

Figure 2: Yearly totals for the following species: Osprey, Sharp-shinned Hawk, Merlin, and Peregrine Falcon. (Non-significant) trend lines are included.

point, it would suggest cause for concern for these four species, even for the Peregrine Falcon, which has recently come off of the endangered species list due to an increasing population.

However, there are two potential problems with this line of argument. First, our coverage is not randomly determined: the first two years, we were much more likely to be out during productive hours than unproductive ones, since we would leave for the day if there were no hawks flying. Thus, as we added hours over the five years, we were consistently adding fewer and fewer productive hours, and causing a drop in birds/hour that was totally unrelated to the populations in question. Second, because of the variation in each species' migration timing, hours added at one point in the season are not equivalent to hours subtracted at another point – in other words, hours of observation cannot be simply added together and expected to yield informative results.

Finally, the IBSP hawkwatch, like most other hawkwatches, is strongly weather-dependent. While our data suggest that hawks may be migrating based primarily on day-length cues, their exact path, and thus our ability to detect them at IBSP, is based largely on weather conditions. Different weather condi-

tions at different times, then, can have major impacts on our counts that are again unrelated to any actual changes in population.

We are here proposing a tentative solution to these problems. Anticipating the implementation of the national RPI (Raptor population index – an attempt by HMANA, Hawkwatch International, and Hawk Mountain Sanctuary to combine hawk counts nationwide into an index of population changes (Goodrich 2005)), we utilized data from the first four years (2000-2003) to construct linear regression models for each species, with the intent of

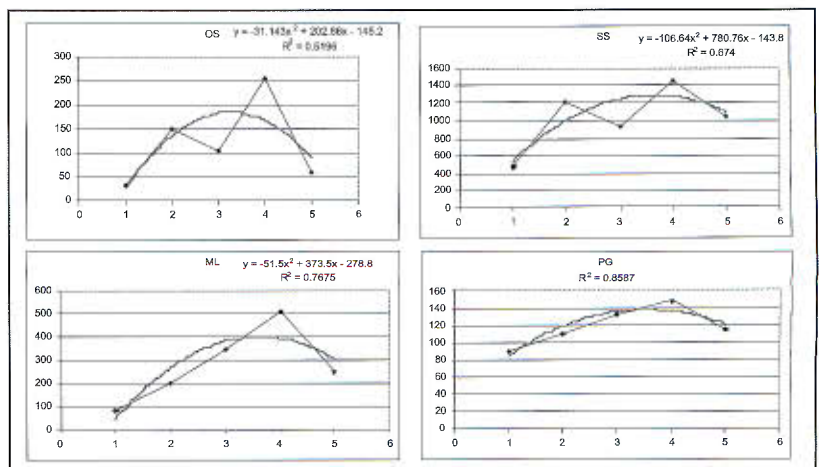


Figure 4: Yearly passage rates (birds/100 hours) for the following species: Osprey, Sharp-shinned Hawk, Merlin, and Peregrine Falcon. Trend lines are not significant.

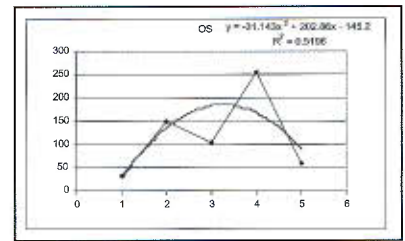


Figure 3: Total hours per year. The trend in this case is significantly upwards, although it will probably level off in the future.

providing a predicted number of birds for each hour of observation for each species. The following factors were included: wind direction, wind speed, an interaction between the two wind variables, date, hour of the day, number of minutes of observation within that hour, cloud cover, temperature, and the change in high temperature since the previous day. This last term is an attempt to account for some species apparent preference for migrating before or after cold fronts.

Wind speed was recorded, and included in the model, based on the Beaufort scale of wind speeds. Our data included speeds from 0 to 6, or 0 to 31 miles per hour. Wind direction was recorded in 16 categories. In order to model the bird's response to wind direction (as seen in Figure 4), we arbitrarily set ESE equal to 1,