

Klamath Bird Observatory



Advancing bird and habitat conservation through science, education, and partnerships

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Study results represent the first published documentation of El Niño's influence on the survival of a resident tropical landbird and suggest that mature, un-fragmented forests may offer refuge in a changing climate

Habitat alteration due to forest clearing and climate change threaten wildlife populations across the globe. To better understand the interacting effects of habitat degradation and climate on bird populations, researchers from the U.S. Forest Service Pacific Southwest Research Station (PSW), Klamath Bird Observatory, and Costa Rica Bird Observatories spent 12 years studying the White-collared Manakin, a fruit-eating tropical bird, in mature and young forests along the Caribbean coast of Costa Rica. During the study, several El Niño and La Niña events—cycles of warm and cold ocean temperatures that influence air temperature and precipitation—resulted in very marked dry and wet annual conditions that allowed researchers to measure differences in manakin survival relative to climatic shifts. Results were recently published as the cover article in the journal *Oecologia* July 2015 edition [<http://link.springer.com/article/10.1007/s00442-015-3256-z>].

In young tropical forests, researchers found dramatic decreases in manakins' survival during dry weather associated with El Niño. Researchers believe that, due to a sparser canopy and their fragmented nature, the young forests were more susceptible to understory drying that reduced fruit production. Conversely, manakins' survival rates were higher during wet years associated with La Niña events in these young forests where increased moisture and sun exposure likely led to an abundance of fruit resources. In mature forests, researchers observed very stable manakin survival rates regardless of climatic shifts, suggesting a relatively constant abundance of fruit resources.

"The complex structure of mature forest is thought to serve as a climatic refuge, buffering fruiting plants from climatic changes resulting in stable manakin survival," says Jared Wolfe, a postdoctoral researcher with PSW and Klamath Bird Observatory and the study's lead author. "Climatic refuges, such as mature tropical forests, may be important for many resident tropical bird species faced with the decreasing availability of mature forests coupled with increases in the severity of El Niño-associated dryness."

These study results represent the first published documentation of El Niño's influence on the survival of a resident tropical landbird. Researchers believe that variation in manakin survival between forest types provides insight into the sensitivity of certain species to habitat alteration. "From a management perspective, understanding how climatic events affect biodiversity is critical for the development of science-based conservation strategies," says Pablo Elizondo, the Costa Rica Bird Observatories' executive director and co-author of the study.

This publication represents an ongoing collaboration between Klamath Bird Observatory, the US Forest Service Pacific Southwest Research Station and International Programs, and the Costa Rica Bird Observatories.

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