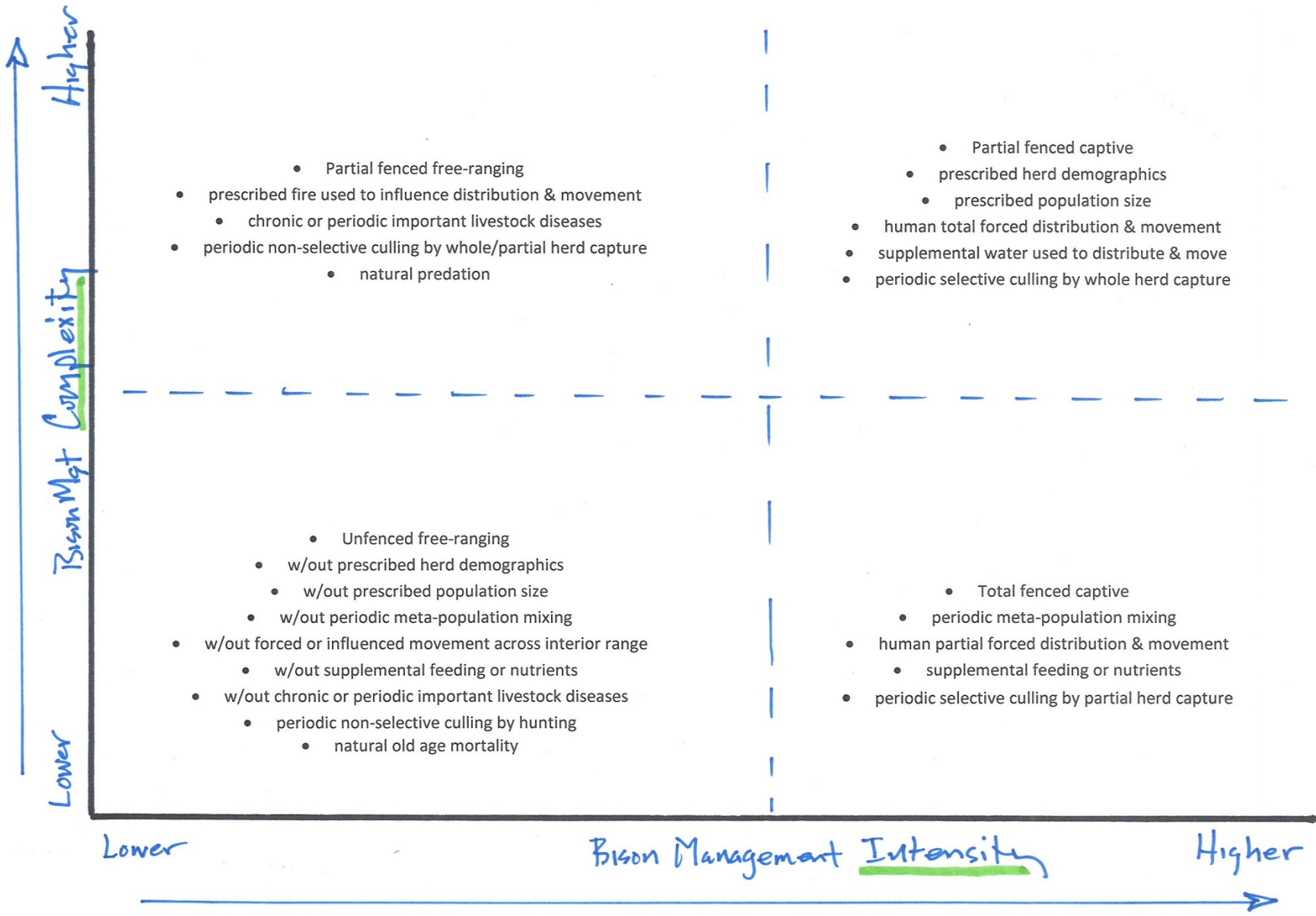
Year-Decade-Century

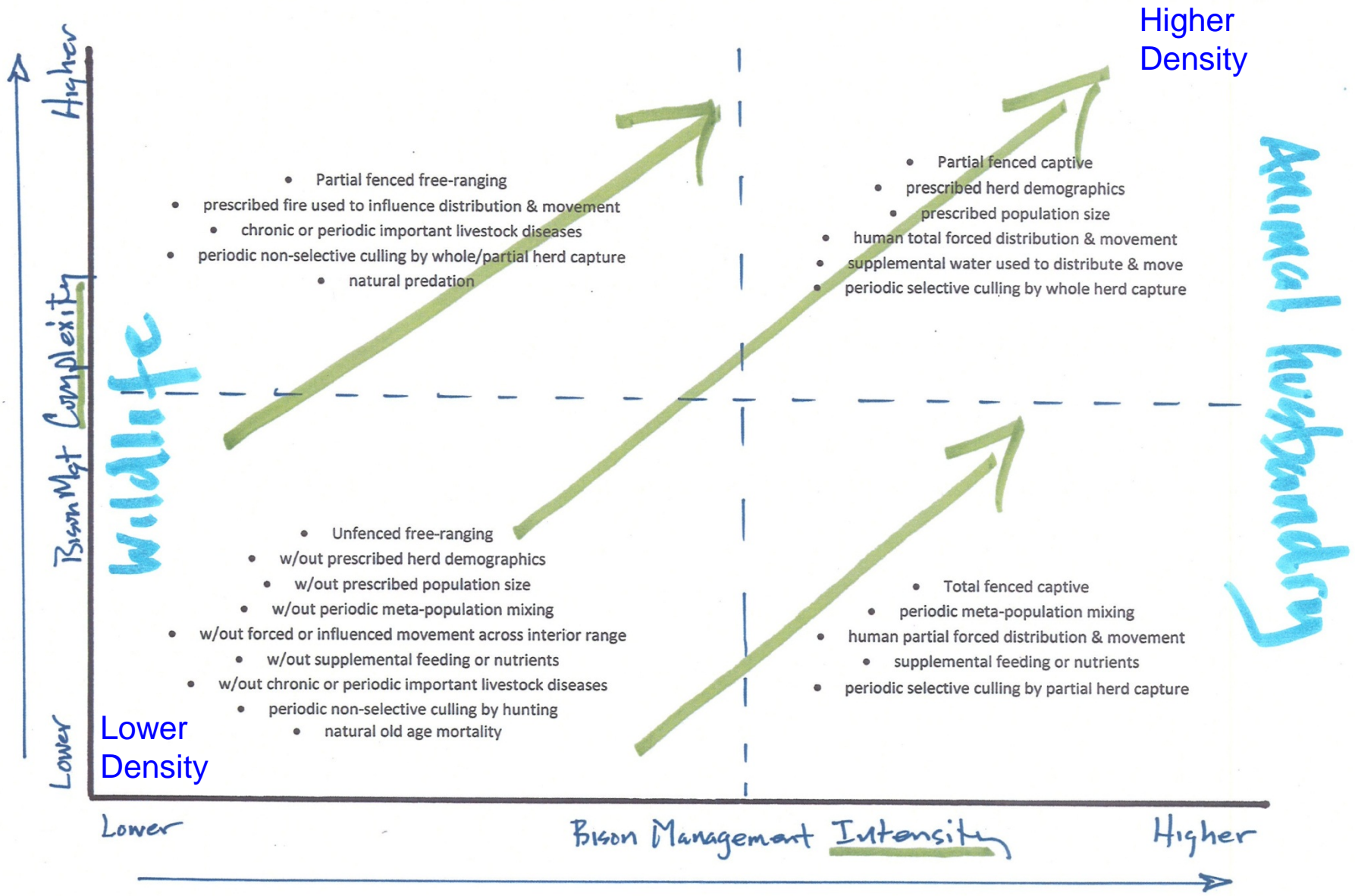
1,000-10,000+ km<sup>2</sup>











Bison Mgt Complexity

Higher Density

Animal husbandry

wildlife

Lower Density

Bison Management Intensity

- Partial fenced free-ranging
- prescribed fire used to influence distribution & movement
  - chronic or periodic important livestock diseases
- periodic non-selective culling by whole/partial herd capture
  - natural predation

- Partial fenced captive
- prescribed herd demographics
- prescribed population size
- human total forced distribution & movement
- supplemental water used to distribute & move
- periodic selective culling by whole herd capture

- Unfenced free-ranging
- w/out prescribed herd demographics
- w/out prescribed population size
- w/out periodic meta-population mixing
- w/out forced or influenced movement across interior range
  - w/out supplemental feeding or nutrients
- w/out chronic or periodic important livestock diseases
  - periodic non-selective culling by hunting
  - natural old age mortality

- Total fenced captive
- periodic meta-population mixing
- human partial forced distribution & movement
  - supplemental feeding or nutrients
- periodic selective culling by partial herd capture

Lower

Higher

## Considerations

Bison ecology is scaled in time and space.

Bison management is scaled in complexity and intensity.

Bison ecology interacts with management as gradient between wildlife and animal husbandry.

There are trade offs between density and ecology on fixed landscapes.

Higher bison density on fixed landscapes trends towards animal husbandry.

These suggest that lower management complexity-intensity derived from lower density across larger landscapes can trend towards conservation of bison ecology across scales.