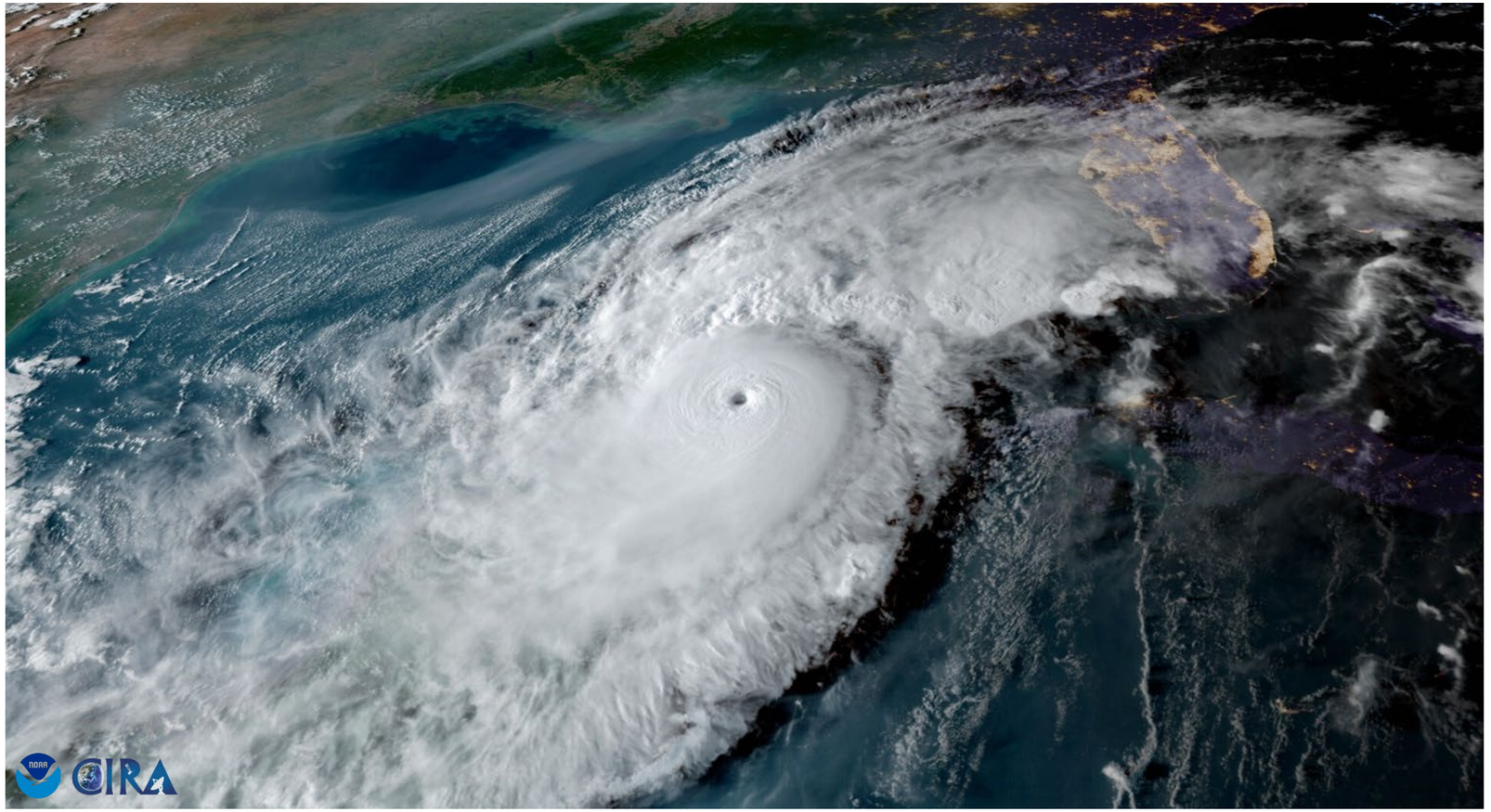

CONSERVANCY
of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.
PRESERVING OUR PARADISE FOR 60 YEARS
Model to Mishap: Maki
Protection of Water Quality in Southwest
Florida
December 10, 2024

LIFE IN SOUTHWEST FLORIDA

CONSERVANCY of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.
PRESERVING OUR PARADISE FOR 60 YEARS

THE FORCE OF NATURE



CONSERVANCY of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.
PRESERVING OUR PARADISE FOR 60 YEARS

THE ROLE OF NATURE

CONSERVANCY of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.
PRESERVING OUR PARADISE FOR 60 YEARS

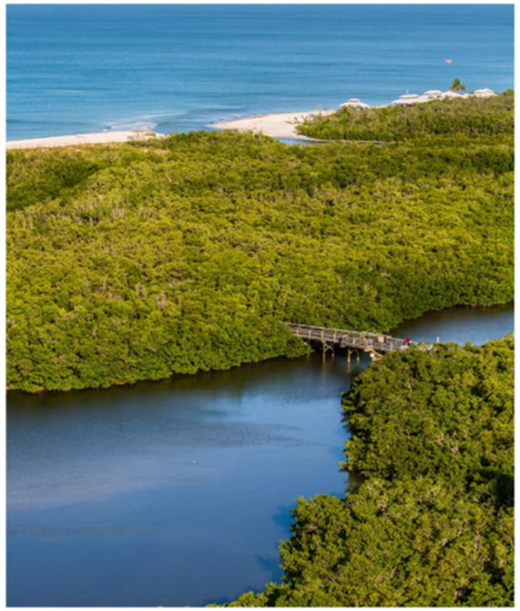
GROWTH MANAGEM

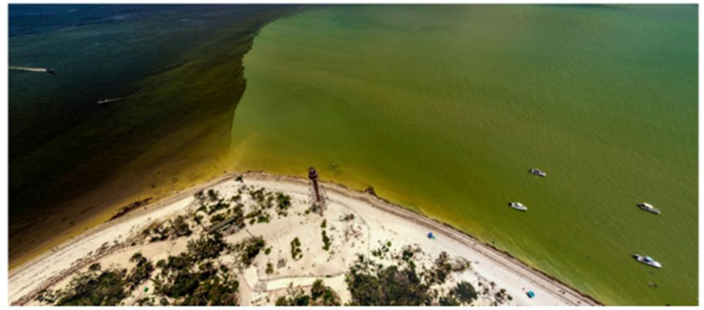
CONSERVANCY of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.
PRESERVING OUR PARADISE FOR 60 YEARS

GROWTH MANAGEM

CONSERVANCY of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.
PRESERVING OUR PARADISE FOR 60 YEARS

CLEAN WATER IS VITAL TO THE ECONOMY OF SWFL





CONSERVANCY of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.
PRESERVING OUR PARADISE FOR 60 YEARS

PARTNERS IN ACTION

SCCF
SANIBEL-CAPTIVA CONSERVATION FOUNDATION

CAPTAINS FOR CLEAN WATER

CONSERVANCY of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.

MAKING THE CONNECTION: OUR WATER, ECONOMY AND QUALITY OF LIFE

APPROACH

(2020) 50, 170–188

The Review of Regional Studies

The Official Journal of the Southern Regional Science Association

Algal Blooms and Tourism: The
act to Counties in Southwest Flo

Andrew Bechard

epartment of Economics, University of Rhode Island, US

recent red tide bloom in the summer of 2018 served as a
Florida. The algal bloom decimated the coast, killing off sea
orced to close, tourists and residents alike were no longer pro
es. This, however, has happened before. We consider four n
in 2005, one in 2006, and the aforementioned bloom in 2018. A
cant impacts on the economy. We examine the effects of two
to determine the magnitude of losses in taxable sales cause
model, we compare taxable sales in counties affected by red t
at affected counties produce 5-7 percent and 1.5-2.5 percent l
ectively. If red tide blooms become more frequent and persis
continue to grow. Policy and strategy to mitigate economics
ful effects of these algal blooms.
s-differences, economics, harmful algal blooms (HABs), Kareni
Q51

TION

rms (HABs) are almost always present in the Gulf
w concentrations (Roberts, 1979; Pierce et al., 2005;
the microscopic algae creep towards the shores of We
o become a natural disaster, as damaging as hurricane
Southwestern Florida is typically known for. Karen
effects of HABs in southwest Florida, can cause mort
ing from massive fish kills across species, to sharks,

nda Ross (Editor) and two anonymous referees for providing
y own.
PhD Student at the University of Rhode Island. *Correspon*
w_bechard@uri.edu

al Science Association 2020
48-49X (online)

FloridaRealto
The Voice for Real Estate in Flo

March 2015
Final Report

Fisheries Research 230 (2020) 105678

Contents lists available at ScienceDirect

Fisheries Research

journal homepage: www.elsevier.com/locate/fishres

Economics losses to fishery and seafood related businesses during harmful algal blooms

Andrew Béchard

Department of Environmental and Natural Resource Economics, University of Rhode Island, 45 Upper College Rd, Kingston, RI, 02881, United States

ARTICLE INFO

Handled by Steven X. Cadrin

Keywords:
Seafood
Shellfish
Harmful Algal Blooms (HABs)
Karenia brevis
Red tide
Time series
ARIMA modeling

ABSTRACT

Harmful Algal Blooms (HABs), specifically red tide, can cause coastal economic activity to slow in Southwest Florida. Popular as a vacation destination, the area relies on revenue generated by its beach access and proximity to fresh seafood. When blooms persist for multiple months in a row, fishery and seafood related businesses feel the negative effects. We examine taxable sales receipts for the fishery and seafood sector of Pinellas County, and find that during months with a persistent bloom of red tide, the county generates 14.8 % less in monthly taxable sales revenue for this sector. For the average month, this is northwards of $20,000 in lost monthly fishery and seafood related revenue. Our estimates, along with previous literature suggest that even if seafood in the area is healthy, the negative news surrounding the blooms causes demand to drop. These results suggest effects of red tide are severely damaging to seafood related businesses and services, and must be at the forefront of policy and management decisions going forward.

1. Introduction

The dinoflagellate *karenia brevis* is almost always present in the Gulf of Mexico, albeit at harmless and low cell count concentrations throughout most of the year (Roberts, 1979; Pierce et al., 2004,2005). However, given the right climate, and the availability and abundance of certain nutrients, *k. brevis* can grow into a harmful algal bloom (HAB), capable of spanning over one hundred miles of coastal Gulf waters (Tavel, 2018). The poisonous brevetoxins produced by the algae commonly known as red tide can have a significant negative impact on marine life. Countless species of fish, sharks, dolphins and sea turtles are all susceptible to the blooms of red tide (Flewelling and Naar, 2005, and Pierce and Henry, 2008). Sea birds, and even humans can be affected aswell through aerosolized brevetoxins, or through consumption of shellfish and seafood that has become poisoned by the brevetoxins (Fiskas and el-Said, 2002; Fleming and Kirkpatrick, 2005; Pierce et al., 2005).

The harmful effects of red tide can force beach closures, fishing restrictions, and even seafood and shellfish consumption (Florida Fish and Wildlife Conservation Commission (FWC), 2018). As a coastal tourism destination, Southwest Florida cities use the proximity to the ocean to attract visitors with fresh seafood caught in the nearby waters of the Gulf. A bloom severe enough to result in these restrictions on seafood could drive away visitors, and a persistent bloom that lasts for many days, even months, might force shutdowns long enough that seafood dealers by the shore cannot recuperate, and suffer significant losses in revenue. HABs, and more specifically red tides, are increasing in frequency, severity and persistency over time (FWC, 2019; Van Dolah, 2000; Pierce and Henry, 2008; Jin et al., 2008). As the blooms expand and hinder seafood processes, losses for fisheries and seafood related businesses could suffer. This paper studies the losses by these firms in the presence of red tide and compares the results to similar, but unaffected firms. The results of this study provide useful information for statewide and county decision makers, and the public, in mitigating and managing these events, by obtaining a more precise assessment of the economic impacts of HABs on the fishery and seafood sector in Southwest Florida.

2. Literature review

As Jin et al (2008) note, studies on economic impacts of HAB events are meagre. Previous literature found impact assessments that were rough estimates due to limited observation or unreliable survey data. Adams et al. (2008); Anderson et al. (2012), and Hoagland and Scatasta (2006, 2009) estimate annual losses during red tide blooms by looking at aggregated data from multiple industries within the economy. Tourism related sectors in general are found to suffer significant revenue losses. Bechard (2019) finds that coastal restaurants, presumably serving seafood, can lose 2-3 % of monthly revenue during a persistent bloom.

Seafood revenue losses have been briefly studied, but still without much statistical rigor. Wessels et al. (1995) determine that negative press coverage of algae can significantly impact demand for seafood on Prince Edward Island, even if it is unaffected by a bloom. A red tide bloom in the summer of 2000 cost Galveston County over $10 million in marine related industries (Evans and Jones, 2003). Oh and Ditton

https://doi.org/10.1016/j.fishres.2020.105678
Received 12 February 2020; Received in revised form 21 June 2020; Accepted 22 June 2020
Available online 01 July 2020

GREENE ECONOMICS

CONSERVANCY of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.
PRESERVING OUR PARADISE FOR 60 YEARS

PROPERTY VALUES

County	Total parcels in county	Total Property Value ($ billions)	Taxable Property Value	Parcels Within a Mile of a Waterway	Property Value w/in 1 mile ($ billions)	Taxable Value w/in 1 mile ($ billions)
Charlotte	213,510	$39.4	$22.6	45,798	$13.9	$4.2
Lee	558,023	$180.6	$112.6	117,774	$60.6	$19.1
Collier	288,581	$185.3	$122.2	57,401	$84.5	$33.9
Total	1,060,114	$405.3	$257.4	220,973	$159.0	$57.2

CONSERVANCY of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.
PRESERVING OUR PARADISE FOR 60 YEARS

QUALITY OF LIFE

Activity	Charlotte County	Collier County	Lee County	Study Area
Saltwater Beach Activities	$218,973,310	$1,426,931,990	$2,138,180,372	$3,784,085,672
Saltwater Fishing	$169,669,30		898772	$2,756,778,158
Nature Study	$185			$1,753,049,671
Freshwater Beach Activities				$1,408,119,683
Freshwater Boat Ramp Use				$868,085,238
Hiking				$4,153,956,195
Wildlife Viewing				$4,745,396,164
Picnicking				$2,162,793,399
Paddling Activities				$2,055,459,658
Saltwater Boat Ramp Use				$858,466,170
Water Skiing/ Wakeboarding	$16,771,713		822,211	$350,853,658
Freshwater Fishing	$90,319,450	$419,144,161	$156,256,054	$665,719,665
TOTAL	$1,620,561,074	$7,308,207,366	$ 16,633,994,992	$25,562,763,433

$25,562,763,433

CONSERVANCY of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.
PRESERVING OUR PARADISE FOR 60 YEARS

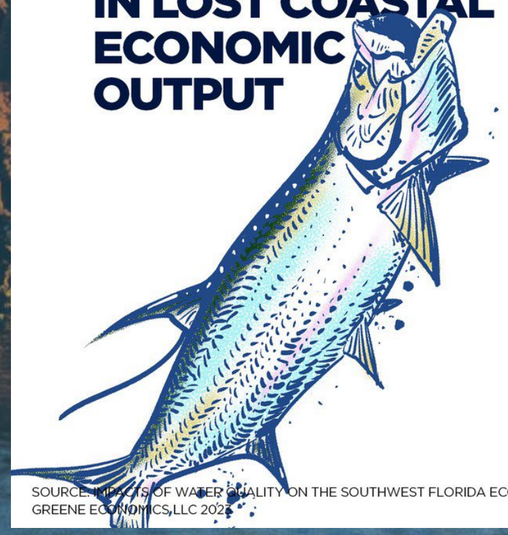
RESULTS: WATER QUALITY

CONSERVANCY of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.
PRESERVING OUR PARADISE FOR 60 YEARS

RESULTS: IMPACT OF HAB

A HARMFUL ALGAL BLOOM COULD COST SW FLORIDA:

$5.2 BILLION IN LOST COASTAL ECONOMIC OUTPUT



SOURCE: IMPACTS OF WATER QUALITY ON THE SOUTHWEST FLORIDA ECONOMY, GREENE ECONOMICS, LLC 2023

A HARMFUL ALGAL BLOOM COULD COST SW FLORIDA:

$8.1 BILLION IN LOST OUTDOOR RECREATION

SOURCE: IMPACTS OF WATER QUALITY ON THE SOUTHWEST FLORIDA ECONOMY, GREENE ECONOMICS LLC 2023

A HARMFUL ALGAL BLOOM COULD COST SW FLORIDA:

$17.8 BILLION IN LOST PROPERTY VALUES

SOURCE: IMPACTS OF WATER QUALITY ON THE SOUTHWEST FLORIDA ECONOMY, GREENE ECONOMICS LLC 2023

A HARMFUL ALGAL BLOOM COULD COST SW FLORIDA:

43,094 LOST JOBS

SOURCE: IMPACTS OF WATER QUALITY ON THE SOUTHWEST FLORIDA ECONOMY, GREENE ECONOMICS LLC 2023

CONSERVANCY of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.
PRESERVING OUR PARADISE FOR 60 YEARS

THANK YOU

CONNECT WITH US

Michele Arquette-Palermo
Chief Program Officer
michelea@conservancy.org

@conservancyswf

CONSERVANCY of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.
PRESERVING OUR PARADISE FOR 60 YEARS