Science to solutions:
Outreach and education materials about coastal change

Dr. William Nuttle

Integration & Application Network

National Association of Marine Labs
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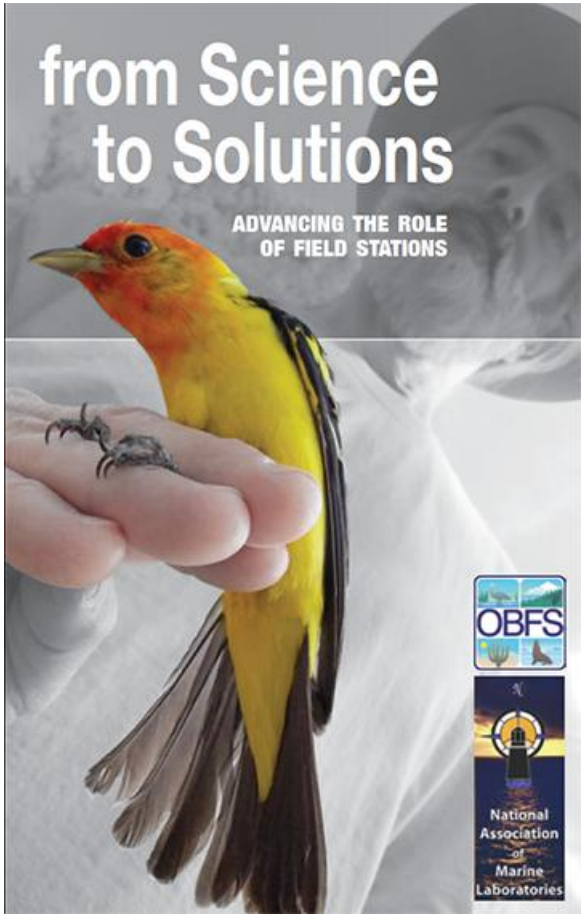
Opportunity for NAML and individual labs

"The **place-based knowledge** that field stations provide **makes better informed** resource managers, **decision-makers**, and citizens."



Telling the story of dynamic, changing coastal ecosystems

Florida Bay Watch Report

August 2001 A synthesis document of the Florida Bay and Adjacent Marine Systems Science Program

The Plume and the Bloom

The status of microalgal blooms and why they develop in different regions of Florida Bay has been an issue for a decade. As was discussed in the Florida Bay Watch Report titled *Florida Marine Research Institute Maps Reveal Decreases in Florida Bay Algal Blooms* (1998), two major blooms have been identified in the bay. One, located in the central region of the bay (Figure 1), is dominated by cyanobacteria (a type of microalgae). The other, located in the western bay, is dominated by diatoms and is the subject of this report.

Diatoms are unique among the various ty microalgae found in Florida Bay because require silicate, a mineral composed of sil oxygen, to grow. When the ratio of silica nitrogen or silicate to phosphate falls belo threshold value, diatoms are easily out-co by other types of microalgae, such as cyanobacteria and dinoflagellates (Figure and 3). At that point, diatom growth beco silicate limited whereas other microalgae to grow. Thus, in order for diatoms to ful exploit a newly available supply of nitrog phosphorus, a silicate source is also requi

Figure 1. Regions of Florida Bay and important coastal features.

Florida Bay Watch Report

June 2002 A synthesis document of the Florida Bay and Adjacent Marine Systems Science Program

Acquiring a Taste for Florida Bay

Florida Bay often surprises at first. It might be the tropical setting or its brilliant turquoise waters. It might be an encounter with a mud bank lurking in its shallow waters. Whatever the cause, Florida Bay isn't what most people, even estuarine scientists, expect to find.

That's because estuaries are like beer. There are hundreds just in the U.S. And although each is unique, people form their perceptions of the whole group on the characteristics of just a familiar few. Some widely known estuaries such as Chesapeake Bay and San Francisco Bay are taken as typical of all; just as the popular brands "Budweiser" and "Miller" are for all beer. Scientists and managers now engaged in restoring coastal ecosystems all over the U.S. know the characteristics of these few estuaries from the many decades of study devoted to understanding their problems. In the same way, most of us are familiar with the taste of a few of the popular brands of beer, and think we know all there is to know.

To the uninitiated, Florida Bay challenges the palate like one's first sip of an unfamiliar beer. Scientific information about the bay is relatively recent and not yet widely known. Coordinated ecosystem research began less than ten years ago in response to alarming changes in its seagrass beds and water quality. The causes of these changes are still not fully understood. As estuarine scientists come to know the basic physical and ecological characteristics of Florida Bay they are acquiring a taste for this peculiar brew.

Basic physical ingredients

Just as all beer is made from only ingredients, estuaries are defined b characteristics, hydrology, geomor hydrodynamics. Hydrology inclu freshwater - mostly as runoff from the resulting influence of the conn shed. Geomorphology refers to th estuaries, which ranges from lake- lagoons to drown river valleys to r Hydrodynamics covers the nature wind-driven mixing within the est the coastal ocean, including the ef stratification.

The degree to which different estu one another largely depends on the these three basic characteristics. I these characteristics of Florida Bay tists to compare what they are find its water quality and ecology with known about similar, better-studie while some scientists are investiga Florida Bay's ecology, such as sea plankton blooms, and fluctuations of fish and wading birds, other sci compiling basic information about hydrology, geomorphology, and hy

Comparison to other estuaries

The characteristics of Florida Bay nearly all other estuaries in the co (Table 1). The National Oceanic a

Florida Bay Watch Report

October 2001 A synthesis document of the Florida Bay and Adjacent Marine Systems Science Program

South Florida's "Current" Concerns Require A Global View

Recent oceanographic research indicates that far-reaching linkages occur between south Florida coastal waters and distant, "upstream" regions of the Gulf of Mexico and the Caribbean Sea. The research shows that sustainability of south Florida's coastal ecosystems depends on both regional water-use practices and inputs from these upstream areas. These findings may have a substantial impact on management of south Florida's coastal waters.

Although local activities having local impacts are easily understood and can often be traced to the source, managers and scientists tend to overlook impacts of upstream areas when forecasting environmental changes associated with Everglades restoration. With the exception of interior portions of Florida Bay, all south Florida coastal waters are tightly connected by a regional recirculation pattern. A combination of wind and Gulf Stream influences causes this circulating flow of water, which occasionally carries influences from discharges such as the Mississippi River and other rivers emptying into the eastern Gulf of Mexico.

South Florida Coastal System

The south Florida coastal region (Figure 1) is comprised of separate subregions defined by their different physical characteristics, flow properties, and species composition. The oceanographic linkage between the subregions depends on the degree of transport and interaction of currents that connect these subregions as well as the whole coastal region. With the exception of the interior of Florida Bay, recent current measurements using fixed instruments and drifting devices (drifters) that track flow have shown a high degree of connectivity over the entire south Florida coastal region and with upstream regions of the Gulf of Mexico.

Water movements occur on time scales ranging from minutes to seasons to years. Tidal currents often account for a large part of the variation in coastal currents and are important for local mixing and dispersion of materials. Because of the reversing pattern of tidal currents, they are not effective transport mechanisms over distances longer than a few miles. Therefore, this report will focus on slowly varying currents that exist for periods of days to seasons, and are technically referred to as "subtidal currents." Subtidal currents are primarily responsible for linking adjacent and distant regions to south Florida ecosystems. In the coastal waters of south Florida, subtidal currents are mainly produced by interactions between local winds and large-scale Gulf Stream current systems (Figure 1). Subtidal coastal currents are also strongly influenced by local depth contours and coastline orientations. The major components of the south Florida coastal system, Florida Bay, Southwest Florida Shelf, and the Keys Coastal Zone, are described below.

Florida Bay is a complex maze of shallow basins separated by mud banks and mangrove islands. The bay is openly connected to the Southwest Florida Shelf along its wide western boundary, but exchange with the Atlantic coastal zone of the

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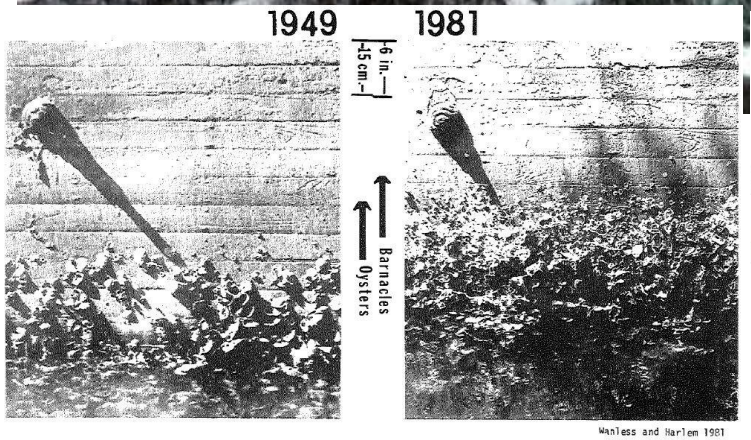
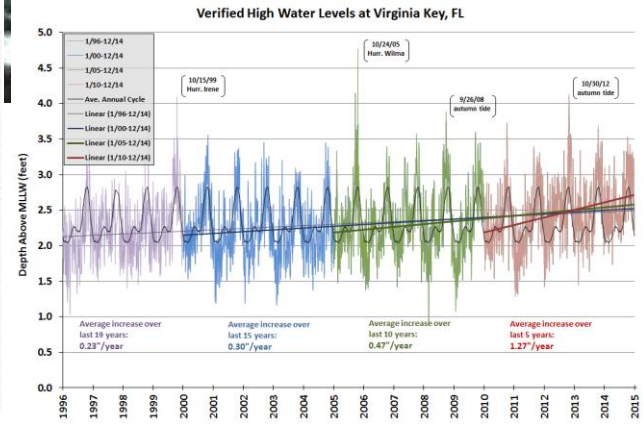
Telling the story of dynamic, changing coastal ecosystems

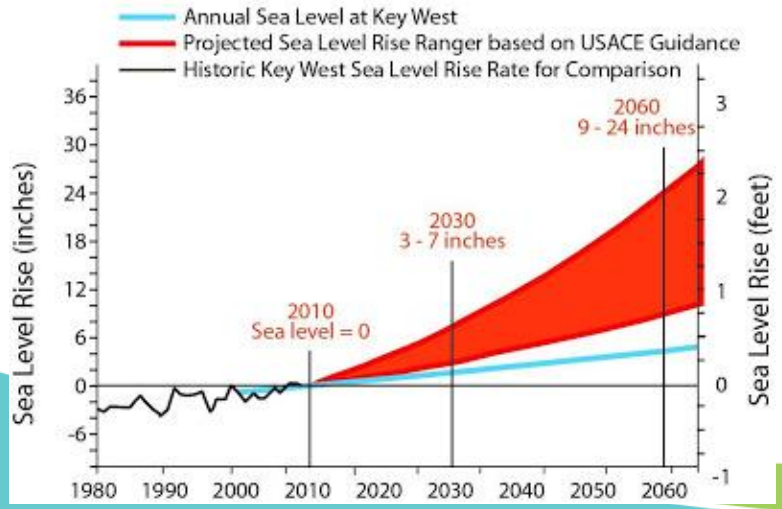


Photographs of the intertidal organisms growing on the concrete bridge support at Le Jeune road and Coral Gables Waterway, Coral Gables, Florida. Support is located at the southwest corner and is imbedded in limestone. Horizontal grooves are about 8 centimeters apart.

Photograph on left was taken August 24, 1949 by Dr. Hilary Moore. Photograph on right was taken April 21, 1981. Upper limits of both barnacles and oysters have shifted upwards about 16 centimeters (6 inches).



Story of dynamic changing coastal communities still to be worked out…



Marine labs have a role in telling the story

February 4, 2015

Does rising sea level signal the end for LUMCON, or a beginning?

Harbor Branch "Love Your Lagoon" Event Raises More Than $50,000

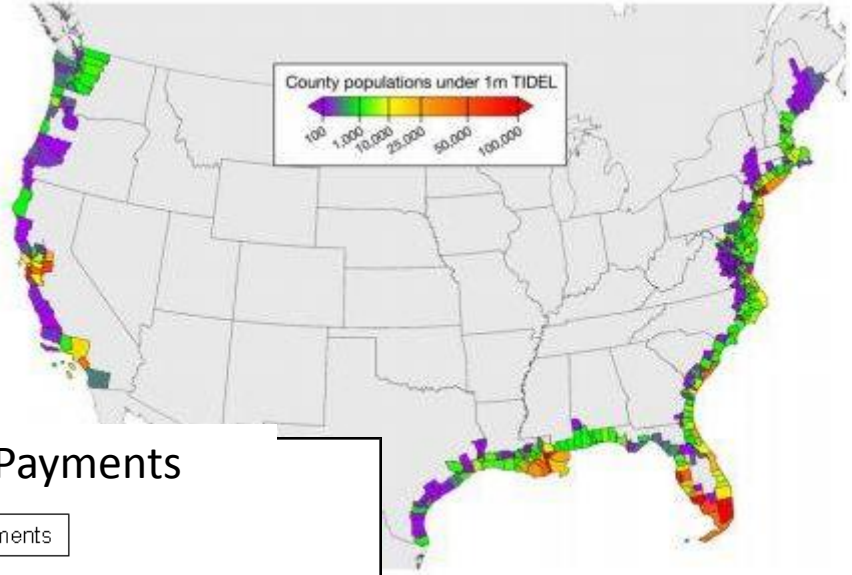
Marine Lab's Newest Research Building Showcases Sustainable Coastal Design

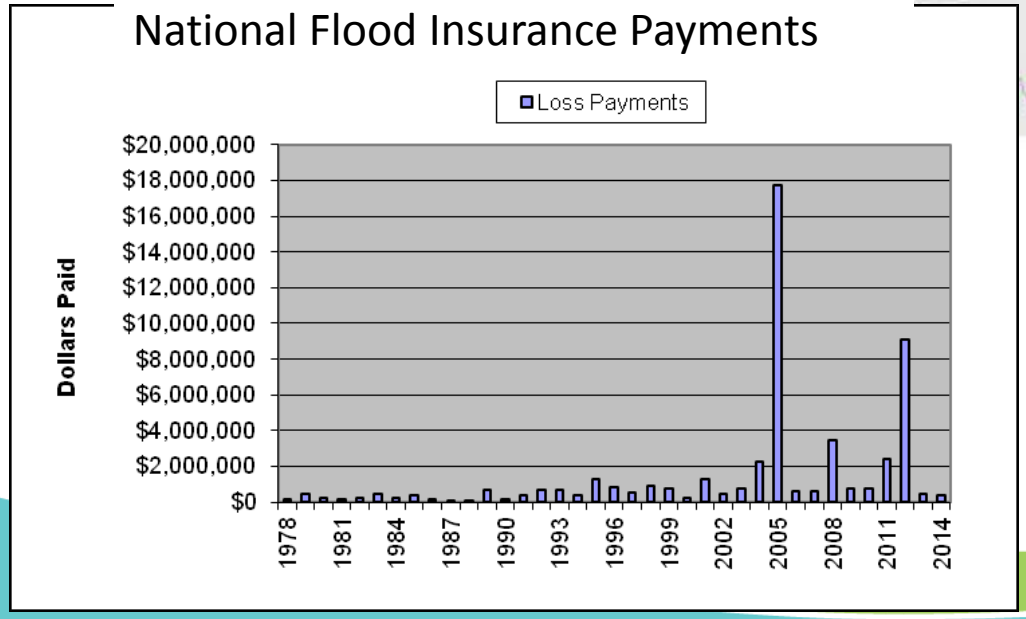
Monday, May 12, 2014

featuring

NAML's role – local stories have national significance

- Andrew $10B
- Katrina $60B
- Sandy $50B





IAN can help formulate and communicate these stories

- IAN's aim is to enable better communication to empower change.
- 3 main focus areas
  - Develop science communication products
  - Ecosystem report cards
  - Training

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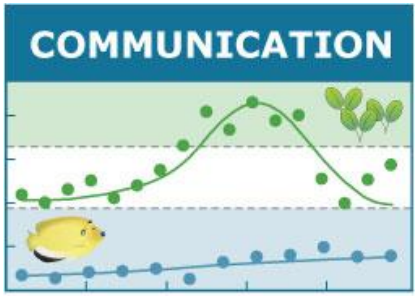

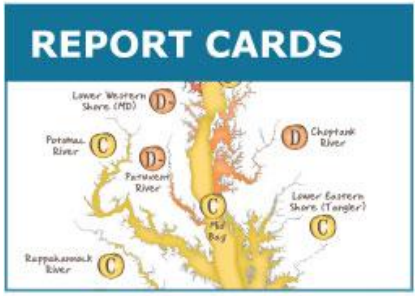

Place-based knowledge makes better decision-makers

- Expand NAML mission?
- Proof of concept project – develop, implement communications strategy
  - Work with 4-6 “early adopter” labs
  - Gather, illustrate best practices
  - Template for sustained effort by NAML members
- Build case for sustaining support from federal, state, and other sources

Thanks!

William Nuttle

wnuttle@umces.edu

Ian.umces.edu

https://medium.com/stories-of-coastal-change-and-resilience