

FEATURE ARTICLES

**FACTORS RELATED TO FECAL ESTROGENS AND FECAL TESTOSTERONE
IN CALIFORNIA SPOTTED OWLS**

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Abstract. We estimated concentrations of fecal reproductive steroid metabolites in free-ranging California Spotted Owls (*Strix occidentalis occidentalis*) during the breeding season. We collected fresh fecal samples ($n = 142$) from 65 individual owls in the Sierra Nevada during April–August of 2001. We developed and validated radioimmunoassay procedures to quantify fecal estrogen metabolites and fecal testosterone metabolites. We used an information-theoretic approach to identify factors that might influence fecal estrogen (E), fecal testosterone (T), and fecal estrogen:testosterone ratio (E:T ratio) levels during the owl's breeding season. We hypothesized that factors related to sampling procedures, owl characteristics (sex, reproductive status), and habitat might influence fecal reproductive steroid levels. Our analyses suggested that sampling factors and owl characteristics, but not habitat variables, were related to fecal reproductive steroid levels in Spotted Owls. Our most supported models explained <30% of the observed variation. Fecal testosterone levels were higher in male Spotted Owls than females, whereas E:T ratios were higher in females compared to males. High fecal estrogens were correlated with high fecal glucocorticoids in nonbreeding Spotted Owls, whereas fecal estrogens and fecal glucocorticoids were not related in breeding birds. Sampling influenced fecal reproductive steroid measures, and bias from small-mass fecal samples might partially explain these relationships. Noninvasive measurements of fecal reproductive steroids might be useful for sex determination and reproductive assessment of free-ranging Spotted Owls. However, more research is needed to understand the variability we observed in sex steroids before this technique can be effective in conservation studies.

Key words: California Spotted Owl, estrogens, glucocorticoids, noninvasive, testosterone, physiology, *Strix occidentalis occidentalis*.