Elliot J. Bertrand* (bertrande@sacredheart.edu), Sacred Heart University, Fairfield, CT 06825, and Mustafa Kulenovic (mkulenovic@uri.edu). Global Behavior of a Class of Order-k Discrete Dynamical Systems.

The first-order Beverton–Holt equation has been widely studied and was historically used to model the population dynamics of fisheries. In this presentation we will consider a class of order-k difference equations that generalize this classical model. Consider

\[ x_{n+1} = \frac{af(x_n, x_{n-1}, \ldots, x_{n+k-1})}{1 + f(x_n, x_{n-1}, \ldots, x_{n+k-1})}, \quad n = 0, 1, \ldots, \]

where \( k \) is a fixed positive integer, \( f \) is a function nondecreasing in all arguments, \( a \) is a positive constant, and \( x_0, x_{-1}, \ldots, x_{1-k} \) are nonnegative numbers in the domain of \( f \). We will discuss several examples of such equations and present some general theory. When \( k = 2 \), we will review some global dynamic scenarios in the event \( f \) is a certain type of linear or quadratic polynomial, and we explore the existence problem of period-two solutions. We will further present results for the global dynamics of the class of difference equations for which \( f \) satisfies specific algebraic or concavity conditions. (Received February 04, 2019)