

## PROJECTS REPORTING TEMPLATE FOR SAIGA-RELATED ACTIVITIES

This reporting template is designed to collate information on projects carried out by intergovernmental, international non-governmental and non-governmental organisations as well as academics and other experts working on any aspect of Saiga antelope conservation and sustainable use. Information will be compiled into a table for discussion at Saiga MOU meetings. The information will be used to: (1) monitor implementation of the [Memorandum of Understanding concerning Conservation, Restoration and Sustainable Use of the Saiga Antelope \(\*Saiga\* spp.\)](#) and the associated [Medium Term International Work Programme](#); (2) support exchange of information throughout the range and beyond, and assist the identification of necessary future actions; and (3) support the implementation of CITES Decisions [14.91 \(Rev. CoP16\)](#), [14.93 \(Rev. CoP16\)](#) & [16.95 to 16.101](#).

Please complete sections as appropriate and **return to the CMS Secretariat**.

E-mail: [cms.secretariat@cms.int](mailto:cms.secretariat@cms.int); Fax: (+49 228) 815 2449

<b>Project: Emergency Response to Saiga Mortality Kazakhstan May 2015</b>				
<b>Country:</b>	China	<input type="checkbox"/>	Turkmenistan	<input type="checkbox"/>
	Kazakhstan	<input checked="" type="checkbox"/>	Uzbekistan	<input type="checkbox"/>
	Mongolia	<input type="checkbox"/>	International	<input type="checkbox"/>
	Russia	<input type="checkbox"/>		
<b>Organisation / Contact details: Royal Veterinary College rkock@rvc.ac.uk</b>				
<b>Duration of project:</b>	from __Ongoing_____ to _____			
<b>Location(s) of main activity: Kazakhstan</b>				
<b>Sub-species:</b>	<i>Saiga tatarica tatarica</i> *	<input checked="" type="checkbox"/>		
	<i>Saiga tatarica mongolica</i> *	<input type="checkbox"/>		
<b>Areas of work:</b>				
Anti-poaching	<input type="checkbox"/>	Habitat restoration	<input type="checkbox"/>	
Population monitoring	<input type="checkbox"/>	Protected area management	<input type="checkbox"/>	
Ecological research	<input checked="" type="checkbox"/>	Training & capacity-building	<input type="checkbox"/>	
Education and awareness	<input type="checkbox"/>	Law enforcement	<input type="checkbox"/>	
Alternative livelihoods	<input type="checkbox"/>	Trade issues	<input type="checkbox"/>	

\* Note that CMS Parties have adopted Wilson, D.E. & Reeder, D.M. (2005) Mammal Species of the World. A taxonomic and geographic reference. Third edition. John Hopkins University Press, Baltimore, USA as taxonomic reference for terrestrial mammals through [Recommendation 9.4](#) where *S. t. tatarica* is referred to as *Saiga tatarica* and *S. t. mongolica* is referred to as *Saiga borealis*.

Socio-economic research	<input type="checkbox"/>	Captive breeding	<input type="checkbox"/>
Range mapping	<input type="checkbox"/>	Reintroduction/release	<input type="checkbox"/>
Habitat research	<input type="checkbox"/>		
For each box ticked, please provide brief details in the project summary box below			
<b>Project Summary:</b> Disease outbreak investigation & disease ecology - Betpak-Dala - Turgai and Tengiz aggregations during calving May 2015			
<b>Planned Activities:</b> Monitoring of die-off and diagnostics, metadata collection for disease co-factors			
<b>Achievements to date:</b> Die-off monitored in two sites with collection of pre – post mortem animal biological materials. Amangeldy rayon of Kostanay oblast (“Turgai”) and Akmola oblast (“Tengiz”) aggregations May 2015. Preliminary diagnosis.			
<b>Reports / Publications / Information material:</b> Summary report at current date attached.			
<b>Collaborators:</b> Biosafety Institute Dr Mukhit Orynbayev, ACBK Steffen Zuther, FAO AGAH Dr Sergei Khomenkho; Royal Veterinary College, Prof Richard Kock			
<b>Budget available:</b> NA			
<b>Current sponsors:</b> CMS UNEP, FFI, RVC, FAO, FZS			
<b>Past sponsors:</b> CMS, FFI, MAF, FZS			
<b>Information contributed by:</b> R. Kock, S. Khomenko. S. Zuther, M. Orynbayev			
<b>Date report submitted:</b> 11/06/2015			
<b>Other:</b>			

**Prof Richard Kock**  
**Department of Pathology & Pathogen Biology**  
**The Royal Veterinary College**  
**Hawkshead Lane**  
**North Mymms**  
**Hertfordshire, AL9 7TA**  
**England**  
**Tel: +44(0)170766 6396 (Office)**  
[rkock@rvc.ac.uk](mailto:rkock@rvc.ac.uk)

## Summary Report 9<sup>th</sup> May to 11<sup>th</sup> June 2015

### Background

Joint monitoring of the saiga Betpak-Dala main calving aggregation (60,000) was started by ACBK & Royal Veterinary College (RVC) research team, in Amangeldy rayon of Kostanay oblast ("Turgai") N49° 48' 18" E065° 27' 59" on 10<sup>th</sup> May as part of ongoing ecological and background mortality studies. As per agreed protocols unusual mortality was reported on 10<sup>th</sup> and triggered a rapid response team from the Biosafety Institute, Gvardeskiy (RIBSP), which joined the team for biological and diagnostic sampling until the 19<sup>th</sup> when the die-off was complete. The team was then strengthened by the addition of Prof Richard Kock RVC on 22<sup>nd</sup> with the team moving to Akmola oblast ("Tengiz") N51° 04' 36" E067° 23' 36" and the second aggregation monitored for a new die-off which had started around 18/19<sup>th</sup> May. Dr Mukhit Orynbayev RIBSP and Dr Sergei Khomenkho joined the team on the 24<sup>th</sup> May. The die-off was complete by the 26<sup>th</sup> May. Core laboratory studies were done at RIBSP and finding of *P. multocida* infection corroborated by Astana Vet Ref Laboratory and reported as such to the OIE.

**A presumptive diagnosis, based on pathological signs and preliminary diagnostics, reported by this outbreak investigation team is polymicrobial disease. This is primarily, a haemorrhagic septicaemia, caused by *Pasteurella multocida* serotype B, complicated by secondary factors, which may include clostridial enterotoxaemia and theileriosis. The most likely primary cause is an environmental trigger, causing massive opportunistic infection of latent commensal bacteria and a synchronous disease cascade in saiga population.**

### Clinical presentation

Adult animals showed remarkable synchronicity in presentation of illness over a short period of a day or less with increasing lethargy, inappetance, weakness/incoordination, salivation, sometimes diarrhoea, and died in extremis in lateral recumbency showing respiratory distress and haemorrhagic diarrhoea in this final phase, in most cases. Calves died some hours after the mothers and twins triplets died within a short period of each other, with similar signs of collapse and terminal diarrhoea. Mortality occurred at an increasing rate with a peak at about 15<sup>th</sup> May in Turgai and 23<sup>rd</sup> May in Tengiz. The assumed total die-off period is approximately 8-9 days in each case. The spread of carcasses reflected this with a tear drop of increasing cases to a mass die-off site with the majority of cases were to be found. The area of die-off in the case of Tengiz was approximately 21 km<sup>2</sup> – carcasses were not especially aggregated or clustered and on average some 30 – 40 m apart suggesting per acute disease leading to cessation of normal behaviour reluctance to move and death where they had been grazing.

### Gross pathology

The carcasses showed reasonable body condition, rarely ticks, mosquitos were still attempting to feed and there was loss of winter coat. Post mortem signs were similar in most cases with reasonable fat reserves, minor differences in some organ systems and varying degrees of the same pathology;

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including; severe haemorrhages (petechiae and ecchymoses in subcutis, subserosal, subendocardial, lymph nodes etc.), severe congestion and oedema of tissues, early pneumonitis and hyperaemia of the thoracic inlet and severe (haemorrhagic) enteritis suggestive of enterotoxaemia and early severe liver and kidney changes suggestive of a severe toxemia and most likely septicaemia. The relative degree of change in core and peripheral organs and tissues reflected a probably enteric and/or respiratory route of infection, rather than initially blood borne (e.g. from vector transmission) although in many cases septicaemia was clearly too advanced to be certain.

### **Histopathology**

This is pending detailed analysis although initial studies suggest acute inflammation of the intestine and lung and toxic degeneration of the liver and kidney. The currently reported histopathology is preliminary and requires more intense investigation but is consistent with a bacterial septicaemia from oral and respiratory routes.

### **Bacteriology**

All cases (27+) sampled show positive culture for *P.multocida* and the serotype is B and genotype consistent between individuals suggestive of this as a causative agent. Clostridial alpha toxins were identified suggesting these bacteria might have contributed to a polymicrobial disease cascade.

### **Parasitology**

*Theileria annulata* was identified in samples of blood by PCR. High infection burdens with theileria spp. is reported in healthy antelope populations and the pathology is not all consistent with theileriosis. Some signs at least grossly are shared with HS including haemorrhages, lymphoid oedema and haemorrhages but hyperplasia was not a particular feature and there was an absence of spleen enlargement which would be expected (absent in all but one case necropsied). These findings suggests theileria might be a secondary factor in a polymicrobial disease event. Histopathology should resolve this question. One tick was seen on the necropsied saiga, but saiga might have come into contact with ticks much earlier in spring in more southern areas. No other parasites of significance were noted grossly.

### **Virology, toxicology**

These studies are still largely incomplete.

### **Diseases tested for and found to be sample negative:**

Foot-and-mouth disease (FMD), Peste de petit Ruminants (PPR), Epizootic hemorrhagic disease (EHD), Q-fever, Malignant catarrhal fever (MCF), mycoplasmosis, Akabanae disease, maedi-visna virus (MVV), sheep pox, anthrax, campylobacteriosis, paratuberculosis, brucellosis, listeriosis, bluetongue. RNA of a Flaviviridae virus detected, but the virus was not identified yet.

### **Metabolic co-factors**

Pasture factors are as yet not analysed. There is a possible hypocalcaemia in some saiga.

### **Ecology & co-factors**

*Vector born disease* – although mosquitos and culicoides were abundant at the time of die-off there are no supportive evidence to suggest this was a primary disease factor although work must continue on this aspect.

*Weather* - These are largely preliminary results. To date only weather data and preliminary observations on pasture and remote sensing data on vegetation are available. Meteorological data is available from local met stations and the research weather station used by RVC on the Turgai site.. There is an associated temperature rise and precipitous fall in temperature, in both monitored die off sites, that might have served as a trigger of bacterial virulence factors in the environment where the bacteria are living, in the case of the *P.multocida* in the oropharynx. This is a preliminary hypothesis and needs verification. Precipitation does not appear to have been associated directly with any trigger of the event although overall average rainfall and snow melt has been associated with flooding prior to this event and is a factor requiring analysis.

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*Pasture* – NDVI analysis suggests the pasture quality and nutrient densities may be variant in 2015 from non-die-off years in this system but this is preliminary and needs careful evaluation. And must include ground work, both botanical and investigation of forage quality/nutrient/mineral data using baselines from last year (in Turgai) and from studies initiated now in both affected and unaffected siaga range.

*Water* – animals were not dependent on environmental open water sources given moist and rich pasture at this time so this as a possible source of pathogen or toxin is unlikely.

*Soil* – the extensive range and synchronicity of the die off is not suggestive of a soil toxin unless universal and the effect of flooding needs investigation in this respect if pathology suggests this co-factor.

*Other species* – no verified reports of sickness in other species, relating to or associated with this event, have been documented

*Carcass pick up / burial operations:* Carcass pick up / burial operations: the work to localize possible spread of infection and minimize public and animal health risks organised by Kazakh government was very efficient given the unprecedented scale and extent of the die-off, as well as remoteness of most areas.

#### Other

The Ministry of Agriculture and the Kazakhstan Government should be commended on the efforts that they have made to support the conservation of saiga antelope, including the transparency in which they have approached the current die-off event. A number of Kazakh and External institutions have offered assistance including in the fields of virology and toxicology. The current Kazakh institutions contributing research are significant and valuable, as long as they are well coordinated and synergistic. The team advises that; Royal Veterinary College Pathology and Epidemiological Departments provide support on histology and field epidemiology, Pirbright Institute, UK and FLI Germany undertake supporting virological studies, The Queens' University, Belfast and University of California Davis supporting toxicological studies. Further specialist institutions might be advisable as the pathological, epidemiological and ecological investigation is progressed.

**Further comprehensive investigations are needed to establish the definite cause of death for the Saiga antelopes and understand the complex mechanisms behind it.**