and vegetative development have no doubt affected our degree of success in detecting first arrivals each spring. Despite these immeasurable factors, we feel confident that long-term median dates provide valid information about regional trends and annual variations among midwestern migrants.

Statistical Information

In Tables 1-3 each median arrival represents the middle recorded date in a chronological sequence and is less affected by occasional extreme dates or chance clusters than either an arithmetic mean or mode. The actual average median difference [in place of deviation] is the mean of the species differences

Literature Cited _

Bond, J. 1985. Birds of the West Indies. Fifth Edition. Collins, London.

Cooke, W. W. 1888. Report on bird migration in the Mississippi Valley in the years 1884 and 1885. U.S. Dept. Agri., Div. Econ. Ornithol., Bull. No. 2.

_____ 1908. Averaging migration dates. Auk 25:485-486.

1915. Bird migration. U.S. Dept. Agri. Bull. No. 185. Craig, D. R. and E. C. Franks. 1987. Bird migration phenology in west central Illinois. Trans. Ill. Acad. Sci. 80:129-156.

Crawford, R. L. 1980. Wind direction and the species composition of autumn TV tower kills in northwest Florida. Auk 97:892-895.

Dorst, J. 1963. The migrations of birds. American Edition. Houghton Mifflin, Boston.

Graber, R. R. 1968. Nocturnal migration in Illinois - different points of view. Wilson Bull. 80:36-71.

Gunn, W. W. H. and A. M. Crocker. 1951. Analysis of unusual

[dev] at each of the 3 sites when compared with E Illinois while the theoretical average is calculated from Hopkins Bioclimatic Law by comparing the geographic location of each site with E Illinois.

In Table 4, each mean arrival date is nearly identical to the median date reported earlier. The standard error (SE) is an estimate of the variability of each sample mean. The mean date plus or minus 1 standard error could be expected to include 68 percent of all other mean dates for that species at the site and doubling the SE would increase to 95 percent the likelihood that such means would fall within this expanded interval. The SE indicates nothing about the expected arrival date in any single

bird migration in North America during the storm of April 4-7, 1947. Auk 68:139-163.

Hopkins, A. D. 1918. Periodical events and natural law as guides to agricultural research and practice. U.S. Dept. Agri., Weather Bur. Monthly Weather Rev. Suppl. No. 9.

Lange, K. I. 1986. Bird migration records for the Baraboo Hills, Wisconsin, 1966-1985. Passenger Pigeon 48:102-118.

Leopold, A. and S. E. Jones. 1947. A phenological record for Sauk and Dane Counties, Wisconsin, 1935-1945. Ecol. Monogr.17:81-122.

Peterson, R. T. 1980. A field guide to the birds. Fourth Edition. Houghton Mifflin, Boston.

Saunders, A. A. 1959. Forty years of spring migration in southern Connecticut. Wilson Bull. 71:208-219.

Smith, F. 1930. Records of spring migration of birds at Urbana, Illinois, 1903-1922. Ill. Nat. Hist. Surv. Bull. 19:105-117. Sprunt, A., Jr. 1954. Florida bird life. Coward-McCann, New York. year. The reported ranges in Table 4 represent the actual number of days between earliest and latest arrival dates for which we have records.

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Stevenson, H. M. 1957. The relative magnitude of the trans-Gulf and circum-Gulf spring migrations. Wilson Bull. 69:39-77.

Taylor, W. K. and B. H. Anderson. 1973. Nocturnal migrants killed at a central Florida TV tower; autumns 1969-1971. Wilson Bull. 85:42-51.

Temple, S. A. and J. R. Cary. 1987. Climatic effects on year-to-year variations in migration phenology: a WSO research project. Passenger Pigeon 49:70-75.

Weydemeyer, W. 1973. The spring migration pattern at Fortine, Montana. Condor 75:400-413.

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