

Implementation of the monitoring system on the effects achieved by management measures in 2007

Monitoring activities according to the Project Activity F.2 have been carried out to assess impact of project activities on target and other indicator species. We followed the monitoring programme that had been set up before the previous field season and accordingly we used the same principles and methodology as in the two previous years. The programme itself and methods have been described in our first monitoring report in 2005.

As in 2005 and 2006, in 2007 mapping of the indicator bird species was performed twice in each of the Project Areas. To obtain comparable data the bird counting routes were kept the same as in 2006. Mapping data were added to the ArcGIS geodatabase and digitally stored as a point layer together with the mapping data of the previous year. The first mapping count in 2007 took place between May 14 and May 31 while the second mapping count – between June 1 and July 1. Mapping data are digitally stored as a point layer in an ArcGIS geodatabase.

Results and discussion

Three years are still too short time to make any conclusions on changes of population of the target and indicator species in the project areas. Any recorded changes may be caused by yearly fluctuations due to various factors not related with the project activities. To assess, if any of the changes observed during the project are related to management actions, changes in the project areas need to be analysed taking into account the species population changes outside the project territories, i.e. changes in the national population index for the corresponding species. To date such analysis impossible as national population indices from the ongoing countrywide monitoring programmes are not available yet. Such analysis will be carried out after such data will become available. Also any geospatial analysis to relate the local changes in occupied territories with management actions carried out in the previous management season will be carried out in due time. The task of this report is to report the summary of this year's monitoring data and to give a general overview of the changes recorded in the populations of the target and indicator species in the project areas. Any attempts to associate the observed changes in bird populations with the changes in the habitats are purely speculative at this stage.

Summary of the results of the bird mapping for each count in the period 2005 – 2007 are given in the Table 1.

For better overview we provide the results and their first analysis in two sections: “species accounts” which gives a species by species description of changes and “site accounts” where changes are described territory by territory.

The pair wise statistical comparisons between the counts and between the years were carried out using the Wilcoxon Signed ranks test using SPSS for Windows 15.0 software. The trends are calculated using yearly maximum counts by TRIM 3 software. We used the classification system adopted by the European Bird Census Council to classify the population trends of the analysed species.

Table 1. Numbers of the main indicator species of the project per Project Area during the period 2005 – 2007.

Project Area	Year	Censused area (ha)	Count No	Corncrake	Spotted Crane	Great Snipe	Common Snipe	Grasshopper Warbler	River Warbler	Quail
Sita and Pededze floodplains	2005	590	1	38	0	21	17	16	9	0
			2	44	0	17	7	10	44	1
	2006		1	46	0	15	28	25	18	0
			2	29	0	17-18	16	20	29	0
	2007		1	41	4	25	25	11	25	1
			2	38	0	28	20	13	20	1
Mugurve meadows	2005	295	1	20	3	0	8	5	21	0
			2	15	0	0	5	4	30	0
	2006		1	13	0	2	12	13	31	0
			2	10	0	0	11	19	34	0
	2007		1	27	0	4	8	9	36	0
			2	20	2	5	4	3	26	0
Dviete floodplains	2005	742	1	62	3	16-18	27	1	3	1
			2	72	20	22-25	13	4	9	2
	2006		1	49	0	20-25	12	12	1	0
			2	56	0	0	0	32	17	0
	2007	742 (793)	1	74(79)	0(0)	12(12)	2(3)	55(57)	23(24)	0(0)
			2	76(79)	0(1)	23(23)	1(2)	52(55)	21(24)	2(2)
Burga meadows	2005	170	1	22	0	13	1	13	0	0
			2	15	1	0 [1]*	2	16	6	0
	2006	170 (183)	1	7 (7)	0 (0)	15 (15)	3 (3)	10 (11)	0 (0)	0 (0)
			2	12 (13)	0 (0)	14 (14)	1	20 (21)	1	0
	2007	170 (183)	1	3 (4)	0 (0)	22 (22)	3 (3)	4 (4)	0 (0)	0 (0)
			2	9 (10)	0 (0)	11 (11)	1 (1)	8 (8)	0 (0)	2 (2)
Meadows of Seda River	2005	190	1	21	4	5	10	11	5	0
			2	15	1	7	4	14	13	0
	2006		1	38	0	3	6	18	13	0
			2	24	0	7	2	25	8	0
	2007		1	31	5	8	8	4	1	0
			2	21	4	3	5	17	15	1
Vidusburtnieks meadow 1	2005	70	1	1	0	0	2	8	0	0
			2	2	0	6	0	3	1	0

Project Area	Year	Censused area (ha)	Count No	Corncrake	Spotted Crane	Great Snipe	Common Snipe	Grasshopper Warbler	River Warbler	Quail
	2006		1	0	0	0	0	9	0	0
			2	3	0	0	0	7	1	0
	2007		1	2	0	0	2	5	0	0
			2	5	0	0	0	7	1	0
Vidusburtnieks meadow 2	2005	210	1	2	5	0	3	15	1	0
			2	1	1	0 [1]*	3	6	8	0
	2006		1	2	0	0	1	15	2	0
			2	4	0	0	0	15	9	0
	2007		1	2	0	1	3	10	2	0
			2	3	1	7	2	21	10	0
Ruja floodplains	2005	335	1	5	1	22	17	27	4	0
			2	3	0	17	5	29	22	0
	2006	335 (374)	1	8 (8)	0 (0)	24 (24)	10 (10)	42 (44)	15 (15)	0 (0)
			2	7 (7)	0 (0)	27 (27)	5 (5)	54 (57)	35 (37)	0 (0)
	2007		1	9 (9)	0 (0)	20 (20)	16 (16)	17 (17)	15 (21)	0 (0)
			2	10 (11)	2 (3)	26 (26)	9 (9)	35 (35)	37 (43)	0 (0)
Burtnieki meadows	2005	175	1	7	4	1	7	8	0	0
			2	4	1	1	0	6	3	0
	2006		1	1	1	3	6	20	0	0
			2	2	0	8	3	17	4	0
	2007		1	11	0	1	9	4	1	0
			2	9	1	8	5	13	2	0
Lielupe floodplains	2005	229	1	32	1	0	0	24	7	0
			2	18	0	0	1	32	2	0
	2006		1	23	0	0	0	22	6	0
			2	0	0	0	0	9	2	0
	2007		1	21	0	0	0	30	10	0
			2	16	0	0	0	22	3	0
Svetes lejtece	2005	819	1	37	0	0	0	17	7	0
			2	26	0	0	1	14	3	0
	2006		1	55	0	0	2	21	3	0
			2	32	1	0	2	28	4	0
	2007		1	63	0	0	0	22	4	0

Project Area	Year	Censused area (ha)	Count No	Corncrake	Spotted Crane	Great Snipe	Common Snipe	Grasshopper Warbler	River Warbler	Quail
			2	51	0	0	0	27	3	3
Kalnciems meadows	2005	170	1	17	0	0	0	9	2	0
			2	7	0	0	7	7	0	
	2006		1	4	1	0	3	5	7	0
			2	0	0	0	5	5	0	
	2007			1	12	0	0	2	11	4
2				3	0	0	2	14	6	1
Rakupe meadows	2005	135	1	6	0	0	2	2	0	0
			2	6	0	0	5	5	0	
	2006		1	3	0	0	1	3	9	0
			2	3	0	0	1	9	0	
	2007	135 (186)	1	3(3)	0	0	0	2(2)	4(5)	0
2			5(10)	0	0	3(4)	14(14)	0		
Lake Durbe meadows	2005	77	1	3	0	0	0	5	2	0
			2	0	0	0	9	1	0	
	2006		1	0	0	1	3	10	2	0
			2	0	1	0	2	12	2	0
	2007			1	1	1	0	0	3	0
2				2	1	0	0	11	0	0
Uzava floodplains	2005	431	1	10	3	0	11	21	0	0
			2	12	0	0	0	24	11	0
	2006		1	13	1	0	3	20	11	0
			2	11	0	0	0	22	4	0
	2007			1	9	0	0	5	16	0
2				27	0	0	0	28	13	0

* figure given in square brackets and marked with an asterisk represent a flushed bird (most likely a female)

figures given in brackets in the "censused area" column represent total area mapped in 2006 if it is different from that in 2005 while figures in brackets in the species columns represent counts for the counted area

Species accounts

The total number of *Crex crex* recoded in the floodplain territories of the project in 2007 was the highest since counts of the species in the territory was started (fig. 1). The increase since previous year was nearly significant (Wilcoxon Signed ranks test: $Z=-1.769$, $p=0.077$). The overall trend of the species is positive too ($S=1.0657\pm 0.0553$), however, it is not statistically significant and thus should be regarded as “uncertain”. There have been 5 territories where the numbers of this species have been constantly growing (Uzava floodplains, Svetes lejtece, Seda bog, Ruja floodplains and Vidusburtnieks meadows 1) and 2 territories where a constant decline has been recorded (Burga meadows and Lielupe floodplains).

Before a deeper geospatial analysis and not knowing countrywide changes in the species population, there is no obvious link between the species density and the management activities.

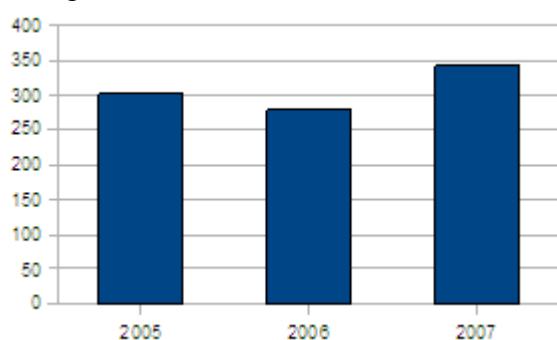


Figure 1. Changes of the yearly maximum counts of Corncrakes *Crex crex* counted in the project areas.

Porzana porzana was recorded in higher numbers in 2007 than it was in the previous year. However, these numbers did not reach even the half of the level recorded in 2005 (fig. 2). Consequently the current overall trend for this species is “steep decline” ($S=0.6405\pm 0.1476$, $p<0.05$). As the count in Dviete floodplains in 2005 was as high as 20 singing males in the best count, which makes one third of the maximum record totals of ALL years for this species, this trend does not describe actual situation in the project territories. The exceptionally high numbers in Dviete floodplains were related to late spring-summer floods in the territory that created a temporary habitat for the species that normally does not occur in such quantities in this area. If data from Dviete floodplains is removed from the analysis, the trend is “uncertain” ($s=0.9177\pm 0.1902$). As fluctuations in numbers are very characteristic for this species in Latvia and they are related to differing moisture conditions between the years, these short-term fluctuations of the species cannot be linked to the management activities carried out by the project.

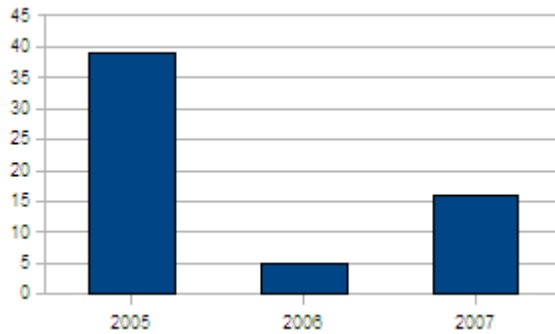


Figure 2. Changes of the yearly maximum counts of Spotted Crake *Porzana porzana* counted in the project areas.

The yearly maximum of *Gallinago media* recoded in the floodplain territories of the project in 2007 was the highest since counts of the species in the territory was started (fig. 3). The increase since previous year is nearly significant ($Z=-1.845$, $p=0.065$). The numbers between years 2005 and 2007 are compares, the difference is statistically significant ($Z=-1.970$, $p=0.049$). Although the overall trend is clearly positive ($S=1.1686\pm 0.1178$), it is not statistically significant yet due to large confidence interval and thus should be regarded as “uncertain”. Thus it should be regarded as “uncertain”. Although the increase was not consistent across all the study areas, there were no territories where a significant drop in numbers had been observed. There are two of the project territories where the species has been newly recorded during the project and no evidences of the species have been reported before (Mugurve meadows and Lake Durbe meadows). If compared with the national trend of the species (fig. 4), where a “moderate decline” ($S = 0.9345 \pm 0.0227$, $p<0.001$) has been recorded since 1999, the increase in numbers in the project territories should be regarded as a success. The success achieved in the project territories should also be regarded as a possible reason for improvement in the national trend in 2007.

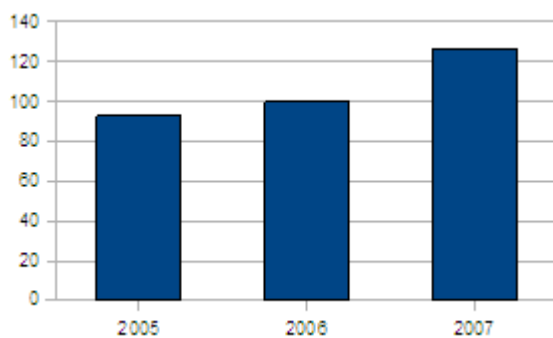


Figure 3. Changes of the yearly maximum counts of Great Snipe *Gallinago media* counted in the project areas.

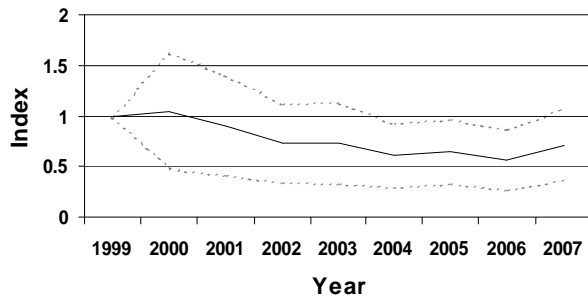


Figure 4. Changes of breeding population index of Great Snipe *Gallinago media* in Latvia (1999 – 2007).

The yearly maximum of *Gallinago gallinago* recoded in the floodplain territories of the project in 2007 was the lowest since counts of the species in the territory was started (fig. 5). Although the overall trend is negative ($S=0.8767\pm 0.0822$), it is not statistically significant and thus should be regarded as “uncertain”. Also the differences between any two of the years were not statistically significant. The tendency is opposite to that of Great Snipe. One of the possible explanations for the observed decline is inter-specific competition as Great Snipe uses largely the same resources as the Common Snipe.

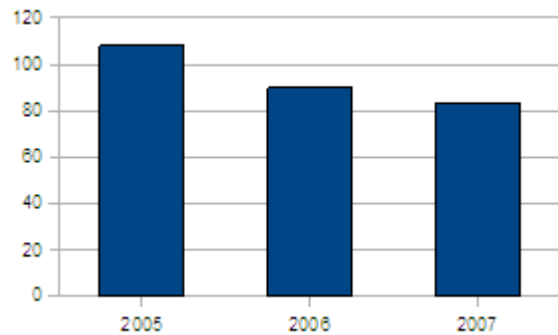


Figure 5. Changes of the yearly maximum counts of Common Snipe *Gallinago gallinago* counted in the project areas.

Locustella naevia after a peak in numbers in 2006, a drop in numbers was recorded in 2007 (fig. 6). Nevertheless, the overall trend is statistically significant and “increasing” ($S=1.1744\pm 0.0838$, $p<0.05$). Such a change pattern was consistent in most of the territories. The difference in numbers between 2005 and 2007 is still significant ($Z=-1.963$, $p=0.05$) although this significance is not as prominent as between years 2005 and 2006.

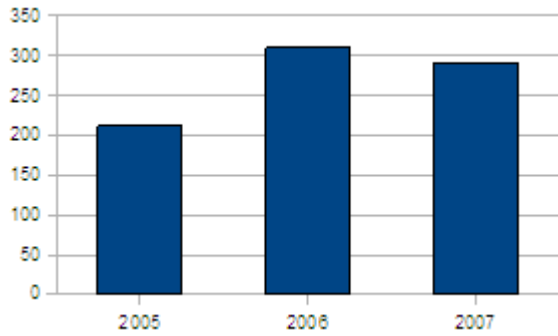


Figure 6. Changes of the yearly maximum counts of Grasshoper Warbler *Locustella naevia* counted in the project areas.

The yearly maximum of *Locustella fluviatilis* recoded in the floodplain territories of the project in 2007 was the highest since counts of the species in the territory was started (fig. 7). Although the trend is positive ($S=1.0583\pm 0.0614$), it is not statistically significant and thus should be regarded as “uncertain”. The change pattern varied between the territories and there were territories with gradual increase as well as gradual decline observed in numbers of this species and these differences were not related with management activities carried out. These results are rather surprising as the species is associated with large bushes. The increase has been recorded in the territories such as Ruja meadows and Seda bog where large scale bush removal had taken place. Before a deeper geospatial analysis and not knowing countrywide changes in the species population, it is too early to draw a link between the species density and the management activities.

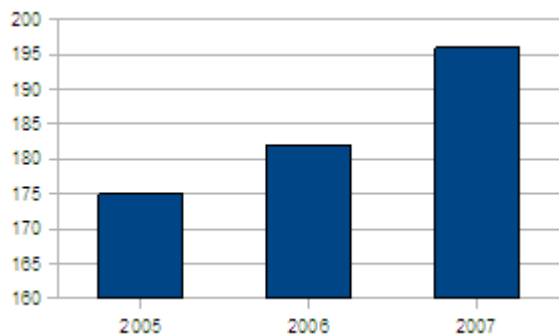


Figure 7. Changes of the yearly maximum counts of River Warbler *Locustella fluviatilis* counted in the project areas.

***Coturnix coturnix*.** After a drop to zero in 2006, the all time maximum was recorded in 2007. Obviously, this increase is statistically significant ($Z=-2.232$, $p=0.026$). Also if the years 2005 and 2007 are compared, the change is still nearly significant ($Z=-1.841$, $p=0.66$). However, the species was still not recorded in adequate numbers to speculate on any benefits for this species in the project areas due to management activities.

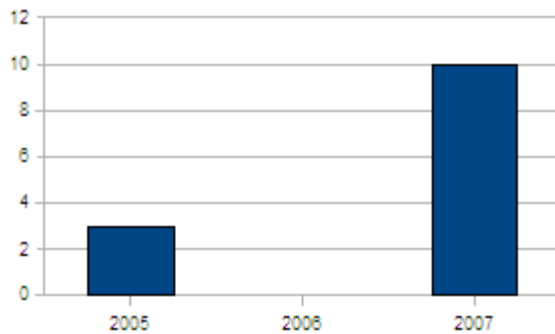


Figure 8. Changes of the yearly maximum counts of Quail *Coturnix coturnix* counted in the project areas.

Site accounts

Sita and Pededze floodplains. The most part of this territory underwent large scale restoration activities until the spring of 2007. Although the most prominent changes took place between 2005 and 2006, the landscape, especially in the northern part of this territory, changed considerably also in the period between the breeding seasons of 2006 and 2007.

The last breeding season (2007) was the best for *Gallinago media* – the number of lekking males increased by ten compared with the previous year and this is higher number for this species ever recorded in this territory since the monitoring of Great Snipe leks started in 1999.. Moreover, two new leks were established, including one in the newly restored northern part of the territory. This may be related not only to restoration activities but also to more wet spring in 2007 which increased area of sites which are suitable for the species to feed. Increase was also observed for *Porzana porzana* – 4 singing males were recorded in 2007 while none in 2006 or 2005. Although the numbers of *Crex crex* recorded in 2007 were lower than in 2006 or 2005, this difference was negligible. Thus numbers of this species can be regarded as stable. The numbers of *Gallinago gallinago* remained on approximately the same level as in 2006. The numbers of both *Locustella* warbler species dropped in 2007.

Mugurve meadows. The extent of changes in habitats due to management has not been as prominent as in the neighbouring site “Sita and Pededze floodplains” (see above), however large enough to have a positive effect on the target species. The last breeding season had the best records for both main target species of the project. The numbers of Corncrake *Crex crex* more than doubled since to 2006 and a new lek with 4-5 males of Great Snipe *Gallinago media* established itself in the breeding season of 2007. Surprisingly, although this site experiences removal of shrubs, a slow increase of *Locustella fluviatilis* has been experienced since 2005.

Dviete floodplains.

Majority of initial mowing and shrubs cutting activities that have been planned in this site were done until the spring of 2007. Numbers of *Crex crex*, *Locustella naevia* and *Locustella fluviatilis* increased in this territory. In both, 1st and 2nd countings, these species had their maximum in 2007. Like in 2006, also in 2007 *Porzana porzana* experienced low number. Apparently, these changes can not be explained with meadows management.

The yearly highest number of lekking *Gallinago media* in Dviete floodplains was estimated close to that number recorded during 2005 and 2006 breeding seasons. As

in 2006, during the second mapping no males were found in previously known lekking area. *Gallinago media* were found at opposite bank of Dviete River where grazed pasture provides good conditions (mosaic vegetation with short-grass patches) for lekking. Therefore, it is believable that during the second count in 2006 number of lekking males was underestimated due to similar lek displacement.

Burga meadows. A large part of this territory underwent restoration activities between the breeding seasons of 2005 and 2006 while comparatively small changes occurred between 2006 and 2007. The number of *Crex crex* has been continuously declining in this territory, while the number of Great snipes has been growing. Numbers of both analysed warbler species declined as expected and there were no changes in the population of Common Snipe.

The reasons of Corncrake decline, possibly, is the very late mowing (usually September). As a result, there is a very short vegetation in next May in these places, and this means that there is no vegetation cover for the species. As in 2006 also in 2007 significantly more Corncrakes were recorded in the 2nd count when the new vegetation had reached considerable height.

Meadows of Seda River. Most part of this Project site had undergone restoration activities either by removal of bushes or introduction of mowing between the breeding seasons of 2005 and 2006 while comparatively small changes occurred between 2006 and 2007. The density of recorded Corncrakes was very high compared to all the other territories and number of Great Snipe continues to grow. Although most of the bushes have been removed from the open part of the territory, density of both warbler species are very high and River Warbler experienced its maximum in 2007. This year was also extremely good for Spotted Crake.

Vidusburtnieks meadow 1. As no management activities had taken place in this territory so far, the only change in habitats was continued overgrowing in the meadow. There were no prominent changes in populations of any of the species analysed, except that number of Corncrakes reached their maximum in 2007.

Vidusburtnieks meadow 2. As no management activities had taken place in this territory so far, the only change in habitats was continued overgrowing in the meadow. As a result both analysed warbler species had their maximums in 2007. A long time extinct lek of Great Snipes was active again in 2007. Most likely this was caused by the very wet spring which made the territory more favourable for the species. The effect of the wet year was observed also in the increase of Common Snipe in 2007 to the level recorded in 2005.

Ruja floodplains. Large areas in this site underwent restoration activities both by introduction of mowing and removal of bushes. The process started in 2005 continued until the spring of 2007. Numbers of both *Crex crex* and *Gallinago media* increased in this territory as did the Common Snipe, Spotted Crake and River Warbler. The only species that declined was Grasshopper Warbler.

Burtnieki meadows. This territory consists of two well separated parts and each of them received different treatment during the project. Removal of bushes started in 2005 and continued until the spring of 2007 in the meadows along Eikenupe river while no management activities were carried out along Briede river. Numbers of both

Crex crex and *Gallinago media* had their maximum in 2007. There was increase also in numbers of Common Snipe.

Lielupe floodplains

Since unusual *Crex crex* distribution pattern in 2006, i.e. lack of singing males in 2nd counting, in 2007 this species again was recorded in both, 1st and 2nd countings, but in numbers that didn't reach their maximum recorded in 2005. Before a deeper analysis, spatial pattern of *Crex crex* distribution was found in this territory. There was possible impact of extremely late moving (in October 2006) and the resulting short vegetation during 1st counting in 2007. *Locustella naevia* after a drop (especially in 2nd counting) in numbers in 2006, in 2007 was recorded in numbers close to numbers founded in 2005.

Svetes lejtece.

The numbers of *Crex crex* and *Locustella naevia* have been continuously growing in this territory and numbers of *Crex crex* had their maximum in 2007. Most likely this was caused by the favourable flood conditions and large dimension of meadows (both, restored by Project activities and kept in good condition by landowners). 2007 was a first year when *Coturnix coturnix* has been recorded during Project counting.

Kalnciems meadows.

After decrease in numbers in 2006, in 2007 *Crex crex* and *Locustella naevia* were recorded in numbers close to numbers founded in 2005, or even reached their maximum as in *Locustella naevia* case. During 2nd counting in 2007 *Coturnix coturnix* has been recorded; this was a first time founding of this species in Kalnciems meadows since Project counting was started.

Rakupe meadows.

In this site considerable change in numbers of birds from counted species wasn't found, the only exception was the increase in numbers of *Locustella fluviatilis*. As this species is associated with scrubs, the increase most likely represents natural fluctuations instead management effectiveness. Because management activities had taken place in this territory, due to narrow shape of meadows in this territory, meadow/forest edges provide a lot of suitable habitats for this species.

Lake Durbe meadows.

Unlike 2006, in 2007 *Gallinago gallinago* and *Gallinago media* weren't recorded in this territory. There were no prominent changes in populations of other counted species. Although lekking *Gallinago media* male was heard in 2006, however as species has their distribution range mostly in eastern part of Latvia and due to small breeding number, it is most likely that species have no capacity to occupy restored areas in a short time. Because of favourable flood conditions absence of *Gallinago gallinago* is still unexplained.

Uzava floodplains.

In this territory numbers of *Crex crex*, *Locustella fluviatilis* and *Locustella naevia* increased in 2007 and were higher during the 2st count. Although these three species had their all time highest numbers, only numbers of *Crex crex* increases two times. Because a large part of this territory underwent restoration activities, it is believable that exactly Project activities provide such good results.

