FE711

UF UNIVERSITY of FLORIDA
IFAS Extension

Public Costs of Florida Red Tides, 2007[1]

Kimberly L. Morgan, Sherry L. Larkin, and Charles M. Adams[2]

Note: This is the executive summary of a larger report which is only available in pdf format. To access the complete report, please click here http://www.agmarketing.ifas.ufl.edu/pubs/2000s/Public_Costs_FL_Red_Tide_08-1_.pdf.

Introduction

Florida is a popular tourist destination and the top U.S. destination for at least four of 19 types of marine recreation, including beach visitation, swimming, snorkeling, and scuba diving (Leeworthy 2001). In 2005, Florida hosted 77.2 million domestic and 6.4 million international visitors (VISIT FLA). In addition, approximately 80% of Florida's population resides in coastal counties, so the state's overall economy is dependent on the health of the supporting marine ecosystem (Kildow 2006). Harmful algal blooms (HABs) are one of the threats to the state's marine environmental quality. Blooms of *Karenia brevis*, which are known as “red tides,” have occurred along some part of Florida's coastline in nearly every year. The toxins that are produced during a red tide can kill marine life, which eventually washes ashore and creates a public nuisance (Baden, et al. 2005; Flewelling, et al. 2005; Steidinger, et al. 1999). In addition, the aerosolized toxins produced during red tides create a public health threat by irritating the eyes, nose, and respiratory system up to three miles inland (Backer, et al. 2003; Kirkpatrick, et al. 2004).

Because information about economic costs resulting from red tide events in Florida is scarce, this study attempts to quantify public expenditures and procedures resulting from red tide-related management and mitigation issues which have affected publicly managed beaches. In this study, municipal and county-level managers located on Florida's Gulf Coast were queried for specific information on (1) costs associated with red tide blooms, (2) beach and red tide management protocols, (3) funding sources and allocations, and (4) the existence and types of public relations efforts. Survey results are expected to provide estimates of red tide-related expenditures incurred by local governments that can be used to guide financial planning for other public agencies (Morgan, Larkin, and Adams 2008).

Survey Procedures

Nine Florida counties were selected for the analysis due to the historical patterns of exposure to

1. This is EDIS document FE711, a publication of the Food and Resource Economics Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL. Published June 2008. Please visit the EDIS website at http://edis.ifas.ufl.edu.

2. Kimberly L. Morgan, Coordinator of Economic Analysis; Sherry L. Larkin, Associate Professor; and Charles M. Adams, Professor, Food and Resource Economics Department, and Florida Sea Grant Marine Extension Specialist, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL.

red tide blooms and popularity as tourist destinations. The counties selected (from northwest to southeast) were Okaloosa, Franklin, Gulf, Pinellas, Manatee, Sarasota, Charlotte, Lee, and Collier. All are coastal counties that border the Gulf of Mexico. In an effort to estimate the fiscal costs of red tide events at a local level, 28 municipalities within the nine sample counties were additionally selected based on their location to Gulf waters.

Top-level administrators within these locations were identified as the sample population, which was effectively a census within the defined study region. A database of names and contact information was compiled using the 2006 Membership Directory published by the Florida Association of Counties and the Florida League of Cities, Inc. The interviews were conducted via telephone by a single trained interviewer at the Florida Survey Research Center from January through March 2007.

Respondents were first asked to discuss beach management programs, and then queried about costs and activities specifically associated with red tide events. Respondents were encouraged to describe general types of beach management or maintenance programs, and to provide data concerning fiscal year expenditures on both labor and equipment used in support of these programs.

Questions pertaining to red tide events were designed to elicit detailed information for each responding county or city agency. The red tide-specific section included actual or estimated labor and equipment costs, evidence of communication protocols related to either clean-up activities or public relations, types of activities undertaken or sponsored by the agency, funds allocated to red tide mitigation or management, historical responses to red tide events, and identification of agency departments charged with red tide-related responsibilities.

Survey Results

Completed interviews were obtained from 27 cities or counties for a response rate of 87.1%. These 27 agencies included all nine counties (Okaloosa, Gulf, Franklin, Pinellas, Manatee, Sarasota, Charlotte, Lee, and Collier) and 18 cites located within these counties. The 18 municipalities are located within the boundaries of five of the nine counties – Pinellas, Manatee, Sarasota, Lee, and Collier. Six municipalities were either unreachable or unwilling to respond to the survey questionnaire. Of the total number of completions, four agencies were deemed ineligible due to their distance from Gulf waters or their lack of publicly managed Gulf-facing beaches.

Counties and cities employed companies and individuals from both public and private agencies to manage red tide events. Six counties involved at least two or more of their departments in the physical management of beach/red tide management responsibilities. The majority of cities interviewed, 12 out of 18, or 67%, assigned physical beach or red tide tasks to their Public Works department while more than half of all cities (10) hired private contractors, contract labor, consulting firms, commercial fishers, marine inspectors, or equipment and boat rental suppliers to handle beach cleaning work. While Franklin County used its own funds to clean its beaches, the respondent claimed that it “has no cities on the Gulf and is not greatly bothered by, nor concerned with, red tide or other HABs.”

Overall, six counties provided estimated and historical financial information with respect to overall beach maintenance efforts. Four counties (Pinellas, Sarasota, Lee, and Collier) kept precise records of red tide-related beach cleaning expenditures. Sarasota County respondents provided current red tide cleaning expenditures of $51,148 for six separate events in fiscal year 2006-2007, which included labor, equipment, and vendor costs. Pinellas County offers a reimbursement program to its cities that incurred costs related to red tide cleaning in 2005, with seven cities receiving $78,090 in total. Lee County recorded costs of $250,000 for a single 2004 red tide event in Fort Myers, and Collier County spent $250,000 in 2005 in red tide-related cleaning expenditures.

Seven cities are reimbursed by their host counties for at least some, but not all, of the labor or dollar expenditures on red tide cleaning efforts (six of these in Pinellas County, and one in Lee County). A total of 11 of the 18 cities, or 61%, provided red

tide-related financial and/or labor costs. The majority of labor and equipment used to clean red tide-related fish kills is provided by regular city staff and machinery, and most counties waived the dumping fees associated with dead fish disposal. Overall, five counties shifted existing personnel and equipment for red tide cleaning efforts, and five counties followed some program of public relations in the case of a red tide event. Sarasota County was the only county with a written, red tide-specific protocol designed to provide stringent guidelines as to policies and procedures for beach cleaning and public safety notifications.

Study Findings

The majority of funds for red tide-related cleanups were generated by tourism tax dollars. Only two counties relied strictly on their county taxes and/or fee revenues, perhaps due to the lack of public beaches in these areas (e.g., none were reported in Franklin County and only one in Charlotte County). In all, four counties and two cities were able to provide actual dollar amounts specific to red tide events that occurred on their public beaches. These six locations provided red tide-specific costs totaling $653,890 over the 2004-2007 time period, with total expenditures per event (including labor, equipment, supplies, and vendor fees) ranging from $11,114 to $250,000. Only two cities, Longboat Key and Naples, have placed red tide cleaning costs as a line-item in the annual budget, in the amounts of $100,000 and $50,000, respectively.

Although Sarasota County provided the only official written protocol outlining specific policies and procedures in the case of a red tide event, each of the other counties and cities appeared to follow a similar pattern of activity. Initially, a complaint of odor from a red tide-related fish kill was received by the agency, either from a member of the public or from beach or park personnel. An agency member, or private consultant, with some level of resource management experience, was sent to the area to investigate the claim and establish a cleaning protocol that would meet any human welfare, environmental, or access restrictions (e.g., human health hazard, turtle nesting site, protected dunes, etc.). At this point, cleaning personnel were assigned from existing staff, outside labor agencies, or prison trustees, and machinery was either diverted from usual uses or rented from local suppliers. Once the debris was collected, it was hauled to local waste disposal sites, following prescribed regulatory procedures (e.g., dead fish might be bagged, buried, or incinerated in designated locations).

Five of the counties and only one city mentioned public notification of an ongoing red tide event, typically by placing warning signs on the beach and sending alerts to tourism-related businesses. However, a few counties and cities mentioned financial support of the grassroots organization START (Solutions To Avoid Red Tide) which has active membership in most of the responding regions and works to educate the public and businesses about red tide. Manatee and Sarasota Counties have equipped their lifeguards with Blackberries® which are used to send twice-daily messages concerning red tide and other beach conditions.

An important finding is the estimated costs of a red tide event per linear foot of beach. Sarasota County spent an average of $4.87 per linear foot of beach to provide the labor and equipment necessary to remove the dead fish resulting from a single red tide event that occurred from October 2006 through February 2007. In Pinellas County, seven cities were reimbursed an average of $14.27 per linear foot of beach for red tide-related cleaning required throughout 2005; however, incidence and duration of the events were not mentioned, and city expenditures may have exceeded county reimbursements due to in-kind labor and equipment reallocations.

Conclusions

In conclusion, there was very limited data available on red tide clean-up expenditures incurred by city or county agencies located along the Gulf Coast of Florida. Study data revealed that public government protocols associated with red tide events are conditional on any or all of the following factors: timing, duration, and severity of an event; size of budget and labor force; overall importance of tourism (evidenced by tourism tax collections); quantity and accessibility of public beaches; and environmental regulations that are specific to each locality. This

information may provide a useful baseline for estimation of red tide-related budget needs for other cities and counties that are responsible for public beach management.

References

Baden, D.G., A.J. Bourdelais, H. Jacocks, S. Michelliza, and J. Naar. 2005. Natural and derivative brevetoxins: historical background, multiplicity, and effects. *Environmental Perspectives* 113(5): 621-625.

Backer, L.C., L.E. Fleming, A. Rowan, Y.S. Cheng, J. Benson, R.H. Pierce, J. Saias, J. Bean, G.D. Bossart, D. Johnson, R. Quimbo, and D.G. Baden. 2003. Recreational exposure to aerosolized brevetoxins during Florida red tide events. *Harmful Algae* 2:19-28.

Flewelling, L.J., J.P. Naar, J.P. Abbott, D.G. Baden, N.B. Barros, G.D. Bossart, M.D. Bottein, D.G. Hammond, E.M. Haubold, C.A. Heil, M.S. Henry, H.M. Jacocks, T.A. Leighfield, R.H. Pierce, T.D. Pitchford, S.A. Rommel, P.S. Scorr, K.A. Steidinger, W.W. Truby, F.M. VanColah, and J.H. Landsberg. 2005. Red tides and marine mammal mortalities. *Nature* 435: 755-756.

Kildow, J. 2006. *Phase I facts and figures: Florida' s ocean and coastal economies*. National Oceans Economics Program, Monterey Bay Aquarium Research Institute, Moss Landing, CA (June). http://noep.mbari.org/download/.

Kirkpatrick, B., L.E. Fleming, D. Squicciarini, L.C. Backer, R. Clark, W. Abraham, J. Benson, Y.S. Cheng, D. Johnson, R. Pierce, J. Zaias, G.D. Bossart, and D.G. Baden. 2004. Literature review of Florida red tide: implications for human health effects. *Harmful Algae* 3(2): 99-115.

Leeworthy, V.R., and P.C. Wiley. 2001. *Current participation patterns in marine recreation - national survey on recreation and the environment 2000*. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Silver Springs, MD (November).

Morgan, K.L., S.L. Larkin, and C.M. Adams. 2008. *Public costs of Florida red tides: a survey of coastal managers*. FAMRC Industry Report 08-1. Florida Agricultural Market Research Center, Food and Resource Economics Department, University of Florida, Gainesville, FL (February).

Steidinger, K.A., J.H. Landsberg, C.R. Tomas, and J.W. Burns. 1999. *Harmful algal blooms in Florida*. Harmful Algal Bloom Task Force Technical Advisory Group Report #1. Florida's Harmful Algal Bloom Task Force, Florida Department of Environmental Protection, Tallahassee, FL.

VISIT FLORIDA. 2005. *Domestic visitors to Florida, Florida visitor's study, 2005*. VISIT FLORIDA (VISIT FLA), Tallahassee, FL. http://media.visitflorida.org/about/research/.