

FAR EASTERN BRANCH OF THE RUSSIAN ACADEMY OF SCIENCES



ЭКСОН НЕФТЕГАЗ ЛИМИТЕД

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GOVERNMENT OF THE SAKHALIN REGION AND FOUNDATIONS
“SAKHALIN - XXI CENTURY”
“GARMONIA”



**AVIAN MIGRANTS
IN THE NORTHERN PACIFIC:
BREEDING AND STOPOVER SITES
IN CHANGING EARTH**

**September 3-7 2013
Yuzhno-Sakhalinsk, Russia**

ABSTRACTS



Yuzhno-Sakhalinsk
2013

**МИГРИРУЮЩИЕ ПТИЦЫ
СЕВЕРНОЙ ПАЦИФИКИ:
МЕСТА РАЗМНОЖЕНИЯ И ОСТАНОВОК
НА МЕНЯЮЩЕЙСЯ ЗЕМЛЕ**

**3-7 сентября 2013 г.
г. Южно-Сахалинск, Россия**

ТЕЗИСЫ ДОКЛАДОВ



**Южно-Сахалинск
2013**

UDK 598.2

Avian migrants in the Northern Pacific: Breeding and Stopover sites in changing Earth. Scientific conference of the Institute of Marine Geology and Geophysics FEB RAS: Abstracts, Yuzhno-Sakhalinsk, September 3–7, 2013/Editor P.S. Ktitorov. – Yuzhno-Sakhalinsk: Institute of Marine Geology and Geophysics FEB RAS, 2013. 44 - p.

The book contains the abstracts of the conference, devoted to ecology of avian migrants in the Northern Pacific. We brought together over 30 scientists from research organizations of Russia, Japan, USA, Canada, Germany, Republic of Korea, Australia, India and Thailand; they have submitted more than 30 papers on a wide range of avian ecology topics.

Published abstracts are of interest to a wide variety of specialists in ornithology, animal ecology, wildlife managers, other specialists in environmental and life sciences and amateur birders.

Key words: avian migrants, stopover sites, migration hot spots, satellite telemetry, stable isotopes, migration strategy, fuel reserves, reproductive isolation, Ramsar sites, East Asian - Australasian Flyway, songbirds, birds of prey, waterfowls, shorebirds, banding, intrinsic markers.

Editorial board:

Editor: P.S. Ktitorov;

Executive secretary: M.Yu. Andreeva.

Issued by the decision of the Scientific Council of the Institute of Marine Geology and Geophysics, Far Eastern Branch of RAS.

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Conference held with the financial support of Far Eastern Branch of Russian Academy of Sciences, the Government of the Sakhalin Region and foundations “Sakhalin - XXI century”, “Garmonia”, Exxon Neftegas Limited, Sakhalin Shelf Service, SAT airlines.

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PREFACE

The North Pacific region serves as a hub for many avian migrants following different flyways in Asia and North America, reaching Europe, Africa, Australia and New Zealand. Sakhalin island, where our meeting is held, represents one of key regions for staging and passage of birds breeding in arctic and boreal regions and moving annually to their wintering grounds and back. This bird conference is intended as a scientific forum to present results, share ideas and establish a new collaboration work on avian migrants traveling through the Pacific region. Particularly, this meeting is devoted to migratory bird species that follow East Asian -Australasian Flyway, one of the largest but understudied migration systems in the world. It is not limited to migration *per se*, but covers ecology of migrants throughout all their annual cycle. Avian migrations are taking place on a large spatial scale, therefore understanding of ecology and evolution of migratory birds, their effective conservation is impossible without international collaborative efforts at the appropriate geographical extent. It is revealing to see that AMNP-2013 attracted researchers from 9 countries and several research centers of Russia. In the abstracts you will find the concise results on a wide variety of topics of avian ecology: stopover ecology, migration strategies, strategies of foraging, issues in taxonomy, methods of migration connectivity studies and results of their application, foraging ecology, disease spreading by migrants. The largest section covers different aspects of conservation of avian migrants: migration and wintering key sites, analysis of the current practices in avian conservation and suggestions for the new protected sites. Ecological groups of birds discussed in the abstracts range from waterfowls and shorebirds to landbirds, particularly songbirds and birds of prey.

I sincerely hope that this meeting establishes a new tradition of regular international workshops held in the Russian Far East, uniting worldwide ornithologists, environmental managers and research groups working with avian migrants in the Northern Pacific and along the East Asian-Australasian Flyway.

Pavel Ktitorov on behalf of organizing committee.

ECOLOGY AND BEHAVIOR OF AVIAN MIGRANTS ON STOPOVER SITES

COMPARATIVE STOPOVER ECOLOGY OF YELLOW-BREASTED BUNTING, *OCYRIS AUREOLUS*, OF TWO SPOTS OF AMURLAND, EASTERN RUSSIA

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Yellow-breasted Bunting (further: YBB) is vulnerable passerine species with decreasing world population (BirdLife International 2013). Despite this circumstance stopover ecology of the species at Russian Far East had never been subjected to thorough examination. At presented study the species was captured and relevant information processed with uniform methodology used at Antonovskoye Lake (AL) at the south of Zea-Burea plain (49.446 N, 129.976 E) and Zabelovskoye Lake (ZL) at the center of Amur-Sungari plain (48.433 N, 134.223 E). The data was collected from mid-August till mid-September of 2006-2008 and 183 ind. of YBB were overall captured. YBB of AL were significantly bigger in size then those captured at ZL (Mann Whitney U Test): $U=651$, $p=0.0157$ for unflattened wing, $U=512$, $p=0.0007$ for head to beak, $U=629$, $p=0.030$ for tarsus. Moreover, there was a considerable fraction of the first-year birds with un-finished moult at ZL whereas nearly all but some few hatch-year birds were with finished body moult and completely all had a full-grown primaries at AL. Such discrepancies indicate the migrating of two different populations at ZL and AL, probably different subspecies of YBB (*ornata* vs. nominate one, correspondingly). Regular rate of body mass gain at both stopovers was $0.6-0.7 \text{ g day}^{-1}$. Condition indices (calculated as ratio of weight to wing length) did not differ much at the two spots under our control but median value was slightly higher in YBB of ZL.

DETERMINATION OF VALUABLE AREAS FOR MIGRATORY SONGBIRDS ALONG THE EAST-ASIAN AUSTRALASIAN FLYWAY (EEAF) USING MACHINE LEARNING PREDICTIONS OF PUBLIC DATA, AND AN APPROACH FOR STRATEGIC CONSERVATION PLANNING (MARXAN)

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Having valuable high-quality stopover sites available for migratory birds is one of the key factors for the success of migration. The situation of migratory songbirds along the East-Asian Australasian Flyway (EAAF) is especially unresolved and thus unsatisfactory for an efficient science-based management. Overall 93 of 315 passerine species along the world's largest flyway are declining (Kirby 2010: 16, Galbraith 2011: 48).

This study aims to identify valuable areas for migratory songbirds along the vast EAAF and to develop a first approach for Strategic Conservation Planning. The methodological framework encompasses predictive modeling (machine learning), the Strategic Conservation Planning Tool "Marxan" and quantitative techniques like Geographic Information Systems (ArcGIS 10).

Overall, six models were created by using mistnet data for the fall migration of five selected index species (Arctic Warbler, Yellow Wagtail, Bluethroat, Siberian Rubythroat & Black-faced Bunting) as well as a by developing a "Species Richness Index" (songbirds).

The extensive contiguous areas with a high index of predicted occurrence indicate broad-front migration and a higher variability in habitat use during fall migration than during the breeding season. It puts much doubt on the earlier concept that only a few and narrow migration hotspots would be required for a successful migration across the flyway.

In the framework of Strategic Conservation Planning, five reserve solution scenarios with different focuses (Species Richness, boreal index Species, subboreal index species, all species as well as all species with consideration of vulnerable areas) were created by using simulated annealing. In general, only a low percentage (10-31%) of the current and official protection network covers the reserves for the selected index species generated by "Marxan". All reserve solutions should be seen as a first approach and a public baseline for future conservation planning processes whereby there is a need of further refinement and assessment throughout a stakeholder's involvement on a wider flyway level.

BODY MASS OF ARCTIC WARBLER ALONG THE EAST ASIAN FLYWAY SECTION DURING FALL MIGRATION

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So far, the major approach to obtain important information on migration strategies of most songbird species is still to study them on migratory stopover sites by means of trapping, banding and measurement of the key biometrical variables. Nowadays in several countries of Asia-Pacific Region songbird migrants are banded and described according to comparable protocols. Data for some species are potentially available from many trapping sites/banding groups, and these species should be selected for studies of stopover patterns and migration strategies at least in a scale of northern and central part of the East Asian Flyway. For this study, we selected Arctic Warbler. We compared body mass of this species along section of flyway. We used data from two stopover sites in central and southern parts of Kamchatka peninsula (Russia), two sites in the north and south of Sakhalin (Russia), one site in Honshu island (Japan), and two island sites in the Republic of Korea, during fall migration. Arctic Warblers migrate with substantial stores of subcutaneous fat but show no trend to increase body mass (and hence fuel stores) from the north to the south of "island" flyway section, from Kamchatka to Japan. Birds in Korea are significantly lighter than Arctic Warblers trapped on other sites. Corrections for individual size of birds and time of trapping do not change the general pattern, but make the difference between sites less evident. Correct comparison of warblers from Korea with birds from our other sites seems problematic due to substantial size difference of forms/subspecies of warblers that migrate along the "mainland" and "island" parts of flyway. Arctic Warblers in the "island" part of the flyway gain substantial fuel reserves on onset of migration and maintain them along the route as margin of safety against unpredictable weather and crossing large barriers such as Sea of Okhotsk. Additional data from the mainland sites are necessary to make valid comparisons with birds captured in Korea and to make inferences about fueling strategy in the "mainland" part of flyway, where birds may move without crossing large water bodies.

BIRD MIGRATION RESEARCH AT MURAVIOVKA PARK/FAR-EASTERN RUSSIA

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Muraviovka Park is situated at the southern part of Zeya-Bureya Plain, south-east of the city of Blagoveshchensk in Amur region of the Far-eastern Russia. The Muraviovka Park is the first territory for sustainable land use in Russia. It covers 6500 hectares of wetlands, meadows and crop fields with small forest islands in the Amur River valley and its first terrace. The area is famous for its breeding populations of endangered species like Red-crowned Crane *Grus japonicus* and Oriental Stork *Ciconia boyciana*. But so far, migration of small birds and especially Passerines was never studied in detail at the Park or even in the whole Amur region. Within the Amur Bird Project (www.amurbirding.blogspot.com) we studied the autumnal migration at Muraviovka Park in 2011/2012 and spring migration for the first time in 2013. The fieldwork was carried out with the help of volunteers from Russia, Germany and the Netherlands under participation of language students from local universities in Blagoveshchensk. Most of the data was collected through the ringing project. We trapped and ringed birds with mist-nets in different habitats on a daily basis. Of every bird we took data about species, age, sex, size and weight, moult, parasites, habitat as well as fat and muscle score. Over 10.000 birds out of more than 110 species got ringed. With the data so far, we can analyse the timing of migration for a variety of species. Furthermore, we achieved more than 4.000 local re-captures, which enabled us to detect a significant increase in fat score and weight during their autumnal stay at the Park for many species. Our investigations show that Muraviovka Park plays an important role for a variety of migratory birds. With continuation over upcoming years, we will be able to detect shifts in timing and abundance.

MIGRATORY FUELLING IN PASSERINES: THE CASE STUDY ON EUROPEAN ROBINS (*ERITHACUS RUBECULA*)

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Due to energetic limitation most songbirds cover migratory distance by several flight bouts with periods of stopover in between. The most obvious aim of stopover is replenishing fuel stores. Fuelling rate together with stopover duration determine the amount of fuel stores at departure and hence potential flight range and migratory speed. Studying of migratory fuelling is based on different methods outcome of which is often difficult to compare. Supplementary feeding experiments where migrants are attracted to feeders installed on electronic balances could provide precise estimate of rate and temporal pattern of fuel deposition. However, fuelling rate obtained with *ad libitum* food may differ substantially from the rate under natural conditions. Another promising method is based on analyzing of fat metabolites in blood. Metabolite concentration indicates the directions of fat metabolism over a rather short time interval (hours) but might not reflect the resulting energy budget across the stopover. Most commonly fuelling rate is estimated using trapping data from ringing stations. Here I used capture-recapture data from long-term ringing project on Biological Station Rybachy (Courish Spit, Eastern Baltic, 55°09'N, 20°51'E) to study migratory fuelling of European robins. I compared the estimates obtained with data on individuals recaptured at nocturnal migratory departure in additionally installed high mist-nets. During 1994-2003, a total of 72416 birds were captured, and 20149 (28%) individuals were recaptured; 125 robins were recaptured at migratory departure. Hourly rate of mass gain was 0.08 g h⁻¹ in both seasons independently on calculation method (regression of body mass of first captures on time of the day, multiple regression of recaptures according to Schaub and Jenni (2000) or direct estimates on birds recaptured in high mist-nets). However, fuel deposition rate (g day⁻¹) calculated on the basis of multiple regression on recaptures (spring: 0.007, autumn: 0.064) was 4-10 times less than direct estimates revealed by recaptures in high-mist nets (0.069 and 0.259, respectively). I discuss the possible reasons of these results and utility of different methods for studying migratory fuelling in songbirds.

GEOGRAPHIC VARIATION AND REPRODUCTIVE ISOLATION IN THE EASTERN POPULATIONS OF ARCTIC WARBLER

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It was recently suggested that Eastern populations of Arctic Warblers, breeding in the south of Kamchatka, Kuril Islands, Sakhalin, Hokkaido, Eastern Amurland and highlands of Sikhote-Alin Ridge, should be separated into a different monotypic species - Kamchatka Leaf Warbler, *Phylloscopus examinandus* Stresemann, 1913. This opinion was based on the analysis of DNA and specific "slow" type of song in the eastern birds.

In fact, birds from those populations show clear morphological variation and difference in body size between populations. Wing length (mm) of birds from Sikhote-Alin Ridge, Eastern Amurland, Sakhalin and Southern Kuriles is the shortest compared to other populations: males 65,0-73,3 (mean 68,9), females - 63,7-68,9 (mean 65,8). Arctic Warblers from the south of Kamchatka and north of Kuril islands are clearly bigger and long-billed. Wing length (mm) in males are 70,3-76,1 (mean 72,7), females - 69,1-72,6 (mean 70,9). Therefore, "slow singing" Arctic Warblers are forming two distinctive geographical races, the «*examinandus*» should belong to large birds from Kamchatka. Russian ornithologists are used to applying the name *Ph. b. hylebata* Swinhoe, 1860 for southern populations. Color features were described for this form by Swinhoe, 1860, and they clearly show the difference of the "slow singing" Arctic Warblers from nominative subspecies, and size in this description is clearly smaller than in birds from Kamchatka and Northern Kuriles. Therefore, eastern group of populations should be considered as two geographical races: southern small *hylebata* and larger northern *examinandus*.

Reproductive isolation between "slow singing" Arctic Warblers and "fast singing" *Ph. b. borealis*, is typical for different subspecies but not for real species. Both song types were registered from the south of Yakutia and Transbaikalia till north of Sakhalin, and some males are using both types of songs, some males show "intermediate" song types. Colors of collections specimens from Sakhalin and Amurland reveal that in these regions "intermediate" features are common, and this populations are closely related to nominative subspecies, in contrast to populations from Kuriles. The North of Kamchatka adjusting to Kariak Ridge (part of *Ph. b. borealis* breeding range) is inhabited by Arctic Warblers with hybrid features of *borealis* and *examinandus*. These facts show us that separating "slow-singing" Arctic Warblers into another species is at least premature.

ISSUES IN STUDIES OF BULLFINCHES DISTRIBUTION AND MIGRATION IN ASIA-PACIFIC REGION

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Despite a more than a century-long study of bullfinches in Asia-Pacific Region, there are a lot of white spots in our knowledge of reproductive isolation between different forms of bullfinches, their distribution and seasonal migrations. One of the major issues was widespread opinion that “black-capped” bullfinches are forming just one or two species. This point of view was changed in Russia by L. V. Stepanian, when he split bullfinches into 3 species.

Nowadays, 5 forms are distinguished in the Russian Far East: *P.pyrrhula pyrrhula*, *P.p.cassini*, *P.cineracea*, *P.gseiventris gseiventris* и *P.griseiventris rosacea*. Reproductive isolation in those species is rather clear: they breed in adjusting habitats without hybridization, and in some occasions breed in overlapping home ranges: *P.p.pyrrhula* and *P.cineracea* in the Easter Siberia, *P.cineracea* and *P.g.rosacea* in the Far East. They are different in annual schedules, size, vocalization and selection of breeding habitats. However, this difference is not fully recognized worldwide due to lack of published information. Many field researchers are not able to recognize the difference between these forms.

Furthermore, information on distribution and migrations of bullfinches is contradictory and scarce. The most enigmatic situation is with *P.p.pyrrhula*, form that probably breed in the East of Amurland or even further in the East. Confirmation of this fact is possible only with correct identification of bullfinches, with due attention to individual and age variation.

Similarly, the recent information on relations between subspecies of Ussuryland Bullfich on Sakhalin Islands and Kuriles is very interesting. Despite the substantial difference in vocalization, we found grate similarity in colors between males. In order to find out details of migration connectivity in different populations of this bullfinch, we need a very detailed analysis of color patterns of the birds wintering in Japan.

STOPOVER PATTERNS OF LANDBIRDS AT AN INLAND SITE OF NORTHEAST CHINA: SPECIES COMPOSITION AND MIGRATION TIMING

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The conservation of migratory landbirds in China faces challenges similar to those in other parts of the world such as Europe and North America. Migratory landbirds have a complex life history and are associated with large spatial scale. The events that occur during migration play a vital role in determining population status. Although many landbirds migrate within China or between China and other countries, little is known about the stopover behavior of migratory landbirds in China during their passage, including species composition, timing, annual variation, not to mention the information about stopover duration, energetic condition (e.g., the amount of fat stores), and the habitat of these birds associated with during stopover. Using data collected from 2003 to 2012 (10 year) at a stopover site in Northeast China, we reported species composition, temporal patterns, recapture rate, and among year variations. A total of 57,005 and 10,228 birds were captured at the site in spring and fall, respectively, during the period. On average, there were 82 species in spring and 91 species in the fall. In spring, the capture was peaked in April (accounting for 59% of the spring capture); in fall it was in September (accounting for 46% of the fall captures). Some of the common landbird species captured at the site included: Black-faced Bunting (*Emberiza spodocephala*), Yellow-headed Bunting (*Emberiza elegans*), Red-flanked Bluetail (*Tarsiger cyanurus*), Pallas's Rosefinch (*Carpodacus roseus*), Long-tailed Rose Finch (*Uragus sibiricus*), Rustic Bunting (*Emberiza rustica*), Long-tailed Tit (*Aegithalos caudatus*), Brambling (*Fringilla montifringilla*), Redpoll (*Carduelis flammea*), Yellow-browed Warbler (*Phylloscopus inornatus*), Mountain Accentor (*Prunella montanella*), and Pallas's Leaf Warbler (*Phylloscopus proregulus*). Between/among seasons recapture rate was 6.3% and 1.4% on average in spring and fall, respective. Based on the recaptured birds and their minimum stopover period (difference between the initial and last capture dates), about 50% and 60% of these birds used the site for 1-3 days. We examined stopover parameters of Red-flanked Bush Robins (*Tarsiger cyanurus*) in more details. We found that the body mass of the fall birds of this species was higher than that of the spring birds; condition index (i.e., body mass adjusted for body size) was lowest among spring females; birds were more likely to stay longer in fall than in spring; there was a positive relationship between time of initial capture and condition index regardless of season or sex, suggesting that the birds were able to replenish energy stores; the net daily mass

gain was the highest among males in the fall (3% body mass); the net daily mass gain would sustain a flight of 0.6 hours for females and 3.1 hours for males in fall. The stop-over pattern of landbird migrants at this site was similar to some landbird migrants of Europe and North America. For example, spring passage time and fat store variation between the sexes agrees with the hypothesis that males are selected to arrive at their breeding grounds as early as food resources or climatic conditions are adequate in the spring. Further research on stopover ecology is urgently needed in China for a better understanding of the migratory behavior and ensuring the conservation of these migratory landbirds.

INDIVIDUAL TAGGING AND INTRINSIC MARKERS IN STUDIES OF MIGRATION CONNECTIVITY AND STRATEGIES OF MIGRATION

USING STABLE ISOTOPES TO LINK BREEDING, STOPOVER AND WINTERING LOCATIONS OF MIGRATORY SONGBIRDS

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Critical to the conservation of populations of migratory birds and other wildlife is an ability to make migratory connections between key locations used during the annual cycle. This task has proven to be remarkably difficult for all but a few species with limited range distributions and high recovery/resighting rates of extrinsic markers or transmitters. The recent development of small light-level recorders (geolocators) has provided a new tool to apply to smaller songbirds but this approach is expensive, requires recovery of philopatric individuals a year later and cannot be applied broadly for those species breeding across continents. The use of intrinsic markers such as naturally occurring stable isotope ratios of the light elements ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$, $\delta^{34}\text{S}$, $\delta^{18}\text{O}$, $\delta^2\text{H}$) that can be linked to spatial patterns within foodwebs (isoscapes) requires only a single capture of individuals and so can provide an unbiased estimate of origin. Here, I will review the basic principles of isotopic tracking of wildlife with an emphasis on migratory birds. Examples will be provided of the kinds of information that can be gleaned from the isotopic analysis of feathers and of new developments in both the creation of tissue-specific isoscapes and in the use of Bayesian probability models for assignment.

MIGRATORY LINKS BETWEEN THE BAIKAL REGION AND THE PACIFIC AREA

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An area of Lake Baikal and the surroundings are situated closely to the center of Eurasia, and local migratory waterbird and shorebird species may follow western or the eastern flyways during migration journey. In the viewpoint of East Asian migratory links, there are several categories of species breeding here:

1) Species with wintering regions in E/SE Asia confirmed by ringing, i.e. Mongolian Gull (wintering at Pacific shores from Sakhalin to Hong Kong), Caspian Tern (Vietnam), White-winged Tern (New Guinea), Common Tern (Philippines), Marsh Sandpiper (Malaysia), and Pochard (Japan). Whiskered Tern, Eastern Spotbill, and Velvet Scoter definitely belong to this category due to their E Asian subspecies identity (*javanica*, *zonorhyncha*, and *steinegeri*, accordingly).

2) Species presumed to winter in E/SE Asia. It includes some regional populations or their parts, e.g. several duck species (Teal, Common Goldeneye, etc), as justified by geographical basements and data on winter distribution. Common Gull is included to this category because its population breeding at Lake Baikal may spend winter in SE or S Asia, but it is not confirmed yet by ring recoveries from wintering grounds despite intensive ringing efforts at Baikal in 1970-1990s.

3) Species with unusually bimodal migratory behavior. For example, in Grey Heron and Black-headed Gull ringed in the Baikal region, most individuals spend winter in Indo-China, but others were found in the Middle Asia (Grey Heron) or W Europe (Black-Headed Gull, and probably (by unconfirmed data) Common Snipe). Populations of these species probably historically invade the Baikal region from different directions (Pyzhjanov, 1997); however, alternately the changing of migratory directions in the same population may be periodical being dependent on the climatic situation. It makes this category of birds most interesting for research.

4) Species being not connected with E Asian regions and spending winter more westward.

MIGRATION ROUTES AND STOPOVER SITES OF SANDHILL CRANES FROM YAKUTIAN BREEDING GROUNDS, REVEALED BY MEANS OF SATELLITE TRACKING

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In order to study movements of Lesser Sandhill Crane (*Grus canadensis canadensis*) breeding in Yakutia throughout the annual cycle, we monitored five sandhill cranes captured and tagged with satellite transmitters in the Platte River Valley, Nebraska (USA), during spring 2000 and 2002. Spring passage of the tagged cranes across North America averaged 73 days, including stopovers of 17-20 days in the Platte River Valley, and 20 days in western Saskatchewan, Canada. The migration distance from the wintering grounds to the Platte River Valley averaged 1000 km and cranes took 7-8 days to reach their destination. Passage time between the Platte River and Saskatchewan (about 1800 km) averaged 12 days, and the time required to fly from Saskatchewan to the west coast of Alaska (7000 km) averaged 18 days. Cranes after departing from Saskatchewan migrated on a relatively narrow front of 100-200 km. Satellite tracked cranes reached Chukotka Peninsula during 13-18 May.

During the final leg of migration to breeding grounds in the lower reach of the Kolyma River, cranes made 2-3 short stopovers (each stop being 1-2 days). The average duration of migration from the east coast of Chukotka to Kolyma tundra (3630 km) averaged 10 days. Tagged cranes arrived on the Kolyma tundra during the last week of May. We recorded summer movements of birds within the breeding grounds over a 142 day period (from 20 May until the 13 September). Fall migration was surprisingly fast compared to spring passage. Cranes covered the Russian section of the migration route within 7 days, on average, and took 39 days to cross the North American section before reaching the wintering grounds. Fall crane departure from breeding grounds on the Kolyma tundra occurred during 7-9 September. Cranes stopped to rest for 1-2 days at several locations in Chukotka and reached the east coast of Chukotka during 15-17 September. Crane flights from Alaska to Saskatchewan averaged 10 days where the birds remained for 20 days, on average. Departure from Saskatchewan to wintering grounds occurred during 11-27 October and birds arrived on their wintering grounds in Western Texas and New-Mexico between 16 October and 6 November, for an average time span of 22 days.

STUDIES OF MIGRATION CONNECTIVITY IN SAKHALIN SONGBIRDS BY MEANS OF BANDING AND STABLE ISOTOPES

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Seasonal migrations are an essential part of the annual routine in most songbird species that breed in temperate and northern latitudes. Information on migratory connectivity in songbirds is crucial for understanding of their ecology and evolution, as well as their effective conservation. Information on migratory connectivity is also useful for forecasting the spread of human and animal diseases. Bird banding has provided the principal technique to study songbird migration. Despite over a century of bird banding, relatively little information has been garnered on linkages between breeding, stop-over and wintering sites for most species, even where extensive effort has occurred along the flyway. Since beginning field research on Sakhalin in 2003, we obtained 9 recoveries of passerines that migrate and winter in Japan, and one long-distance recovery of Black-browed Reed Warbler from Thailand. Sustainable banding schemes are still not developed in most of tropical East Asia, and thus the collection of sufficient population-specific information about wintering ground connectivity from bird banding in the Asia-Pacific Region is questionable. We therefore applied analysis of stable-hydrogen isotope ratios ($\delta^2\text{H}$) of claw keratin in bird as an alternative to banding in order to infer and depict wintering grounds of Siberian Rubythroats (*Luscinia calliope*) from the central Amurland ($n=22$), South of Sakhalin Island ($n=18$), and Sakhalin Leaf Warbler (*Phylloscopus borealoides*) from the Cognominal island ($n=10$), using $\delta^2\text{H}$ from the distal end of birdclaws, captured at stopovers soon after their arrival from wintering grounds. Values of $\delta^2\text{H}$ indicated two large spatial clusters where Rubythroats from Amurland and Sakhalin most likely over-wintered: one on the mainland from the Western Bengali in India through eastern Myanmar, or possibly the Philippine Islands. This result suggests a possible migration divide between Amurland and Sakhalin birds. However this spatial assignment could not separate these two alternate possible wintering grounds since the two regions are predicted to be isotopically similar. Spatial assignment of samples from the Sakhalin Leaf Warbler indicated that the most likely wintering grounds of this species are on Hainan Island (China), Cambodia, south of Thailand and the Malaysian peninsula. Additional samples from the depicted winter grounds are necessary to validate migration links of species under study, but preliminary results suggest that the isotopic method may provide a useful addition to traditional band recovery efforts.

MIGRATION STRATEGY OF YELLOW-THROATED BUNTINGS (*EMBERIZA ELEGANS*) REVEALED BY STABLE ISOTOPE ANALYSIS

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Migratory birds have species-specific migration strategies to ensure successful migration and survival to maximize their lifetime fitness. However, there is little information about migration strategies of passerines in East Asia where bird banding schemes are inactive and poorly networked. In order to overcome the limitation of typical bird banding using extrinsic markers for understanding of migration strategy in the region, we analyzed stable isotopes (δD and $\delta^{18}O$) in tail feathers of Yellow-throated Buntings (*Emberiza elegans*). One outermost tail feather was collected from each of 41 buntings in the first winter plumage (October to November 2008) and of 22 buntings in the first summer plumage (March and April 2010) at two banding stations in Korea. To estimate the latitudinal difference in origins of two wintering populations, tail feathers of two wintering groups were also collected from December to February: Sihwa Lake in the central part of Korea (wintering at 37°N), and Hong-do in Korea and Izumi in Japan (wintering at 34°N and 32°N). The values of δD and $\delta^{18}O$ had increased as the migratory season progressed in autumn, suggesting that buntings born in higher latitude arrived earlier to the stopover sites. Their returning migration to breeding grounds in spring showed a similar pattern; buntings born in higher latitude arrived earlier. By representing lower δD values, the buntings wintering in the northern part of their winter distribution may be originated from a higher latitude than the southern wintering population was. Consequently, Yellow-throated Buntings in East Asia may have the chain migration strategy, rather than the leapfrog, and their northern populations probably start migration earlier than southern populations do. In further studies, more samples should be intensively collected in each season to avoid potential effects of annual variations and to detect the subtle sexual difference in migration strategy.

BIRD MIGRATION AND BIODIVERSITY CONSERVATION IN EAST ASIA

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Migratory birds encounter habitat destruction, hunting, chemical pollution, and collisions with aircraft and wind turbines during their migration. They may carry the viruses of some infectious diseases such as West Nile fever and avian influenza. Therefore, it is quite important to study their migration routes, stopover sites and destinations, migration patterns through time, and habitat use. In the early 1990s, satellite tracking became available for the study of birds. For nearly 20 years I have collaborated with Russian, Mongolian, Chinese, Korean, Indian and American scientists on satellite tracking of migrating birds. Satellite tracking is especially well suited to Asian-based research because of the extremely large land area, sensitive political situations, and many urgent conservation problems in the region. We have studied the migration of about 20 species using satellite tracking in Asia, and concentrated especially on certain taxonomic groups, including cranes, storks, swans, geese, ducks, and hawks. In this presentation, I review the results obtained from our work under four broad categories: migration routes, relative importance of each stopover site, habitat analysis using satellite images, and migration route selection. I then report on conservation applications and achievements emerging from this work, and discuss future possibilities. During the course of these studies, I have also realized that bird migration and migration studies connect not only nature in different countries but also people living along the migration routes. People in different countries can share by watching the same flocks of migrating birds, and by cooperating to protect focal species and their habitat. The data obtained through satellite tracking can help show people that they need to cooperate to conserve a shared resource. Finally, I will introduce our hawk migration satellite-tracking open-to-the public project. In this project, we shared time to watch the real time migration process of Oriental Honey-Buzzards with many people in East Asia and other areas.

**MIGRANT WADERS COUNT IN MAY 2012 WITH
PARTICULAR REFERENCE TO SPOON-BILLED SANDPIPER
(*EURYNORHYNCHUS PYGMEUS*) AT THE STAGING SITE
IN LOSOSEY BAY, ANIVA GULF, SOUTHERN SAKHALIN**

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The Spoon-Billed sandpiper *Eurynorhynchus pygmeus* (SBS) is considered to be one of the most endangered birds in the world. The IUCN threat status of the species was upgraded to Critically Endangered in 2008. With a breeding population that may now be less than 100 pairs, the species is in real danger of extinction. SBS migrate along part of the East Asian – Australasian Flyway, following the west Pacific coast between their breeding grounds in the coastal tundra of north-east Russia and their wintering sites in southern and South-East Asia. One of the well known places where staging SBS have been recorded during spring and autumn migration is Southern Sakhalin. Counts of up to 200 birds (on 30 May 1979) have been documented, but only single individuals have been seen in recent years.

Study of stopover waders with special search of SBS carried out in Lososey Bay on 16-31 May 2012. 28 species of waders were recorded. The most numerous were Red-Necked Stint *Calidris ruficollis*, Dunlin *Calidris alpina* and Mongolian Plover *Charadrius mongolus*, peak numbers of which exceeds thousand birds for each species. SBS was seen 6 times: as many as five to nine different individuals could have been seen. Four waders (two Red-necked Stint, Mongolian Plover and Ruddy Turnstone *Arenaria interpres*) were banded with standard metal rings and two coloured leg flags (yellow and white). Colour-marked waders were seen on at least six or possibly eight birds of three species: 4 Red-Necked Stints with leg flags from China, Taiwan, north-west and south-east Australia, a Dunlin from China and a Grey-tailed Tattler *Heteroscelus brevipes* from Japan. Records of SBS in Lososey Bay demonstrated that this area is still an important staging site for SBS on their spring migration, but numbers of recorded SBS confirm rapid and continued population decline in this species.

MIGRATION STRATEGIES OF ARCTIC GEESE IN WESTERN AND EASTERN PALEARCTIC

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Geese migration itineraries are different during spring and autumn passages. In spring most geese species move more slowly, with longer stopovers, while in autumn they reach distant wintering grounds in much shorter time window, with shorter stops on their way. There are only some exceptions (like Brent Geese) from this general rule where the opposite strategy is common. Among the most important characteristics or biological features related to “capital/income” dichotomy of breeding strategies of different geese populations are those connected with the overall flight distance, length of the last migration, last stopover duration, and also duration of pre-nesting period on the breeding grounds. Discussion of these questions in relation to large waterfowl received much attention in recent studies, though not all species have been analyzed on a population level. Comparative analysis of migration itineraries of different geese populations in Western and Eastern Palearctic on the example of the Greater White-fronted Goose shows that there is a positive link found between the length of the migration leg from the last stopover, mean body size and duration of pre-nesting period. These features would be discussed with respect to other differences in geese biology found on population level among White-fronted Geese and some other Arctic geese species.

THE STUDY OF MIGRATION AND SPATIAL RELATIONSHIPS OF STELLER'S SEA EAGLES IN THE SOUTHERN PART OF THE BREEDING RANGE

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Migration of Steller's sea eagles was studied using radio-telemetry, banding, and tagging chicks with colored wing tags. A total of 173 birds were tagged with radio transmitters and 125 birds were tagged with wing tags.

As much as 12.5% of birds from the Lower Amur region and Sakhalin, which were tagged with the wing tags, were encountered in Hokkaido. The age of the oldest of them was 10 years. The mortality rate of the tagged birds in the first winter was 29%.

The results of radio telemetry for 11 years confirmed that, on average, at least 36% of Steller's sea eagles from Sakhalin spend winter in Hokkaido. The distribution of records of birds of different age classes during wintering was as follows: 1st wintering, 12%; 2nd, 42%; 3rd, 23%; 4th, 10%; 5th, 10%; and 6th, 3%.

The telemetry data for the sea eagles on Sakhalin in summer show a well-expressed philopatry. As much as 14–71% (on average, 41%) of sea eagle chicks tagged in different times were encountered later on northeastern Sakhalin. The age structure of the birds met in summer was as follows: 1 year of age, 28%; 2 years, 34%; 3 years, 27%; 4 years, 4%; 5 years, 2%; 6 years, 4%; and 7 years, 1%. This distribution pattern indicates an increased mortality rate in the first years of life. According to the results of telemetry, the probability of survival to maturity is approximately 5%.

The average distance between the DF points of sea eagles and their place of birth is 36.7 km. As much as 65% of one-year birds were recorded no further than 50 km from their nests (on average, 32.7 km, $N = 20$); 78% of two-year birds were recorded no further than 50 km from their nests, of which 48% no further than 20 km (on average, 39.6 km, $N = 22$); 64% of three-year birds were recorded no further than 50 km from nests, of which 50% no further than 20 km (on average, 35.7 km, $N = 14$). Older age classes (up to 7 years of age) were recorded at a distance of 3–45 km from their place of birth (on average, 21.9 km, $N = 5$). In three cases, signals from the birds that reached sexual maturity (6 and 7 years of age) were recorded. One of them nested 9.14 km from the place of birth.

AGE-DEPENDENT SPRING MIGRATION STRATEGIES OF MALE ORANGE-FLANKED BUSH ROBINS (*TARSIGER CYANURUS*) IN KOREA

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Earlier arrival to breeding grounds in males has been known to be related to their breeding success and, therefore, various strategies for early arrival (e.g., departs earlier, stopovers shorter, or stays in higher latitude during winter, etc.) have been suggested in various avian species. We investigated whether the different age-groups of males have different migration strategies in the Orange-flanked Bush Robin (*Tarsiger cyanurus*), a sexually dichromatic species with males having fully mature plumage in three or four years after fledging. We banded a total of 386 individuals during the spring migration season in 2010 at the constant-effort banding station on Hong-do Island, Korea. We determined the age based on the plumage color, classified males into four age groups, and monitored differences in arrival dates, sizes, and stopover periods among the age groups. We also investigated their relative wintering latitudes by analyzing ratio of stable isotope (δD) in the tips of claws. After second year (ASY) males had longer wings and total lengths than second year (SY) males, but there were no significant differences among ASY age groups. Older groups of males tended to arrive earlier than younger groups. Rate of daily mass gain was faster in ASY than in SY males, though the stopover period showed no difference among age groups. No significant difference in the relative wintering latitudes among male age groups was detected, but we found that older groups tended to winter in higher latitudes. These results suggest that the long-distance migratory population of Orange-flanked Bush Robins that passes through Korea has multiple migration strategies dependent on age in spring.

**MAINTAINING MORPHOLOGICAL SPECIFICITY
AND GENETIC INTROGRESSION IN POPULATIONS
OF THE GREAT TIT (PARUS MAJOR)
AND THE JAPANESE TIT (P. MINOR) IN MIDDLE AMURLAND**

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The ranges of the Great Tit (*Parus major*) and the Japanese Tit (*P. minor*) overlap in Middle Amurland, where hybridization of these two species occurs. These species have contacted for nearly one hundred years on the western slope of Bureiskiy Ridge, but the Great Tit has settled territories to the east of the ridge only in the last two decades. (Smirenskiy, 1986; Nazarenko et al., 1999). The percentage of minor's allele of intron 2 of mioglobin gene has significantly increased from 8.9% in the west to 27.8% in the east in phenotypic major's populations. Thus the percentage of foreign mtDNA in major's populations has not changed significantly from west (6.2%; n=120) to east (3.2%; n=61). Simultaneous use of two genetic markers (one nuclear and the other mitochondrial) supports our conclusion about strong genetic introgression in the populations of both species, which nevertheless maintain their morphological specificity in the contact zone.

MIGRATION HOTSPOT SITES, ECOLOGY OF WINTERING AND BREEDING GROUNDS

CHILIKA LAKE - AN IMPORTANT WINTERING AND STOP- OVER SITE FOR WATERBIRD POPULATIONS OF BOTH THE CENTRAL-ASIAN AND EAST-ASIA AUSTRALASIAN FLYWAYS IN THE INDIAN SUBCONTINENT

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Chilika Lake (19°28'-19°54'N; 85°05'-85°38'E) is one of the prime waterbird habitats of the Central-Asian Flyway population in the Indian subcontinent as it provides wintering habitat for around a million migratory waterbirds annually. Additionally, being located along the east-coast of India, considerable populations of several waterbird species of the East-Asia Australasian Flyway also winter at this Lake. This was established through ringing recoveries (e.g., Northern Shoveller *Anas clypeata*, Gadwall *Anas strepera*, Curlew Sandpiper *Claidris ferruginea*) and satellite tracking (e.g., Bar-headed Goose *Anser indicus*) studies. The Lake serves also as a stop-over site especially during the northward journey for the waders wintering further south of Chilika.

This paper highlights the global importance of Chilika Lake for the waterbirds of both the flyways based on the waterbird population monitoring study carried at Chilika between 2002 and 2012 by the Bombay Natural History Society in collaboration with the Chilika Development Authority. During the study period, the number of birds recorded in Chilika exceeded 1% of the biogeographical population in 45 waterbird species. Among the waterbirds, the anatids were the predominant group, comprising 60-70% of the total waterbirds counted in Chilika Lake. Of these, the numbers of Northern Pintail *Anas acuta*, Gadwall and Eurasian Wigeon *Anas penelope* exceeded 100,000 each in all the years. Waders were the second dominant group in Chilika. The Black-tailed Godwit *Limosa limosa* was the most abundant among all waders, their numbers fluctuating between 33,000 and 100,000. This is the only site in India where the rare Asian Dowitcher *Limnodromus semipalmatus* occurs in several hundreds, up to 500 counted.

GLOBAL IMPORTANCE OF PONG DAM - A MANMADE RESERVOIR IN NORTH-WESTERN INDIA FOR THE MIGRATORY WATERBIRDS OF THE CENTRAL-ASIAN FLYWAY

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Pong Dam (31°80'-32°07'N; 075°08'-076°25' E ???), a Ramsar Site, is basically an irrigation reservoir which is used by a large number of waterbirds. It was declared as a bird sanctuary in 1983. This paper is based on the three year bird ringing and satellite tracking studies carried out at Pong Dam. The Dam supported the highest congregation of Bar-headed Goose *Anser indicus* in the Central-Asian Flyway, their numbers ranging from 20,000 to 40,000 birds. Satellite tracking studies revealed that the Bar-headed Geese wintering at Pong dam are less migratory, and originate from Kashmir and Tibet regions. In spite of the Dam's location in northwest India, it also serves as wintering and stop-over sites for the East-Asia Australasian Flyway bird populations. The recovery of Common Teal *Anas crecca* ringed at Pong Dam in northeast Russia and the tracking of Ruddy-Shelduck *Tadorna ferruginea* to north China substantiated this. Several wader species which prefer coastal habitats during winter, such as Terek Sandpiper *Xenus cinereus*, Ruddy turnstone *Arenaria interpres*, Dunlin *Calidris alpina* and Curlew Sandpiper *Calidris ferruginea* also utilize this wetland as a stop-over site during spring passage. A Common Redshank *Tringa totanus* ringed in southeast India (Point Calimere) recovered during its northward journey at Pong dam confirmed this. The populations recorded exceeded 1% of their biogeographical population in 11 waterbird species. The uncommon/rare winter visitors to India, namely Mallard *Anas platyrhynchos*, Common Merganser *Mergus merganser*, Common Shelduck *Tadorna tadorna* and Greater White-fronted Goose *Anser albifrons* occurred regularly in Pong Dam.

50 YEARS OF INTERNATIONAL COLLABORATION FOR RESEARCH AND PROTECTION OF BIRDS IN THE RUSSIAN FAR EAST

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Internationally recognized studies implemented by soviet ornithologists in the Russian Far East started at early 60th of XX century. In order to carry out comprehensive research, large academic centers were established in the Far East and Siberia, and professional ornithologists began their studies there.

For the 'reference point' we should take year 1963, when International Union for Conservation of Nature (IUCN) first published global lists of rare and endangered species of animals and plants. The term "Red Data List" was introduced those days and it is still important for ecologists and environmentalists. In Soviet Union the first lists and descriptions of rare and endemic birds were prepared. It is worth to note that most of them breed only on Russian Far East.

It took less than 10 years to accomplish the first description of avifauna of the vast regions of the Far East. As a result of this work USSR joined several international and bilateral Conventions, the first one was The Convention on Wetlands of International Importance, especially as Waterfowl Habitat, also known as Ramsar Convention (1973). Due to efforts of Far Eastern ornithologists, the Khanka lake and the most valuable adjusting wetlands were nominated to the List of Ramsar sites of Soviet Union.

Starting from 1976 the Institute of Biology and Soil Science (Vladivostok) coordinated a research under Soviet - Japanese convention "On Protection of Migrating Birds and Endangered Bird Species, and Habitats Thereof". Collaboration between Soviet and Japanese ornithologists was initiated even earlier by a prominent Japanese scientist Yoshimaro Yamasina. The first Soviet-Chinese symposium took place in 1989 during Amur river cruise, providing a basis for the future close cooperation.

Nowadays it is safe to say that after 50 years of collaboration we have gained valuable and positive experience of scientific research and learned how to resolve complex conservation issues in protection of birds.

ANTHROPOGENIC TRANSFORMATIONS OF PRIAMURJE NATURAL ECOSYSTEMS AND THEIR IMPACT ON THE BIRDS OF THE REGION

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Present day environmental situation in the Amur basin region (Priamurje) much depends on natural factors and specifics of human impacts on natural systems. The main anthropogenic factors of significant direct or indirect impact on natural ecosystems include agricultural and forestry industry developments, mining, water consumption, and in some places also residential development, hunting and fishing. Catastrophic transformations of natural ecosystems in large areas are caused by forest and grassland fires, which occur mostly due to economic developments and largely characterize the general culture of natural resource use in the region.

Birds, being one of the most significant and mobile elements of ecosystems, vulnerably respond to environmental changes and are a sensitive indicator of ecosystem conditions. To a lesser extent this applies to ecologically adaptive bird groups, including stress tolerant species, and much more - to conservative species, which are initially small in number, rare and endangered.

Large-scale and wide-range anthropogenic transformations of natural complexes caused significant changes in the bird population of the region. In recent 50 years, the natural avifauna has lost Japanese crested ibis (*Nipponia nippon*) and crested shelduck (*Tadorna cristata*). The following birds became extremely few and rare: black (Ciconia nigra) and Far Eastern (Ciconia boyciana) storks, whooper swan (*Cygnus cygnus*), grey goose (*Anser anser*), bean goose (*Anser fabalis*), black grouse (*Lyrurus tetrix*), Siberian goose (*Falcipennis falcipennis*), black-billed capercaillie (*Tetrao parvirostris*), Japanese (*Grus japonensis*) and white-naped (*Grus vipio*) cranes, spotted greenshank (*Tringaguttifer*), osprey (*Pandion haliaetus*), falcon (*Falco peregrinus*), white-tailed eagle (*Haliaeetus albicilla*), fish eagle (*Bubo blakistoni*) and common (Bubo) eagle owl and many others. Conditions of migratory birds, which stop in the region on their way, have also deteriorated.

At the same time, the population of birds of different habitats quite specifically responds to every type and nature of human impacts. The response varies from a catastrophic reduction in number and species composition to little rearrangements in its structure and active use of adaptation mechanisms. Knowledge of these reactions makes possible realistic projections of the avifauna dynamics in the developing areas and environmentally adapted process of natural resource management.

A GLOBAL MODEL OF AVIAN INFLUENZA PREDICTION IN WILD BIRDS: THE IMPORTANCE OF NORTHERN REGIONS AND LESSONS LEARNED FOR THE PACIFIC RIM FLYWAY

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The avian influenza virus (AIV) is enzootic to wild birds, which act as a natural reservoir. AIV presents us with a large degree of genetic diversity and most of the isolated strains are of low pathogenicity to poultry but poorly studied beyond that. Although AIV can be found in most wild bird populations, highly pathogenic H5N1 subtypes in poultry have been the focus of most efforts. However, here we argue to better understand the viral ecology of AIV, a predictive model should 1) include wild birds, 2) include all isolated subtypes, and 3) cover the host's natural range, unbounded by artificial country borders. As an example, we used the Random Forests algorithm, an ensemble data-mining machine-learning method, to develop a global-scale predictive map of AIV, identify important predictors, and describe the environmental niche of AIV in wild bird populations. The model has a good accuracy of 0.79 and identified northern areas as having the highest relative predicted risk of outbreak. The primary niche was described as regions of low annual rainfall and low temperatures. While this study uses publicly available IRD and environmental data, it relied heavily on earlier work done in the Northern Pacific Rim and its flyway data collected over many years in the field in Alaska, Russia, Japan and China. Finally, we provide a summary and overview that lead to these first sets of models, how to improve them and with an increased relevance to birds, conservation and public health on an international and global scale.

**HISTORY, REALITIES, COMPARISONS, NEEDS,
OPPORTUNITIES AND VISIONS FOR MIGRATORY BIRDS
ON THE EAST-ASIAN AUSTRALASIAN FLYWAY (EEAF)
AND BEYOND: A SUSTAINABILITY EFFICIENCY CHECK
AND ‘BEST PROFESSIONAL RESEARCH PRACTICES’**

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Despite decades of research, most migratory flyways tend to be in a bad shape these days: taxonomies are not well harmonized, most population trends are poorly known, precious wilderness habitats got converted, conservation policies are not efficient, wildlife management is widely absent, climate change is adding huge and unknown stressors, data are hard to come by, and many public budgets are declining for flyways and conservation.

Based on a wider literature review here I provide a brief history of flyway research and its outcome. Secondly, I provide an overview of what has kept wild birds and ecological services alive, and what has not worked well using a World Fact book and BirdLife International global data analysis. Third, I will present a conservation and Avian Influenza (AI) study overview for the EEAF and what was already achieved. Fourth, I provide an outlook for the next 100 years based on published IPCC and official development scenarios.

I conclude with a synthesis and urgently needed ‘best practices’ for flyway research in order to avoid errors made elsewhere, and as a good ethical and conceptual foundation how one of the last great wilderness flyways (EEAF), its species and habitats, can be managed, conserved well and spared from further global destruction.

THE BAIKAL SIBERIA: MIGRATORY STRATEGY AND KEY STOPOVER SITES OF SHOREBIRDS AND WATERFOWLS

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The Baikal Siberia is a large region of Northern Asia and includes the basin of Baikal lake. Thousands of migrating shorebirds and waterfowls passing annually this mainland region. Due to complex mountain landscapes, we may confidently distinguish several areas that are used by migratory waterbirds as a passage corridors and stopover sites : Baikalo-Angaro-Yenisey, Toreisko-Kirengsko-Tungus, Vitimo-Patomsky, Hingano-Arguno-Aldan, Toreisko-Olekminsky, Baikalo-Angaro-Tungus, Toreisko-Baikalo-Angarsk and Selenginsky. Among the largest migration corridors are Selenginsky, Toreisko-Baikalo-Angarsk and Baikalo-Angaro-Yenisey. In this areas earliest arrival of migrants were observed in spring (the end of March – the beginning of April) as well as latest large stopover aggregations of birds during their the autumn season (second half of November).

The largest migratory numbers of stopover migrants of the region are typical for the lake Baikal: of the Selenga river delta, the Chivyrkujsky bay with neritic shoals and lakes and Verhnjya Angara and Kichery river delta, and also Verhne-Angarsk multi-branches. In the south the largest aggregations of staging migrants are observed on for Toreisky lakes (in years of a substantial floods). In the north of the Baikal region great numbers of shorebirds and waterfowls are observed on many shoals and bays of the Bratsk water reservoir. Less significant, but still very important stopover sites are known for a valley of the Oka river and the Predbaikal regional deflection. Even single counts here provide numbers of stopover birds that exceeds by factor of ten (and hundred in some cases) the international Ramsar criterion of 20 thousand individuals.

In the Baikal Siberia birds are using two different migration strategies in spring and autumn. In the beginning of spring the main flow of migrants goes through southern hollows on forest-steppe. Here there are small lake systems where large numbers of birds stay and wait till warm weather front, and then fly with this front to the north. In second half of spring birds start follow many additional small passage corridors across mountain ridges, while mountains are still covered with a snow. They join the large migratory corridors that passing along the whole region from the south to north. In the autumn the strategy is opposite. In the beginning of the season birds fly in a wide fronts. Later flows of migrants are narrowing in several main directions along valleys of the large rivers that cross the steppe areas.

ECOLOGICAL CRISIS IN THE EAST ASIAN-AUSTRALASIAN FLYWAY AND THE IMPORTANCE OF RUSSIA

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The East Asian-Australasian Flyway (EAAF) is one of the nine global bird migration pathways. The Flyway embraces 22 countries, and Arctic Far East Russia along with Alaska is the breeding area of many waterbird species that migrate through East and South-east Asia to non-breeding grounds in Australia and New Zealand. Over 200 species of migratory waterbird occur on Sakhalin Island and other parts of Far East Russia, including cranes, ducks, shorebirds and seabirds. Many of these species are threatened, often facing multiple threats in different countries. Some, like the Baer's Pochard *Aythya baeri*, Spoon-billed Sandpiper *Eurynorhynchus pygmeus* and Siberian Crane *Grus leucogeranus* are on the brink of extinction. Among the long-distance migrants, several shorebirds have declined precipitously in recent years, such as Nordmann's Greenshank *Tringa guttifer*, Far Eastern Curlew *Numenius madagascariensis*, Great Knot *Calidris tenuirostris* and Black-tailed Godwit *Limosa limosa*. We will discuss current threats in Russia, the importance of international collaboration and the best ways to ensure adequate protection for these species at their breeding sites. The EAAFP is a partnership of 30 entities: governments (including Russia), inter-governmental and international non-governmental organizations and an international private enterprise. One of the aims of EAAFP is to identify key sites along the Flyway which, if conserved and effectively managed, can support the continued migration of different waterbird species in the Flyway. Sites in Sakhalin are important for both breeding and passage waterbirds. During this roundtable discussion we will identify key sites as well as necessary management actions.

ODOPTU BAY (NORTHERN SAKHALIN) – THE KEY STAGING SITE FOR WADERS DURING POSTBREEDING MOVEMENTS AND FALL MIGRATION IN OKHOTSK SEA REGION

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Okhotsk sea region is one of the most important parts of Eastasian-Australasian flyway. Several millions of waders of 60 species passing thru the region during post-breeding movements and fall migration. Until recently, 14 sites in this region were recognized as internationally important for conservation of waders. However, only one site in Russia included to the East Asian-Australasian Shorebird Reserve Network – Moroshechnaya River Estuary on Kamchatka. During field studies on the coast of Northern Sakhalin, we found an area with substantial concentration of waders, not mentioned previously in relevant literature. It is Odoptu bay, the southernmost closed lagoon between Piltun bay and Schmidt peninsula. Results of observations and trapping of stopover waders show that this area is one of the key staging sites, comparable with Moroshechnaya River Estuary in terms of conservation value. Massive passage and concentration of waders on the bay was recorded for the period from beginning of July till middle of October. Maximal number of waders recorded during single count on the bay mud flats reached 50 000 birds. Particularly, we recorded large stopover aggregations of Black-Tailed Godwit (up to 15000), Great Knot (up to 11500), Red Knot (up to 2000), Red-necked Stint (up to 15 000), Dunlin (up to 10 000). Among wader species rear in the region, we recorded Far Eastern Curlew, Nordmann's Greenshank, Temminck's Stint, Curlew Sandpiper, Spoon-Billed Sandpiper, Broad-Billed Sandpiper and Western Sandpiper. We trapped and banded more than 10 000 waders during 2009-2012. On the base of trapping data we found out that Dunlins from northern populations staging on the bay for post-nuptial molt. Retraps of individuals of several species prove that some birds staying and refueling on this stopover sites for two-four weeks. We have got band recoveries of birds from Australia, China, Japan, Thailand, Taiwan. In 2010 we trapped dunlin of North-Alaska subspecies, ringed on Alaka near Barrow. Therefore, it is save to say that Odoptu bay is one of the most important staging sites for several wader species, where they stopover for roosting, refueling and molting before further migration journey.

BEWICK'S SWAN (*CYGNUS BEWICKII*) AUTUMN MIGRATION AT THE PILTUN BAY

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The restoring western population of the Bewick's Swan migrates along Sakhalin. This species is included into the Red Books of Russia and Sakhalin Oblast. The biggest groups of swans during the autumn migration on Sakhalin were found at the Piltun Bay. Researches were carried out in 2007, 2011 and 2012 from late September through late October. Results of the researches showed that number of transit migrating Bewick's swans has considerably increased during last decades. In late October 99% of swans were identified as Bewick's swans. Big feeding groups of swans were found at some sectors of the Piltun Bay water area: 4,3 k – Sep 29, 2011; 5,6 k – Oct 4, 2011; 6,3 k – Oct 6, 2012; 5,8 k – Oct 21, 2007. Maximum number of swans found at the same time at the Bay was: 2007 – 28,5 k; 2011 – 21,4 k; 2012 – 13,5 k birds. Total number of identified swans during the whole monitoring period: 2007 – 62,2 k; 2011 – 55,2 k; 2012 – 43,2 k. 4 sectors of the bay water area were found to place groups of over 5,000 swans staying for a long period.

Considerable differences of swans' transit migration dynamics were identified. In 2007 and 2012 number of swans at the bay increased from late September and reached maximum in mid October, In 2011 – maximum number was identified in late September – early October, after what the swans started leaving the bay in droves.

Intensive migration of the swans in the southern direction was seen in the Piltun Bay area during the autumn migration. Many flocks were flying over the Bay and didn't make a stop to rest and feed. On many occasions hunting was seen to trigger migration move of the birds: flocks of thousands of swans scared by shooting were almost all together leaving the bay. Intensity of hunting is the key factor affecting distribution and staging time of the swans in the bay. Migration timeframe and dynamics are mostly determined by weather conditions in the northern parts of the Far East.

These researches confirmed the importance of the Piltun Bay as a stop and feeding area for, at least, 25% of the world Bewick's Swan population during their autumn migration.

THE SLATY-BACKED GULL IN THE NORTHERN THE SEA OF OKHOTSK: THE CHOICE OF FEEDING STRATEGIES DURING THE BREEDING PERIOD

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The northern part of the Sea of Okhotsk is the second important area for the reproduction of the Slaty-backed Gull (after Kamchatka Peninsula) by the number of breeding pairs. The foraging strategies used by gulls from different breeding colonies varied considerably and they were bird predation, fishing, feeding on dumps, gathering inland and gathering on the littoral zone. The basic foraging strategy was typical for each colony among years even considering seasonal and individual variations.

We studied a feeding of the Slaty-backed Gull using traditional methods: collection of food samples and observation over feeding birds. We analyzed food spectra of the Slaty-backed Gull nesting in colonies differing by number of nests; seabird species composition; distance from settlements; and also inside of the city of Magadan (roof breeders).

Our observations showed that the choice of basic foraging strategy was defined by the proportion of nesting Slaty-backed Gulls in seabird colony. If the proportion of Slaty-backed Gulls was less than 1% of number of other seabird species in a colony the Slaty-backed Gull was a predator on eggs, chicks, and adult seabirds (or their corpses). If the proportion was more than 1% the foraging strategy was dominated by gathering on littoral zone of coast with intraspecific predation of eggs as only predator strategy. The proportion of anthropogenic food was defined by distance of a colony to settlements or dumps. In an extreme variant as the urban population of Slaty-backed Gulls in Magadan-city (single species colonies) the foraging strategy was feeding only on dumps. Besides, Slaty-backed Gulls in any colony (except for the urban population) easily switched to mass seasonal foods for a short time.

IZMENY STRAIT AS A POTENTIAL RAMSAR SITE

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Southernmost part of the Greater Kuril Ridge is an important key area for water-bird migrants following the Eastasian-Australasian Flyway. During spring and fall passage the strait between Kunashir and Hokkaido support tens of thousands of staging waterfowls: Scaups (*Aythya marila*), Black Scoters (*Melanitta americana*), White-Winged Scoters (*Melanitta deglandi*). Thousands of dabbling ducks and shorebirds use marshes and lowlands of the southern Kunashir as a stopover sites. The largest numbers of migrants are estimated during spring passage. Fall migration is less intensive and very much extended in time. Hundreds of thousands of stormpetrels of several species pass to the north across the strait during summer. Substantial concentration of birds in this area is explained by environmental conditions, favorable for refueling and roosting: shallow bays and lagoons, mountains that screen this area from cold northern winds, and highly productive coastal ecosystems. Based on available data it is clear that Izmeny strait and adjoining coastal areas play an important role in conservation of migratory waterbirds and well deserves inclusion to the List of Ramsar sites.

BAIKAL BAY AND NEWSKOE LAKE AS A POTENTIAL RAMSAR SITES ON SAKHALIN ISLAND

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Sakhalin island play an important role for many waterfowl and shorebird species. Sea bays and lagoons provide an environment both for successful breeding and efficient refueling of waterbird migrants that follow Eastasian-Australasian flyway. Despite the critical importance of Sakhalin for conservation and management of waterbirds, non of the key sites of the island are protected by Ramsar convention. I suggest to consider two locations as a potential Ramsar sites: Baikal bay on the north-west of Sakhalin, and Newskoe lake on the central east cost. Area of Baikal bay (53°28'20"N, 142°23'54"E) is more than 500 sq. km. Newskoe lake (49°21'59"N, 143°22'3"E) is separated by narrow spit from Terpenia bay, and in fact it is salt-water lagoon of the sea of Okhotsk. Wetlands itself and adjusting landscape provide excellent foraging conditions and concealment for many bird species. 44 waterbird species have been observed on Baikal Bay, and 135 bird species from all ecological groups on Newskoe lake. Some common birds species are breeding there in substantial numbers: Mallard, Common Teal, Northern Pintail, Eurasian Widgeon, Water-rail. Particularly important is breeding in of vulnerable Red list species – Swan Goose (Baikal bay), Spot-Billed and Mandarin Ducks (Nevskoe lake). Not yet confirmed for Baikal bay, but possible breeding of Schrenck's Bittern, Common Tern, Garganey, and protected species: Aleutian Tern and globally endangered Nordmann's Greenshenk. During fall passage we observed there large flocks of Baikal Teal. Common breeding species specific for Newkoe lake are Red-throated Loon, Little and Red-necked Grebes. Both wetlands lays on the migratory pathway of bean gees, white fronted gees and protected lesser white fronted gees, whooper and bewick swans. During spring and fall migration, and summer post-breeding movements both wetlands and surrounding grasslands and marshes support large aggregations of waterfowls, shorebirds and landbirds, including several Red list species of raptors.

ONGOING PROJECTS FOCUSING ON MIGRATORY BIRDS WHICH SPEND THE NON-BREEDING SEASON IN THAILAND

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Thailand occurs along major flyways including stopover and wintering sites for roughly 300 species of migratory birds. The objective of the ongoing projects described here is to determine the migration routes of birds which overwinter or passage through the country as part of a general program trying to understand the dynamics of avian influenza and other emerging zoonotic diseases. Three programs have been established for monitoring and research, first using satellite tracking and geolocators, second using cannon netting and leg flagging of shorebirds, and the third focusing of landbirds. From 2007 to present we tagged 12 birds with satellite collars or geolocators (n=20). During the same period we ringed >10,000 shorebirds (at 3 major sites), and approximately 20,000 land birds (2 major sites). Of the satellite collared/geocator birds, 16 individuals provided clear migration data for 7 species. For the shorebirds, >400 resighting reports of 18 species have been obtained both inside and outside of Thailand. For the landbird ringing, only 1 long-distance recovery was made (Russian Far East) although approximately 4,000 birds have been recaptured providing valuable survival data and within-site movement data. The shorebird ringing appears to be remarkably cost effective, while the landbird ringing has provided very little data on long-distance migration. However, the addition of stable isotopes and geolocators may provide valuable data for the landbird work. The satellite data provide useful data on a small number of species and individuals. The geolocators hold promise for lower cost detailed understanding of migration. Analysis of the entire dataset is in progress.

Keywords: satellite tracking, geolocators, leg flagging, cannon netting.

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For notes

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НАУЧНОЕ ИЗДАНИЕ

**Мигрирующие птицы
Северной Пацифики:
места размножения и остановок
на меняющейся Земле.**

Тезисы докладов

Ответственный редактор
Ктиторов Павел Сергеевич

Редактор английского текста П.С. Ктиторов
Редактор электронной вёрстки А.А. Киреева
Дизайн обложки М.В. Сеначин
Фото на обложке Е.Ю. Кузьменко

Подписано в печать 29.08.2013 г.
Усл. печ. лист. 5,1. Уч.-изд. лист. 2,08.
Формат 60х84/8. Бумага «Color copy».
Тираж 50 экз. Заказ № 7720.
Печать офсетная. Без цены.

ФГБУН Институт морской геологии и геофизики
Дальневосточного отделения
Российской академии наук
693022, г. Южно-Сахалинск, ул.Науки, 1Б. Офсетный цех