The American Peregrine Falcons of Yukon-Charley Rivers National Preserve, Alaska

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American peregrine falcons (*Falco peregrinus anatum*) are iconic birds of prey capable of flight speeds up to 200 mph (320 km/hr). Their breeding range extends from Mexico north to the tree-line in Canada and Alaska. In Alaska, they occur in the forested interior, nesting primarily on cliffs along the major rivers. In the northern parts of its range, the American peregrine falcon is highly migratory, wintering as far south as Brazil and Argentina. The upper Yukon River, from the Alaska-Yukon Territory border to Circle, Alaska, provides excellent cliff-nesting habitat for the falcons as well as an abundant variety of prey species. The majority of this habitat lies within Yukon-Charley Rivers National Preserve (YUCH), which was one of the primary reasons for the preserve's establishment in 1980 (U.S. Congress).

Beginning in the late 1940s, the use of persistent organochlorine pesticides greatly affected American peregrine falcons in North America. These pesticides affected mortality and behavior, and caused birds to lay thin-shelled eggs that often failed to hatch and consequently lowered productivity. American peregrine falcons were classified as endangered in 1973 under the Endangered Species Act. In interior Alaska, American peregrine falcons declined to approximately 20 percent of historical levels by the mid-1970s. In 1972, the U.S. restricted the use of persistent organochlorine pesticides, and since 1978, American peregrine falcons in interior Alaska have been increasing.

Though population numbers have increased, recent evidence suggests that American peregrine falcons are still threatened by environmental contaminants. Analyses of American peregrine falcon eggs from the upper Yukon River suggest that mercury, a persistent compound which bioaccumulates at high trophic levels causing toxic effects (similar to DDT), is currently at levels that may affect reproduction, and trends suggest that mercury levels may be increasing (*Ambrose et al. 2000*). High levels of mercury are biologically available through industrial processes, such as mining and waste incineration, and will likely increase with global industrialization. Additionally, DDT and other pesticides are still being used on wintering grounds, which may cause continued risk to the population.

American peregrine falcons in the upper Yukon River corridor, within and adjacent to Yukon-Charley Rivers National Preserve, have been identified by the NPS as an important vital sign in the Central Alaska Network vital signs monitoring program (CAKN). In fact, a raptor species is being monitored in each network park because they are a top trophic-level predator and changes in their status could be indicative of ecosystem changes. Because we can access some eyrie sites for peregrines, we can also monitor the presence of persistent bioaccumulative contaminants in feathers and eggshells (*MacCluskie et al. 2005*). The fact that the upper Yukon River study area was identified as one of two index areas for Alaska in the national Monitoring Plan for the American Peregrine Falcon (*USFWS 2003*) is an additional benefit in that the data are relevant not only to the park, but also to a sister agency.

The objectives for the CAKN American peregrine falcon monitoring program in the upper Yukon River study area are to: 1) Determine annual levels and variation over the previous decade of nesting territory occupancy, nesting success, and overall population productivity; 2) Describe historic levels of environmental contaminants and eggshell thickness; 3) Determine levels of organochlorine pesticides, mercury and eggshell thickness every five years; and 4) Measure changes in habitat on the breeding range.

We accomplish these objectives by conducting two surveys along the Yukon River each year. The first survey is conducted in late May/early June and determines which territories are occupied. The second survey in late June/early July provides data on success of eyries and, if

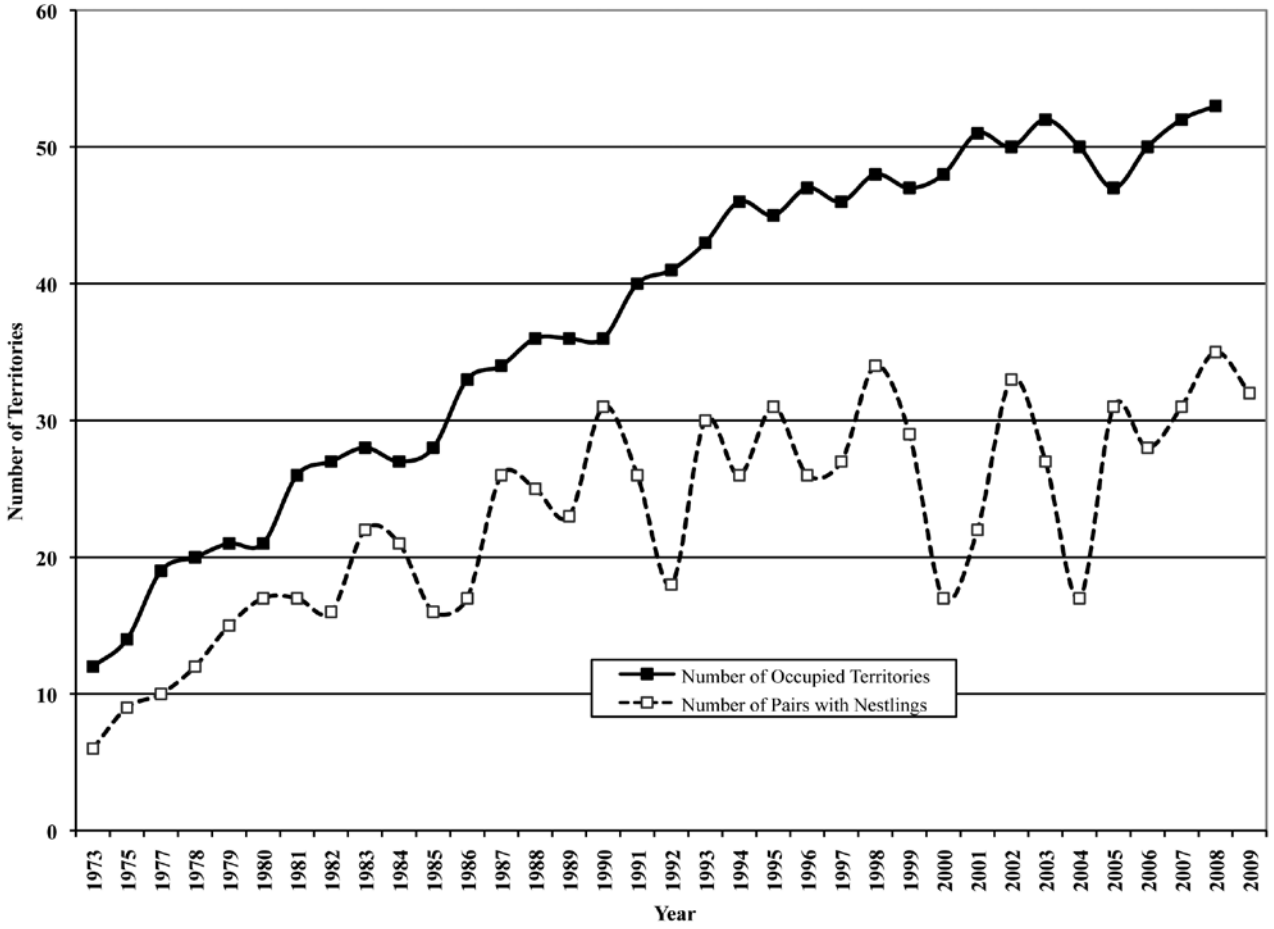

Figure 1. The number of occupied and successful (≥ 1 nestling) territories of American peregrine falcons along the upper Yukon River in Yukon-Charley Rivers National Preserve has steadily increased from 1973-2009. In 2004, only 39 of the 52 pairs were checked for breeding success and productivity due to smoke from large forest fires.

applicable, how many chicks are produced. Additionally, we collect samples from unhatched eggs and shed adult and nestling feathers for contaminants analyses during the second survey. We work cooperatively with the U.S. Fish and Wildlife Service (FWS) to have these samples analyzed for contaminants. Samples from nestling feathers indicate contaminants exposure on the breeding grounds while samples from adult feathers and unhatched eggs indicate contaminants exposure on the wintering grounds and/or migration routes.

The American peregrine falcon population breeding in the upper Yukon River valley is believed to be one of the best studied populations in North America. Over 36 years of data have documented the population's recovery from 11 pairs in 1973 (*Ritchie 1976*) to a record high 53 pairs in 2009 (*Ambrose et al. in prep*). The number of total pairs nesting along the up-

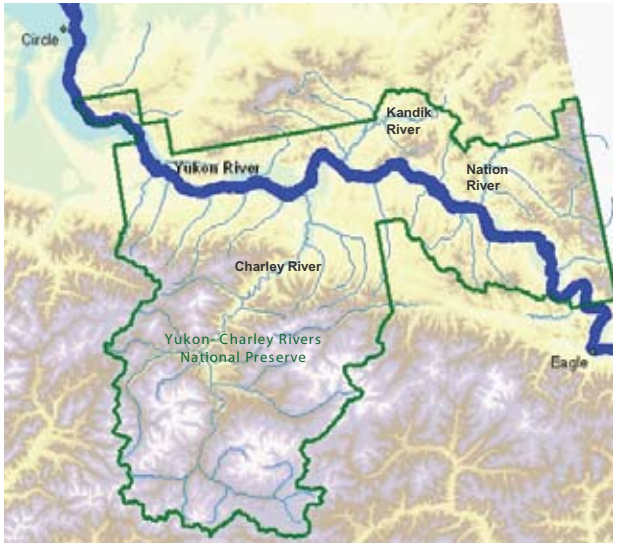

Figure 2. The Upper Yukon River American peregrine falcon study area includes all available habitat within 0.6 miles (1.0 km) of the section of the Yukon River between the Alaska - Yukon Territory border and Circle, Alaska. Yukon-Charley Rivers National Preserve is outlined in green.

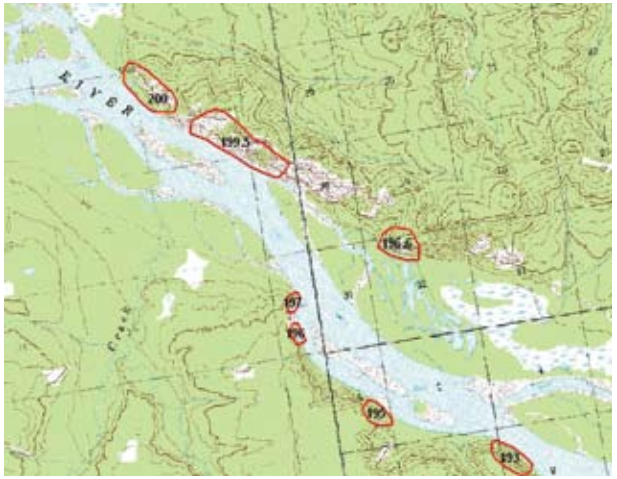

Figure 3. The locations of some of the American peregrine falcon territories along the upper Yukon River study area in Yukon-Charley Rivers National Preserve are shown here outlined in red. The photograph of territory numbers YUKO 195.5, YUKO 196.0, YUKO 197.0 and YUKO 199.5 show what the bluffs look like from the Yukon River.


NPS photograph by Skip Ambrose

Figure 4. Three American peregrine falcon nestlings huddle together as they wait for their parents to return to the eyrie with food. This eyrie is located in Yukon-Charley Rivers National Preserve.


NPS photograph by Skip Ambrose

Figure 5. Biologists Chris Florian (right) and Melanie Flamme watch for American peregrine falcon nestlings in an eyrie along the upper Yukon River in July of 2009.


NPS photograph by Skip Ambrose

Figure 6. A female American peregrine falcon keeps a close eye on biologists visiting her nestlings to collect contaminants and genetics samples; July of 2009 along the upper Yukon River.

per Yukon River has been steadily increasing, although the percentage of total pairs nesting successfully has been declining (*Figure 1*). This may be attributable to increased competition for resources due to increased density and birds moving into sub-optimal territories (i.e. territories with insufficient resources and cover from predators). Further monitoring is necessary to understand the natural variation of a "healthy" American peregrine falcon population, which will allow us to later detect population change that is beyond normal limits of variation.

One important aspect of the American peregrine falcon population in Yukon-Charley Rivers National Preserve is that nest manipulations, captive breeding programs, releases and take for harvest have never occurred. In all other populations in the Lower 48 states, there have been influences by these manipulations and captive-breed releases. Hence, the upper Yukon River population is unique as one where the recovery has been completely natural and well studied.

Surveys for American peregrine falcons along the upper Yukon River (between Circle, Alaska, and the Alaska-Yukon Territory border) have been conducted annually since 1973 by now retired FWS biologist Skip Ambrose (*Payer 2001*). He collected most of the data (over 95%) in the current data set and has expertise and intimate knowledge of the study area and the raptors. The CAKN has been working with Mr. Ambrose to train NPS biologists in the survey methodology and to compile all the historical data into a database that includes photographs of eyrie sites, notes, territories and production data. Additionally, annual reports on the status of the population are produced and are available to the public on the CAKN website (http://science.nature.nps.gov/im/units/cakn/reportpubs.cfm).

Due to their near extinction and subsequent recovery following the DDT ban throughout their breeding range, peregrine falcons have become a public symbol for conservation, and specifically for Yukon-Charley Rivers National Preserve. Nesting peregrine falcons are one of the top visitor attractions in the preserve, and there is strong public support for their protection and the monitoring program. Through the love of and interest in peregrine falcons, program staff gain support to protect the entire system of which falcons are a part. It is important that we continue to work for this support by providing species information throughout the preserves, as well as educational programs to support their conservation.

NPS photograph by Chris Florian

Figure 7. A photograph of a bluff demonstrating an American peregrine falcon territory in Yukon-Charley Rivers National Preserve. The map shows the relative location of this territory to others along the upper Yukon River (outlined in red).

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