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RAPID BAND WEAR IN EARED GREBES AND OTHER SALINE LAKE BIRDS

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Abstract.—Corrosion and wear of aluminum bands probably leads to rapid band loss in Eared Grebes (*Podiceps nigricollis*) and other species that inhabit highly saline or alkaline lakes. If unrecognized, such loss will result in misleading population parameters. The use of stainless steel bands would alleviate this problem, but they are unavailable.

RÁPIDO DESGASTE DE ANILLAS COLOCADAS EN INDIVIDUOS DE *PODICEPS NIGRICOLLIS* Y OTRAS AVES DE LAGOS SALOBRES

Sinopsis.—La corrosión y el desgaste de anillas de aluminio probablemente da origen a la pérdida de estas en individuos de *Podiceps nigricollis* y de otras aves que habitan en lagos salobres o alcalinos. Si la pérdida de las anillas no es reconocida durante una investigación, esto podría dar origen a que se tomen parámetros poblacionales erróneos. La utilización de anillas de acero inoxidable podría prevenir este problema. Sin embargo, el Laboratorio de Anillamiento de Aves del Servicio de Pesca y Vida Silvestre de los E.U.A. todavía no dispone de las mismas.

The use of banding data has become an integral part of population studies of birds, although it is complicated by the effects of band loss, especially in marine environments (Hatch and Nisbet 1983). In this paper I show that band loss may be particularly rapid in Eared Grebes (*Podiceps nigricollis*) and perhaps in other species that inhabit highly saline lakes, thus rendering suspect any population data based on banding.

Recently, I (Jehl 1988) reviewed the biology of Eared Grebes in the nonbreeding season. Briefly, in late fall vast numbers molt and stage at certain saline lakes in western North America. Mono Lake, California, attracts about 750,000 Eared Grebes, or 30% of the North American population. The grebes show no adverse effects from living in that lake's harsh chemical environment (pH = 10, total dissolved solids 90‰; Mahoney and Jehl 1985) and they remain there continuously for several months (up to 8 mo for some summering nonbreeders) before departing to winter quarters.

Since 1984, my associates and I have banded over 1000 grebes at Mono Lake, using standard Fish and Wildlife Service aluminum bands (Jehl and Yochem 1986, 1987). Our major purposes were to study the origin and winter destination of this population and to begin accumulating data on its age composition. To date we have recovered two bands, both exhibiting extensive wear that can be attributed to corrosion. The first was from an adult banded at Mono Lake on 25 Jul. 1985 and recaptured there on 8 Aug. 1988. The band was very thin; it weighed 28% less (0.53 g vs. 0.74 g) and was 26.4% thinner (0.70 vs. 0.95 mm) than unworn

bands. I judge that it would have fallen off within the next few months. Wear was evident on both the outer and inner surfaces, especially on the leading edge, where the thickness was reduced by 58%, to 0.40 mm. The second band was obtained from a grebe found dead in early Feb. 1988 at Whittier Narrows, California. It had been banded as an adult on 13 Aug. 1987 at Mono Lake. Band weight had decreased by 2.7% (to 0.72 g) and thickness by ca. 5.3% (to 0.88 mm).

From knowledge of arrival and departure schedules of grebes at Mono Lake and on the wintering grounds (Jehl 1988 and unpubl.), I judge that the first grebe probably spent 11 of the 34.5 mo since banding at Mono Lake, and another 9.5 mo on marine wintering grounds. The second grebe almost certainly remained at Mono Lake for 5.5 mo after banding, until about 1 Feb. 1988, and succumbed shortly after emigrating. Annualized rates of band weight loss and band thinning for the first grebe are 9.8% and 9.7%, and for the second 5.4% and 11.6%.

If bands break at thicknesses approximating 0.45 mm, or half of the original thickness (cf. Hatch and Nisbet 1983), band loss in these grebes will begin within 3–4 yr and become a significant problem in 5–6 yr. This is an unacceptably short duration and probably explains why the species' documented longevity record is only 4 yr, as compared to 10 yr in the Horned Grebe (*Podiceps auritus*; Clapp et al. 1982). The latter species avoids highly saline lakes, but spends about half the year in marine habitats.

That high rates of band loss are likely among other denizens of saline/alkaline lakes is indicated by Winkler's (1988) finding that the greatest age attained by a California Gull (*Larus californicus*) banded at Mono Lake is only 7 yr; this is based on an analysis of 136 recoveries, 89 of which were from birds banded between 1938 and 1963, which is sufficiently long ago for birds of greater age to have been recorded. Yet, banding data from other areas, where water conditions are less extreme, show that the life span for California Gulls, as in other large gulls, may exceed 20 yr (Clapp et al. 1982, Pugesek and Diem 1983).

While corrosive effects are probably elevated in highly saline/alkaline environments, they are not the only cause of band loss, because Ludwig (1967) showed that wear of aluminum bands in Ring-billed Gulls (*Larus delawarensis*) averaged 9.5%/year, the same as that shown above by Eared Grebes. It follows that the use of aluminum bands for population studies of saline lake birds is probably ineffectual and misleading, and if unrecognized or uncompensated (e.g., Nelson et al. 1980) will result in erroneous estimates of mortality rates and other population parameters. The problem might be alleviated by the use of Monel bands, although their durability has been questioned (Boekelheide and Ainley 1989). The best solution is stainless steel (incoloy) bands, whose lower rates of weight loss (0.5–0.6%/year) result in their estimated minimum life of about 40 years (Hatch and Nisbet 1983). But these are not currently available from the U.S. Bird Banding Laboratory (J. Tautin, pers. comm.). These considerations should be noted by those planning long term studies.

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