

**FEDERAL AID
FINAL PERFORMANCE REPORT**

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 115526
Juneau, AK 99811-5526

**Alaska Department of Fish and Game
State Wildlife Grant**

GRANT AND SEGMENT NR: T-4-1

PROJECT NUMBER: 2

PROJECT TITLE: American Dipper nesting ecology. Part 1: Phenology patterns and distribution in an exceptional year; Part 2: Bird blowfly infestations in nests

PARTNER: Willson Ecological Consulting

PRINCIPAL INVESTIGATORS: Mary F. Willson

PROJECT DURATION: July 1, 2007 – June 30, 2008

REPORT PERIOD: July 1, 2007 – June 30, 2008

I. PROBLEM OR NEED THAT PROMPTED THIS RESEARCH

Part 1. Phenology patterns and distribution. The winter of 2006-07 had record levels of snowfall, and snow (with associated cool temperatures) is still present (as of 10 June) in many places above 200m. The unusual winter and early spring is having noticeable effects on the dipper population. The developing breeding season of 2007 is clearly exceptional in a number of ways that influence the interpretation of distribution, abundance, and factors that control breeding population size. Although some annual variation in nesting phenology is normal and expected, the 2007 season is exceptionally late overall (by several weeks). Nest initiation is far more protracted than usual, with a few broods already hatched while other nests are just being built, and many traditional territories (used successfully in previous years) remain unoccupied as of 10 June, especially at higher elevations. An unusually high proportion of nests that were initiated early this year have already failed. And several banded birds that nested successfully at higher elevations in previous years are nesting near sea level this year.

The unusual phenology in spring 2007 provides an opportunity for several instructive comparisons. First, the nesting season is likely to extend farther into late summer than usual, giving us the chance to determine nest success at that season. More importantly, if traditional territories continue to be unoccupied, this informs our understanding of dipper distribution and the factors that limit the breeding population by documenting the impact of weather. It therefore also would mean that accurate use of nesting dipper presence or absence as an indicator of stream quality should take into account the effects of weather on population distribution.

As Stephen Jay Gould (1980) once noted, “It is the exception that probe the rule, by testing and exploring its consequences in altered situations.” The 2007 nesting season is exceptional and offers significant new insights into dipper ecology.

Part 2: Bird blowfly infestations. In the summer of 2006, we examined nest contents after broods had fledged and learned that many nests were infested with bird blowflies (Protocalliphoridae). Almost nothing is known about bird blowflies in Alaska (Terry Whitworth, Adjunct Professor of Entomology, Washington State University, pers. comm.), but high infestations of these parasites can sometimes cause nesting failure, especially when avian foraging conditions are poor (e.g., Rogers et al. 1991, Sabrosky et al. 1989).

In 2007, I intended to examine nests after the chicks have fledged to assess the frequency and levels of blowfly infestations.

II. REVIEW OF PRIOR RESEARCH AND STUDIES IN PROGRESS ON THE PROBLEM OR NEED

Research supported by the previous contract strongly suggested that apparent annual mortality of adult dippers was markedly greater in colder winters, leading to increased levels of territory vacancy and decreased abundance. Nest success was low in a cold spring. (see abstract below) Territory occupancy in 2008 was greater than in 2007, presumably reflecting the good nest success in 2007, but adult survival was relatively low again, and overall occupancy level remained below that of the first 3 years of the study. Nesting phenology in 2007 was delayed by > two weeks compared to most previous yrs.

In the breeding season of 2006 we learned that several dipper nests were infested with parasitic bird blowflies, which apparently contributed to nest failure in some cases. Our intent was to further investigate the impact of blowflies on chick survival. In 2007, however, we found no blowflies in nests. In June 2008, we found a nest in which all chicks died, apparently from a very high level of blowfly infestation.

III. APPROACHES USED AND FINDINGS RELATED TO THE OBJECTIVES AND TO PROBLEM OR NEED

OBJECTIVE 1: Continue documenting nest phenology and nest success on Juneau streams in 2007 to determine the impact of weather on dipper distribution and nest success.

In 2007, we located and monitored the nests of 24 pairs of dippers. Nest success was high (see below), although a cold spring resulted in delayed nesting.

OBJECTIVE 2: Document frequency and levels of bird blowfly infestations in nests.

In 2007 we found no blowflies in any of 15 nests that were inspected. Because dippers customarily remove nest linings after nesting, however, it is possible that low levels of blowfly infestation would be missed. In June 2008, however, one nest contained three dead chicks and over 300 bird blowfly larvae.

IV. MANAGEMENT IMPLICATIONS

See Abstracts. Research possibilities for the future:

- a. Document extent and frequency of bird blowfly infestations in dippers, and in other cavity nesting birds. Include effects of weather. Assess effects on chick growth and survival.
- b. Assess effects of fish on chick growth and survival, and on adult body condition.
- c. Continue to document effects of winter weather on overwinter survival of dippers, and consequent effects on territory occupancy.

V. SUMMARY OF WORK COMPLETED ON JOBS FOR LAST SEGMENT PERIOD ONLY (July 1, 2007 – June 30, 2008)

JOB/ACTIVITY 1A AND 1B: Continue to search for nests and monitor nesting activity through the 2007 season.

We monitored 24 pairs of dippers in 2007 and monitored nest phenology and success. Four pairs lost their first brood and re-nested. Overall (including re-nests) 92% (N=22) pairs raised nestlings successfully, despite the delayed starts. A male whose mate disappeared during the early nestling period raised chicks successfully in June 2008. All nest locations were mapped in GIS. To fully understand the distribution and abundance of dippers on local streams, including their ability to rebound after a population crash, it would be useful to know more about chick growth and survival, which would require regular access to nests and weighing and banding of the nestlings.

JOB/ACTIVITY 1C: Analyze data, making comparisons to previous three years.

This level of nest success is comparable to most previous years (except 2006, which had low nest success), but re-nesting was fairly common. Knowledge of chick growth and survival would be useful.

JOB/ACTIVITY 2A: Collect nest linings after fledging and count blowfly puparia. Send specimens to Dr. Whitworth for identification.

We collected nest linings for 15 nests, none of which had birdblowfly larvae or puparia in 2007. One nest in June 2008 had numerous blowfly larvae; specimens sent to Dr. Whitworth, who said they were probably *Protocalliphora aenea*, as in a previous year. Little is known about bird blowflies in Alaska, although they infest several cavity-nesting species. It would be useful to know how commonly they parasitize our species, under what conditions, and to assess their impact on nest success.

JOB/ACTIVITY 2B: Summarize and report findings. The 2007 results were included in the following mss.

VI. PUBLICATIONS

Mary F. Willson and Katherine M. Hocker. in press. NATURAL HISTORY OF NESTING AMERICAN DIPPERS (*CINCLUS MEXICANUS*) IN SOUTHEASTERN ALASKA. *Northwestern Naturalist*.

ABSTRACT--We studied American Dippers nesting near Juneau, AK, for 4 years. Few dippers in our area live long enough to breed in 3 or more seasons. The nest exterior is composed of a variety of moss species. Nest success ranged from 62% to 87% of first nesting attempts and was lowest in a cool, wet spring. Nesting phenology was delayed in

years with cool, wet springs, at higher elevations, and on lowland stream reaches that supported few fish. Second broods were uncommon, but were most often reared when 1st broods were early and on stream reaches with ready access to small fish. Hourly chick-feeding rates varied widely, from 0-35 trips/hr. Fish were delivered to some nests, up to 17 fish/hr per nest, especially by female parents. In a few cases, a female nested with the same male, successfully, in 3 successive years. Most changes of mate and territory were associated with the disappearance of one member of a pair, and all changes of territory occurred within the same watershed. Females that lost their mates after egg-laying were capable of rearing a brood alone. Some nests were infested with bird-blowflies (Protocalliphoridae). Dippers commonly removed nest lining after fledging of the first brood; this behavior can be a good predictor of nest success in the absence of direct observation.

Mary F. Willson and Katherine M. Hocker. in review. Distribution and Abundance of Nesting American Dippers (*Cinclus mexicanus*) near Juneau, AK, and Their Use as Indicators of Stream Quality.

ABSTRACT--We studied American Dippers (*Cinclus mexicanus* Swainson) near Juneau AK from 2004 through 2007. Several factors combine to limit local distribution and abundance of dippers in our area, including stream size and food abundance, nest sites, and territorial aggression; mortality can reduce abundance below the levels set by the other factors and result in unoccupied streams. Dippers nested only on streams with an estimated stream-flow in summer exceeding 0.3 cfs, and regularly nested only where this flow exceeded 0.9 cfs, even when apparently suitable nesting sites were present. Larger streams provided a greater abundance of benthic insects. Although most territories were centered on typical fast, fairly high-gradient, rocky stream reaches, a few were centered on low-gradient reaches with sandy substrate, which was made possible by the presence of anthropogenic nest sites. Overwinter mortality was high in two years, reducing the number of occupied territories to about half of its previous level. Dippers often decrease in abundance on polluted streams, but the use of their abundance as an indicator of stream quality must also account for other sources of mortality.

Mary F. Willson and Katherine M. Hocker. in press. AMERICAN DIPPERS WINTERING NEAR JUNEAU, ALASKA. *Northwestern Naturalist*.

ABSTRACT—American Dippers (*Cinclus mexicanus*) in winter often foraged in habitats not used for nesting, including deltas of coastal creeks, and occasionally ponds, tiny streams, and ditches. The birds migrated altitudinally, at least 12 crossed a saltwater channel, and some apparently made wider, regional movements (5-50% of banded birds, with annual variation). In 2 relatively severe winters, we resighted fewer banded birds (<40% vs >65%) and annual survival was lower (<40% vs >50%), compared to 2 relatively mild winters. Birds foraging in the intertidal zone on deltas preyed on amphipods (low fat content) and fish, but this habitat was unavailable at high tide.