

Regional economic impacts of razor clam beach closures due to harmful algal blooms (HABs) on the Pacific coast of Washington

Karen Dyson*, Daniel D. Huppert

School of Marine Affairs, University of Washington, 3707 Brooklyn Avenue NE, Seattle, WA 98105-6715, United States

ARTICLE INFO

Article history:

Received 23 June 2009

Received in revised form 11 November 2009

Accepted 12 November 2009

Keywords:

Economic impact
Harmful algal bloom
Input–output model
Razor clams
Recreational fishery
Washington

ABSTRACT

Visitor spending in the recreational razor clam fishery positively impacts the coastal economies of Grays Harbor and Pacific counties in Washington State. Since 1991 the fishery has frequently closed due to harmful algal blooms (HABs). These events reduce or eliminate recreational clam-related visitor spending. We develop an economic impact model, based on recreationists' spending, to estimate the economic impacts of these closures. To estimate visitor expenditure patterns, questionnaires were distributed in April of 2008 to an on-site sample of clammers at four beaches on Washington's Pacific coast: Mocrocks, Copalis, Twin Harbors, and Long Beach. Based upon responses from 240 parties, the average expenditure per party ranged from \$268.77 at Mocrocks beach to \$412.67 at Long Beach. Overall expenditures for the 2007–2008 season were estimated at \$24.4 million. A regional input–output model was used to estimate that the fishery had the local economic impact of supporting 404 full-time equivalent jobs and \$12.6 million in labor income. To estimate negative impacts of HAB closures, expected visitor expenditures are adjusted to account for visitors' stated intentions when razor clamming is unavailable. For a full year closure of all four beaches, the estimated negative economic impact is a loss of support from the razor clam fishery impacting 339 full-time equivalent jobs and \$10.6 million of labor income in the two counties. Further, impacts were calculated for beach closures ranging from a single (2–5 days) season opening to a full year, for individual beaches and combinations of beaches. As expected, the closing of a single opening at one beach had the smallest economic impacts, while whole season closures at multiple beaches had the largest impact.

© 2009 Elsevier B.V. All rights reserved.

1. Introduction

This study examines local economic effects of recreational razor clam fisheries on communities near the Pacific coast beaches of Washington State. Both toxic diatoms (*Pseudo-nitzschia*), which produce a neurotoxin (domoic acid) that can cause amnesic shellfish poisoning in humans, and dinoflagellates from the genus *Alexandrium*, which cause paralytic shellfish poisoning, occur in Washington's coastal waters (Moore et al., 2009). The State of Washington samples the shellfish both in advance of and during fishing seasons to determine whether the toxins in shellfish exceed levels that can trigger human health problems. When toxins exceed the critical level, shellfish harvesting is prohibited in the areas affected. Recreational razor clam fishery closures due to harmful algal blooms (HABs) have occurred on Washington's coasts in recent years. The first major closure of the razor clam fishery occurred in October 1991 to April 1992, with negative economic consequences for coastal communities, Indian tribes,

and local industries engaged in the harvesting and processing of the affected organisms (Wekell, 2001). Between 1991 and 2008, 25.8% of potential razor clam fishing days were lost due to closures spurred by domoic acid (23.3%) and PSP (2.4%) (Ayers, unpublished data). Season-long domoic acid events also occurred along the West Coast in 1998–1999 and 2002–2003, causing closures of the coastal razor clam and Dungeness crab fisheries. Partial closures of individual beaches or seasons have also occurred during the past dozen years, although no closures have occurred since the spring of 2005 (Ayers, unpublished data).

The recreational razor clam fishery attracts visitors whose expenditures on everything from meals and motel rooms to fishing gear boost the coastal economy during razor clam harvest openings managed by the Washington Department of Fish and Wildlife (WDFW). These openings occur in Pacific and Grays Harbor counties from October through April or May, coinciding with the off-season for most coastal tourism. Various back-of-the-envelope estimates of the economic impact on local communities due to HAB-related closures suggest losses in the millions of dollars (Nosho, 1999; Wekell, 2001). However, no previous study quantified the economic impact of the razor clam fishery, nor of the HAB-related closures in a more rigorous way. Research

* Corresponding author. Tel.: +1 847 347 5517; fax: +1 206 322 1551.
E-mail address: karendyson@gmail.com (K. Dyson).

reported here develops a more accurate method for estimating the local economic impacts of razor clam fishing and the negative effects associated with closures due to HABs. It is worth noting that closing razor clam beaches due to HABs is a management measure with benefits as well as costs. The benefits here are avoided expected human morbidity or mortality, however these are not measured here.

To quantify the relationship between clamming activities and local expenditures in the beach communities during razor clam seasons, a survey of recreational clammers was conducted during an opening in April of 2008. The survey collected information regarding how much visitors spent in different categories, along with details about their activities and opinions. A simple input–output model (I/O model) was created for the combined Pacific and Grays Harbor county area that reflected the main economic sectors affected by tourism and recreational spending. Using specific questions in the survey questionnaire, estimates of the likely changes in coastal recreational spending that would follow a range of clam closure scenarios, and we combine this information with the coastal county I/O model to generate estimates of the economic impact of closures due to HAB outbreaks.

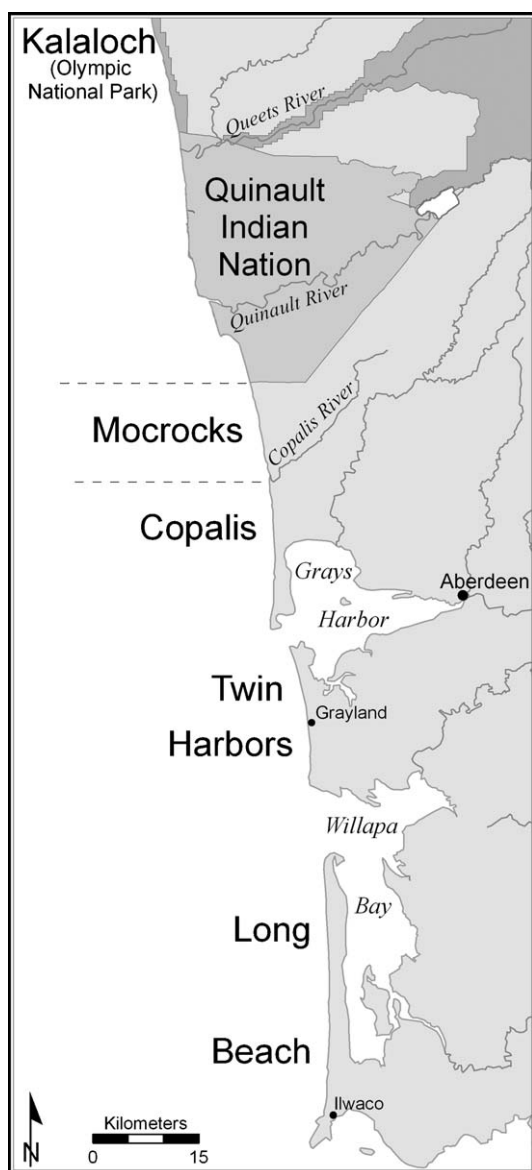


Fig. 1. Map of the four razor clamming beaches on Washington's outer coast: Mocrocks, Copalis, Twin Harbors, and Long Beach.

This approach to assessing the economic effects of a change in a recreational activity is a standard method of “economic impact assessment.” It provides a relatively accurate means of estimating changes in a local, regional economy based upon an estimated change in direct expenditures. The impact, which can be positive or negative, is expressed as a change in annual regional sales, or income, or employment. Negative economic impacts, which will be the focus here, only become lost economic value when the local economy cannot adequately replace the negative economic impact, such as when a laid-off worker cannot find alternate employment after a HABs outbreak. This may be a concern in Pacific and Grays Harbor counties, as alternate job opportunities may be difficult to find.

As noted by Hoagland et al. (2002), the economic impact allows one to gauge the magnitude of the change in the regional economy. Some, such as Adams et al. (2008), have also used the same analysis to assess the economic impacts of red tide events to various segments of the coastal economy in Florida. It is important to place the role and meaning of our economic impacts within the wider range of socio-economic effects that may be of importance. For instance, Hoagland et al. (2002) list several categories of economic effects of HABs, including productivity losses, medical costs of human health problems, impacts on government expenditures, and costs of administering shellfish closures. Whitehead et al. (2003) examine the effects of information about *Pfiesteria* on consumer risk perceptions and the demand for seafood. Jin et al. (2008) develop estimates of the effects of a 2005 red tide event in New England on the shellfish markets, including effects on prices and imports to New England. As explained below, we observe few human health consequences of HABs in the razor clam fishery, because the State carefully monitors the related toxins and closes the fishery when they are at dangerous levels. Further, the research reported here does not estimate the cost of the monitoring and management program, nor does it attempt to estimate effects on related commercial markets including consumer risk perception and clam prices. This report is focused on straightforward measures of change in the local economy of two coastal counties due to reduced recreational visitor expenditures when the beaches are closed to clamming.

2. Materials and methods

2.1. Study area

The study area spanned four beaches on the outer coast of Washington in Pacific and Grays Harbor counties (Fig. 1). The beaches include Mocrocks beach, Copalis Beach, Twin Harbors Beach, and Long Beach (WDFW, 2007). Each of the beaches has multiple public and private access points.

2.2. Survey data collection and analysis

A survey questionnaire was developed and distributed to participants in the razor clam harvest during the April 19th and 20th openings in 2008. WDFW fish biologists distributed 450 questionnaires while carrying out their usual monitoring activities during the opening. We designed the questionnaire to obtain information from individuals representing a clamming ‘party’, as groups traveling and staying together share many expenses and we wanted to avoid having more than one person from a party complete the questionnaire. To avoid creating a bias towards either small or large group sizes, we had the WDFW staff distribute the questionnaires to a representative sample of group sizes. WDFW staff asked potential participants if they were willing to complete the questionnaire. Those answering positively received a questionnaire and a pre-paid self-addressed envelope.

Download English Version:

<https://daneshyari.com/en/article/4545786>

Download Persian Version:

<https://daneshyari.com/article/4545786>

[Daneshyari.com](https://daneshyari.com)