This dataset supports the manuscript "**Hurricane and exotic herbivore destabilized populations of a tropical epiphytic orchid in its peripheral range**," which is under review for publication in Ecosphere. In this study we conducted repeated census across the core and peripheral range of *Trichocentrum undulatum*, a threatened orchid that is found throughout the island of Cuba (species core range) and southern Florida (the northern peripheral range). We used demographic matrix modeling as well as stochastic simulations to investigate the impacts of herbivory, hurricanes, and logging (in Cuba) on projected population growth rates (λ and λ_s) among sites.

Our goals were to observe and evaluate the effects of leaf and inflorescence herbivory, a major hurricane, increased recruitment, and different logging scenarios in order to address the following questions: (1) Is the Florida population expected to persist? (2) What are the major differences between populations in the core versus edge distribution in terms of growth, fecundity, and overall long-term persistence? (3) What are the impacts of current threats and disturbances to the orchids' populations?

Data set list with variable information and brief description

The following text files were imported and read by R 2.4.4 Software Package using the code script from R file "Trichocentrum_undulatum_HB"

The data file "tricho_8yrs_feb25" contains data on individual plants found at different populations that include:

- population: the numerical identification code for the population (each population is given one code)
- year: the year number (count begins on 1 and ends with 8 for a total of 8 years)
- plant.no: the plant identification number (each plant in a population is given one number and can the fate can be tracked across censuses)
- size.index: the plant's size index score
- stage: the plant's stage on census that is based on size index and flowering
- fate: the plant's stage on the next/return census
- flwr.or.not: whether or not the plant was flowering
- fruit.or.not: whether or not a fruit was produced by the plant
- fruit.no: number of fruits on the plant
- infl.herbivory: inflorescence herbivory presence on plant
- leaf.herbivory: leaf herbivory presence on plant

The text file titled "tricho8yrs_feb25" used for "Part I" and "Part IV" labelled sections of the R script. "Part I" created matrices using the demographic data for each site, census, and plant identification found in the text file. "Part IV" was the transient analysis that projected the short term dynamics and used the most recent field observations or stage class vector for each population (Supplemental Appendix). We calculated three indices for short-term transient dynamics to capture the variation during a 15-year transition period: reactivity, maximum amplification and amplified inertia. Reactivity measures a population's growth in a single measured timestep relative to the stable-stage growth, during the simulated transition period. Maximum amplification and amplified inertia are the maximum of *future population density* and the maximum *long-term population density*, respectively, relative to a stable-stage population that began at the same initial density (Stott et al. 2011). For these analyses, we used a mean matrix for Core 1, Core 2 Core 3, and Core 4 sites and the population structure of their last census. For the Peripheral site, we averaged the last three matrices post-hurricane disturbance and used the most-recent population structure. We standardized the indices

across sites with the assumption of initial population density equal to 1 (Stott et al. 2011). Analysis was done using R Popdemo version 1.3-0 (Stott et al. 2012b).

The data file "tricho_matrices_nov29" are the matrices used to run the stochastic simulation of hurricane introduction, logging introduction, episodic recruitment introduction, and scale insect mortality removal at select censuses/populations (Supplemental Appendix). The file was used in the "Part II" and "Part III" labeled section in the R script.

The following two text files were imported and read by R 2.4.4 Software Package using the code script from R file "Tricho_markov_hurriane"

The text file "tricho.matrices.hur" contains the matrices that will be pulled for each phase as described in the manuscript methodology "four major transition phases gathered from the Peripheral population censuses: (1) phase I, the hurricane year (census 5); (2) phase II, first year post-hurricane (census 6); (3) phase III, second and third year post hurricane (7 and 8); (4) phase IV, non-hurricane affected years (census 1, 2, 3, and 4) (Table 2; Appendix S1: Table S1)." To simulate the historic and increased probability of hurricane impacts on long-term population growth rates (λ values) at our longest running censused population we used two Markovian chains.

The text file "tricho.mark.hur" contains the state of environments for the hurricane probability scenarios. The probability of a hurricane happening on any given year was 0.1. If a hurricane did occur, then Phase II was followed by Phase III, unless another hurricane. The two matrices in phase III occurred at equal probability on the second and third year post-hurricane. On the fourth year after a hurricane and until the next hurricane occurs, the four matrices in phase IV occurred at equal probability. To project the effects of an increase in hurricane frequency, we applied changes to the yearly hurricane probability to 0.15 (an increase of 50%). The remaining probabilities for the above post-hurricane stayed the same.