Abstract. Radio transmitters are a useful tool in determining the degree of use of and extent of movement from contaminated sites by highly mobile wildlife species. Programs monitoring wildlife species for environmental contaminants from localized sources can maximize the amount of information obtained from an individual animal by using radio-telemetry to ascertain residence history. The use of radio-telemetry techniques on two mobile wildlife species, mule deer (*Odocoileus hemionus*) and mallard ducks (*Anas platyrhynchos*), to document their use of and movement from low-level radionuclide contaminated waste ponds are described.

1. Introduction

Sampling mobile wildlife species for contaminants in areas having limited or local environmental contaminant sources frequently presents difficulties in data interpretation. Often the accumulation of contaminants by animals, particularly from ingestion, is a gradual process, and may require weeks or even months for animal tissues to reach maximum or equilibrium concentrations. Generally, there is no way of assessing how long an animal has used a contaminated area prior to collection of that animal. Therefore sampling can result in the collection of some individuals that had little or no opportunity to accumulate available contaminants. Cadwell et al. (1979), for example, found that the concentrations of $^{137}$Cs in muscle of American coots (*Fulica americana*) collected from an industrial waste pond contaminated with low-levels of radionuclides ranged from near zero to more than 2000 pCi/g-dry weight. They suggested that some of the coots sampled were probably new arrivals to the pond and had not yet accumulated $^{137}$Cs in their muscle tissue. Halford et al. (1981) reported the concentrations of 29 radionuclides occurring in waterfowl collected on a liquid radioactive waste disposal pond complex at the Idaho National Engineering Laboratory Site in southeastern Idaho. Maximum radionuclide concentrations were typically five to twenty times greater than average concentrations. The birds, however, were not marked and the authors were uncertain of the birds residence times on the waste ponds.

One method of increasing the reliability of radionuclide or other environmental contaminant information for wildlife species is to increase the number of individuals collected; however, this may be unacceptable either economically or from the standpoint

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of conserving a scarce wildlife resource. Also, when the data are to be used for
calculations of radiation dose to hypothetical, maximally exposed, humans (Sula et al.,
1982:47), then some assurance that the data are representative of wildlife having
maximum opportunity for exposure to contaminants is highly desirable.

Radio-telemetry techniques provide an opportunity to ascertain the residence history
of mobile animals and therefore to sample those individuals that should reflect the
highest contaminant levels. In this paper we present examples of the use of radio-
telemetry techniques in contaminant studies of two mobile wildlife species, mule deer
(Odocoileus hemionus) and mallard ducks (Anas platyrhynchos). In addition, we discuss
the general application of radio-telemetry techniques to wildlife species for contaminant
monitoring purposes. The purpose of this paper is to present the integration of tech-
niques rather than results since they are published in part elsewhere (Eberhardt et al.,
1984).

2. Methods

Research was conducted on or near two man-made waste management ponds 15 and
29 ha in size located approximately in the center of the 1476 km² Hanford Site in
southcentral Washington. The Hanford Site was established in 1943 as a national
security area and contains a number of nuclear facilities. Both ponds, which now