Journal of Climatology and Weather Forecasting, Vol. 10, Issue 10, 001-002 Opinion

Forecast for Sanibel Island in Southwest Florida

D. Ricardo*

Editorial Office, United kingdom

Corresponding Author

D Ricardo.
Editorial Office,
Journal of Climatology and Weather Forecasting,
United Kingdom
E-mail: Climatolres@journal.com

Received: 15-Oct-2022, Manuscript No. JCWF-22-20160; **Editor assigned:** 21-Oct-2022, Pre QC No. JCWF-22-20160 (PQ); **Reviewed**: 24-Oct-2022, QC No. JCWF-22-20160 (Q); **Revised**: 26-Oct-2022, Manuscript No. JCWF-22-20160 (R); **Published**: 28-Oct-2022, doi:10.35248/2332-2594.22.10 (10).376

Abstract

The (latitude 26.436394, longitude-82.105589) is a low-lying barrier island with an area of around 4,900 hectares that was developed by sediment accretion, producing linear dune systems with a range in height (between 0 and 3 m above sea level). The interior of the island's lower elevation is surrounded by natural sand dune ridges, creating freshwater wetland. The freshwater wetlands of Sanibel Island are protected from subterranean saltwater intrusion from salty aquifers beneath the island and the Gulf of Mexico by osmotic pressure brought on by seasonal rains and a thin clay laye. During the summer and fall wet season, when Sanibel receives 85% of its annual precipitation, these wetlands flood, and during the winter and early spring dry season, the water levels drop. Therefore, Sanibel's conservation lands (about 50% of the island's land area) are primarily restricted to the island's flood-prone interior of freshwater.

Keywords: Freshwater • Wetland • Sanibel Island • Summer, Season Changes • Model resolution in high • Glaciers

Introduction

In Sanibel's freshwater marshes, woody plants, especially buttonwood (Conocarpus erectus), are now prevalent where sand cordgrass (Spartina bakeri) had predominated. Upland areas are dominated by the development of homes, businesses, and infrastructure. Sanibel Island and its fauna are susceptible to the effects of climate change because it is a low-lying barrier island. Increased flooding is anticipated in this region as a result of forecasted increases in frequency and intensity of heavy rainfall events. Because of the higher underlying water table caused by sea level rise, which limits or prevents precipitation entry into the soil and increases flood potential, coastal habitats are particularly sensitive to floods. As the water table increases above that of low-lying places, causing their inundation, sea-level rise alone, without altered rainfall patterns, can increase the frequency of surface flooding. Through flooding, such adjustments to hydrologic patterns directly affect the distribution of wildlife, and indirectly through changes to the structure and composition of vegetative specie. Sanibel before development. Prior to development, the interior marshes of Sanibel Island were predominately grassy, periodically flooded, and vulnerable to saltwater intrusion from storms and high tides during the dry season when seawater might enter through the wetland's natural outfall. The encroachment of shrubs, which is facilitated by shortened hydroperiods, dewatering projects and the plugging of the wetland's natural outfall, salinity changes, wildfire suppression, and elevated atmospheric CO2 concentrations, have changed the composition and structure of grassy systems, such as the freshwater interior marshes of Sanibel Island. The freshwater inner marshes of Sanibel Island, however, are not likely to support this unique vegetative community for very long. Within the next century, sea level rise is anticipated to inundate Sanibel Island's freshwater interior wetlands, facilitating the transition to mangrove forests, as has already been seen elsewhere in south Florida. research species On Sanibel Island, rice rats, black rats, and cotton rats coexist. The distinct ecological differences between rice rats and cotton rats reduce niche overlap, enabling sympatric dispersion across much of the southeastern United States. Cotton rats are herbivorous but rice rats are omnivorous which may reduce competition for food supplies. However, due to the seasonal diet flexibility of both species and resource availability, there may be seasonal dietary overlap and resource-related competition. Although it has been hypothesised that cotton rats and rice rats avoid each other in specific areas, species-specific habitat preferences most likely explain this trend. Although rice rats and cotton rats normally inhabit wetter and drier regions, there is significant spatial overlap between the two.

If we measured three environmental factors that are expected to get worse with climate change (shrub cover, mangrove density, seasonal flooding). As mangrove invasion is made easier by sea-level rise, as has already been seen throughout south Florida's coastal wetlands, mangrove density is anticipated to rise within Sanibel Island's interior. During the first field season, we counted the number of mangrove stems within a 4-m2 quadrat at a spatially standardised subset of nine of the twenty-five trap points per site; these nine places are referred to as "environmental sampling points" from now on. On buttonwood and sand cordgrass sites (n = 36), we repeated mangrove stem counts every year because these sites were potentially vulnerable to mangrove invasion and because managed fire and mechanical shrub removal altered the vegetation composition. We didn't use stem twice. On mangrove sites (n = 18), we did not repeat stem counts annually because these areas did not experience fire or mechanical shrub removal and remained throughout the research. We did not distinguish between red (Rhizophora mangle), white (Laguncularia racemosa), or black (Avicennia germinans) mangroves. Increased atmospheric CO2 concentrations, shortened hydroperiods brought on by previous dewatering initiatives, and perhaps the abolition of wildfire are all contributing factors to the ongoing shrub encroachment on Sanibel Island's interior marshes. We used a remote sensing method to measure the amount of shrubs using real colour (red, blue, and green) images that were made accessible to the public by the Lee County government.

We used a remote sensing technique to measure the amount of shrub cover using publicly accessible true colour (red, blue, and green bands) georeferenced aerial footage from January 2015 that was made available by the Lee County government. We classified photos in ArcGIS using a supervised method based on true colour spectral reflectance data, allowing us to choose types of land cover in advance. Shrubs, sand cordgrass, leather fern, and open water were among the several types of landcover. The additional classifications were added even though shrub cover was the only remotely sensed land-cover class of interest. This is because (a) they are common in Sanibel Island's freshwater interior and (b) supervised classification necessitates the identification of other land-cover classes that are present. Then, for places that weren't naturally dominated, we retrieved shrub cover estimates in 0.44-ha circular polygons with a 75-m diameter.

By excluding areas with mangroves or upland tropical hammocks from our sample (i.e., n = 27), we were able to only include regions where measurable changes in shrub cover may occur. All other websites were set to zero. Using information gathered at the 9 environmental sampling locations set up on each of the 27 remotely sensed sites, we evaluated the precision of shrub cover estimations. In the remotely sensed data layer, we recorded a binary measure of whether shrub cover was dominant at each position in 2015 and within a 1 ml buffer of each point. To evaluate categorization accuracy, we then computed omission and commission error rates. Seasonal flooding on Sanibel Island is predicted to increase due to climate change due to more intense individual rain events. We created a flooded point count by counting the number of environmental sampling points (0 points–9 points) with standing water at each site during each trap period in order to estimate seasonal flooding. Any environmental sampling point, including tidally-flooded points, that was submerged for a portion of the survey period was counted. We took into account two factors (visual blockage and season) that we hypothesised would affect rodent detection. Visual blockage may change foraging-related fear feelings that affect detection likelihood. Using a Robel pole, we annually quantified visual obstruction, a metric of vegetation density, at each environmental sampling point per site. We measured the lowest visible point on the Robel pole to the closest decimeter from each cardinal direction while standing at 0.7 m height, roughly the height of mammalian predators. To calculate an annual average measure of visual obstruction for each site, we averaged observations over the nine environmental sampling points at each site. Seasonal variations in temperature and food availability affect activity levels and bait attractiveness. We hypothesised that two factors (visual blockage and season) would affect rodent identification. The likelihood of detection may differ due to visual blockage. Consequently, we added a binary season metric.

The chance that invasive species and erratic environmental circumstances would change how island endemic wildlife is distributed. We discovered that the distribution of native and invasive wildlife was likely to vary as a result of environmental factors related to climate change. As a result of the environmental changes anticipated by future climate change scenarios, we also discovered that interspecific interactions between invasive and native species were likely to grow. In particular, we discovered that the distribution of mangroves on Sanibel Island was predicted to increase through at least 2100, which would increase interspecific interactions between invasive black rats and endemic cotton rats. Coexistence without competitive exclusion may have been aidedby differences in space utilisation and dietary flexibility. Black rats are able to obtain resources for nesting and feeding in trees that may be less available to cotton rats. Additionally, black rats are omnivorous, with a significant portion of their diet made up of invertebrates and other non-vegetative food sources as opposed to cotton rats, which are mostly herbivorous. By utilising novel food sources like mollusks in mangrove forests, black rats are able to further limit the likelihood of dietary overlap with cotton rats. Alternatively, the observed co-occurrence patterns might be explained by a mutualistic relationship. Given that the black rat has a history of outcompeting many native species and since there doesn't appear to be a mechanism for either It is possible for one species to encourage the occurrence of a different one. The attenuation of predatory pressure and facilitation of habitat alteration are conceivable mechanisms, but more study is required to determine their viability. As anticipated, the continuation of cotton rats on Sanibel Island may be threatened by increased floods and mangrove density. Cotton rat occurrence may decline in those locations when sea level rise enables a gradually expanding mangrove distribution around Sanibel Island's northern edges. But within the next century, when sea levels rise and wetlands in the interior become submerged, the distribution of cotton rats on Sanibel Island might shift most dramatically. This would then allow mangrove forests to grow. Flooding and mangrove expansion, two phenomena that are detrimental to cotton rat occurrence, combined as a result to may drive cotton rats out of the interior freshwater wetlands where they have historically been most prevalent.

Cite this article: Ricardo. D. Forecast for Sanibel Island in sSuthwest Florida. J Climatol Weather Forecast. 2022,10(10), 001-002