1135-92-1193 **Madel R. Liquido*** (mliquido15@saintpeters.edu), Saint Peter's Univeristy, Department of Mathematics, 2641 Kennedy Blvd, Jersey City, NJ 07306, and **Nickolas Kintos** (nkintos@saintpeters.edu), Saint Peter's University, Department of Mathematics, 2641 Kennedy Blvd, Jersey City, NJ 07306. *A simplified mathematical model to explore the output of a rhythmic neural network.*

The electrical output of rhythmically active neural networks is ubiquitous in the nervous systems of animals. Such networks are driven by a core circuit called a central pattern generator (CPG), and, due to their stereotyped activity, CPGs are tractable for mathematical analysis. We examine the gastric mill rhythm (GMR) of the crab, Cancer borealis, whose CPG activity is composed of the half-center oscillation between the lateral gastric (LG) neuron and interneuron 1(Int1). The GMR is activated by synaptic input from the axon terminals of the projection neuron, modulatory commissural neuron 1 (MCN1). Using the difference in fast-slow time scales that exist within the biological system, we construct a simplified, 2-dimensional ODE model of the GMR. Through phase plane analysis of our singularly perturbed system, we show that the MCN1-LG synaptic interactions drive the GMR oscillations in the model. Also, we show that the addition of a fast, synaptic input onto Int1 strongly influences the GMR frequency in the model. Our results agree with those of experiments, and our simplified model captures the underlying network dynamics of this CPG circuit. (Received September 20, 2017)