



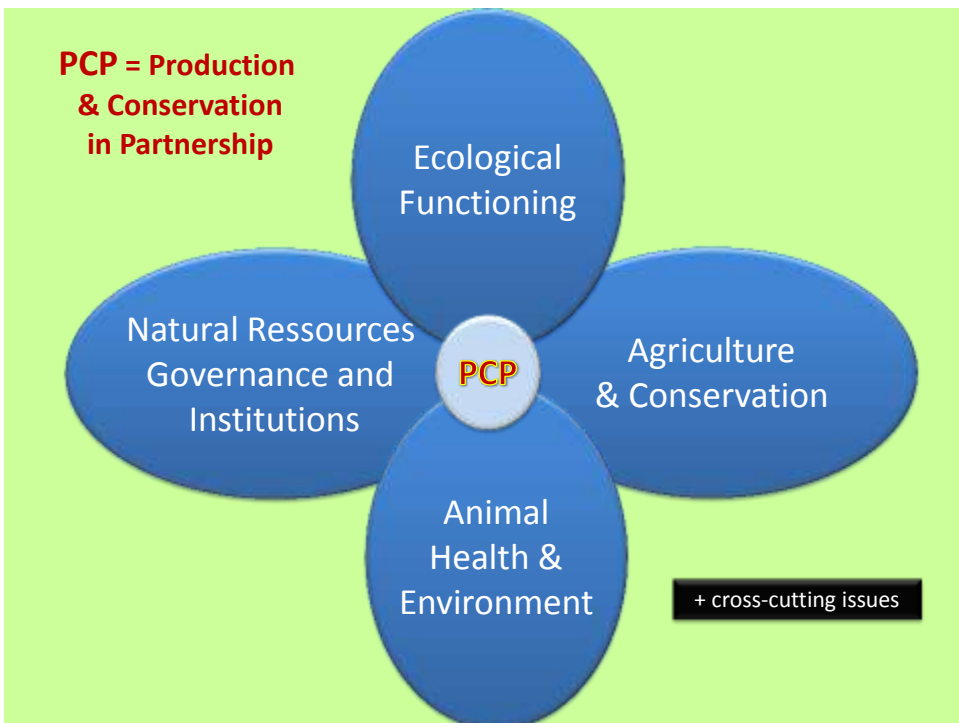
Prevalence of diseases at different wildlife/livestock interfaces in the Great Limpopo Transfrontier Conservation Area



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AHEAD Meeting, 2-4 March 2011, Mopane Camp, KNP



TFCAs in Southern Africa

www.peaceparks.org

- TFCAs:
 - TransFrontier parks: Great Limpopo TFCAs
 - Conservation areas (private)
 - Communal land
- For:
 - Conservation
 - Development
 - Ecosystem Health



Health and TFCAs



- TFCAs expected to increase movements of wildlife
 - Increased movements of their pathogens
- Sanitary risk:
 - Emerging diseases at the wildlife/domestic interface
- The **perception** is that, if sanitary risk not adressed, TFCAs could have a negative impact:
 - on international trade (e.g., FMD)
 - on local livelihoods (e.g., tick-borne diseases)
 - on human health (e.g., zoonosis such as brucellosis)

Study Objective

*Survey important diseases
at different wildlife/livestock interfaces
in the South-East Lowveld of Zimbabwe*



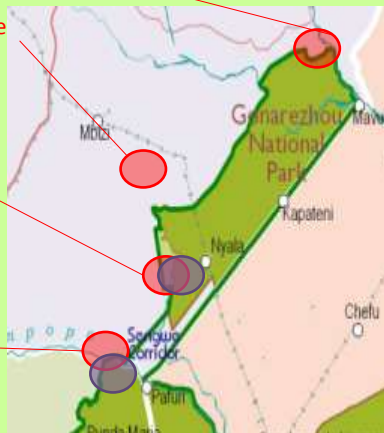
Study sites

Chizvirizvi/Gora Fenced interface

**Chikombedzi/Pfumare
/Chomupane**
No interface

Malipati/Pahlela
No fence

Pesvi
No fence



Wildlife sampling
(buffalo, kudu, impala)

Selected diseases

- The Bad Five at the interface
 - Bovine tuberculosis
 - Foot-and-Mouth Disease
 - Brucellosis
 - Theileriosis
 - Rift Valley Fever



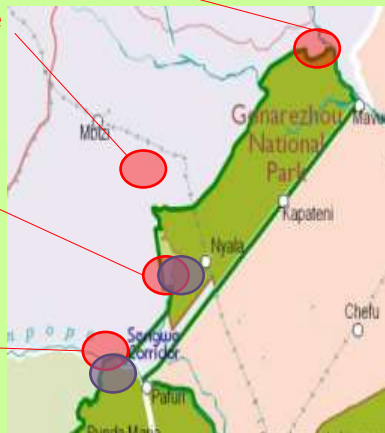
Sampling

Chizvirizvi/Gora Fenced interface
2008-2009

**Chicombedzi/Pfumare
/Chumupane**
No interface
2008-2009

Malipati/Pahlela
No fence
2008-2009

Pesvi
No fence
2008-2009



Wildlife sampling
(**buffalo**, kudu, impala)
- Mabalauta (10.08, 11.09)
- Crook' corner (06.10)

Cattle sampling: bTB

Date : Sept 2007- Oct 2009		Test CIDT		
Species: Cattle		No of animals	No of positives	Estimated prevalence (CI)
Unfenced Interface	Malipati	195	2	1.03% (0-2.44%)
	Pesvi	179	3	1.68% (0-3.56%)
Fenced Interface	Chizvirizvi	120	2	1.67% (0-3.97%)
No Interface	Chikombedzi	104	0	0%
Total		598	7	1.17% (0.31-3.08%)

Cattle sampling: bTB (2)

- Extensive interface: Malipati (collared herd):
 - Confirmation: **2 IFG negative**
+ 1 culture+histo negative
 - December 2010:
- 0/51 CIDT positive (0.0%)
- Extensive interface: Pesvi
 - Confirmation: **2 IFG negative**

No
confirmation of
bTB in cattle



Cattle sampling: FMD

Date : October 2008		Test	Liquid Phase bloquing ELISA		
Species: Cattle			Nb of animals	Nb of positives	Estimated prevalence (CI)
Unfenced Interface	Malipati	SAT 1	70	5	7.1% (4.1-10.2%)
		SAT 2	70	1	1.4% (0.0-2.8%)
		SAT 3	70	2	2.9% (0.1-4.8%)
SubTotal			70	7	10.0% (6.4-13.6%)
Fenced Interface	Gora	SAT 1	60	2	3.3% (1.0-5.7%)
		SAT 2	60	4	6.7% (3.4-9.9%)
		SAT 3	60	2	3.3% (1.0-5.7%)
SubTotal			60	4	6.7% (3.4-9.9%)
No Interface	Chomupane	SAT 1	54	7	13.0% (8.4-17.6%)
		SAT 2	54	3	5.6% (2.4-8.7%)
		SAT 3	54	2	3.7% (1.1-6.3%)
SubTotal			54	7	13.0% (8.4%-17.5%)
Total			184	18	9.8% (7.6-12.0%)

Cattle sampling: FMD (2) – CORUS – T0

Date : April 2009		Test	Liquid Phase bloquing ELISA		
Species: Cattle			Nb of animals	Nb of positives	Estimated prevalence (CI)
Unfenced Interface	Pahlela	SAT 1	119	12	10.1% (7.3-12.8%)
		SAT 2	119	3	2.5% (1.1-4.0%)
		SAT 3	119	11	9.2% (6.6-11.9%)
	Malipati	SAT 1	119	7	5.9% (3.7-8.0%)
		SAT 2	119	3	2.5% (1.1-4.0%)
		SAT 3	119	6	5.0% (3.0-7.0%)
SubTotal			238	20	8.4% (6.6-10.2%)
No Interface	Pfumare	SAT 1	116	14	12.1% (9.0-15.1%)
		SAT 2	116	7	6.0% (3.8-8.2%)
		SAT 3	116	11	9.5% (6.8-12.2%)
	Chomupane	SAT 1	114	20	17.5% (14.0-21.1%)
		SAT 2	114	21	18.4% (14.8-22.1%)
		SAT 3	114	13	11.4% (8.4-14.4%)
SubTotal			230	46	20.0% (17.4-22.6%)
Total			468	66	14.1% (12.5-15.7%)

Cattle sampling: FMD (3)

- FMD Circulation (annual?) at all interfaces
- No difference between W/L interfaces
- Confirmed by NSP tests
- Restrospective survey of Outbreaks in the South East Lowveld indicates that Lowveld is a hotspot for FMD emergence
- CORUS survey in unvaccinated diptank in 08.09
 - No interface: 69% +
 - Extensive interface: 78% +
 - Circulation in 2009 – to be confirmed



Cattle sampling: CA

Date : October 2008		Test	RBT/cElisa		
Species : Cattle		Nb of animals	Nb of positives	Estimated prevalence (CI)	
Unfenced Interface	Pesvi	57	10	17.5% (12.5-22.6%)	
	Malipati	60	10	16.7% (11.9-21.5%)	
No Interface	Chomupane	60	8	13.3% (8.9-17.7%)	
	Pfumare	60	3	5.0% (2.2-7.8%)	
Total		237	31	13.1% (10.9-15.3%)	

Date : October 2009		Test	RBT/cElisa		
Species : Cattle		Nb of animals	Nb of positives	Estimated prevalence (CI)	
Unfenced Interface	Malipati	66	4	6.1% (3.1-9.0%)	
Fenced Interface	Chizvirizvi	60	0	0%	
No Interface	Chikombedzi	60	8	13.3% (8.9-17.7%)	
Total		186	12	6.5% (4.7-8.3%)	

Cattle sampling: RVF

Date : October 2008		Test	Indirect ELISA		
Species: Cattle		Nb of animals	Nb of positives	Estimated prevalence (CI)	
Unfenced Interface	Malipati	71	13	18.3% (13.7-22.9%)	
Fenced Interface	Gora	59	5	8.5% (4.9-12.1%)	
No Interface	Chomupane	52	4	7.7% (4.0-11.4%)	
Total		182	22	12.1% (9.7-14.5%)	
Species: Goat		Nb of animals	Nb of positives	Estimated prevalence	
Unfenced Interface	Malipati	8	0	0.0%	
Fenced Interface	Gora	18	0	0.0%	
No Interface	Chomupane	20	1	5% (0.1-9.9%)	
Total		46	1	2.2% (0.0-4.3%)	
Species: Sheep		Nb of animals	Nb of positives	Estimated prevalence	
Unfenced Interface	Malipati	18	1	5.6% (0.2-11.0%)	
Total		18	1	5.6% (0.2-11.0%)	

Cattle sampling: Theileriosis

Date : 2007-2009		Test	IFA (<i>T. parva</i>)*		
Species: Cattle		Nb of animals	Nb of positives	Estimated prevalence (CI)	
Unfenced Interface	Malipati	31	1 (3 suspects)**	3.2% (0.0-9.5%)	
	Pesvi	40	17 (5 suspects)	42.5% (27.0-58.0%)	
Fenced Interface	Gora	60	0 (4 suspects)	0.0%	
No Interface	Chomupane	51	0 (3 suspects)	0.0%	
Total		182	18 (+15 suspects)	9.9% (5.5-14.2%)	

Cattle diseases: summary

Species: Cattle	bTB	FMD	CA	RVF	Corridor
Unfenced Interface	0	++	+	++	++
Fenced Interface	0	++	+	+	0
No Interface	0	++	0	+	0

- Small sample sizes: no clear interpretations
- Extensive interface

Wildlife sampling: bTB

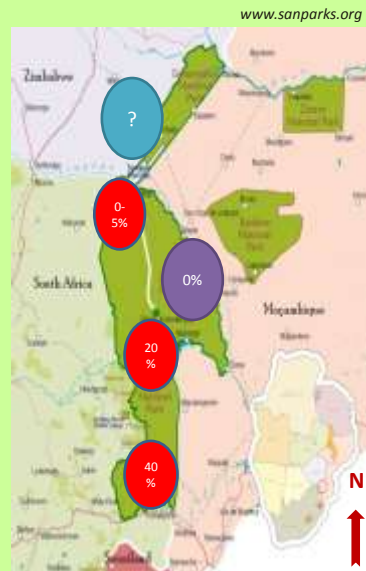
June 2010
N=47 buffalos
(Moz, SA, Zim)



Oct. 2008
(38 buf, 25 kudus,
50 Impalas)
Nov. 2009
(10 buffalos)

bTB in the GLTFCA

- Up to 2008:
 - Gradient of bTB prevalence in the buffalo population
 - >12 wild species detected with bTB
 - Absence in LNP *(Hofmeyr, pers. com.)*
 - No info in Zimbabwe



Wildlife sampling: bTB

- October 2008: Initial boma capture
 - 38 buffalos in 4 groups
 - **4/38** positives by IFG, **(10.5%)**
 - 22 Greater kudus
 - **0/22** positives by IFG **(0.0%)**
- February 2009: Buffalo re-capture
 - **2 positive** buffalos culture/hispatho
 - Both culture positive for bTB
 - Same strain as KNP strain (VNTR technique)

Confirmation of
bTB in buffalo



de Garine-Wichatitsky et al. 2010. Emerg Inf Dis

Wildlife sampling bTB (2)

- Recapture of collared buffalo
- bTB is spreading in the GNP Buffalo population



Buffalo recapture	October 2008	February 2009	November 2009
1	Pos	Culled	Neg
2	Neg	X	Neg
3	Neg	X	Neg
4	Neg	X	Neg
5	Neg	X	Neg
6	Neg	X	Neg
7	Neg	X	Neg
8	Neg	X	X
9	Neg	X	Neg
10	Neg	X	Neg
11	Neg	X	Pos
12	Neg	X	X
13	-	Collared	Neg
Incidence	-	-	1/10

Wildlife sampling: bTB (3)

- June 2010: Crook's corner area:
 - 0 positive for bTB
 - BUT problem of « invalid results » on >10 samples
 - Interpretation difficult
 - Estimation by SANParks of herd in this area:
 - Prevalence 0-5%

Wildlife sampling: FMD



	SAT1	SAT2	SAT3	0 strain	1 strain	2 strains	3 strains
Buffalo	35	26	25	2	5	12	19
n=38	92,1%	68,4%	65,8%	5,3%	13,2%	31,6%	50%
Impala	0	0	0	0	0	0	0
n=24	0	0	0	0	0	0	0
Kudu	7	9	3	12	4	3	3
n=22	31,8%	40,9%	13,6%	54,5%	18,2%	13,6%	13,6%

Probang testing = 0 isolation
Same result for June 2010

Wildlife sampling: CA

Date: October 2008	Test	RBT & FCT*		
Species: Buffalo		Nb of animals	Nb of positives	Estimated prevalence
Unfenced Interface	Mabalauta area	38	0	0.0%
Total		38	0	0.0%
Species: Greater Kudu		Nb of animals	Nb of positives	Estimated prevalence
Unfenced Interface	Mabalauta area	22	0	0.0%
Total		22	0	0.0%
Species: Impala		Nb of animals	Nb of positives	Estimated prevalence
Unfenced Interface	Mabalauta area	22	0	0.0%
Total		22	0	0.0%
Date: November 2009	Test	RBT & FC		
Species: Buffalo		Nb of animals	Nb of positives	Estimated prevalence
Unfenced Interface	Mabalauta area	10	0	0.0%
Total		10	0	0.0%

Wildlife sampling: CA (2)

- June 2010: Crook's corner area:
 - 7/47 positive
 - Estimated prevalence: **14.9%**

Wildlife sampling: RVF

Date: October 2008	Test	Indirect ELISA		
Species: Buffalo		Nb of animals	Nb of positives	Estimated prevalence (CI)
Unfenced Interface	Mabalauta area	38	2	5.3% (1.7-8.9%)
Total		38	2	5.3% (1.7-8.9%)
Species: Greater Kudu		Nb of animals	Nb of positives	Estimated prevalence
Unfenced Interface	Mabalauta area	22	0	0.0%
Total		22	0	0.0%
Species: Impala		Nb of animals	Nb of positives	Estimated prevalence
Unfenced Interface	Mabalauta area	23	0	0.0%
Total		23	0	0.0%

- June 2010: Crook's corner area:
 - 5/46 positive
 - Estimated prevalence: **10.9%**

Wildlife sampling: Theileriosis

Date: October 2008		Test	IFA (<i>T. parva</i>)*		
Species: Buffalo		Nb of animals	Nb of positives	Estimated prevalence (CI)	
Unfenced Interface	Mabalauta area	27	1	3.7% (0.0-7.3%)	
Total		27	1	3.7% (0.0-7.3%)	
Species: Buffalo		Nb of animals	Nb of positives	Real Time PCR (<i>T. parva</i>)**	
Species: Buffalo		Nb of animals	Nb of positives	Estimated prevalence (CI)	
Unfenced Interface	Mabalauta area	17	15	88.2% (80.4-96.0%)	
Total		17	15	88.2% (80.4-96.0%)	

- November 2009: 100% positive out of 10 buffalo
- June 2010: Crook's corner area:
 - 46/47 positive

Cattle diseases: summary

Species: Cattle	bTB	FMD	CA	RVF	Corridor
Unfenced Interface	0	++	+	++	++
Fenced Interface	0	++	+	+	0
No Interface	0	++	0	+	0

Species: Buffalo	bTB	FMD	CA	RVF	Corridor
Unfenced Interface Mabalauta	+	+++	0	+	+++
Unfenced Interface Crook'scorner	(0)	+++	+	+	+++

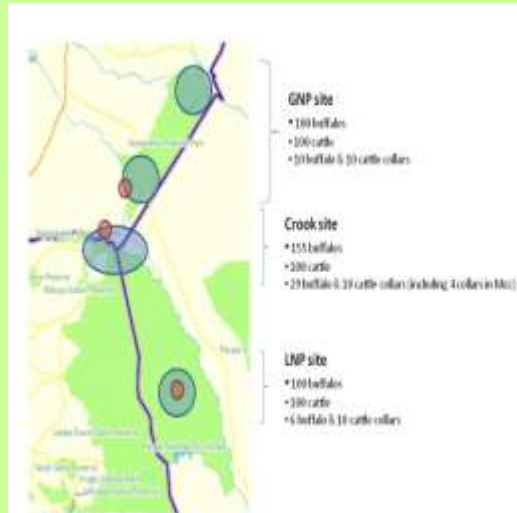
- Difference between the 2 unfenced interface for wildlife

Way forward

- Need larger survey to confirm or not these first findings

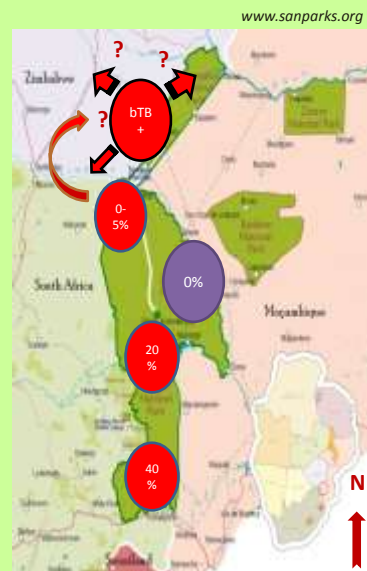
- Transboundary project - Phase I (June 2010 – Moz, SA, Zim)

- Need to be extended:
 - Phase II – draft circulated to co-worker
- Survey in Hwange (KAZA) at the W/L interface



Way forward

- bTB has spread from KNP to GNP:
 - Probably through buffalo movements
 - Other wildlife species: possible
 - Buffalo-cattle-buffalo: no information to support this scenario
- What is the risk of bTB spread to cattle?
- Importance of knowledge of contacts between potential hosts
- We use **contacts at the wildlife/livestock interface** to estimate the risk of bTB transmission



Acknowledgements



Onderstepoort Veterinary Laboratory, Pretoria



Research platform – PCP Zimbabwe



South African National Parks



Mammal Research Institute, Uni. Of Pretoria



- Zimbabwean Veterinary Services
- Park and Wildlife Management Authority



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Merci de votre attention



Thanks to Irene for the paintings