Managing rhino, even in the absence of poaching

Howard H. Hendricks

Markus Hofmeyr, Sam Ferreira and Mike Knight
Why should rhinos matter?

<table>
<thead>
<tr>
<th>Species</th>
<th>Ecosystems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Varied threats</td>
<td>Mega-herbivore disturbance</td>
</tr>
<tr>
<td>Endangered and threatened</td>
<td>Disturbance key process</td>
</tr>
<tr>
<td>Existence value</td>
<td>Heterogeneity</td>
</tr>
<tr>
<td>Educational value</td>
<td>Biodiversity</td>
</tr>
<tr>
<td>Indicator species value</td>
<td>Resilience</td>
</tr>
<tr>
<td>Science value</td>
<td>Ecosystem services</td>
</tr>
</tbody>
</table>
What are conservation objectives?

Range state reports and strategies

- Growth: 100%
- Meta-population: 40%
- Genetic: 50%
## Where did South Africa come from?
### Population enhancement and range expansion

<table>
<thead>
<tr>
<th>Year</th>
<th>Key event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1895</td>
<td>20-50 white rhinos in Hluhluwe-iMfolozi Park</td>
</tr>
<tr>
<td>1961</td>
<td>Development of capture techniques</td>
</tr>
<tr>
<td>1968</td>
<td>First hunts</td>
</tr>
<tr>
<td>1977</td>
<td>CITES Appendix 1</td>
</tr>
<tr>
<td>1981</td>
<td>Management removals intensify</td>
</tr>
<tr>
<td>1988</td>
<td>1st Auction of live rhinos - Private ownership allowed</td>
</tr>
<tr>
<td>1993</td>
<td>CITES Appendix 2 for South African White Rhinos</td>
</tr>
<tr>
<td>2003</td>
<td>CITES Appendix 2 for Swaziland White Rhinos</td>
</tr>
<tr>
<td>2008</td>
<td>Poaching intensifies</td>
</tr>
</tbody>
</table>
Where are Africa’s rhinos?

- Black: 5055
- White: 20405

Data provided by Richard Emslie, AfRSG
RHINO CONSERVATION IN AFRICA

- South Africa is key
- Four range states
  - 96% of black rhinos
  - 99% of white rhinos

Rhino numbers

- South Africa: 21001
- Namibia: 1025
- Kenya: 708
- Zimbabwe: 127
- Botswana: 37
- Swaziland: 14
- Tanzania: 26
- Zambia: 1
- Malawi: 1
- Angola: 1

RHINO CONSERVATION IN AFRICA
RHINO CONSERVATION – White rhino

**White Rhino Numbers**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>7000</td>
</tr>
<tr>
<td>1994</td>
<td>9000</td>
</tr>
<tr>
<td>1996</td>
<td>11000</td>
</tr>
<tr>
<td>1998</td>
<td>13000</td>
</tr>
<tr>
<td>2000</td>
<td>15000</td>
</tr>
<tr>
<td>2002</td>
<td>17000</td>
</tr>
<tr>
<td>2004</td>
<td>19000</td>
</tr>
<tr>
<td>2006</td>
<td>21000</td>
</tr>
<tr>
<td>2008</td>
<td>23000</td>
</tr>
<tr>
<td>2010</td>
<td>20,430 (2012)</td>
</tr>
</tbody>
</table>

**Country** | **Number**
---|---
South Africa | 18933
Namibia | 524
Kenya | 394
Zimbabwe | 284
Botswana | 185
Swaziland | 84
Zambia | 10
Uganda | 14
Mozambique | 1
RHINO CONSERVATION – Black rhino

Black Rhino Numbers

<table>
<thead>
<tr>
<th>Country</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>2068</td>
</tr>
<tr>
<td>Namibia</td>
<td>1750</td>
</tr>
<tr>
<td>Kenya</td>
<td>631</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>424</td>
</tr>
<tr>
<td>Botswana</td>
<td>9</td>
</tr>
<tr>
<td>Tanzania</td>
<td>127</td>
</tr>
<tr>
<td>Swaziland</td>
<td>18</td>
</tr>
<tr>
<td>Zambia</td>
<td>27</td>
</tr>
<tr>
<td>Malawi</td>
<td>26</td>
</tr>
<tr>
<td>Mozambique</td>
<td>0</td>
</tr>
<tr>
<td>Angola</td>
<td>1</td>
</tr>
</tbody>
</table>

Graph showing the increase in black rhino numbers from 1992 to 2012.
RHINO CONSERVATION SUCCESS

Conservationists applied best practice management
  Pioneers saw value in what they were doing
    Large protected areas provided recovery
      Innovative approaches provided expansion
        Legal incentives provided more areas
  Most values of rhinos were recognized
SOUTH AFRICA’S RHINO CONSERVATION

• Sound biological and conservation management
• Recognizing a values associated with rhinos
Rhino ownership in South Africa  
2010

<table>
<thead>
<tr>
<th>Ownership</th>
<th>White rhino</th>
<th>Black rhino</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private land</td>
<td>4531</td>
<td>446</td>
</tr>
<tr>
<td>SANParks</td>
<td>10605</td>
<td>775</td>
</tr>
<tr>
<td>Provincial</td>
<td>3644</td>
<td>695</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>18780</strong></td>
<td><strong>1916</strong></td>
</tr>
</tbody>
</table>
# Rhino ownership in South Africa 2012

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>White Rhino</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SANParks</td>
<td>10 649</td>
<td>10 641</td>
</tr>
<tr>
<td>Provinces</td>
<td>3 644</td>
<td>3 710</td>
</tr>
<tr>
<td>Private owners</td>
<td>4 531</td>
<td>4 527</td>
</tr>
<tr>
<td><strong>Black rhino</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SANParks</td>
<td>797</td>
<td>913</td>
</tr>
<tr>
<td>Provinces</td>
<td>695</td>
<td>697</td>
</tr>
<tr>
<td>Private owners</td>
<td>447</td>
<td>434</td>
</tr>
</tbody>
</table>
White rhino population manipulation in Kruger

Number of white rhinos

-300 -250 -200 -150 -100 -50 0 50 100 150 200

Introductions


351

Removals

1509

85% sold

Ferreira, Botha & Emmett 2012

© Mike Knight
What is current status?

**White rhino**

- Number of white rhinos from 1995 to 2015
- Data from Ferreira, Botha & Emmett 2012

**Black rhino**

- Number of black rhinos from 1995 to 2015
- Data from Ferreira, Greaver & Knight 2011

© Sam Ferreira
The tenuous basis of numbers

- Observer bias
- Availability bias
- Detectability bias
- Capture bias
Checking population status

Survey \(\approx 40\%\) of Kruger using blocks.

Define biases influencing estimates

Define population sizes using Jolly-Seber aerial survey estimators

Evaluate the trends in population estimates

Define optimal survey designs to detect trends

Define a survey strategy for Kruger
What rhinos did we see?

• Surveyed 878 blocks
• Represent 41.7% coverage of Kruger
• Bias assessments
  – 56 White rhinos
  – 23 Black rhinos
Optimal sampling efforts?

(a) Population estimate vs. % area surveyed

(b) % confidence limits vs. % area surveyed

Ferreira et al. 2011.
Availability Bias

White Rhino

Black Rhino

Percentage of time visible

Percentage woody cover

1 3 3 6 8 11 12 9 1

1 1 2 7 2 9 3

White Rhino

Black Rhino
Regulation and limitation

Death rates associated with environment and density

Birth rates associated with density

Males

\[ y = -3 \times 10^{-5}x + 0.3206 \]

\[ R^2 = 0.8193 \]

Females

\[ y = -3 \times 10^{-5}x + 0.3206 \]

\[ R^2 = 0.8193 \]
Rhino population management models

Landscape specific models

- Several landscape have high densities
- Several landscape equilibrium dynamics
- Economic removal - half growth rate
- Mimicking ecological effects lower
The changing South African context

2007 to 2010
Annual increase of 4.7%
18,780 white rhinos
758 poached rhinos
1,797 rhinos fewer

Rhinos increased but could have done so faster if no poaching
A GLOBAL CHALLENGE

Supply sourced largely from South Africa

End users market not within South African control

Wildlife Trafficking

Syndicated Crime

Greed

Poverty

Illicit wildlife trade

Demand

Environmental Assets
THREAT TO RHINO: POACHING

Poached in South Africa

<table>
<thead>
<tr>
<th>Country</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botswana</td>
<td>1.03%</td>
<td>0.52%</td>
</tr>
<tr>
<td>Kenya</td>
<td>2.83%</td>
<td>5.82%</td>
</tr>
<tr>
<td>Malawi</td>
<td>7.69%</td>
<td>11.54%</td>
</tr>
<tr>
<td>Mozambique</td>
<td>1200%</td>
<td>200%</td>
</tr>
<tr>
<td>Namibia</td>
<td>0.04%</td>
<td>0.22%</td>
</tr>
<tr>
<td>South Africa</td>
<td>3.18%</td>
<td>4.61%</td>
</tr>
<tr>
<td>Swaziland</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Tanzania</td>
<td>1.57%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Uganda</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Zambia</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>4.10%</td>
<td>1.84%</td>
</tr>
<tr>
<td>Africa</td>
<td>2.92%</td>
<td>4.07%</td>
</tr>
</tbody>
</table>
Kruger National Park is iconic

High biodiversity, 1.4 million visitors a year

Biggest rhino stronghold in the world

2,000,000ha or 20,000 km², 380 km x 60 km

356 km border with Mozambique

Lebombo mountain range

Part of 3,000,000 ha GLTP

950km circumference of boundaries.

Over 1000km around the GLTP
WHAT CHANGED?
HOW TO DEAL WITH IT SYSTEMICALLY?

Traditional response

Poacher
Producer

Poacher

Local organizer

National buyer

International distributor

Syndicate

Local trader

Consumer

Within protected areas

Beyond protected areas

Illegal activities on local level

1 (Poacher) & 2 (Receive / Courier)

National – Exporter

National – Couriers / Buyers / Facilitators

International consumer

Buyer / Driver

JIM
Getting smart?

**Must have solutions**
- Pro-active anti-poaching

**Rhino creation solutions**
- Strategic removals
- Sanctuaries, conservancies, strongholds
- Conservation husbandry

**Idealistic strategic solutions**
- Creating sustainable demand
- Trade options

**Game-breaking solutions**
- Disruption of transnational organized crime
- Alternative economic choices for communities
- Incentivized asset consolidation
Rhino creation solutions
Maximize rhino productivity

Strategically remove rhinos

<table>
<thead>
<tr>
<th>Stimulate growth</th>
<th>Remove asset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numbers stable</td>
<td>Periphery</td>
</tr>
<tr>
<td>Little poaching</td>
<td>Poaching hotspot</td>
</tr>
</tbody>
</table>

Strategic Rhino Strongholds
- Intense protection
- Rhino husbandry
- One ranger per 10 km²
- Maximize births

Partner Stronghold
- Protected areas
- Community areas
  - Share expertise

Private Stronghold
- Private land
- Consumptive use
  - Share expertise/return not given

International Conservancies – Expansion Programmes

Strategic rhino revenue
- Fund conservancies
- Support husbandry

Ferreira, Hofmeyr, Malan, Joubert & Solano-Fernandez 2014 In preparation
LESSONS LEARNT

Conservation
• Sound conservation and sustainable use principles play key roles
• Long lag effects for outcomes to materialize from actions taken now

Governance
• Political will essential – unpopular decisions often required
• Joint, integrated and strategically focused efforts have more impact
• International collaboration essential should be strengthened

Stakeholders
• Active participation of communities essential
• Increase economic incentives essential to promote rhino populations
• Costs of interventions are under-estimated

Law enforcement
• Legislation should be current, relevant and a deterrent
• Penalties should align with severity of offences
• Regional law enforcement – Mozambique key focus
PRIORITY ACTIONS

Managing the Threat
- Safety and Security

Transnational Organized Crime

Managing the Rhino
- Robust Conservation

Disrupt organized crime

Create economic choices

Enhance rhino populations

Implement long-term sustainability

Funding
Governance
International Cooperation
Thank you

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