ESTIMATING EFFECTIVE POPULATION SIZE IN WILD POPULATIONS FOR CONSERVATION AND MANAGEMENT[TWS]

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Estimating abundance of wildlife has challenged managers for nearly a century. Relatively recently, wildlife biologists have been employing techniques used by molecular biologists to estimate an abundance parameter, called effective population size. Effective population size is the size of an ideal population that would have the same rate of genetic change as the population under consideration. Effective population size is approximately 10 percent of the census population size, and is an important parameter because it determines the rate of loss of genetic variation, fixation of deleterious alleles, and inbreeding. I will review three methods that take advantage of recent developments in D A sampling techniques and technology to estimate local, current, effective population size. The first technique is called gametic disequilibrium and requires approximately 90 samples from a

population to estimating effective population size. The second technique is called the heterozyote excess method, which again requires many samples from only one sampling occasion. Due to large sample size constraints, the gametic disequilibrium and heterozygote excess methods are more commonly used with anadromous fish and marine invertebrates. Lastly, the temporal allele method, which requires approximately 30 samples from two sampling occasions may be the most promising for estimating effective population size of endangered vertebrates. Recent advances in molecular genetics have also allowed researchers to "mark" animals by using individual genotypes obtained through either invasive, i.e., capturing animals and collecting ear punches or blood samples, or non-invasive, i.e., collection of scat and hairs, techniques. Combining DNA technology, which allows us to non-invasively mark elusive animals, with well-established capture-mark-recapture techniques provides promising ways to monitor endangered wildlife.