BOTSWANA

CONTROL OF ANIMAL DISEASES USING WOAH STANDARDS

25th Conference of the WOAH Regional Commission for Africa

23rd February, 2023

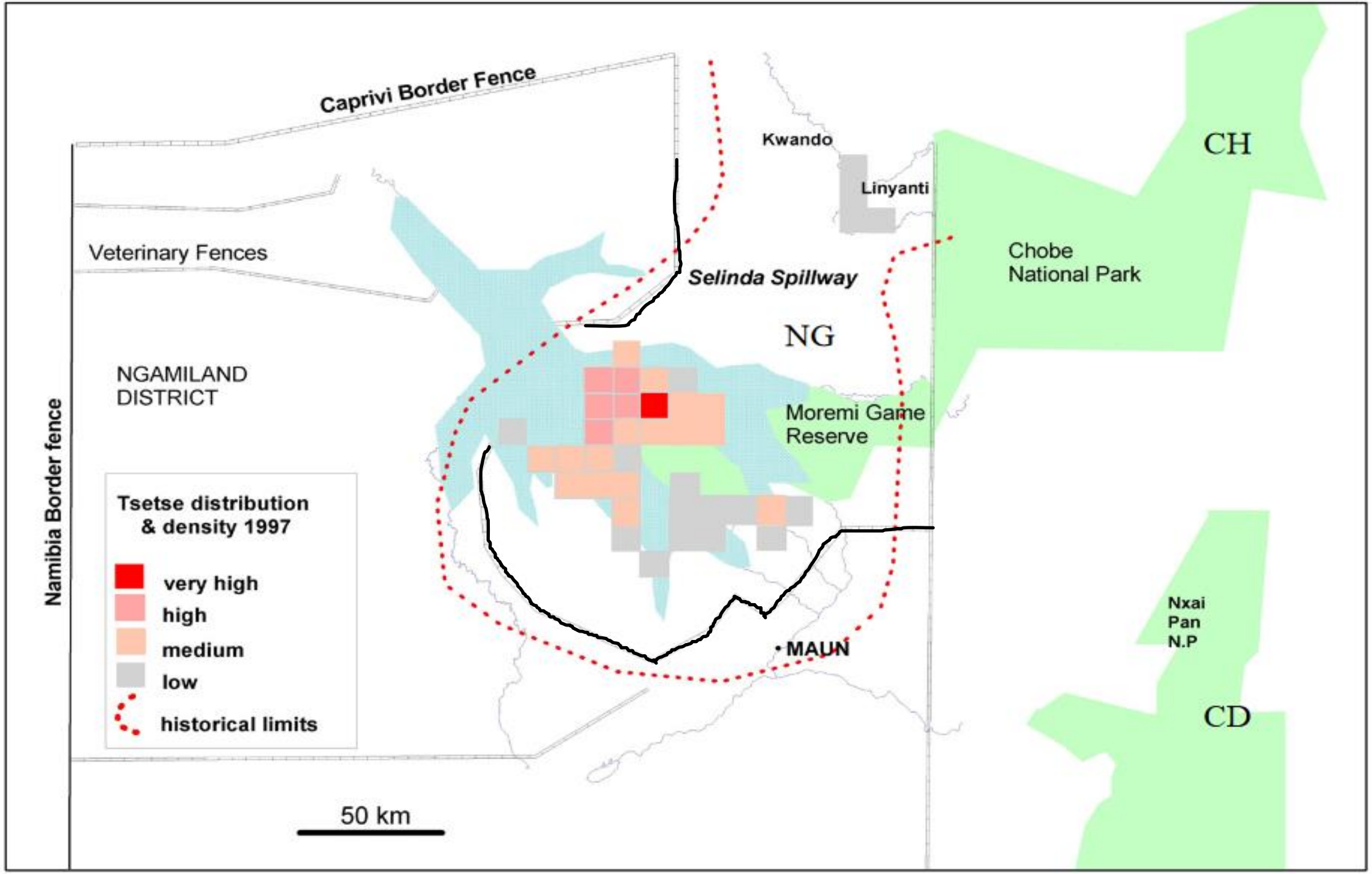
Tsetse Fly Control

- *Glossina morsitans centralis*
- Guardian of the wetlands (Okavango/Linyanti)
- Southern limits of the Morsitans group distribution
  - Historical distribution – 5000 km2 -30000 km2
- Climate / host availability
  - 1896 rinderpest drastically reduced tsetse distribution
- Human tryps: 50 cases/yr (1957-1977)
- Zero Nagana cases by 1985 (SAT), Resurfaced in 1998

MINISTRY OF AGRICULTURE BOTSWANA

BOTSWANA Our pride, your destination

REPUBLIC OF BOTSWANA


Caprivi Border Fence
Kwando
Linyanti
CH
Veterinary Fences
Selinda Spillway
Chobe
National Park
NG
NGAMILAND
DISTRICT
Moremi Game
Reserve
Namibia Border fence
Tsetse distribution
& density 1997
very high
high
medium
low
historical limits
MAUN
Nxai
Pan
N.P
CD
50 km

Tsetse Fly Control

Concerted tsetse control efforts started in 1930s

- Habitat and game destruction to starve the fly
- Tsetse fly Control Division (TCD) established in the 1940s
- **1960-1972** Residual (Selective) ground spraying
  - DDT applied it to selected tsetse resting sites using knapsack
  - targeted only 20% potential tsetse resting sites
  - Tedious / labour intensive, eradication impossible

Tsetse Fly Control

1970-1990s: SAT Area-wide Aerial Spray

Significantly reduced tsetse distribution from

20000 km2 to 5000 km2 but no eradication

- Rudimentary navigation (beacons)
- Localised overspraying (Environmental concerns) and
- Under-spraying
- Reinvasion of spray blocks in between spray seasons

Tsetse Fly Control

1970-1990 Odour-baited insecticide treated targets

- Considered more environmentally friendly
- 20000 deployed in preferred tsetse habitat in the Delta
- Routine maintenance difficult, destruction by elephants
- Tsetse distribution gradually recovered to pre-spray levels
- Outbreaks of tryps in cattle in 1998 (up-to 44 tsetse/day)
- Concern of tryps in tourists!

Tsetse Fly Control

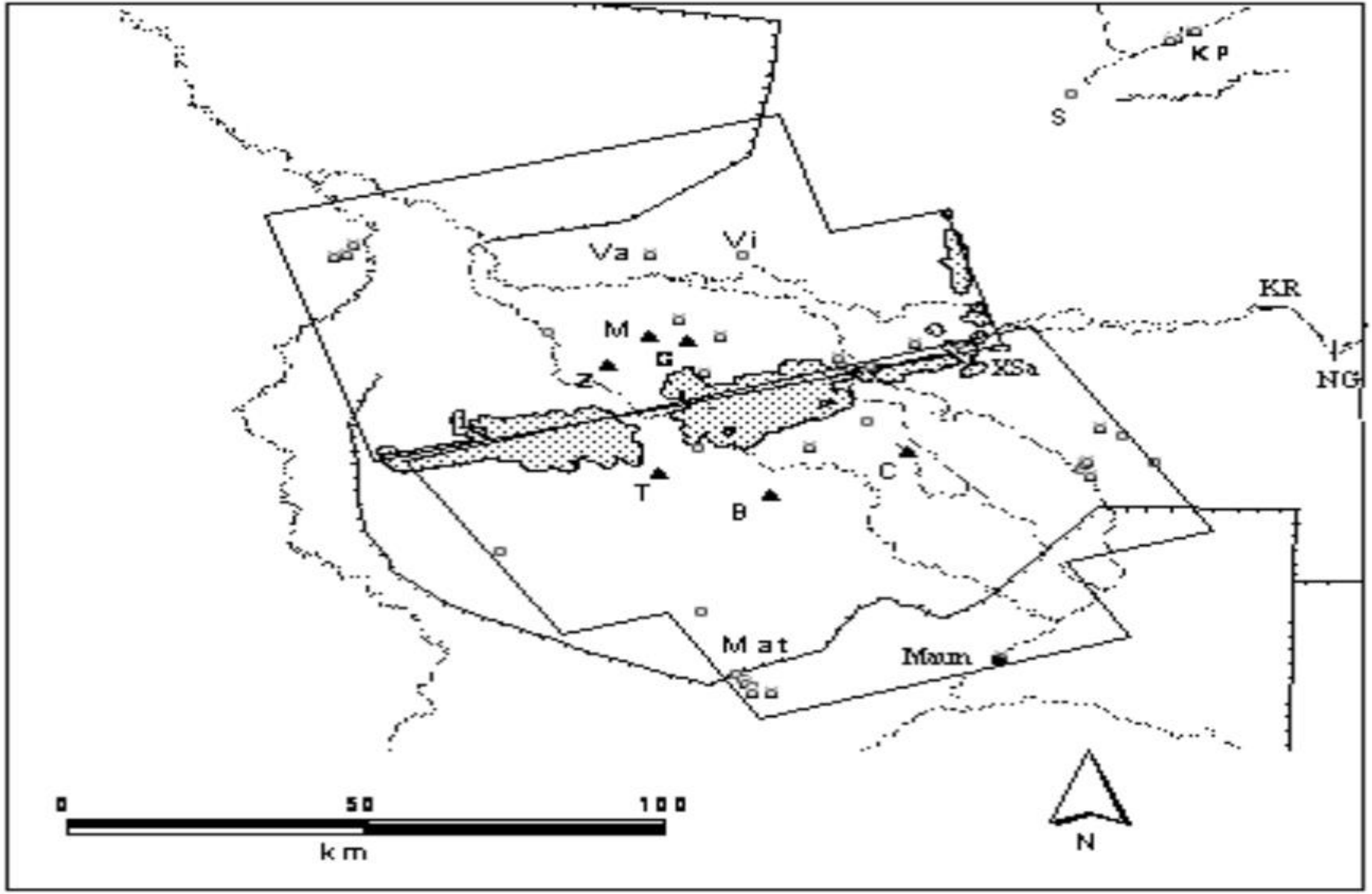
Integrated Control Strategy (1999-2002)

- Prophylactic treatments of livestock – Dimanazine, isometamidium
- Aerial Spray (SAT) - Refined
- Sterile Insect Technique (SIT)

Okavango Aerial Spray (2001-2002)

Refined Aerial Spray

- Improved navigation, accurate spraying (SATLOC)
- Ultra low doses of deltamethrin – low environmental toxicity
- 2 success aerial sprays in 2001 and 2002
- **2 Spray blocks:** 2001 – 7000 km2 , 2002 – 8150 km2
- Target barrier prevented reinvasion in between the sprays
- Integrated Control Program
  - SIT (TCP/IAEA) - not necessary after all


KP
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100
km
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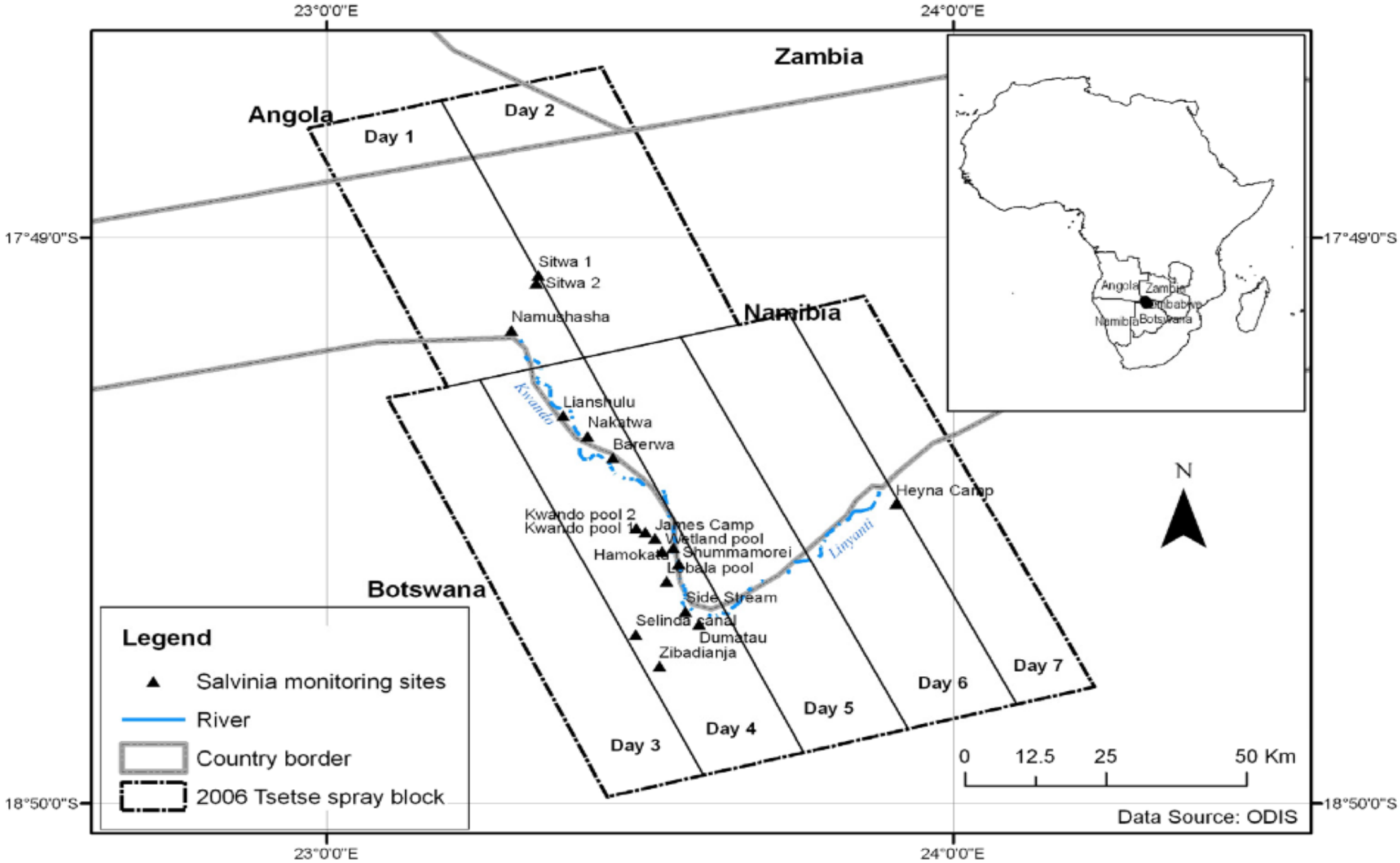
Kwando-Linyanti-project (2004-2005)

- Part of the regional Kwando-Kavango-Zambezi project
- Project covered the Kwando/Kavango/Zambezi belt
- 4 countries collaborated Angola, Botswana, Namibia, Zambia
- Successfully eradicated 10000 km2 of Linyanti belt
- Sprayed 10 km inland of Angola/Zambia


23°0'0"E
24°0'0"E
17°49'0"S
18°50'0"S
Zambia
Angola
Namibia
Botswana
Day 1
Day 2
Day 3
Day 4
Day 5
Day 6
Day 7
Sitwa 1
Sitwa 2
Namushasha
Kwando
Lianshulu
Nakatwa
Barerwa
Kwando pool 2
Kwando pool 1
James Camp
Wetland pool
Hamokata
Shummamorei
Lebala pool
Side Stream
Selinda canal
Dumatau
Zibadianja
Linyanti
Heyna Camp
N
0
12.5
25
50 Km
Data Source: ODIS
Legend
Salvinia monitoring sites
River
Country border
2006 Tsetse spray block
Angola
Zambia
Zimbabwe
Namibia
Botswana

PROJECT OUTC0MES

- Human - No HAT cases (Last HAT cases in 1970s)
- Animal production - Last animal tryps in 1999
- Tourism

Eradicating the Tsetse Fly

Botswana Wildlife Conservation

SIYABONA AFRICA
Home
Safari
Lodges
Destinations
Travel
Guide
Wildlife

of the first fences to be erected was the Khuke Fence on the northern boundary of the **Central Kalahari Game Reserve**. What this fence did was to stop this huge migration of Wildebeest - with the result that the Wildebeest population in Botswana has dropped more than 90 percent.

The End of the Okavango?

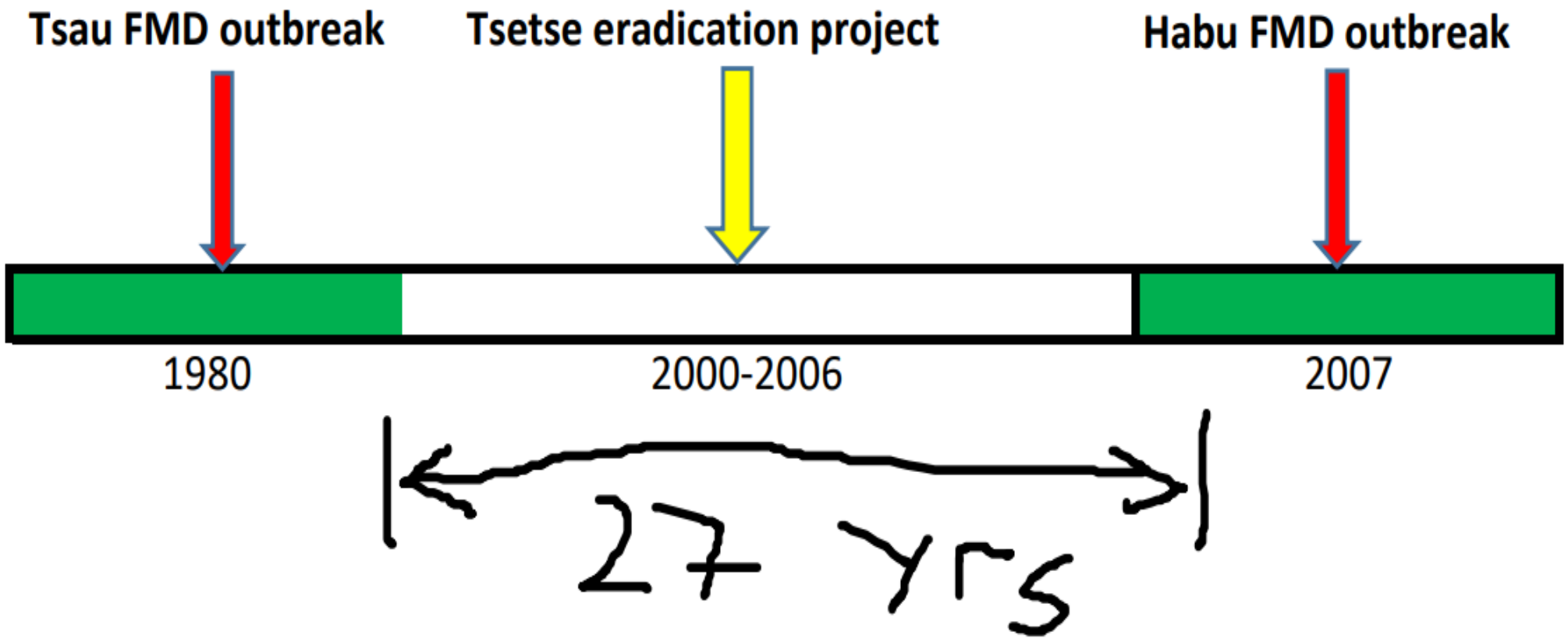
Possibly the best known fence is **the 'Buffalo Fence'** that separates Maun from the Okavango Delta. It literally stretches across the breadth of the country. There was a huge outcry when the fence was erected but it has since been acknowledged by many that the fence may have saved the Okavango Delta.

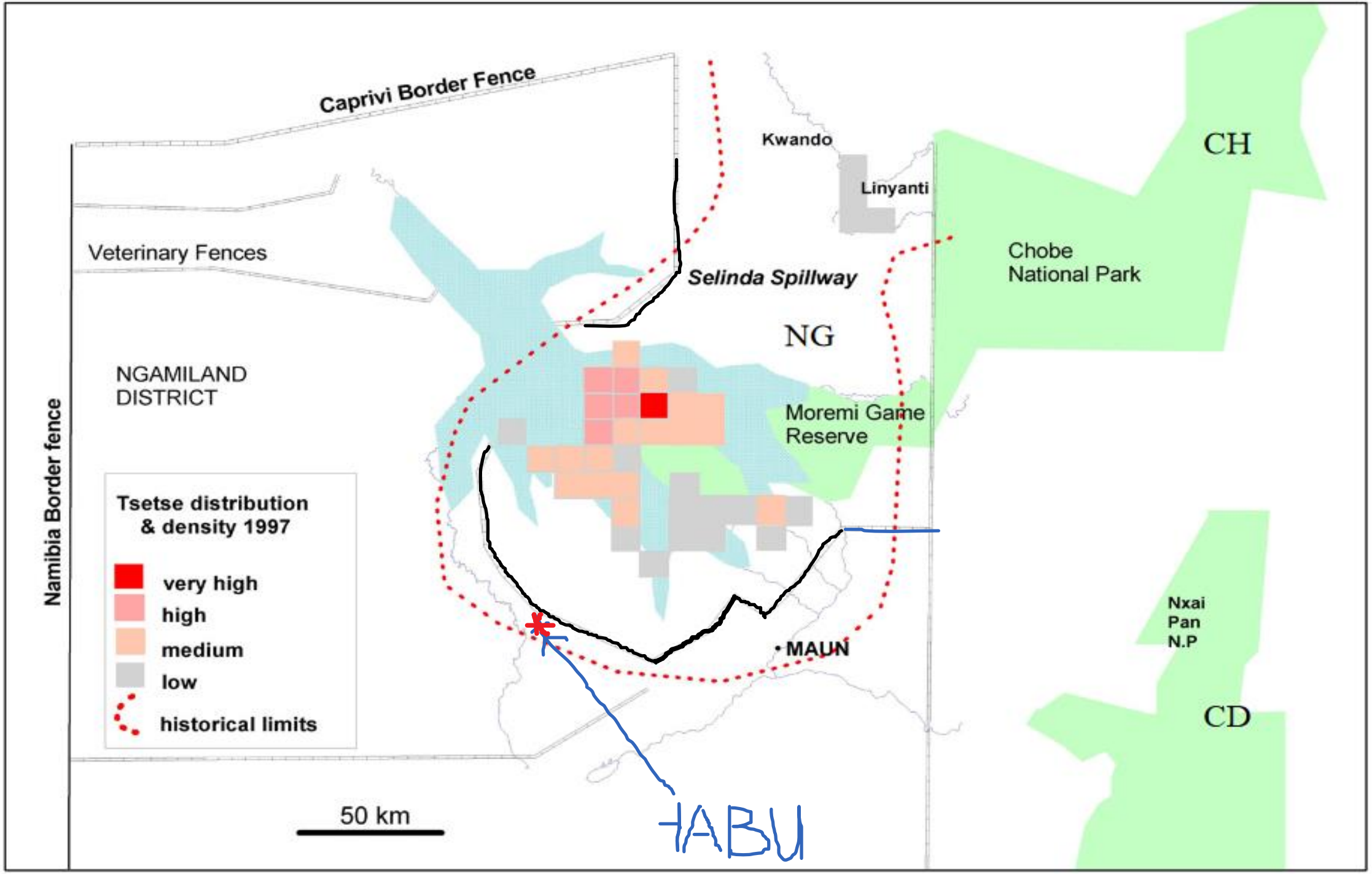
At about the same time as the erection of the fence the Botswana government had embarked on a **project to wipe out the Tsetse fly** from the delta. The Tsetse fly was the very reason that cattle had not moved into the prime grazing lands of the Okavango floodplains. Sleeping sickness and Nagana were prevalent in Botswana at the time and with the Tsetse fly gone it would be a free for all for cattle in the delta. The fence stopped that before it could happen.

Wildlife, Cattle and Livelihoods

The major part of Botswana's foreign earnings today come from diamonds and tourism and it is this point that has become the call for environmentalists to the Botswana government for the cessation in the erection of fences - a call that has largely being unheeded. It is

Tsetse eradication and FMD resurgence




Caprivi Border Fence
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Veterinary Fences
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National Park
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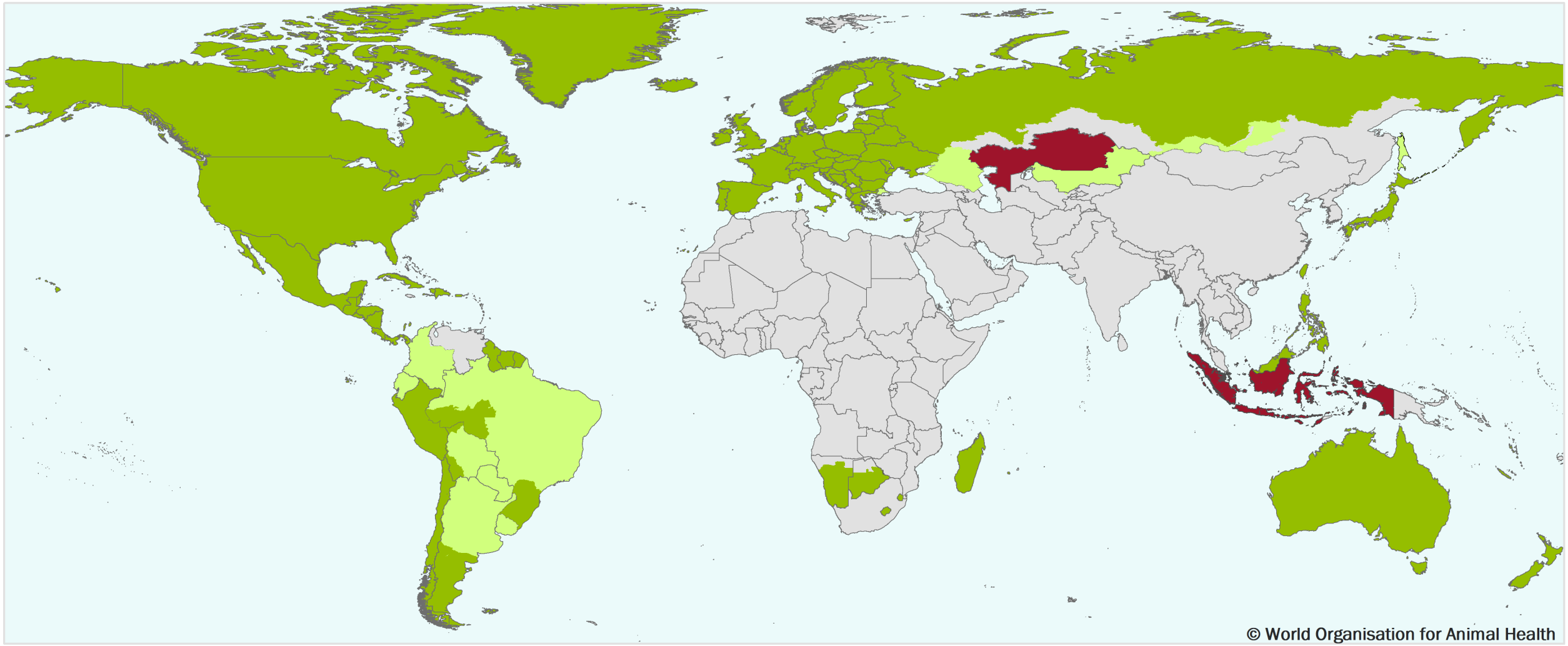
Moremi Game
Reserve
Namibia Border fence
Tsetse distribution
& density 1997
very high
high
medium
low
historical limits
MAUN
Nxai
Pan
N.P
CD
50 km
TABU

WOAH Members' official FMD status map

Last update September 2022



Members and zones recognised as free from FMD without vaccination

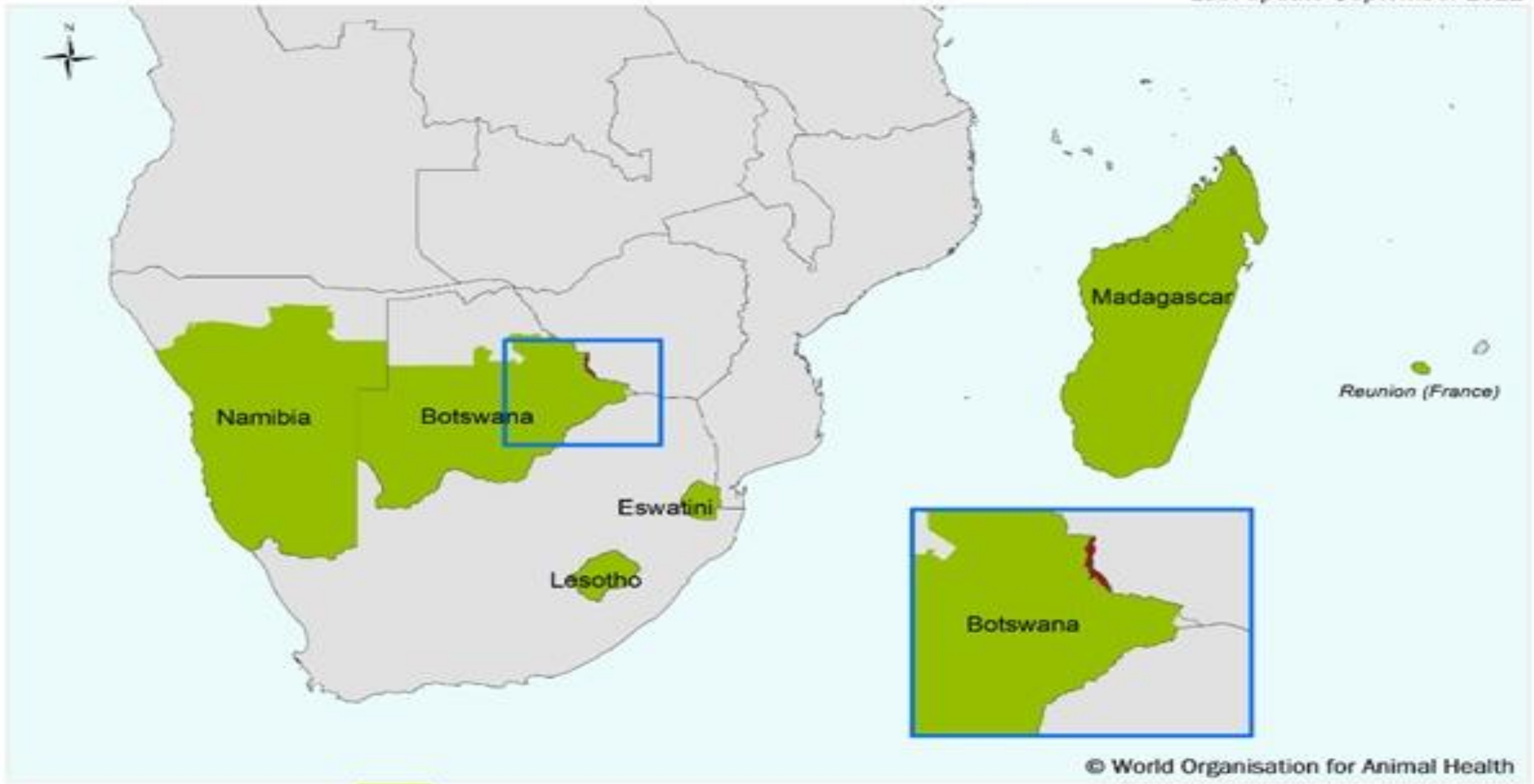
Members and zones recognised as free from FMD with vaccination

Countries and zones without an official status for FMD

Suspension of FMD free status

SOUTHERN AFRICA: WOAH Members' official FMD status map

Last update September 2022



Members and zones recognised as FMD free without vaccination

Countries and zones without an official status for FMD

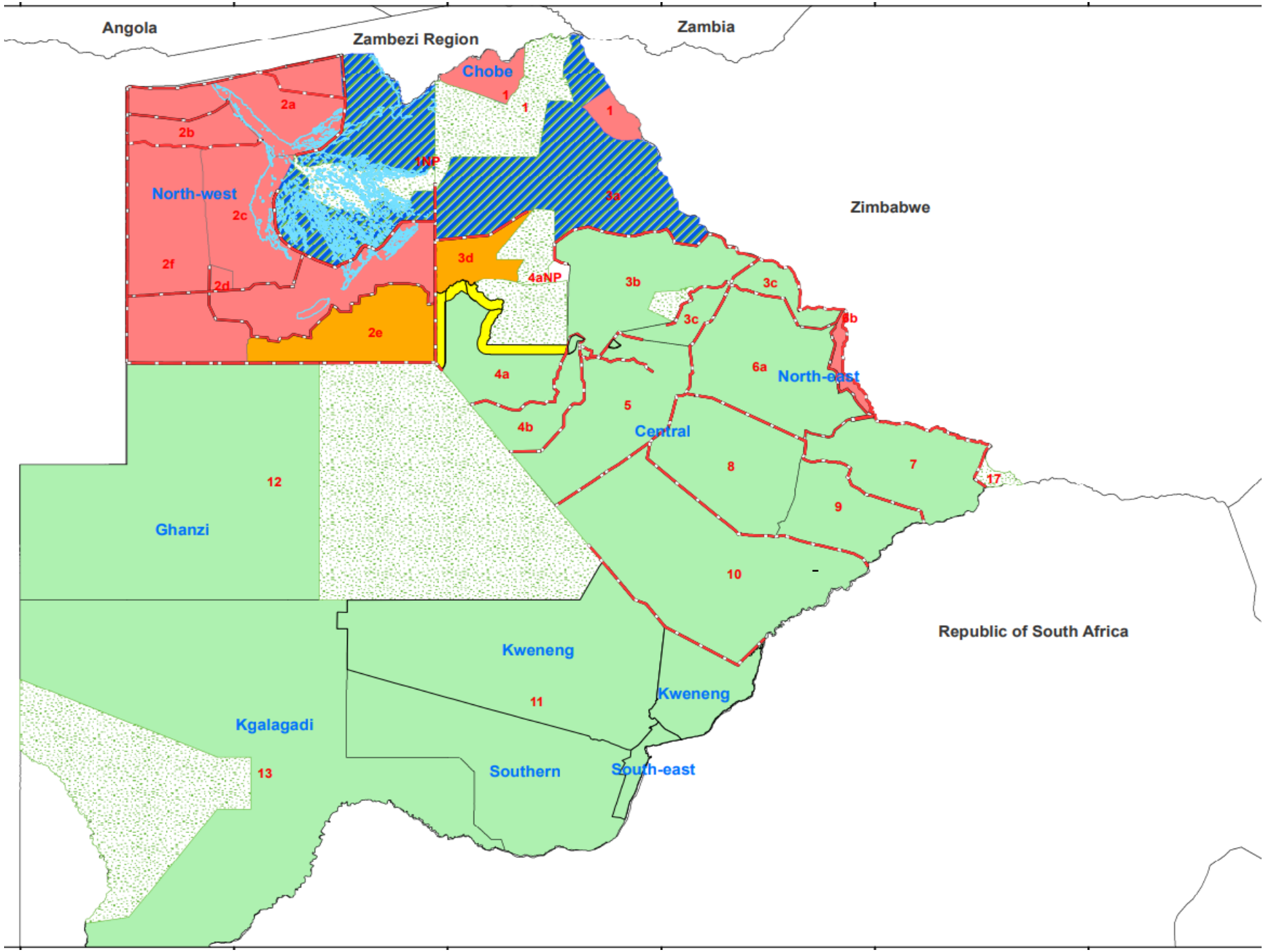
Suspension of FMD free status

Foot and Mouth Disease (FMD) Situation

- SAT1, SAT 2, SAT 3
- SAT 2 Most common, Topotype : II
- Buffalo – cattle transmission (Zone 1, 2)
- Cattle – cattle transmission (Zone 6,7)

Cordon fences & zones

- Kuke fence est. 1970s
- Buffalo fence est. 1980s
- Makalamabedi fence est. 1980s
- CBPP fences est. 1996
- International boundary fences

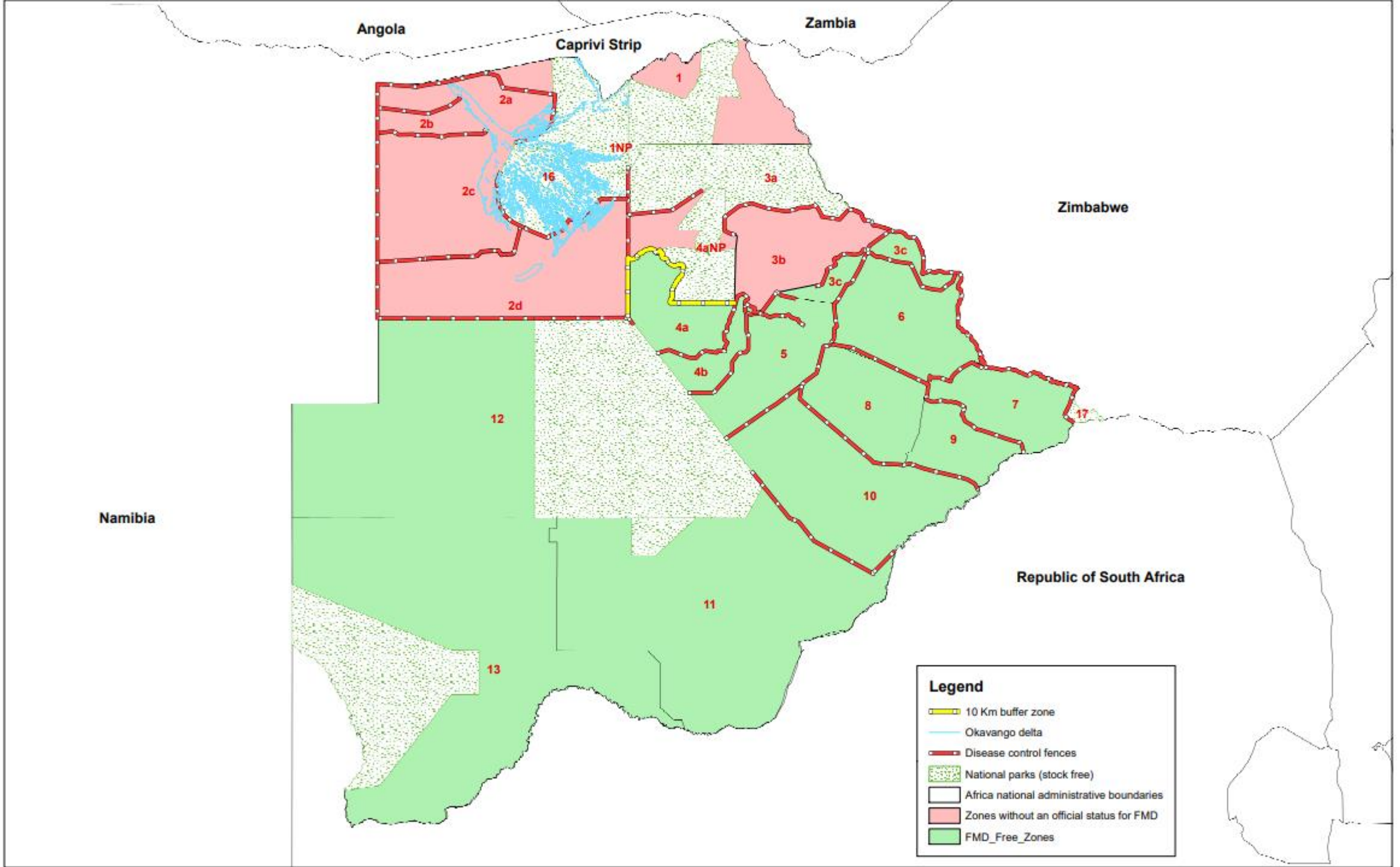

Angola
Zambezi Region
Zambia
Zimbabwe
Republic of South Africa
Chobe
1
1
1
1NP
2a
2b
North-west
2c
2f
2d
2e
3a
3d
4aNP
3b
3c
3c
3b
6a
North-east
4a
5
4b
Central
8
7
17
9
12
Ghanzi
10
Kweneng
11
Kweneng
Kgalagadi
13
Southern
South-east

FMD outbreaks in Free Zones

- Late 1980 – (Tsau)
- 2001 – Zone 6
- 2008 – Zone 12
- 2011 – Zone 6
- 2011 – Zone 7
- 2022 – Zone 6b

Zone 6 Outbreak (2011)

- Detected in April 2011
- SAT 2
- Topotype I (first report topotype I)
- Initially cattle
- Later small stock (only in crushes that had cases in cattle)


Angola
Zambia
Caprivi Strip
Zimbabwe
Namibia
Republic of South Africa
1
2a
2b
2c
2d
1NP
16
3a
3b
3c
4aNP
4a
4b
5
6
7
8
9
10
11
12
13
17
Legend
10 Km buffer zone
Okavango delta
Disease control fences
National parks (stock free)
Africa national administrative boundaries
Zones without an official status for FMD
FMD_Free_Zones

Zone 6 Outbreak (2011)

Control Strategy

- Emergency Vaccination
- Surveillance (in all FMD susceptible species which included cattle, small stock, pigs and wildlife)
- Depopulation – **abattoir, burial**
- Establishment of the containment zone
- Restocking

OIE TAHC (2011)

Article 4.3.3

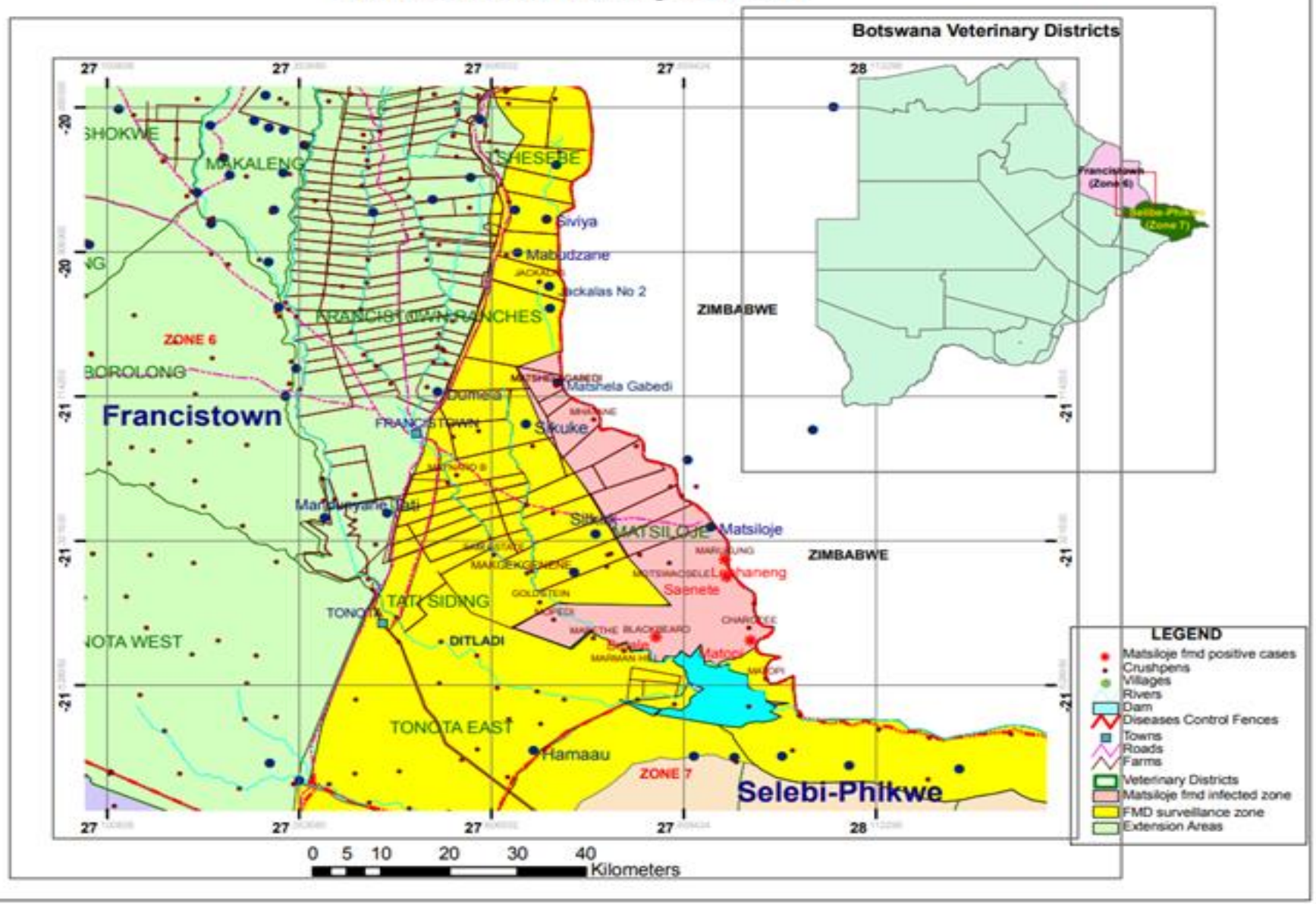
Containment zone

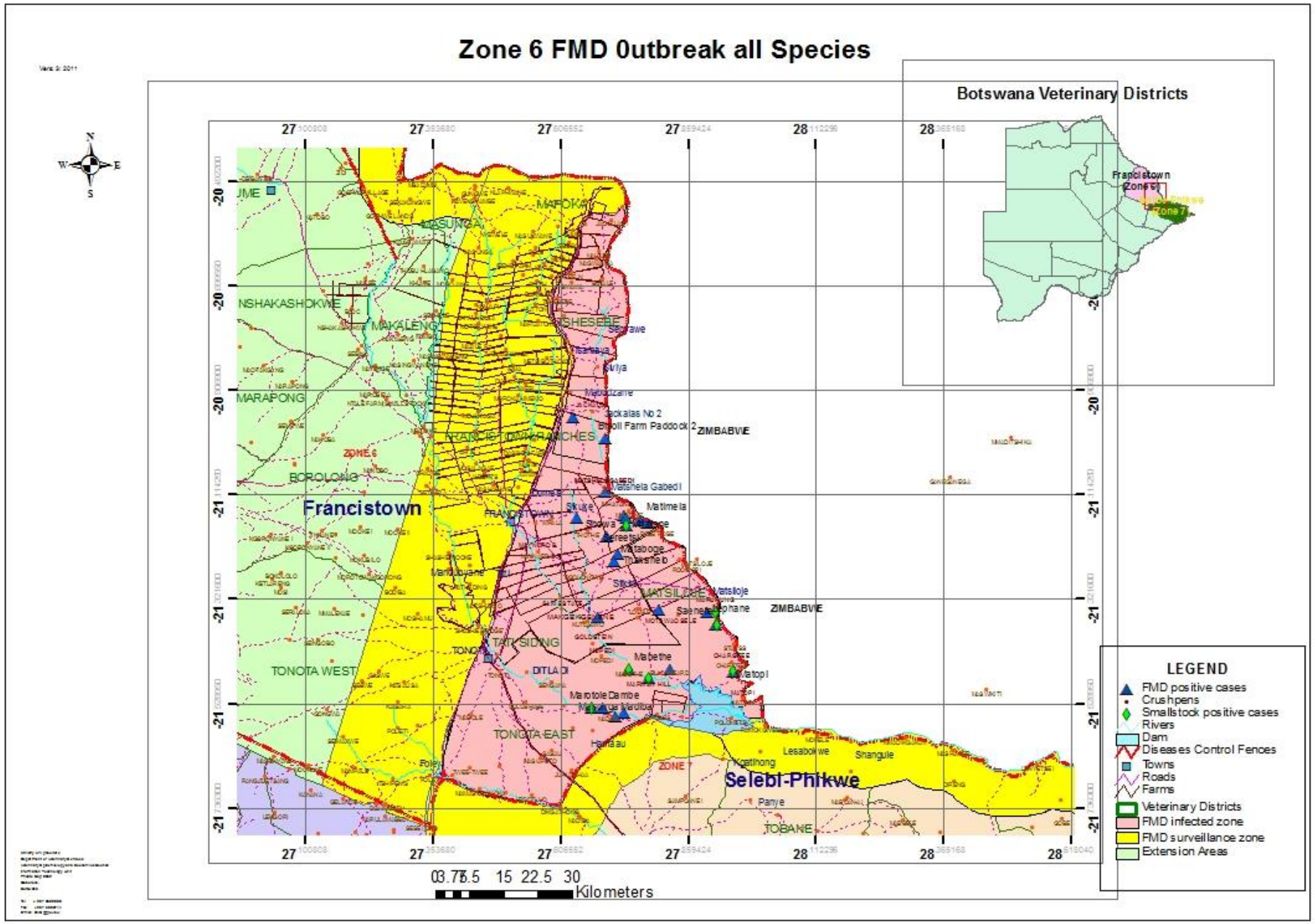
For the effective establishment of a containment zone, it is necessary to demonstrate that there have been no new cases in the containment zone within a minimum of two incubation periods from the last detected case

Zone 6 containment zone

CZ zone endorsed in September 2011

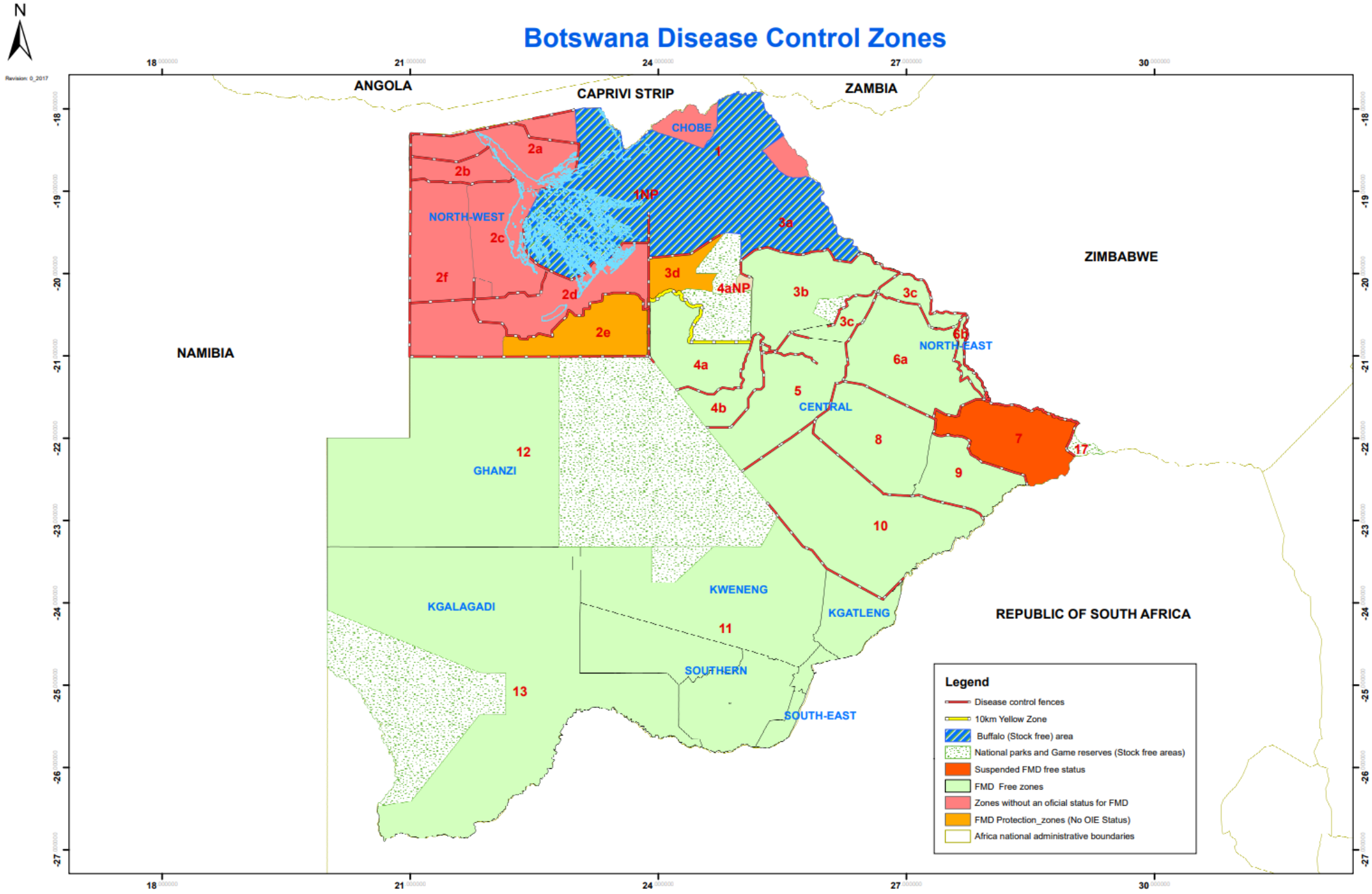
- 5 months from the initial case
- Vaccination adds to the delay
- But crucial to suppress virus
- Approval of CZ before depopulation commenced
- Case resolved in 2013


Botswana Veterinary Districts
ZIMBABWE
Francistown
Selebi-Phikwe
ZONE 6
ZONE 7
MAKALENG
TSHESEBE
Siviya
Mabudzane
Matshela Gabedi
Sikuke
Matsiloje
Lephaneng
Saenete
TATI SIDING
DITLADI
TONOTA EAST
Hamaau
BOROLONG
LEGEND
Matsiloje fmd positive cases
Crushpens
Villages
Rivers
Dam
Diseases Control Fences
Towns
Roads
Farms
Veterinary Districts
Matsiloje fmd infected zone
FMD surveillance zone
Extension Areas
0 5 10 20 30 40
Kilometers


Zone 6 FMD 0utbreak all Species
Botswana Veterinary Districts
Francistown Zone 6
Selebi-Phikwe Zone 7
N
W
E
S
27 100808
27 353680
27 606552
27 859424
28 112296
28 365168
28 618040
-20 402200
-20 654920
-21 114280
-21 367000
-21 619720
-21 872440
UME
MAPOKA
MASUNGA
NSHAKASHOKWE
MAKALENG
SHESEBE
MARAPONG
BOROLONG
ZONE 6
Francistown
FRANCISTOWN RANCHES
ZIMBABWE
Matimela
Matabogo
MATSILOJE
Matsiloje
ZIMBABWE
TATI SIDING
TONOTA WEST
DITLADI
Mabethe
Tatopi
TONOTA EAST
Hantlau
Lesakowe
Shangule
ZONE 7
Selebi-Phikwe
Panye
TOBANE
0 3.75 7.5 15 22.5 30
Kilometers
LEGEND
FMD positive cases
Crushpens
Smallstock positive cases
Rivers
Dam
Diseases Control Fences
Towns
Roads
Farms
Veterinary Districts
FMD infected zone
FMD surveillance zone
Extension Areas

Post outbreak activities

- Collaboration on FMD control with Neighbouring countries e.g Joint vaccinations, synchronized vaccinations
- Establishment of protection zones
  - Zone 6 split into 2 zones: 6a and 6b
  - Ngamiland protection zone


Botswana Disease Control Zones
N
Revision: 0_2017
ANGOLA
CAPRIVI STRIP
ZAMBIA
ZIMBABWE
NAMIBIA
REPUBLIC OF SOUTH AFRICA
CHOBE
1
1NP
2a
2b
NORTH-WEST
2c
2d
2e
2f
3a
3b
3c
3d
4aNP
4a
4b
5
CENTRAL
6a
6b
NORTH-EAST
7
8
9
10
11
12
GHANZI
13
KGALAGADI
KWENENG
KGATLENG
SOUTHERN
SOUTH-EAST
17
Legend
Disease control fences
10km Yellow Zone
Buffalo (Stock free) area
National parks and Game reserves (Stock free areas)
Suspended FMD free status
FMD Free zones
Zones without an oficial status for FMD
FMD Protection_zones (No OIE Status)
Africa national administrative boundaries

Zone 7 Control Strategy

- May 2011
- Stamping out in affected extension area
- Uncontrolled movement of livestock
- Modified strategy to vaccination-to-live after virus escaped
- Free status recovered in 2018

WOAH TAHC (2021)

Article 4.4.7

Containment zone

A containment zone is considered to be effectively established when the following is demonstrated: EITHER

a) there have been no new cases in the containment zone within a minimum of two incubation periods from the disposal of the last detected case; OR

b) it comprises an inner zone where cases may continue to occur and an outer zone where no outbreaks have occurred for at least two incubation periods after the control measures above have been put in place and which separates the inner zone from the rest of the country or zone.

Does the change work for us?

Article 4.4.7

Containment zone

CZ Options

Option 1 : You need to remove last case (NB definition of case)

Option 2 : Introduces inner (active cases) and outer (no cases) zones

Advantages

- Containment zone can be established when active cases are occurring within the infected zone provided there is a protection zone (outer zone), with no outbreaks
- Can potentially establish CZ quicker and trade resume earlier outside CZ and could reduce economic losses ???

Does the change work for us?

Article 4.4.7

Containment zone

Disadvantages

1. Resource intensive (surveillance & controls) to assure CZ integrity
   - Funding
   - Capacity – Documentation, surveillance, tracing, networks etc
2. Technically challenging (Core competencies)

Zone 6 B Outbreak Information

Livestock population	B 17893, C 11777, O 1649, P 386, G sparse
Reporter	Farmer
Laboratory Confirmation	27-Aug-22
Virus isolated	SAT 2 Topo-type II
Species affected	Cattle
Vaccine used	6PD50 trivalent SAT 1,2,3
Emergency vaccination	2 x @ 28 Days interval
Number of cases	242

Zone 6b containment zone

- Bisoli ranch bisects zone 6b (Bisoli north & Bisoli south)
- Cases Restricted to villages in the Bisoli north
- Predominantly communally shared grazing land
- Population B 9500, C 7634, O 546, P 342, G Sparse

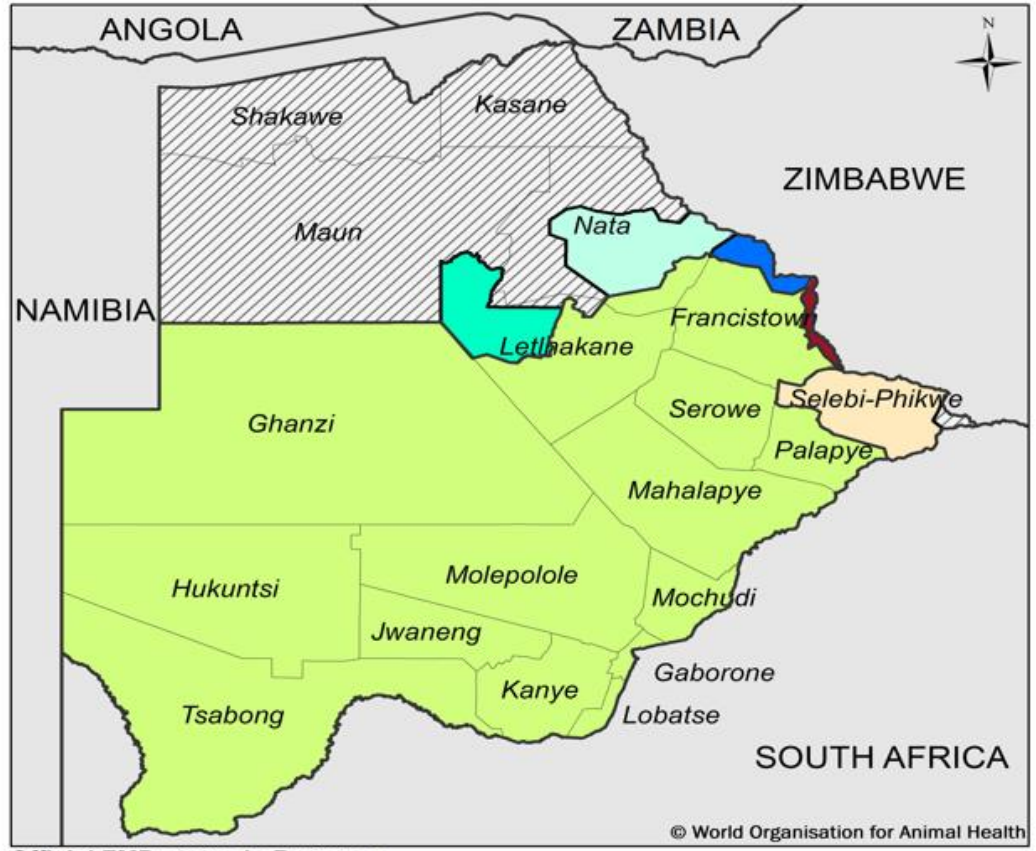
Zone 6b containment zone

- Northen part (Bisoli North) proposed CZ
- Protection zone proposed within the CZ to protect the southern part (Bisoli south)

Zone 6b containment zone

- Emergency vaccination (September – October)
- Last cases detected in 10 October 2022
- The event closed in December 2022
- Recovery of free status to be achieved by depopulation in CZ (10 000 cattle)
- Slaughter in approved abattoir

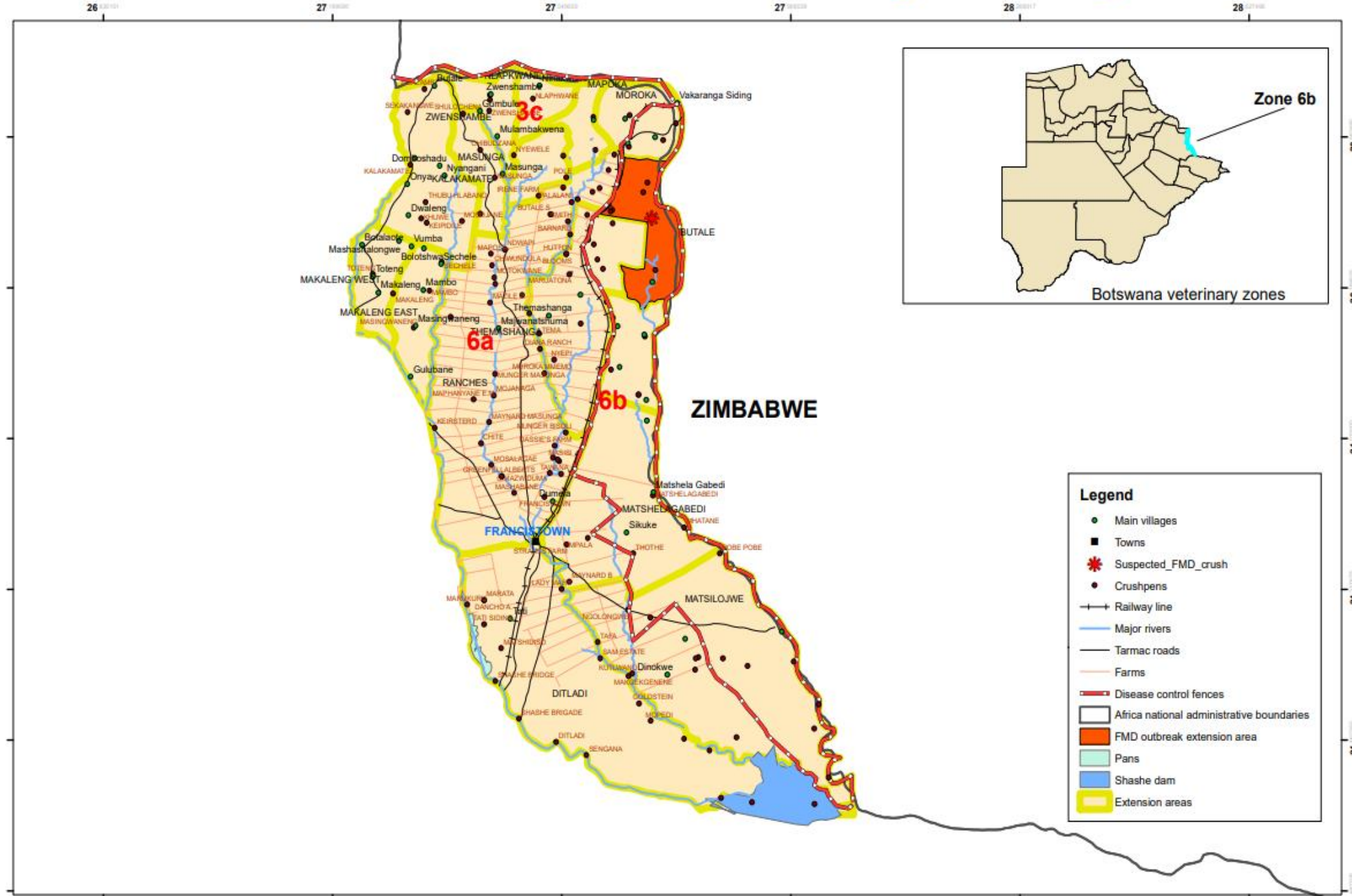
FMD free zones in Botswana



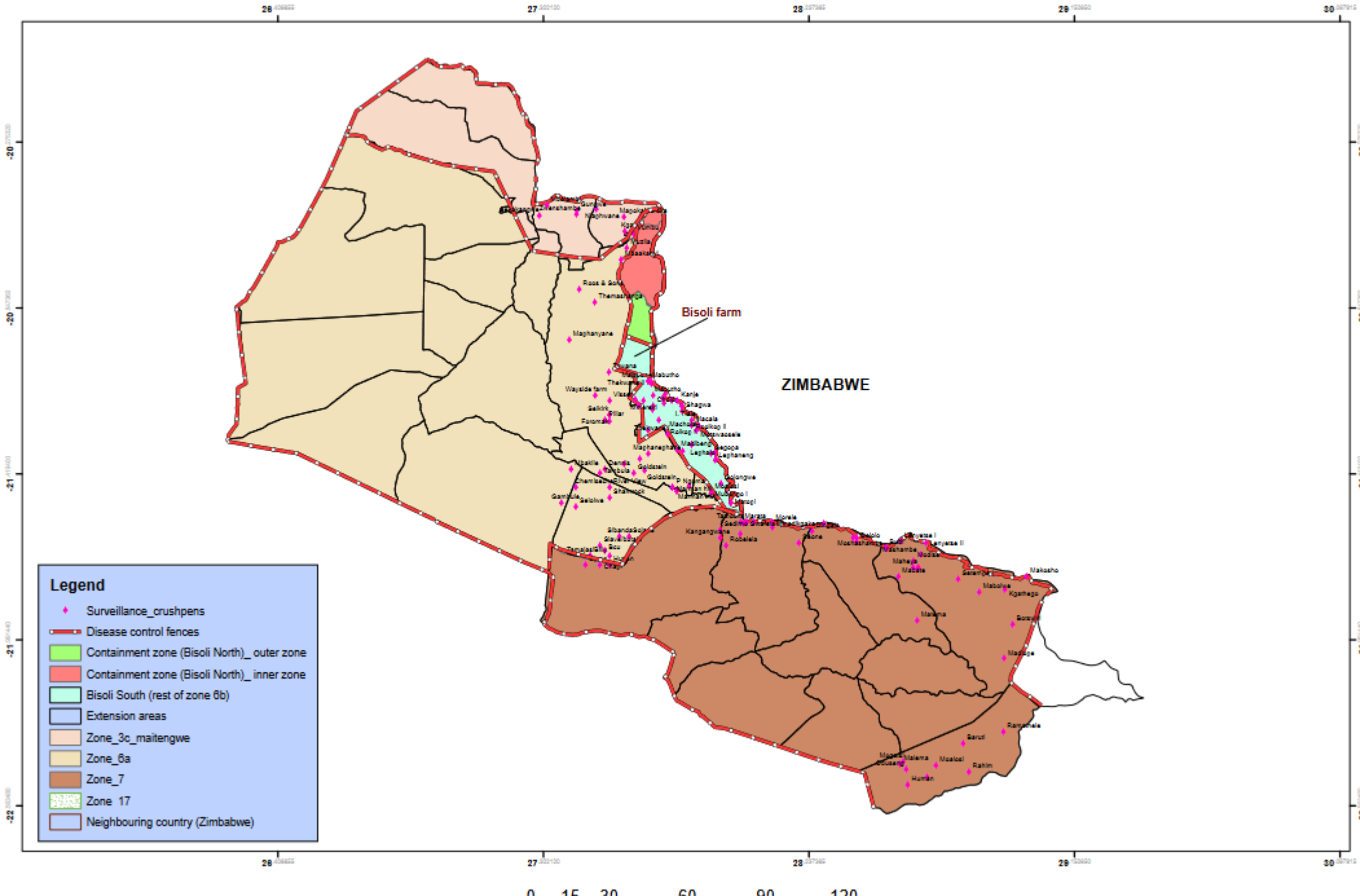
Official FMD status in Botswana

- FMD free zone where vaccination is not practised, consisting of zones 3c, 4b, 5, 6a, 8, 9, 10, 11, 12, and13 (January 2009, November 2009 and August 2014), covering Gaborone, Ghanzi, Hukuntsi, Jwaneng, Kanye, Lobatse, Mahalapye, Mochudi, Molepolole, Palapye, Serowe, Tsabong and part of Francistown, Letlhakane and Nata
- FMD free zone where vaccination is not practised, consisting of zone 4a (August 2014), consisting of part of Letlhkane
- FMD free zone where vaccination is not practised, consisting of zone 3c Maitengwe (August 2014), consisting of part of Francistown
- FMD free zone where vaccination is not practised, consisting of zone 3b (August 2016), consisting of part of Nata
- FMD free zone where vaccination is not practised, consisting of zone 7 (August 2018), consisting of part of Selebi-Phikwe
- Zone of Botswana without a recognised FMD status, covering Shakawe, Kasane, Maun, part of Selebi-Phikwe, part of Nata and part of Letlhkane
- Suspension of the FMD free zone where vaccination is not practised, zone 6b consisting of part of Francistown (18 August 2022)

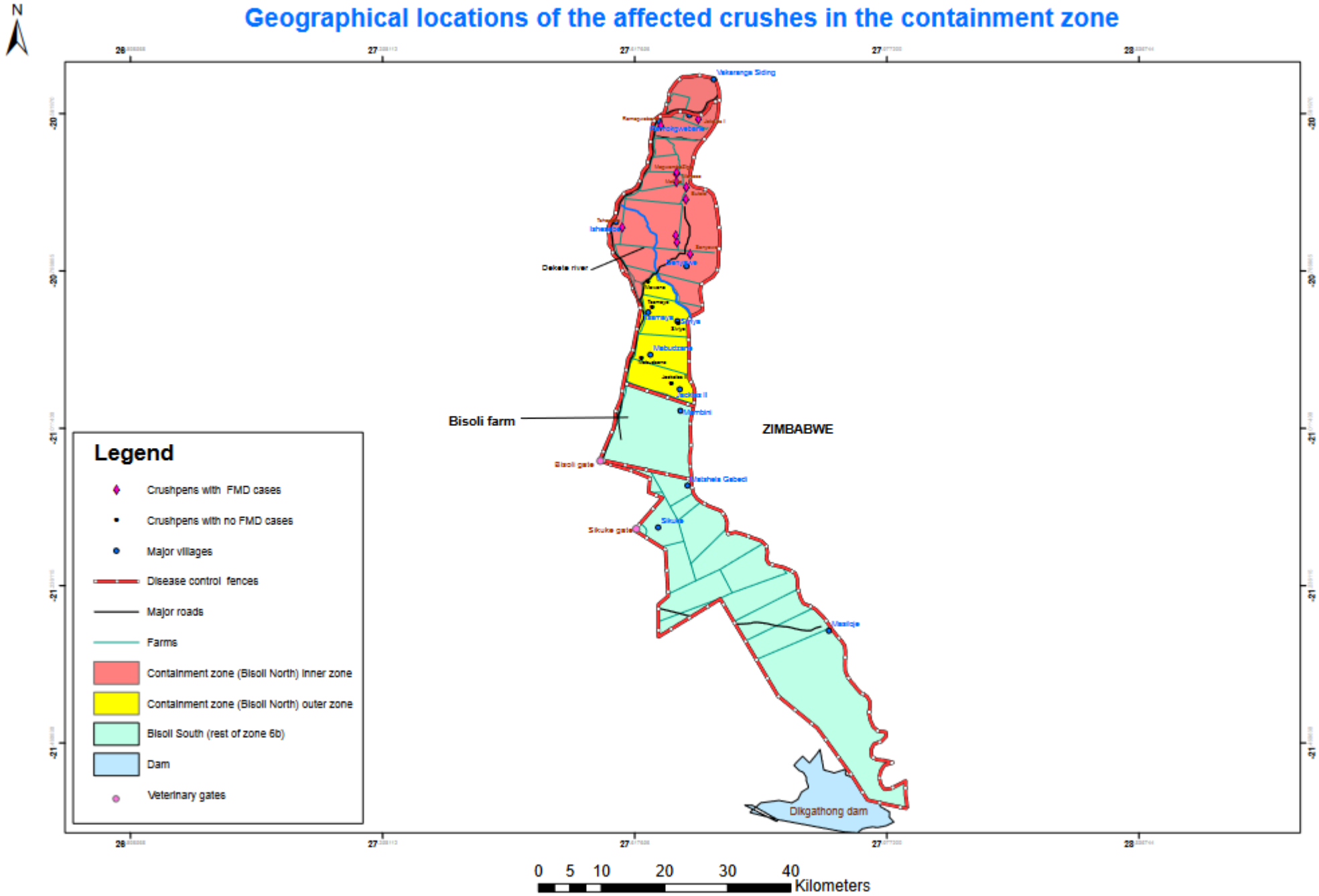
NORTH-EAST Suspected FMD Outbreak_ Butale Area_ 2022



Zone 3c Maitengwe,6a,6b Surveillance Crushpens



Geographical locations of the affected crushes in the containment zone



Issues

Commodity based trade - outcomes

Livelihoods

- Improved access to markets
- Increased Value of meat

Environment protection - off-take

Disease control

- Quarantine
- Reduced risk of incursion into free areas (market price differential)

Herding 4 Health program

Cooperation of Government and NGOs –

Wild Entrust and CLAWS Communities Living Amongst Wildlife Sustainably

Conservation International (CI)

Objectives

- Awareness raising CBT and the H4H protocols to enable CBT adoption
- Access to markets (mobile quarantine pilot)
- Restoration of rangelands, wildlife friendly practices

THANK YOU!