

Assessment of virus movement across continents: using Northern Pintails (*Anas acuta*) as a test

Trip Report Capture and Marking of Northern Pintails in Japan 9-20 February 2008

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In 2007 The USGS Alaska Science Center (ASC) initiated a cooperative study¹ with Japanese scientists to assess the likelihood that migratory birds could transmit highly pathogenic H5N1 avian influenza virus from Asia to North America. Study collaborators include the University of Tokyo, USGS National Wildlife Health Center, Western Ecological Research Center, U.S. Fish and Wildlife Service, and Yamashina Institute of Ornithology. We are using Northern Pintails as a focal species because they frequently migrate across continental boundaries and because a relatively high proportion of pintails carry avian influenza strains. We are involving Japanese scientists because Japan is the main wintering area for Northern Pintails in east Asia. The study includes four components: (1) analysis of band recovery data to identify areas in Russia where pintails from North American wintering areas would likely come into contact with Japanese pintails during migration and nesting, (2) use of satellite telemetry to model spatial and temporal distribution of Japanese pintails during migration and nesting, and to estimate the likelihood that they occur in areas occupied by North American pintails, (3) assessment of transcontinental transmission of avian influenza by comparing low pathogenic (non-H5N1) virus strains in pintails in Alaska and California to those from Japan, and (4) comparison of neutral nuclear and mitochondrial genetic similarities between Asian and North American pintails to evaluate the degree of reproductive isolation between these populations. In 2007 we completed analysis of band recoveries from North American pintails in Japan, marked 27 pintails with satellite transmitters on Japanese wintering areas, evaluated whether there was genetic evidence of Eurasian virus strains in low-pathogenic viruses carried by Alaskan pintails, and completed genetic comparisons of Japanese and North American pintails².

From 9—20 February, 2008 we traveled to Japan (Fig. 1) to conduct a second year of marking Northern Pintails with satellite transmitters (PTTs).

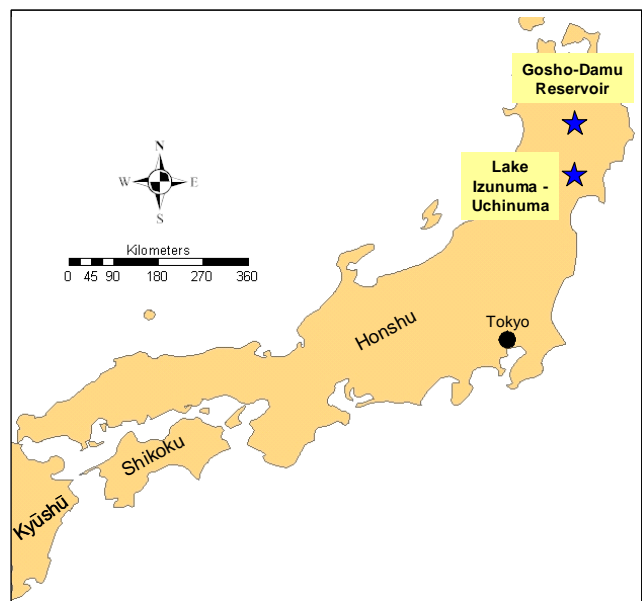


Figure 1. Locations in Japan where Northern Pintails were marked with satellite transmitters in 2008

¹ The study proposal is available at: http://alaska.usgs.gov/science/biology/avian_influenza/projects.html.

² A progress report is available at:

http://alaska.usgs.gov/science/biology/avian_influenza/pdfs/Assessment_of_virus_movement_progress_report_2008.pdf.

Our primary collaborator continues to be Dr. Hiroyoshi Higuchi, Director of the Laboratory of Biodiversity Science, University of Tokyo. In addition, we worked closely with Dr. Noriyuki Yamaguchi, a Post-Doctoral Fellow in the Laboratory of Biodiversity Science. Dr. Higuchi and Dr. Yamaguchi secured necessary permits and made logistical arrangements prior to our arrival, however Dr. Higuchi was unable to join us for field work due to other commitments. Through a cooperative agreement, ASC provided the University of Tokyo funding to support the field work, and salary for Dr. Yamaguchi to analyze satellite telemetry movements of pintails in Japan. We are partially supporting Dr. Yamaguchi's post-doctoral research because the study is yielding a large amount of data on movements and habitat use by pintails while they are in Japan and during their migration to Russia. We believe it most appropriate for Japanese scientists to analyze these data because of their greater familiarity with landscapes, wetland habitats, and conservation issues in East Asia.

We captured pintails at Lake Izunuma-Uchinuma in the Miyagi Prefecture and at Goshō-Damu Reservoir in the Iwate Prefecture of northern Honshu (Fig. 1). We had previously captured pintails at Lake Izunuma-Uchinuma in 2007. In both areas wintering Northern Pintails and Whooper Swans are hand-fed by local people (Fig. 2). Because of feeding, the birds are very concentrated and easily approached.



Figure 2. Feeding of Whooper Swans and Northern Pintails at Goshō-Damu Reservoir, Japan, February 2008.

We captured pintails at Lakes Izunuma-Uchinuma on 12 February and at Goshō-Damu Reservoir on 14 February. At each site Japanese biologists used a clap trap to catch between 20—150 pintails at each trapping event (Fig. 3). In addition to Dr. Yamaguchi and his team from the University of Tokyo, representatives from the Ministry of the Environment and several non-governmental organizations assisted with captures at Lake Izunuma-Uchinuma (Fig. 4). At Goshō-Damu Reservoir, Dr. Atsuki Azuma and



Figure 3. Capture of Northern Pintails at Goshō-Damu Reservoir, Japan, February 2008.



Figure 4. The pintail capture team at Lake Izunuma-Uchinuma.

several of his students from Iwate University took part in captures. Also, representatives from the Japan Ministry of Health, National Institute of Infectious Diseases were present at Goshu-Damu Reservoir to sample pintails for the presence of highly pathogenic H5N1 and West Nile viruses.

We attached PTTs (Fig. 5) to 35 pintails (24 males and 11 females) at Lake Izunuma-Uchinuma, and 17 pintails at Goshu-Damu Reservoir (7 males and 10 females). In addition, Dr. Yamaguchi deployed 18 PTTs supplied by the University of Tokyo to pintails at Goshu-Damu Reservoir. We deployed 20 g battery powered PTTs manufactured by Microwave Telemetry Inc., whereas Dr. Yamaguchi used solar powered PTTs. We attached Kim PTTs dorsally (Fig. 6) to pintails using a Teflon[®] ribbon following the same methods used by Miller et al. (2005. *Canadian Journal of Zoology* 83:1314-1332). As of 6 March, all 52 PTTs deployed by the ASC team were operable and providing locations³. Dr. Yamaguchi will provide us with updates on movements of pintails that his team marked.

Following marking of pintails at Goshu-Damu Reservoir, we returned to Tokyo on 15 February. On 18 February we met with Naoki Amako from the Japan Ministry of the Environment to discuss the study, and in particular to gain his assistance in securing low pathogenic virus samples from pintails in Japan for genetic comparison with viruses from North American pintails. Mr. Amako was helpful and agreed to

³ Movements of pintails will be posted on the project web site at:
http://alaska.usgs.gov/science/biology/avian_influenza/pintail_movements.html

assist our search for Japanese collaborators that can provide low pathogenic viruses. We have been in email contact with Mr. Amako since our return.

We spent part of 18 February working with Dr. Yamaguchi to install computer software developed by ASC scientist David Douglas that compiles satellite telemetry data, filters unlikely locations, and produces graphic output of movements in Google Earth files. Japanese scientists had previously expressed great interest in using this program to manage satellite telemetry data that they are collecting from species such as Mallards, Eurasian Wigeon, Northern Pintails, and Oriental Honey Buzzards. We also met with Dr. Higuchi to discuss status and future plans for the project. At that time we also discussed Dr. Yamaguchi's post-doctoral research on movement of pintails in East Asia. Dr. Higuchi expressed his pleasure in progress of the study and his interest in further collaboration. He suggested that we may want to consider marking pintails at a winter site in northern Hokkaido in 2009. He also expressed interest in expanded collaborative studies involving waterbirds that migrate between Asia and North America.

On the evening of 18 February we presented a seminar on all four components of the project to members of Dr. Higuchi's laboratory. Because Japanese scientists are currently engaged in numerous projects related to transmission of the H5N1 virus by migratory species, they were especially interested in the virus component of the study and asked numerous questions. Following the seminar, Dr. Higuchi hosted a reception for us at a local restaurant.

On 19 February we toured the Abiko City Museum of Birds. We were hosted by Mr. Ken-ichi Tokita, Deputy Director of the Museum and a colleague who had taken part in capture and marking of pintails. We also made a brief stop at the Yamashina Institute for Ornithology to report data from Japanese banded pintails that were recaptured during our trapping efforts. We returned to Anchorage on 20 February.

In addition to successfully deploying satellite transmitters on pintails at two locations, this trip served to strengthen our relationships with Japanese colleagues. Their interest in the role of migratory birds in transmission of the H5N1 virus parallels ours, and we can each benefit from the other's work. We made good progress in discussions regarding the virus component of the study, and believe we are now closer to finding a source for low pathogenic viruses from Japanese pintails. Our continued ability to work directly with Japanese colleagues will be critical for success of the project.



Figure 5. ASC scientists Paul Flint and John Pearce attach a satellite transmitter to a Northern Pintail duck.



Figure 6. A female Northern Pintail following attachment of a 20-g satellite transmitter.