Institute of Biological Problems of the North FEB RAS

Bird community monitoring at the Chaun delta, Chukotka, Russia, as related to climate change and anthropogenic factors

Final report for the grant from
Small Grant Fund of the EAAFP

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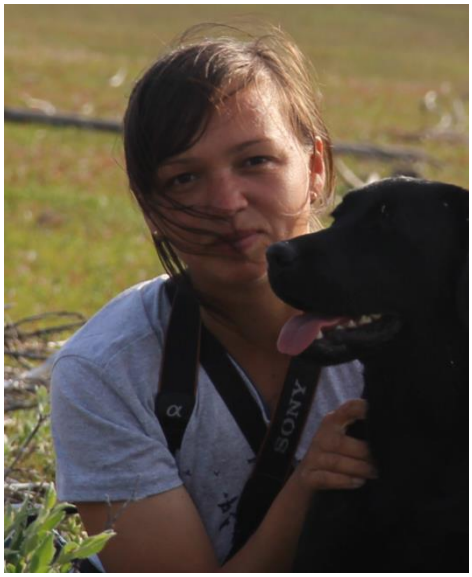
Magadan

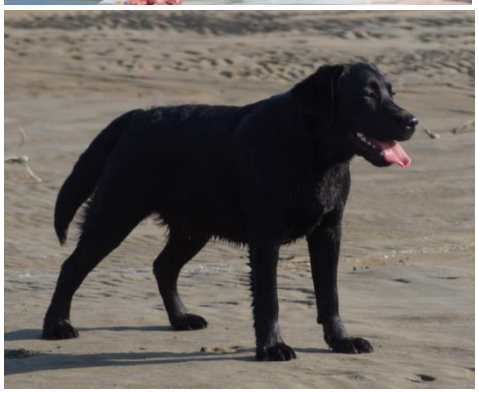
2019

The project aimed to document and to quantify recent changes in nesting bird community in Chaun delta tundra as compared to "cold" 1970-80s and within the period of warming in 2011-2019. In 2019 we proposed to estimate breeding species composition, nest density for each species, nesting chronology, clutch and egg sizes, and nest success.

Table 1. Project team and their responsibilities in the project

Picture	Name & affiliation	Responsibility
	Diana Solovyeva, Institute of Biological Problems of the North FEB RAS	Project PI, team training
	Sergey Vartanayn, NE Interdisciplinary Research Institute FEB RAS	Logistics, boat driving, large bird plot search
	Valeria Nikiforova, birdwatcher	Shorebird plot search, sub-team leader, photographer

	Daria Barykina, Ms student, Far-Eastern Federal University	Large bird plot search, sub-team leader
	Mikhail Ettuvgii, local reindeer herder	Large bird plot search
	Irina Yuldybaeva, Bs student, North East State University	Shorebird plot search

	Denis Petrov, Ms student, Saint-Petersburg State University	Large bird plot search, Shorebird plot rope dragging
	Konstantin Pavlyukov, Institute of Biological Problems of the North FEB RAS	Logistics, boat driving, cooking, station keeping
	Beautiful Lady Silk (Ciri), a dog	Large bird plot search

Field work took place in Chaun delta between 11 of June and 25 of July 2019 with the field crew based on Chaun Biological Station of the IBPN FEB RAS. In 2019 we used the Field Protocol developed for this project in 2011 and the protocol was modified from US FWS Research Protocol for the Yukon-Kuskokwim Delta NR and Arctic Shorebird Demographic Network Field Protocol.

Nine large plots were searched by two personnel twice during nesting period with 10-day interval (Figure 1). Each nest fate was reported after predicted nest hatch date. Five shorebird plots were searched for 3 times: two searches by two personnel and one rope-dragging.

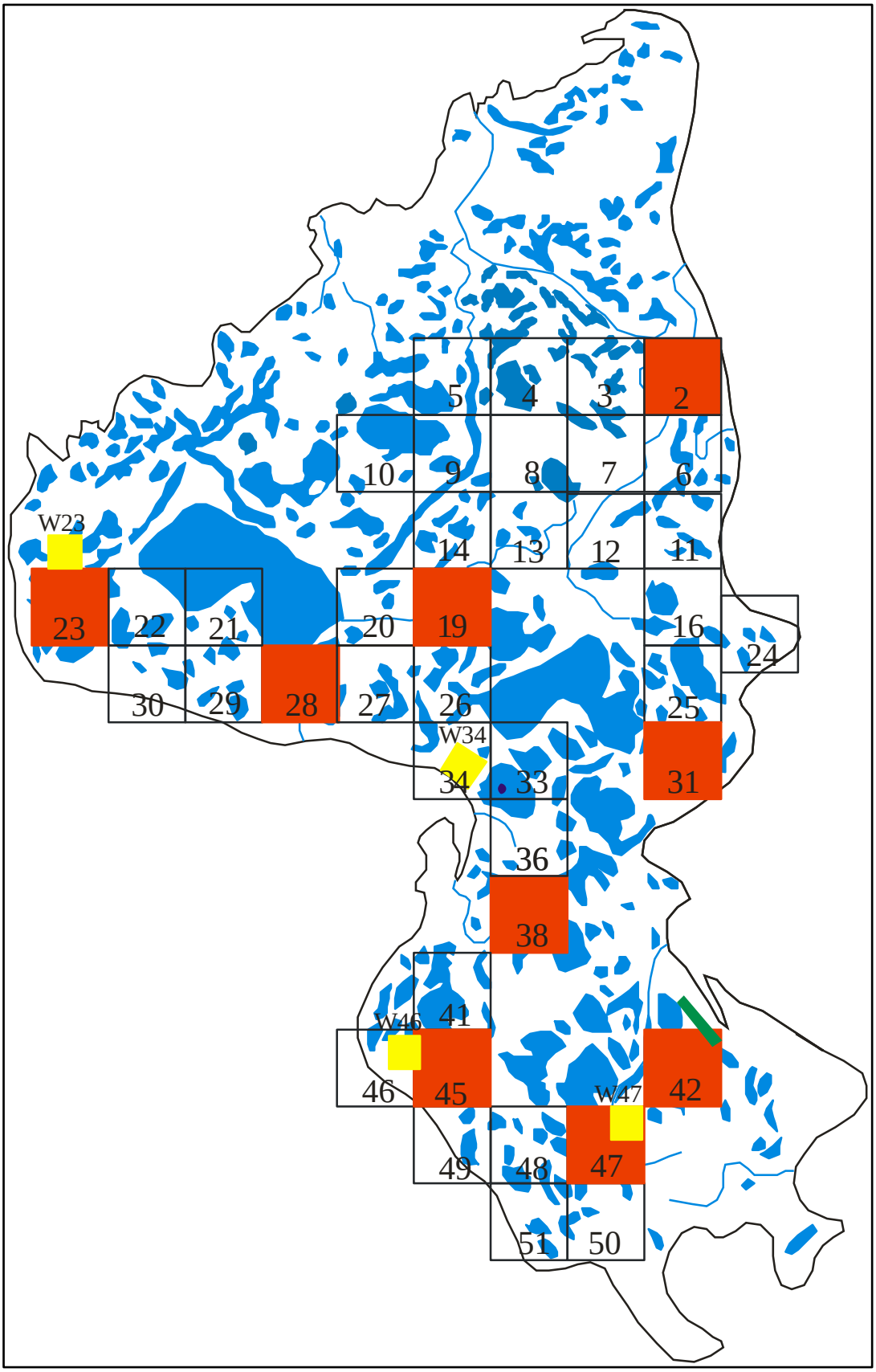


Figure 1. Study plots on Ayopechan Island, Chaun Delta, Chukotka, Russia. Open numbered squares are spectacled eider nest search plots used prior 2011 (##2 to 51); red squares are bird community monitoring plots where all large bird were studied=large bird plots; yellow squares are shorebird nest search plots (numbered as W for waders and ## number of nearest SPEI plot); green stripe is passerine mist-netting area.

Key results

There were 36 species recorded to nest in the Chaun delta in 2019 with a total of 202 nests being investigated. Among the new records for the area there are the Mallard *Anas platyrinchos* and the Pallas's Reed Bunting *Emberiza pallasi* - another swab dwelling passerine, that followed Siberian Rubbythroat first recorded in 2018.

Figure 2. Records of exotic, southern, birds in Chaun delta in 2019. Pallas's Reed Bunting: a pair was observed in June and probably nested. Pair Mallard was overflying on 12 of June. Photo by Evgenia Kornilova, Bluethroat migration project.

Table 2. Nest densities, clutch sizes and nest success of some birds in the Chaun delta, Chukotka, Russia in 2019.

Species	Nest density, nests/km2	Clutch size, eggs, av± SE	Apparent nest success
Arctic Loon	0.22	1.50 ± NA	0.00
Pacific Loon	0.44	2.00 ± 0.00	0.20
Yellow-billed Loon	NA	NA	0.00
Red-necked Grebe	NA	3 ± NA	1.00
Bewick’s swan	1.78	3.38 ± 0.04	0.27
Greater White-fronted Goose	0.11	4.50 ± 0.34	0.50
Bean Goose	0.11	7.00 ± NA	1.00
Northern Pintail	NA	NA	1.00
Spectacled Eider	0.67	4.78 ± 0.10	0.64
Long-tailed Duck	5.00	6.75 ± 0.18	0.13
Willow Ptarmigan	NA	11.50 ± NA	NA
Sandhill Crane	1.00	1.88 ± 0.03	0.50
Pacific Golden Plover	1.25	3.00 ± NA	1.00
Common Ringed Plover	NA	3.33 ± 0.36	1.00
Dunlin	10.00	3.88 ± 0.04	0.80
Pectoral Sandpiper	6.25	3.75 ± 0.09	0.50
Temminck’s Stint	1.25	4.00 ± 0.00	1.00
Ruff	5.00	4.00 ± 0.00	0.57
Long-billed Dowicher	1.25	4.00 ± NA	1.00
Red-necked Phalarope	16.25	3.94 ± 0.03	0.72
Vega Gull	1.11	2.83 ± 0.06	0.83
Glaucous Gull	0.22	3.00 ± 0.00	1.00
Long-tailed Jaeger	NA	2.00 ± NA	NA

Arctic Tern	0.22	2.00 ± 0.00	0.75
White Wagtail	NA	6.13 ± 0.11	1.00
Dusky Thrush	NA	6.00 ± NA	1.00
Bluethroat	NA	5.00 ± NA	0.67
Redpoll	NA	6.00 ± NA	1.00
Siberian Accentor	NA	6.00 ± NA	1.00
Little Bunting	NA	5.00 ± NA	1.00
Snow Bunting	NA	6.00 ± 0.13	0.88
Common Raven	NA	4.00 ± NA	1.00

NA – not applicable; NA as SE means the dataset is lower than 3 nests

Discussion

No obvious nest density trends were detected in all the most abundant shorebird species, nesting in the Chaun delta, as resulted from the nest search in 2019 (Figure 3).

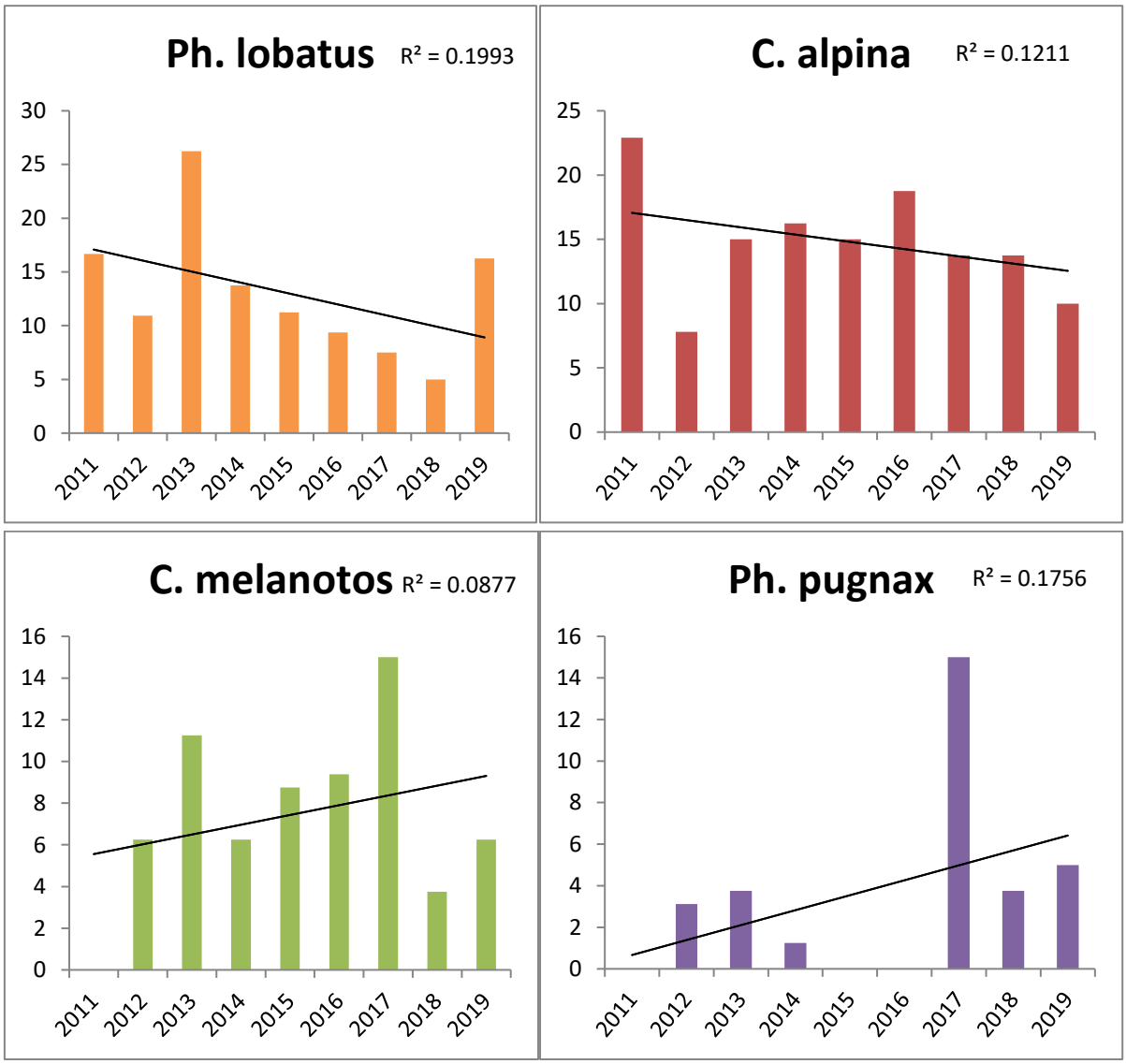


Figure 3. Nest density dynamics in the four dominant shorebird species in the Chaun delta in 2011-2019. R2 for each trend line is given. None of trend is significant.

Before 2019 the decline in the Red-necked Phalarope was considered as significantly declining; this negative trend was improved by high nest density in 2019.

In contrast to the shorebirds many of common waterfowl and gulls are declining in their nest density in the Chaun delta (Figure 4).

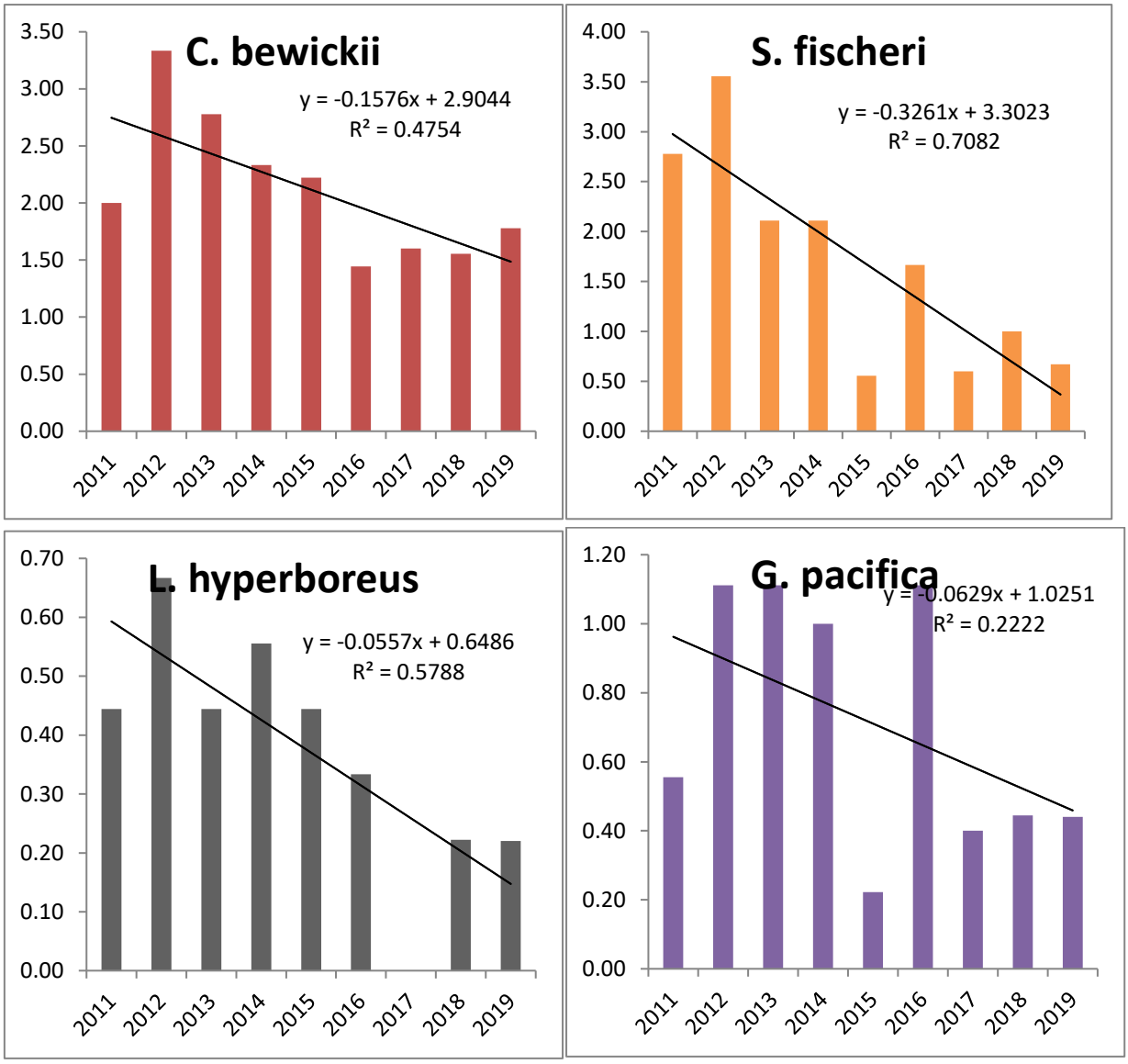


Figure 4. Nest density dynamics in the four dominant "large" bird species in the Chaun delta in 2011-2019. Equation for the trend line and R2 are given.

This decline is significant in the Spectacled Eider and the Glaucous Gull, both species wintering in the Bering Sea, and is not significant in the Pacific Loon, also wintering in the marine environment. Bewick's Swan is now declining after 10-folded increase in nest density between 1980th and 2002 (Solovyeva et al 2019) and it seems to stabilize in the last four years (2016-2019) at the level of 1.5 nests/km^2.

Conclusion

Continuation of the monitoring in the Chaun delta will provide more reliable trends in the nest densities and productivity of tundra birds breeding along the East-Asiana –Australasian Flyway. This is critical for several species demonstrating significant decline.

Appendix A. Selection of pictures from the Chaun delta field work, 2019, © Valeria Nikiforova (pictures 1 -2 and 6), © Evgenia Kornilova (pictures 3-5).