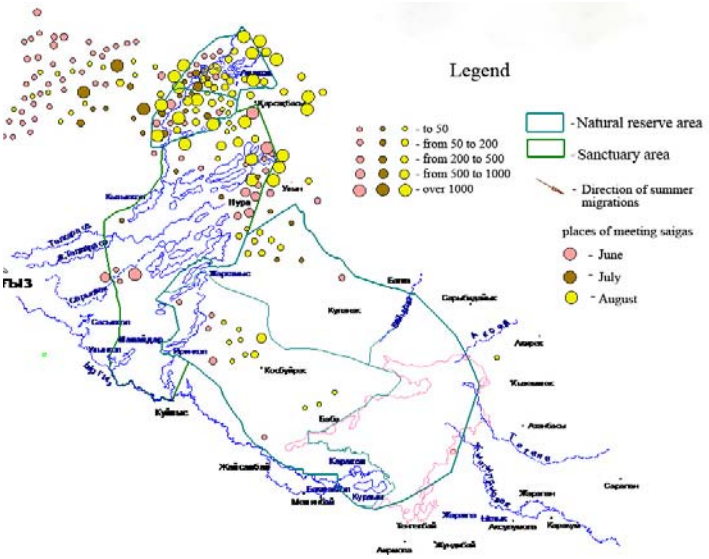

Figure 4. Summer distribution of saigas in the Irgyz-Turgai SNR, 2012

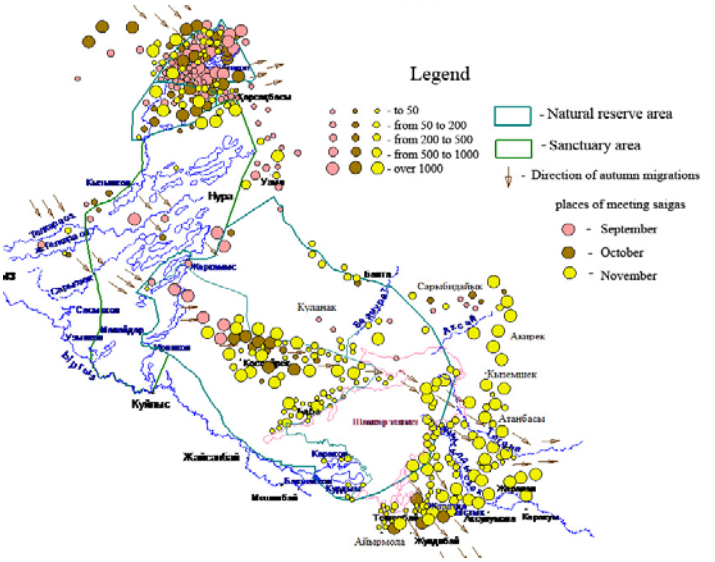

Figure 5. Autumn distribution of saigas in the Irgyz-Turgai SNR, 2012

Using participatory monitoring to assess the status of the pre-Caspian saiga population

Leejiah Dorward[1], Yuri Arylov[2], E.J. Milner-Gulland[1]

1. Imperial College London. 2. Centre of Wild Animals of the Republic of Kalmykia.
Corresponding author: *Leejiah Dorward*, leejiah@gmail.com

Introduction

The pre-Caspian saiga population followed global populations trends crashing from 800,000 in the 1950s to 15-20,000 in 2001. The most recent population estimate, in 2012, was 7,000 (*see* SN-16), and there is concern that the population is still declining. However there is much uncertainty in current population sizes, trends and distributions.

Since 2008 the Centre for Wild Animals of the Republic of Kalmykia has run three participatory monitoring projects; a British Council BRIDGE funded project from March 2008 to November 2009; a Rufford funded project from October 2010 to June 2011; and a US Fish and Wildlife Service (USFWS) funded project from February to November 2012. The BRIDGE and Rufford projects both employed 25 monitors, with none in common, while the USFWS project employed 43 monitors, some of whom had worked on previous projects. Monitors were employed to record opportunistic saiga sightings (number of saigas seen, date and time of sighting, sex of saigas, distance and angle from observer, and other comments).

As monitors did not measure survey effort it is not possible to calculate absolute or relative abundances, however data on herd sizes and frequencies of sightings collected by monitors who had participated on multiple projects can be used to indicate changes in the status of the population (assuming their survey effort is similar between years). Comparing locations of monitors who did and did not record saiga sightings can be used as presence/absence data to assess changes in saiga distribution.

Changing Herd Sizes

Each year was split into three seasons due to temporal variations in herd sizes; spring (days 1-122), summer (days 123-244) and winter (days 244-365). Summer herds were significantly smaller than spring and winter herds (χ^2=46.2, p<0.001; Figure 1). Spring herd sizes were significantly different between years (χ^2=12.0, p=0.008) with reductions in herd sizes between 2008 and 2012 and between 2011 and 2012. There were no significant differences between summer and winter herd sizes (Figure 1).

Despite greater numbers of monitors covering a larger area, there was a marked reduction in maximum and mean herd sizes in 2012 compared to previous years (Table 1).

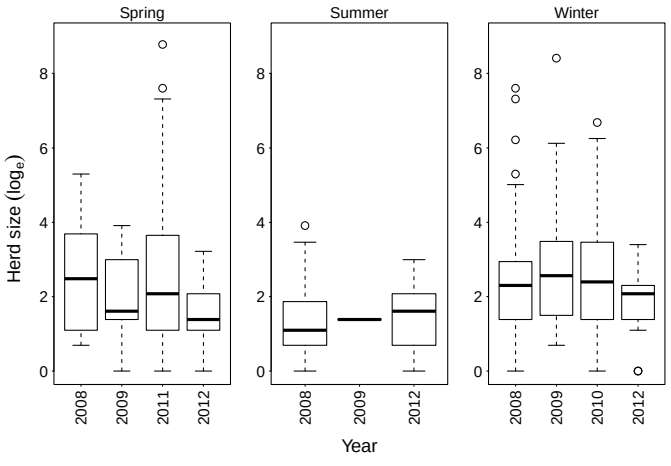

Figure 1. Differing herd sizes in each season and year of the participatory monitoring.

As different seasons and areas were covered in different years care must be taken in interpreting these statistics, however this may indicate the loss of larger herds in 2012.

There was a significant reduction in spring herd sizes between 2012 and all previous years combined (W_{255}=6175, p=0.0012). There was no significant difference between summer herds in different years (W_{185}=3249, p=0.52). Winter herds were larger in previous years than in 2012, however this difference was not quite significant (W_{259}=3536, p=0.086).

Linear mixed effects models were used to investigate changes in herd sizes comparing only those monitors who had monitored in more than one year. This showed average herd sizes increasing from 2008 to 2009, and then in 2010 dropping to below 2008 levels and continuing to decrease in 2011 and 2012. The only significant difference in herd size was between 2009 (when herd size was largest) and all the other years.

Changes in Numbers of Sightings per Month

Changing frequencies of saiga encounters by monitors who had participated in multiple projects were investigated, under the assumption that if monitor effort was the same from year to year, fewer encounters would indicate that there were fewer herds on the steppe. There was a significant reduction in the numbers of sightings per month for the eight monitors who participated in both the BRIDGE and USFWS projects; from an average of 1.6 sightings per month in 2008/2009 to 0.5 per month in 2012 (V_8=26, p=0.047). For the 20 monitors who participated in both the Rufford and USFWS projects there was a significant reduction in average sightings per month from 0.89 in 2010/11 to 0.32 in 2012 (V_{20}=188, p=0.0002).

Photo by Leejiah Dorward

Females with calves quickly vanish from sight.

Table 1. The maximum and mean herd sizes (with 95% confidence intervals), total number of herds recorded and the number of active monitors in each year that a participatory monitoring project has run. The minimum herd size was 1 in all years.

Year	Maximum herd size	Mean herd Size	Numbers of sightings	Number of monitors
2008	2000	32±11	222	25
2009	4500	544±440	46	25
2010	800	48±13	89	25
2011	6500	86±32	220	25
2012	30	7±0.45	122	43

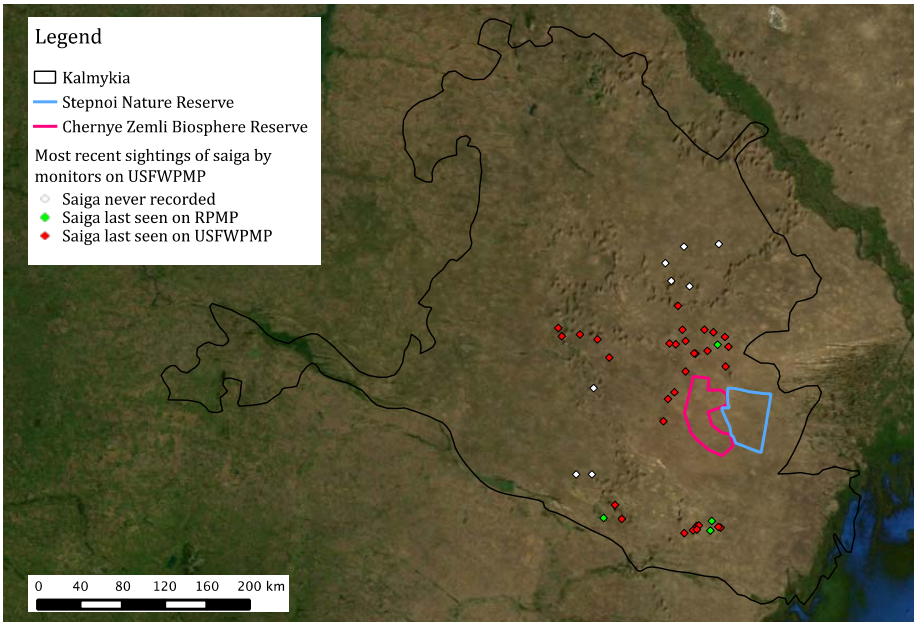

Figure 2.
Map showing changes in saiga range from the BRIDGE (2008/2009) and Rufford (2010/2011) projects to the USFWS (2012) project. Points show locations of monitors on the USFWS project coloured by the project during which they last saw a saiga.

Changes in Saiga range

There is little indication of a change in the saiga's range over the period 2008-12 (Figure 2). The majority of monitors who participated in more than one project saw saiga during both projects (n=24). The four monitors who saw saigas during the Rufford project but did not see saiga in the USFWS project lived near to monitors who did record saiga in both projects (between 5.7 and 12.1 km apart).

Conclusions and Recommendations

Changing monitor locations is likely to be partly responsible for the high degree of variation in herd sizes between years (Figure 1). Five monitors from the Rufford project, who were not monitors under the BRIDGE or USFWS projects, recorded the biggest herds and most frequent sightings of 2010 and 2011. They live in part of the saiga's core range immediately to the south of the Stepnoi and Chernye Zemli reserves. Their inclusion in the Rufford project but not the USFWS project may make perceived differences in herd sizes between the two projects more extreme and weakens our ability to draw accurate inferences on population trends. However this analysis does suggest that saiga populations could be lower in 2012 than in previous years.