

# **WATER DEPENDENCY AND MOVEMENTS OF SABLE ANTELOPE**



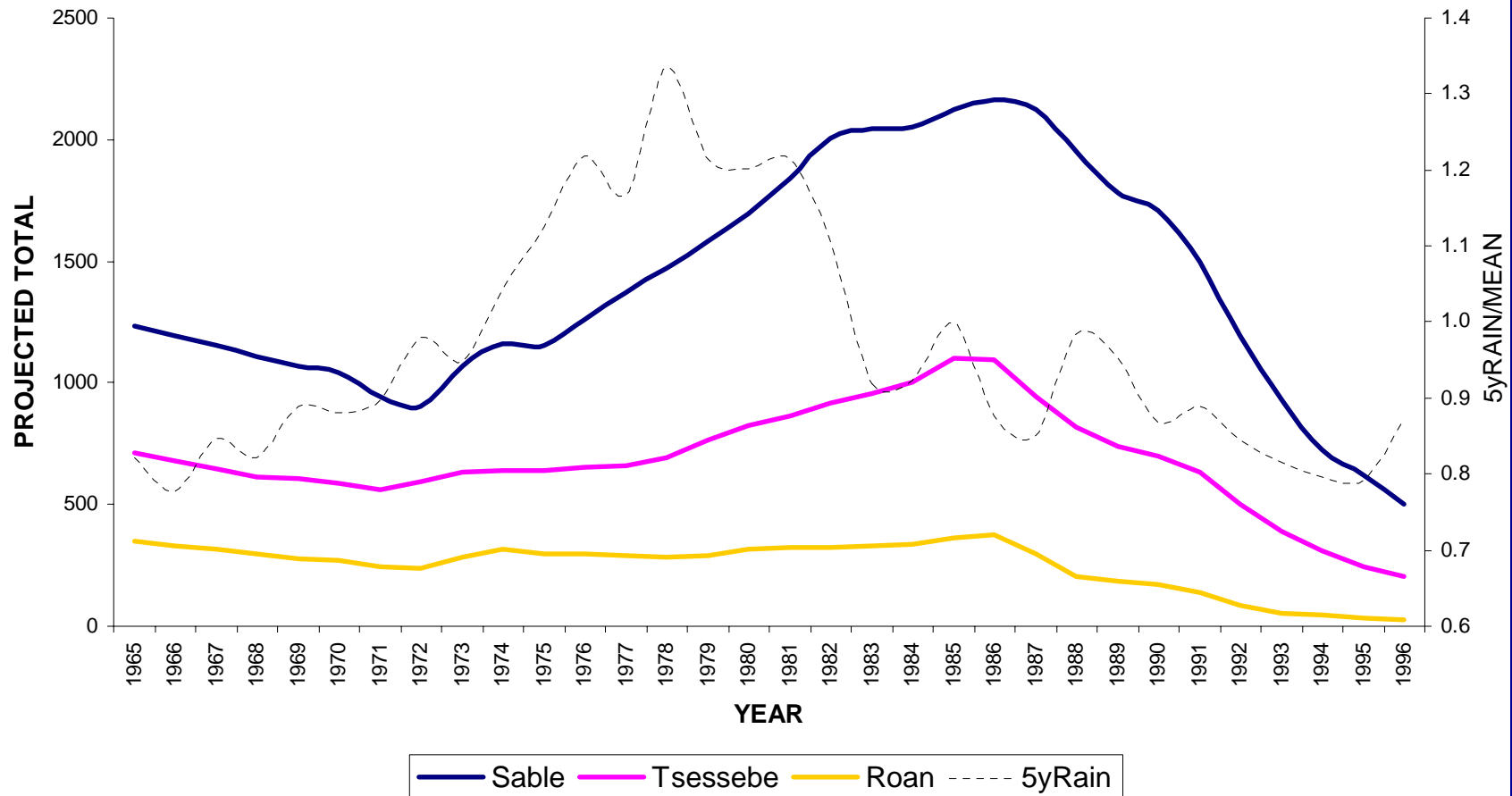
**James W. Cain III and Norman Owen-Smith**  
**Centre for African Ecology,**  
**School of Animal, Plant & Environmental Sciences,**  
**University of the Witwatersrand**

Photo by S. Henley



# Rare Antelope Declines

POPULATION TRENDS - SABLE, TSESSEBE, ROAN



# Hypotheses for Decline

- **Extreme weather conditions (e.g. drought)**
- **Habitat deterioration**
- **Competitive displacement by another species (e.g., zebra or buffalo)**
- **Elevated predation risk**
  - Influence of waterpoints
- **Interaction multiple of factors**

# Analysis of Animal Movements

- **Assess patterns of resource exploitation within home range**
  - Extension of habitat selection studies
    - E.g., selection of foraging vs. bed sites
  - Spatial and temporal patterns in resource utilization
    - Fine-scale foraging patterns vs. long distance movements
    - Diurnal vs. nocturnal foraging activity
- **Identify constraints on resource use**
  - Influence of environmental characteristics and landscape structure
  - Impact of predation and competition
- **Behavioral responses to nutritional stress, habitat degradation, or predation risk**

# Sable Movements

- **Limited data on sable movement patterns other than home range estimates**
- **Objectives**
  - **Basic movement patterns:**
    - **Diurnal vs. nocturnal movements**
    - **Seasonal**
      - **Distances**
      - **Rates**
      - **Spatial patterns of water use**

# Sable Water Dependency

- **2 – 4 km from water** (Wilson and Hirst 1977)
- **Infrequently >1 km from water** (Grobler 1981, Ben Shahr 1990, Magome 1991)
- **Sable in Punda Maria area >4 km from man-made water sources during the dry season** (Henley 2005 )

**Punda Maria (1 herd)**

May 06 – Mar 07



- **GPS/GSM Collars**

- **Wet and Dry Seasons**

- 1 location/6 hours

- **Dry Season**

- 1 location/hour

**Talamati (2 herds)**

Nov 04 – May 05

Nov 04 – Feb 06



**Pretoriuskop (4 herds)**

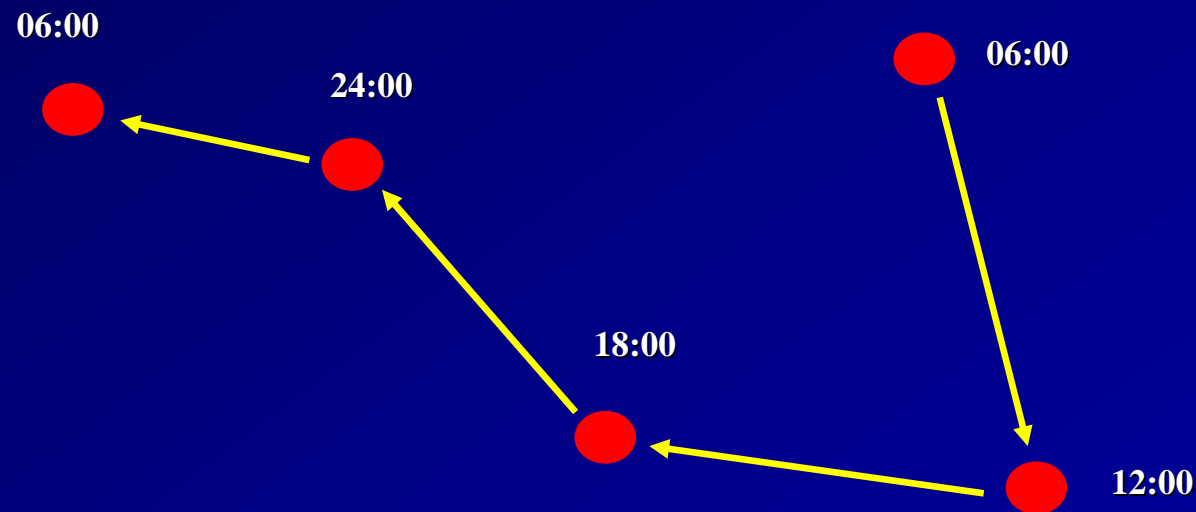
Nov 05 – Mar 07 (1 herd)

May 06 – Mar 07



# Methods

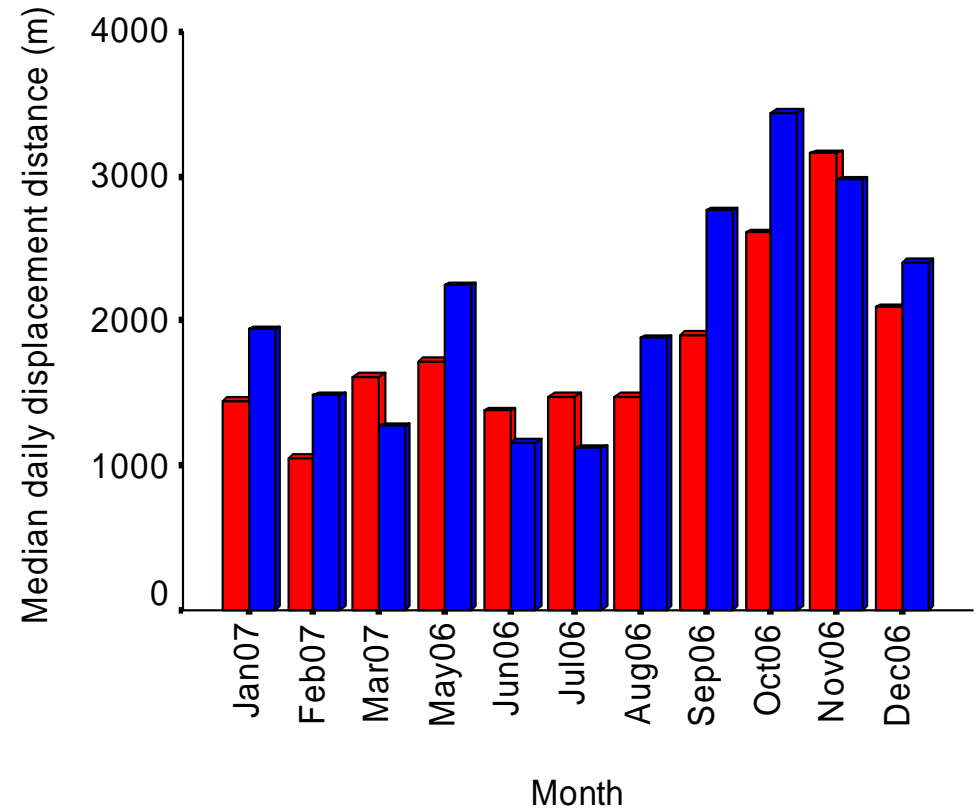
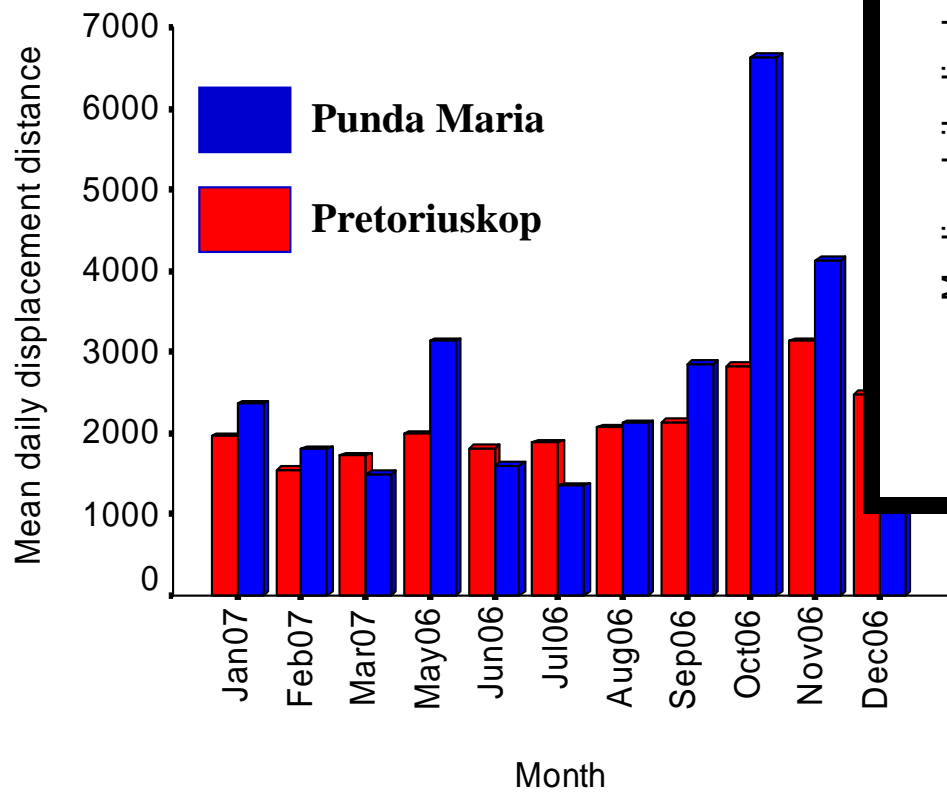
- **Distance between consecutive GPS positions**



# Methods

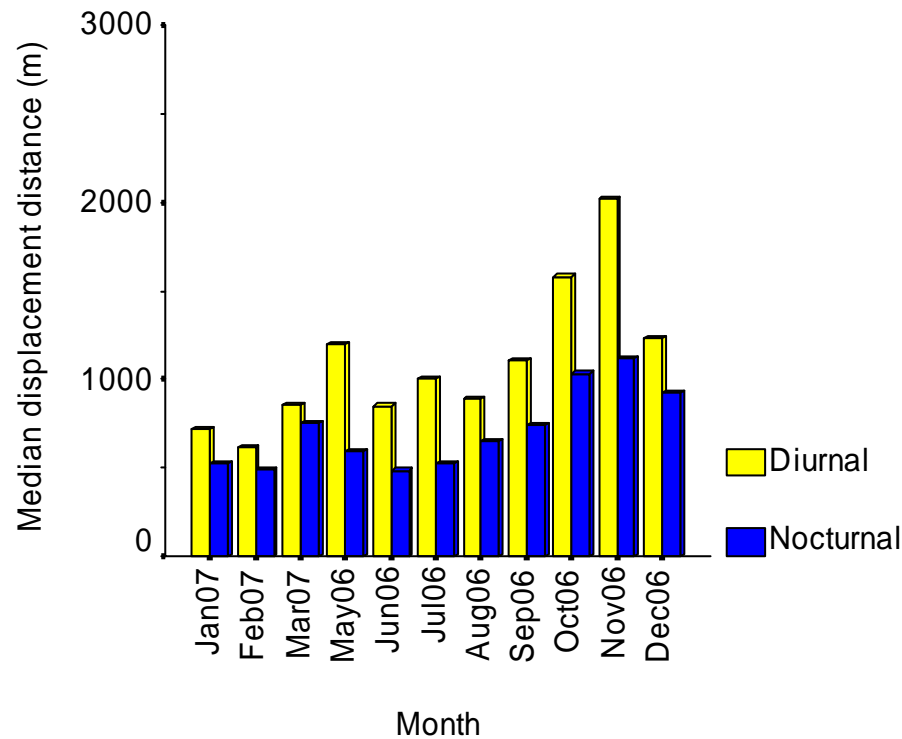
- **Sable Movements**
  - Wet and dry seasons
    - Seasonal movement patterns
      - Daily displacement distance
      - Diurnal versus nocturnal displacement distances
  - Dry season
    - Hourly movement rates
      - Monthly
      - Diurnal vs. nocturnal movement rates
- **Sable distribution and movement in relation to water sources**
  - Movements to Water
  - Distance to man-made water sources

# Monthly Displacement Distance

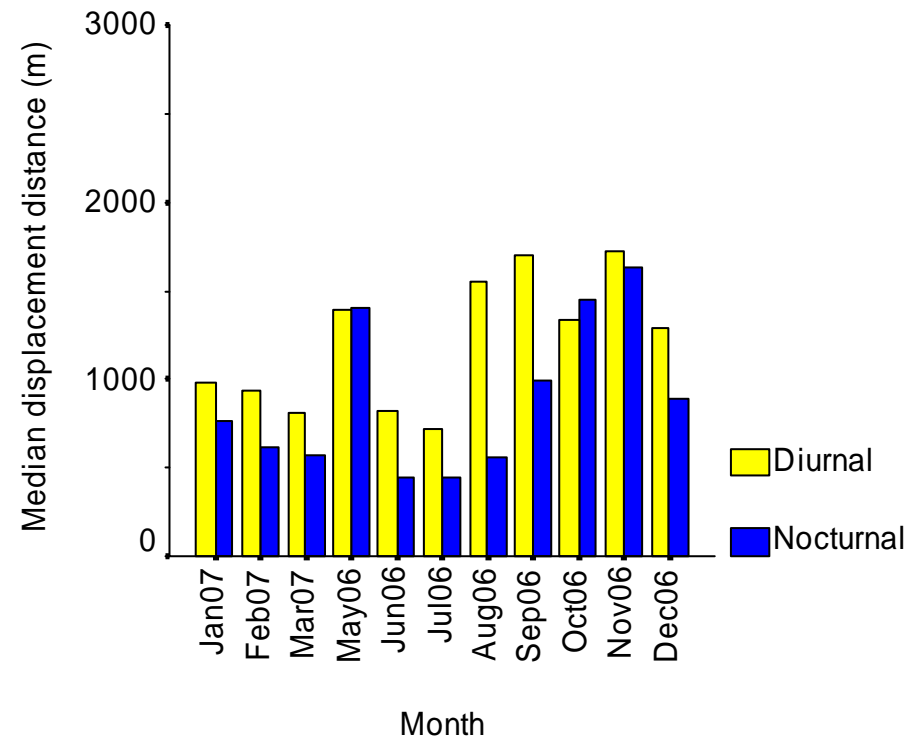


# Nocturnal vs. Diurnal Movement

## Pretoriuskop

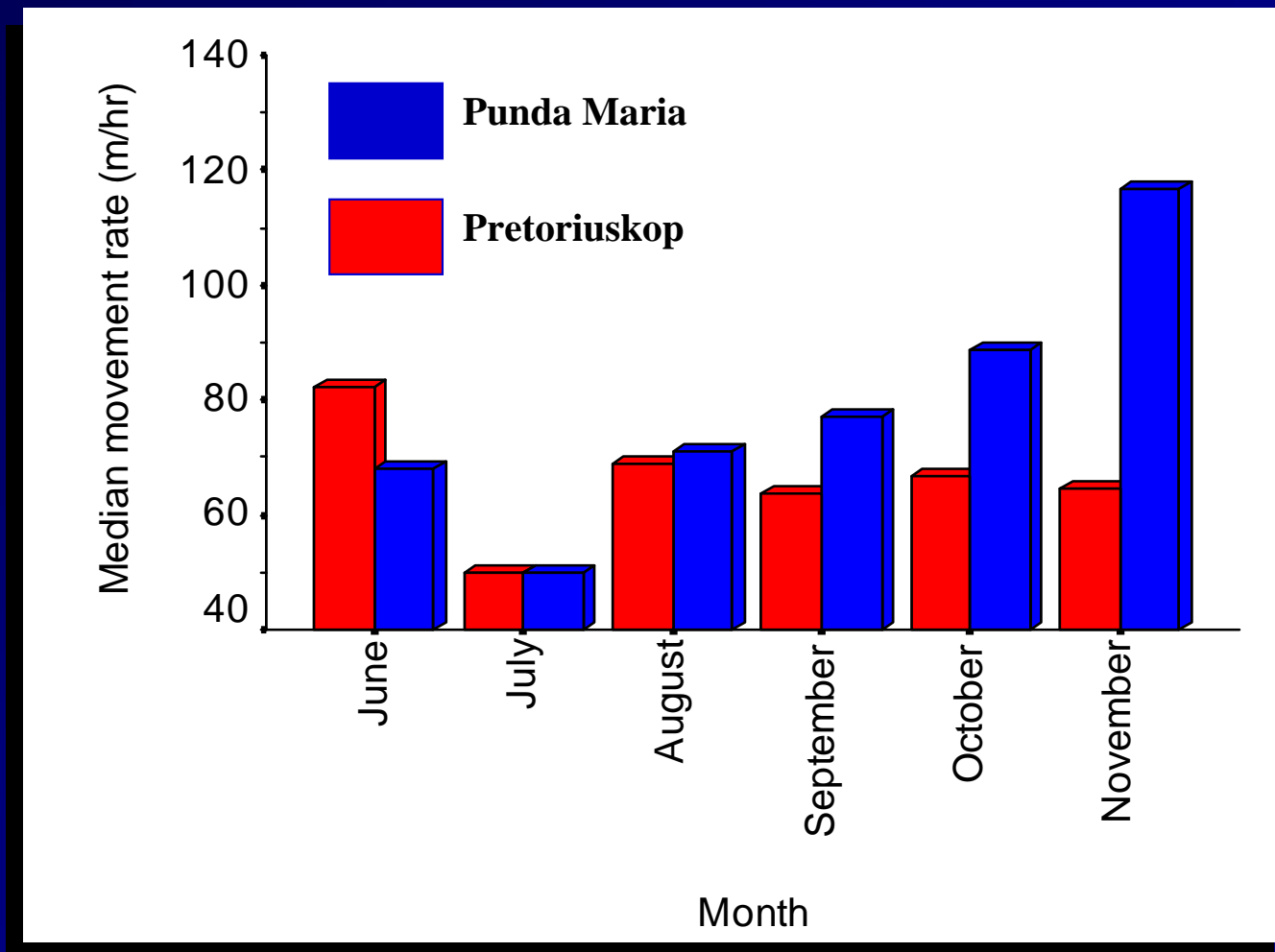


## Punda Maria



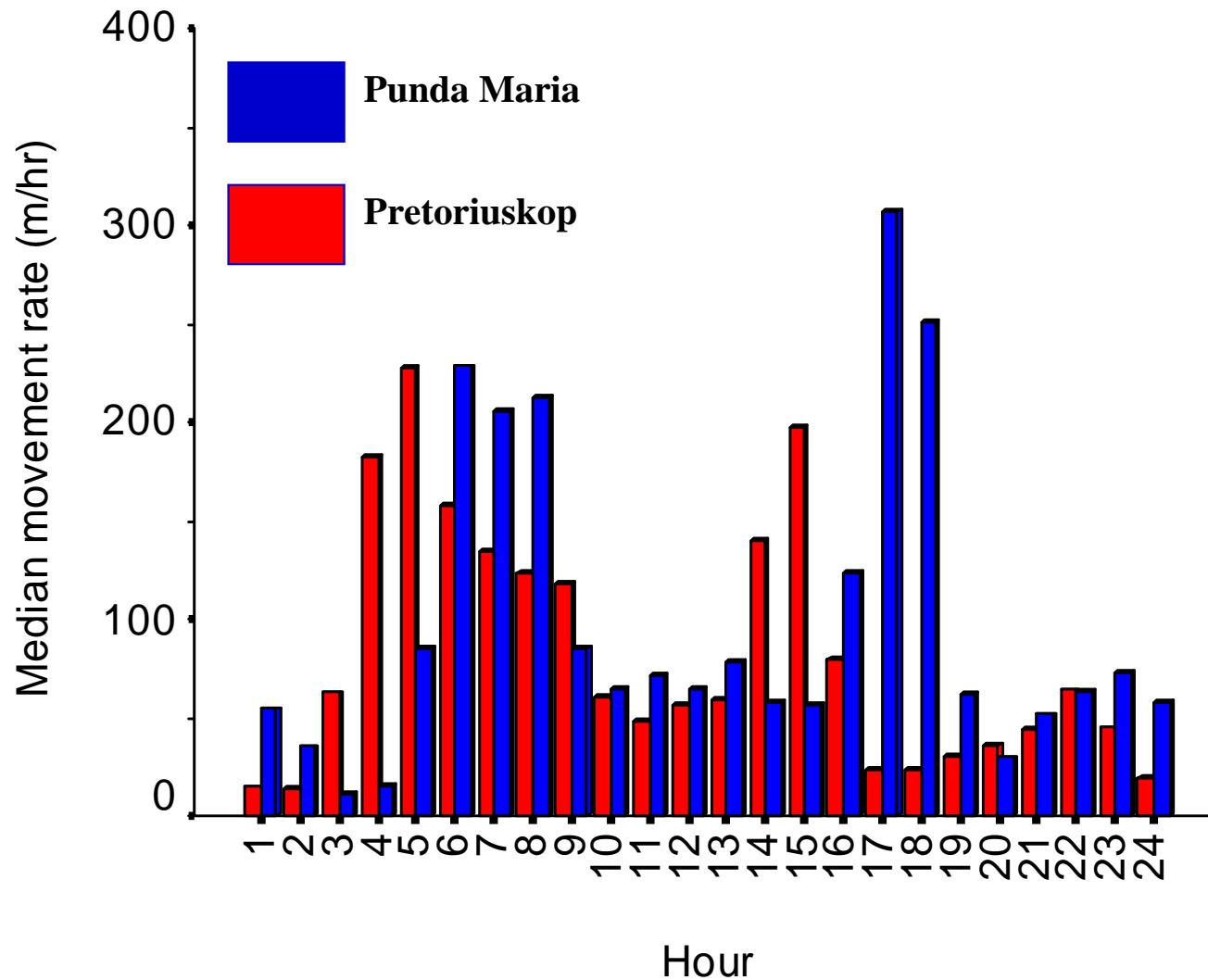
# Dry Season

## Monthly changes in movement rate



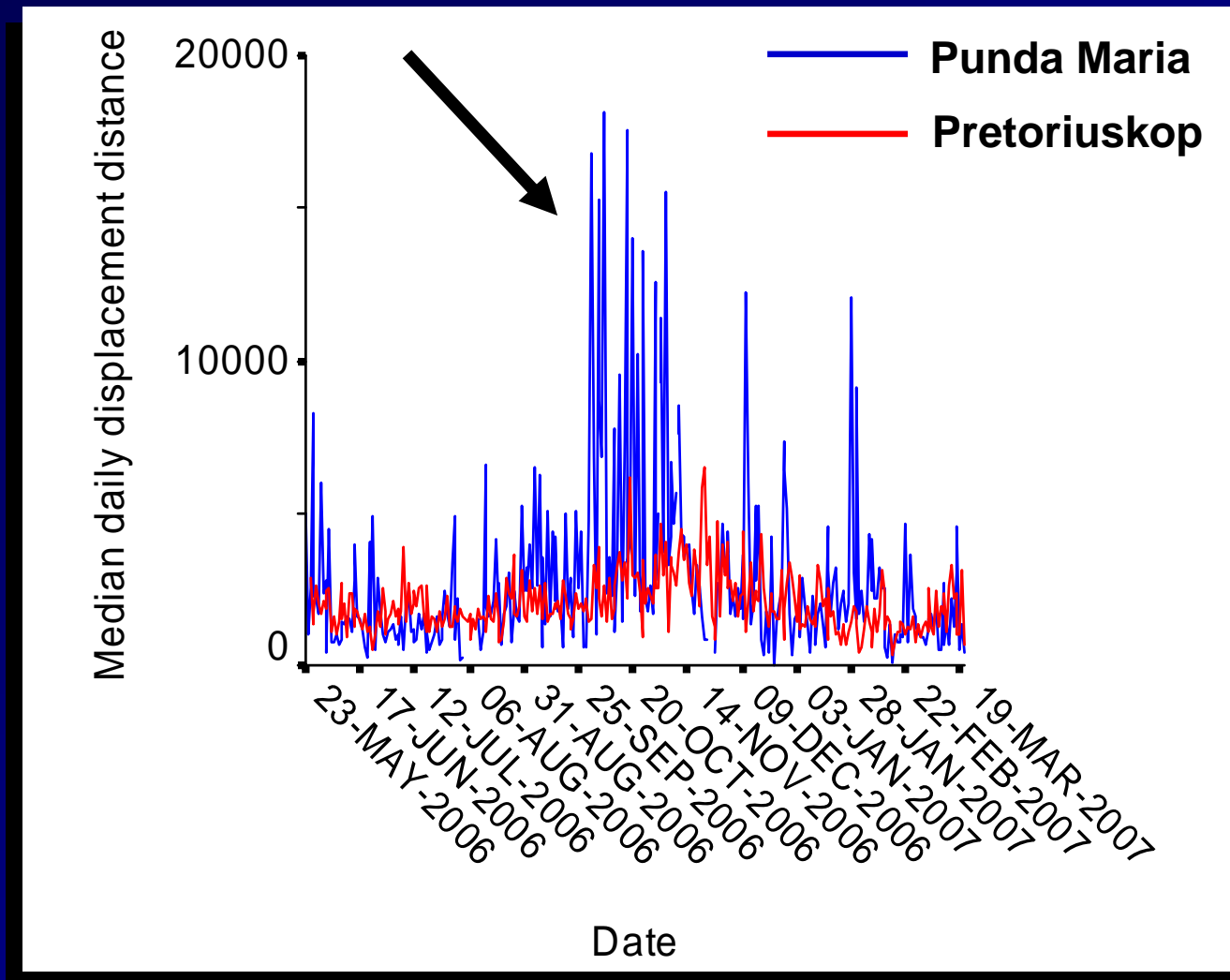
# Dry season

## Diel movement rates



# Dry season

## Movement rates



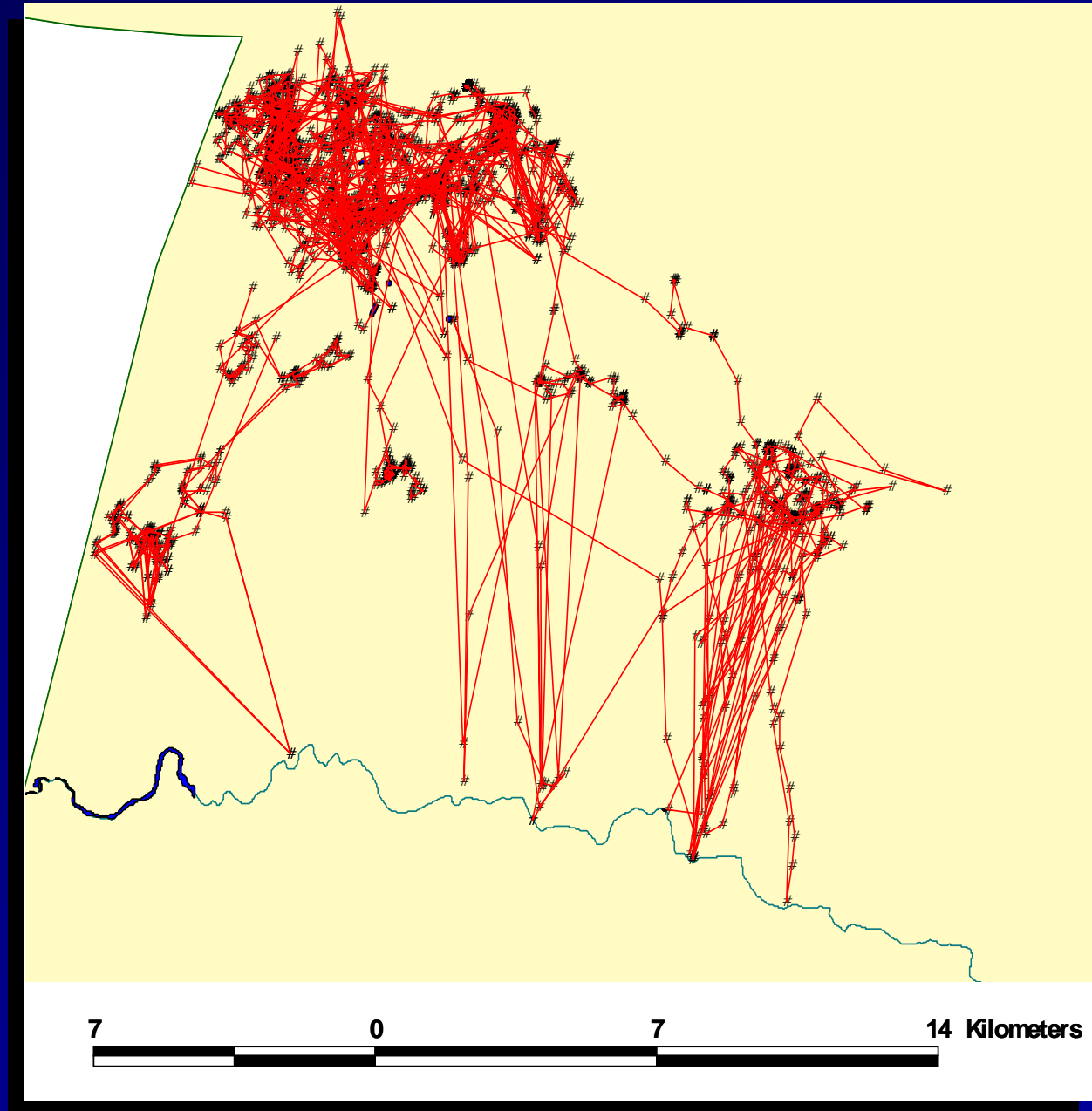
# Movement to water – Punda Maria

- **Frequency**

- Oct – Nov ( $n = 21$ )
- Mean 3.6 days (SD = 2.3)
- Range 2 – 10 days

- **Trip distance**

- Mean 13.7 km (SD = 3.8)
- Range 6.0 – 21.1 km



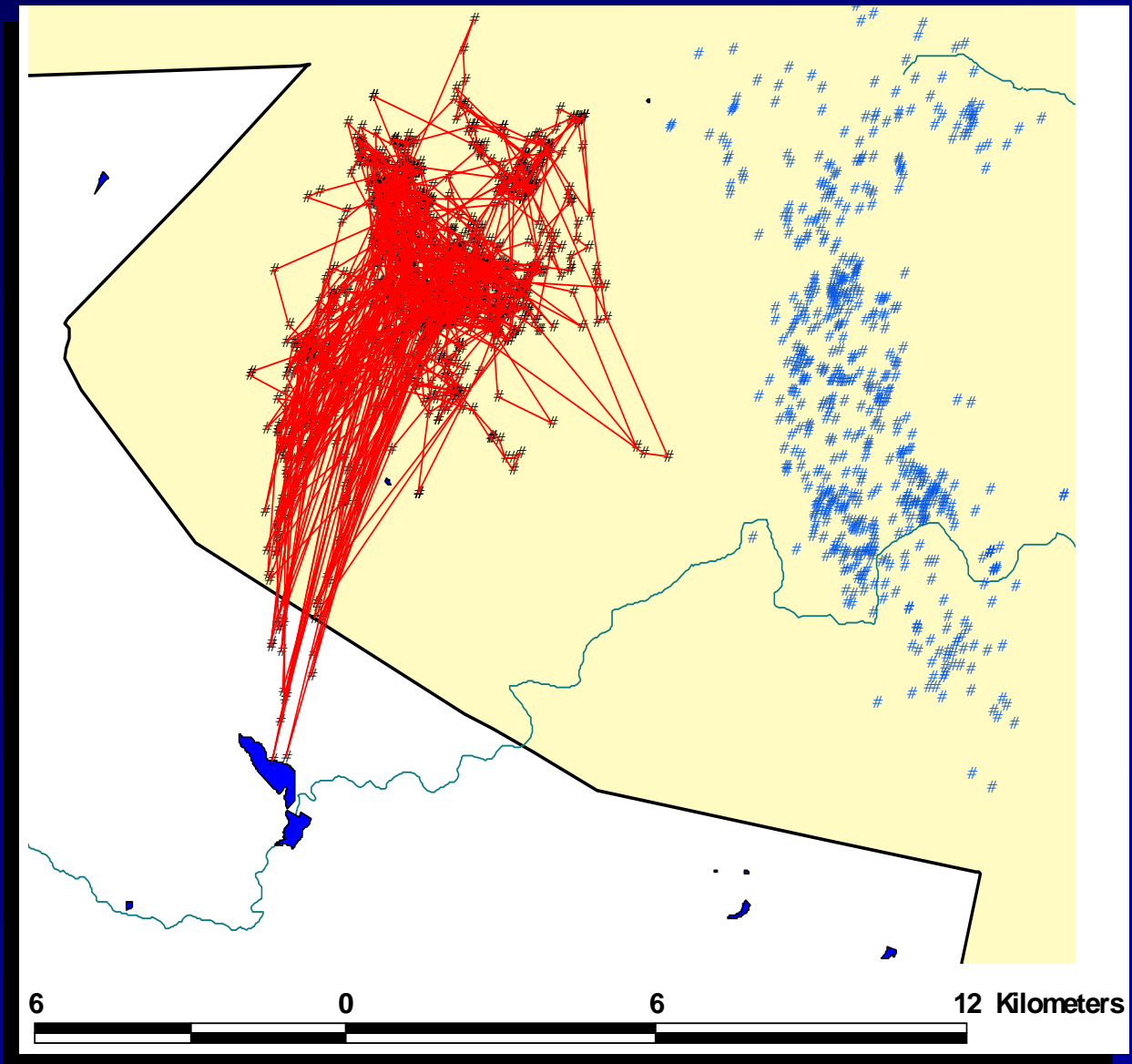
# Movement to water – Talamati

- **Frequency**

- June – Nov ( $n = 20$ )
- Mean 8.0 days (SD = 5.6)
- Range 2 – 25 days

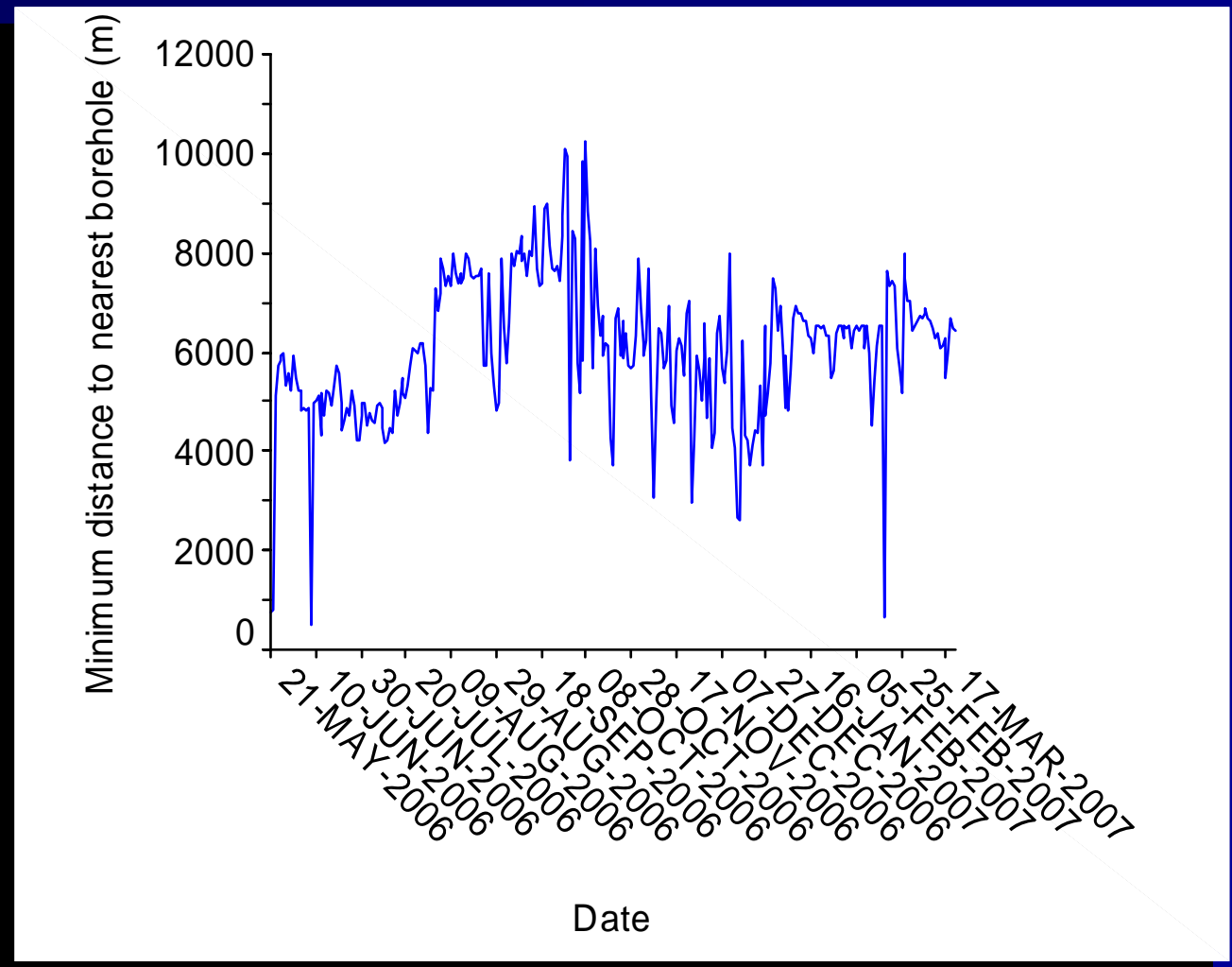
- **Trip distance**

- Mean 11.1 km (SD = 3.3)
- Range 6.6 – 18.4 km



# Distance to nearest borehole

- Distance to boreholes



# Conclusions

- **Seasonal variation in movement patterns**
  - Increase in movement as dry season progresses
- **Regional variation in movement patterns**
  - **Spatial**
    - Northern herd displayed higher movement rates/distances
  - **Temporal**
    - Northern herd displayed high incidence of nocturnal movements
- **Movement towards water sources**
  - Northern and central herds make long-distance movements towards rivers/dam areas
  - Little evidence of strong influence of boreholes on sable distribution in Punda Maria area

# Future Directions

- **Detailed analysis of dry season movement patterns**
  - Assessment of biotic/abiotic characteristics of sable locations (24-hr)
- **Movement of sable in relation to distribution and movements of buffalo and zebra**
  - Avoidance model
- **Sable movement rates in relation to nutritional status**