THE PHYSICAL VULNERABILITY OF THE FLORIDA KEYS

CLIMATE CHANGE AND THE FLORIDA KEYS

FACT SHEET 3

FKNMS/NOAA SOCIOECONOMIC RESEARCH AND MONITORING PROGRAM

The views and recommendations are the author's and are not necessarily endorsed by NOAA.

OVERVIEW

The Florida Keys is the area most at risk from climate change in the United States, the southernmost part of a State which is itself under significant threat.

The low elevation of the Keys aggravates the risk. The main hazard is from sea-level rise, expected to threaten *at least* 38% of the current land area by 2100 – in the worst case almost the whole area. Storm surges from hurricanes and coastal erosion aggravate the threat.

The Florida Keys, significantly, form a "super-ecosystem", with its collection of islands complete with key deer and other threatened species, pine forests, hammocks, mangrove and seagrass communities, and coral reefs. It is useful to adopt this view, recognizing the vital role of the reefs while giving the threat of sea-level rise its proper focus.

Elevated sea temperature is the primary threat to the coral, aggravated by ocean acidification. These factors interact with and reinforce traditional stressors including land-based pollution, overfishing, destructive fishing practices, invading species, and disease.

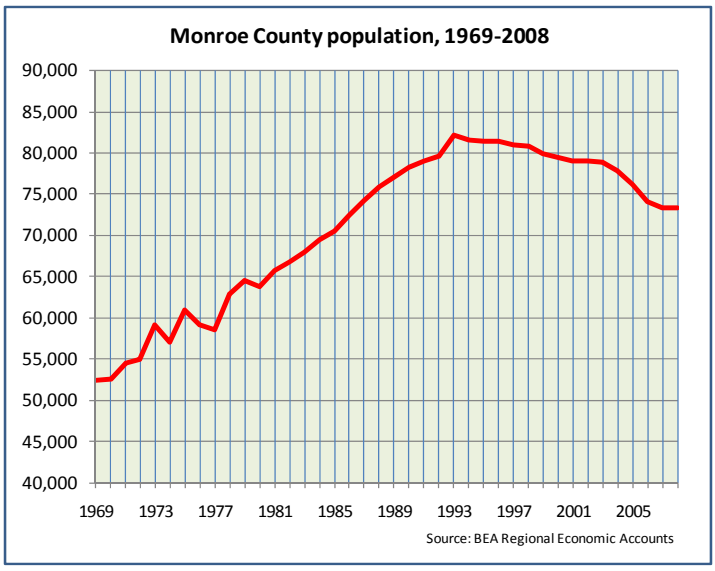
The coral cover of the reefs declined by half between 1996 and 2008. Commercial fishery landings in Monroe County, including spiny lobsters, pink shrimp, and reef fish such as snappers and groupers, showed comparable declines.

Most of the water supply is through aquifers from the immediate north. It is already affected by saltwater intrusion, which would be aggravated as the sea level rises.

Carrying capacity (further discussed in Fact Sheet 4) is a key issue for Monroe County. Partly as a result of its residential permit control system, the population is in decline. After rising steadily until the early nineties, the population in the Florida Keys (where practically all Monroe County residents live) peaked at approximately 82,200 in 1993. By 2008 it had fallen to 73,300, as shown on page 2.

EXTERNAL INFLUENCES

Two forces from the immediate north of the Keys aggravate the environmental threat: the deterioration of the Everglades and 5.5 million inhabitants of the South Florida Metropolitan Area (Miami-Dade, Broward and Palm Beach Counties) on the very doorway to the Keys. The parlous state of the Everglades causes pollution of the neighboring Florida Bay and further



along the Keys. The existence of the metropolitan area in such close proximity has a multitude of consequences that add to the risks faced by the Florida Keys despite strong local and regional government action to manage the situation.

KEY ISSUES

Five successful workshops were held in 2008 with community leaders and other prominent residents. The ultimate purpose was to identify key issues from subjective discussion to supplement biophysical research data and hard demographic and socioeconomic statistics. The issues fall into two groups, those that are essentially forced upon the community from outside and those that are actually or potentially manageable from within.

Climate change was universally seen as the dominant threat. Other hard-to-manage issues were water supply (coming mainly from outside the Keys) and carrying capacity (ability to support a given population). Other external influences over which little local control was possible included pollution from the Everglades and from the mainland via the Gulf.

The more manageable key issues were reef health, sustainability and fisheries (within the confines of global climate change), and internally generated pollution which was identified separately. The role of education and outreach was recognized as an important adjunct in dealing with reef health and sustainability. The workshops also explored the issue of the Keys economy, the future of tourism in the Keys, and any diversification potential that might assist the future economy.

MANAGING THE CONTROLLABLE ISSUES

Monroe County has a key role in dealing with a wide range of issues, being highly conscious of the threats that face the Keys from climate change, and from pollution whether generated locally or elsewhere. It introduced the regulations to limit population growth to fit the carrying capacity of the Keys, and collaborates with other counties and the State to manage water supply, pollution and other matters.

The sanctuary administration is based on a finely tuned integrated coastal and marine management structure. The Florida Keys National Marine Sanctuary collaborates with other authorities at local, state and federal level (and other coral reef authorities including the Great Barrier Reef Marine Park Authority in Australia). For almost the entire period since the FKNMS was formed in the 1990s, it has conducted day-long bimonthly meetings with the Sanctuary Advisory Council, bringing together a wide range of local government, community,

industry, scientific, and other interests including those concerning other environmental issues in the Keys (such as the key deer on Big Pine and No Name Keys).

There is general agreement that the integrated management style has been beneficial, but facing intensifying climate change, there is a need for increased funding, and there is still a lack of protected "no-take" areas (only 6% including Dry Tortugas). In comparison, the Australian Government dramatically increased the protected areas in the Great Barrier Reef Marine Park from 4.6% to 33.3% in 2004, making it the largest protected sea area in the world.

RESILIENCE

The most important concept when striving for preservation of the coral reefs in Florida is resilience – the ability of corals to absorb disturbances and bounce back. Alex Score in her presentation to the 2008 Florida Reef Resilience Program conference (organized by The Nature Conservancy, TNC) outlined three dimensions: *resistance* (the ability to resist negative impact of stress), *tolerance* (ability to suffer negative impacts to rebound and live), and *recovery* (where dying corals are replaced by new corals).

COMMUNITY ORGANIZATIONS

This description would be incomplete without mentioning the vital role of local community groups ranging from GLEE (Green Living Energy Education), SFFFK (Sanctuary Friends Foundation of the Florida Keys), and special-purpose societies protecting local endangered species like the key deer. These groups provide the community backing for the work carried out by the FKNMS, TNC and others operating as part of larger organizations.

HHG November 3, 2010

Further reading

Climate Change and the Florida Keys, Chapters 4 to 6.

Fact sheet 4 (*Structural change in the Florida Keys economy*).

Chris Bergh (2009), *Initial Estimates of the Ecological and Economic Consequences of Sea-level Rise on the Florida Keys through the Year 2100*. The Nature Conservancy, Sugarloaf Key, FL. August. http://www.frrp.org/SLR.htm.

FKNMS Sanctuary Advisory Council (2008), 'Recommendations based on the SAC Marine Zoning Workshop March 25, 2008, June 11, 2008
DRAFT.' http://floridakeys.noaa.gov/sac/agendas/061708zoning.pdf .

Florida Reef Resilience Program, Reef Resilience Conference 2008: *Coping with Climate Change.* http://www.frrp.org/.

Alessandra Score (2008), 'Summary of resilience strategies'. http://www.frrp.org/.

Pictured: Key deer, Big Pine Key (HHG 2008)