

Call for the conservation of Dunlin through the East Asian-Australasian Flyway

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The Dunlin (*Calidris alpina*) is one of the most abundant shorebirds wintering in East Asia. The connectivity among its breeding, staging and wintering areas has been partly identified by long-term banding/recovery efforts through the EAAF. However, the monitoring outcomes have revealed its decline, and AMBI-EAAF Workplan lists Dunlin as one of the conservation priority species.

In Japan, the nationwide shorebird monitoring survey has been conducted since 1973. Now the monitoring is done at 140+ sites for 3 seasons a year. The Dunlin is dominant in spring and winter. Its main subspecies in Japan is identified as *arctica*, but the population analysis from the monitoring results has shown the possibility of other subspecies occurring in Kyushu Island in certain migration seasons. The population of Dunlin shows a continuous decline for the past 40 years. It is analysed that the current population is about 30% in spring, and about 15% in autumn compared to those of the 1980s.

In January 2020, an expert workshop on the conservation of small shorebird species that migrate among Russia, US and Japan was organised to seek for the opportunities of developing cooperative research and conservation actions especially on Dunlin. In the workshop, the experts shared existing knowledge including migration patterns, monitoring schemes and population trends of Dunlin in each country, to identify the knowledge gaps, then listed up necessary research actions to fill in the gaps. The participants wished to share the workshop outcome with a wider audience to invite more people from the rest of the EAAF to join in the initiative.

The Dunlin has the potential to be a flagship species for developing further cooperative conservation works of shorebirds throughout East Asia. A discussion session will follow after a series of Dunlin presentations in this science meeting to discuss possible future conservation actions and priority projects to pursue. Experts from relevant ranges are welcome.

Theme: Breeding Ecology, Migration Ecology, Non-breeding Ecology, Monitoring
Preferred option: Oral Presentation

Demography and migratory dynamics of Dunlin on the East Asian-Australasian Flyway

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The Dunlin (*Calidris alpina*) is one of the most abundant shorebirds wintering in East Asia. Populations in East Asia include four different subspecies, each has their own distinct breeding range in the Arctic with population sizes between ~900 and 500,000 birds. Declines of up to 80% have occurred in the Japanese nonbreeding range since 1975, and losses in other areas are likely because the species stages or winters where large-scale reclamation has occurred. Demographic models for Dunlin breeding in North America indicate the *arctica* subspecies has much lower mean annual survival rates than other subspecies of Dunlin that winter in North America. Species differences suggests losses are occurring outside of the breeding range. At present rates, the population will reach 3% of its 2014 level within 20 years. Band resightings indicate *arctica* Dunlin primarily use areas in Japan during migration and winter, with some visiting the Yellow and China sea regions. In contrast, observations of *actites* and *sakhalina* Dunlin almost all occurred in the Yellow and China Sea regions. Up to 83% of *arctica* Dunlin exhibited inter-annual site fidelity to specific nonbreeding sites, suggesting that loss of specific sites could lead to declines. Light-level geolocation data indicated the nonbreeding range of *arctica* Dunlin was primarily the eastern edge of the flyway (western Alaska and central Japan), whereas *sakhalina* and *kistchinski* Dunlin were found along the western edge of the flyway (Bohai Bay and inland China). However, all four subspecies used the same core regions at the center of the flyway (Sakhalin Island, Yellow Sea, and East China Sea). Dunlin subspecies co-occurred temporally in core flyway regions in winter and north migration but did not co-occur together in south migration. Variation in migration patterns indicate conservation can occur at the subspecies level; identifying threats to *arctica* and the very rare *actites* subspecies should be a top priority.

Theme: Migration Ecology

Preferred option: Oral Presentation

Banding and count survey of Dunlin on Kamchatka

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Dunlin is one of the most common shorebird species of Kamchatka. Over the past 30 years, we have collected big information about the terms and routs of migration through the Peninsula, number and important staging places. We conducted shorebird counting work on Kamchatka on southward migration during 13 seasons and on northward migration during 16 seasons. In May, Dunlins arrive at various points in the southern part of the Western coast of Kamchatka from Sakhalin. The main migration route is formed along the West coast. In its center, we counted up to 124 thousand Dunlins for 1 migration season. Further north the main part of the Dunlins crosses the Peninsula in various places in its Central and Northern parts and then move along the North-Eastern Kamchatka. On the South-Eastern coast of Kamchatka, the intensity of migration is relatively weak; we counted there not more 1500 Dunlins during May. On southward migration, the routes are about the same. The only difference is that a large number of Dunlins migrate through the northernmost part of the Western coast of Kamchatka, and in the spring there is almost no migration here, since all coasts are covered with ice till early June. In 1990-2000s the number of Dunlins on Kamchatka was decreased on northward migration, but breeding population is stable till now. We estimated total number of Dunlins in main staging places during southward migration on West Kamchatka as 300000 in Penzhina River Estuary, 120000 - in the Moroshechnaya River Estuary and 80000 - on the Vorovskaya River lagoon. In total about 11,600 Dunlins were banded and flagged on Kamchatka in 1990-2020, including 6,900 in the Vorovskaya River lagoon in 2014-2020.

Theme: migration ecology

Preferred Option: Oral Presentation

Numbers and distribution of Dunlins in Republic of Korea

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Shorebird monitoring survey was conducted from 2001 in ROK. The monitoring has been done on 8~20 sites along western and southern coastline. The Dunlin is the largest number of migrating and wintering shorebird species in ROK.

The number of migrating Dunlin was 65,567 ~100,786 in spring, and 14,913~36,114 in autumn season in recent 5 years. The most important site having largest population(23.6% of total number) is Yubu Island, and the other important sites are Asan Bay, Yeongjong Island, Namyang Bay, Geum Estuary and Cheonsu Bay. The migrating Dunlin population has been on declining trend since 2001.

Average wintering population for 21 years was 10,932 with the range of minimum 2,624 in 2018 to maximum 21,955 in 2010. Wintering Dunlins has been recorded at 74 sites of 200 Winter Waterbird Census sites since 2000, but the wintering ground over 1,000 dunlins of maximum count was only 20 sites. The main wintering sites are including in Nakdong Estuary, Yubu Island, Saemangeum region, Namyang Bay and Suncheon Bay. The habitat types of wintering Dunlins are intertidal mudflat zone, bay, estuary, sand beach, inland wetland, etc.

Because the Dunlin is common species that has largest numbers of shorebirds in ROK. There is no specific conservation effort, but the efforts are being made to protect their habitats used by other waterbirds.

Distribution and Conservation Status of the Dunlin in China

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The coastal regions of southeast China have great importance for Dunlin which migrating along the East Asian - Australasian flyway. Each year, large numbers of Dunlin are widely distributed here for resting and wintering. However, due to the lack of special investigations in the past, the population status and distribution of Dunlin in China is still not clear. In addition, without the morphological features that can be easily identified for different subspecies, it's difficult for us to assess the dynamic changes of populations by field monitoring. Given the above, we first reviewed the synchronous monitoring results of water birds in the Yellow and Bohai Sea for recent ten years to determine the main distribution of Dunlin in China, 24 stopover sites and 5 wintering sites were being identified. Then based on the monitoring results of Dunlin in Yalu Jiang estuary over past two decades, bird banding records and color flag collecting records, we made a assessment on the population dynamics of Dunlin. The results showed that although its overall distribution is relatively stable, but the populations in some individual areas continued to decline, and the changes of population structure indicated that some subspecies are facing potential threats. Finally, we summarized the conservation status of Dunlin and the threats they faced, including mudflat reclamation, the invasion of *Spartina* and the shortage of food resources et al. We called for the strengthening of monitoring and ecological research on Dunlin to enhance the protection of its population and habitats.

Theme: Monitoring

Preferred Option: Oral Presentation