# Management Issues

# Commercial Mollusc Fisheries

## Level

4-5

## Key question

What can we find out about commercial mollusc farming?

## Key outcome

To develop an understanding of commercially important fishery stocks.

Adapted from Karen Wilson, Marine Discovery Centre, Woodbridge, Tasmania.

## What you need

Paper, pencils, crayons
Mollusc shells (empty)
Access to resource material (library, Internet)
Map of bay/coastline where mollusc farming occurs (the State Department of Fisheries will provide assistance).

## What you do

Choose two of the following commonly farmed molluscs: Abalone, Blue mussel, Pacific oyster, Sydney rock oyster, or Scallop. Carry out library research to determine the answers to these questions:

- Where is this mollusc found in the local area? Show on an appropriate map.
- Describe the life cycle and habitat of the chosen species.
- How are these species farmed?
- Describe the production process from early larval stage to fish shop/supermarket.
- Who is the target consumer? (export fresh, local fresh/frozen, canned, smoked etc.)
  Is the shell used?
  For what?
- What current and potential environmental problems exist?
- What management controls exist for the chosen species?
- What management controls should be in place?

Students should each choose a shell. Put it under a blank sheet of paper and gently rub over the top with a pencil/crayon to produce a textured shell rubbing. Display as a collage within the classroom.

Extension

Buy some of the molluscs and learn how to prepare them for eating.

Go on to a rocky platform and make a specific search for molluscs, using one of the field methods described in ‘Field Methods’. Observe the differences between the live and dead mollusc shells. Suggest reasons why we can’t just ‘farm’ molluscs from rocks.

# Red Algae Bloom

## Level

8+

## Key question

Should a large algal bloom be removed from an attractive beach to improve aesthetics for local holiday makers?

## Key outcome

Understand the complexities of managing the natural environment when faced with a conflict issue.

by Sue Feary, NSW NPWS, Nowra, NSW.

Though this is an issue directly related to Jervis Bay, the approach can be applied in other areas.

## What you need

Suitable footwear
Camera
Measuring tape and surveying poles

## What you do

1. Gain first hand experience of the extent of the problem through a field inspection.

2. Obtain information on what is being done currently to address the issue.

3. Provide feedback on the effectiveness on the existing management and educational programs.

4. Consider alternative approaches.

**Field survey**

Examine the beach and photograph it.

- Measure the extent to red algae on the beach using poles and tapes.
- Measure the depth of one of the piles of rotting algae. Note that face masks may be useful!
- Observe any animals living in the pile.
- Do you observe birds looking for food amongst the algae?
- Estimate the distance from the algae to the nearest house.

**Questionnaire**

Prepare a simple questionnaire to ascertain local residents views.

- What do they consider is the affect on their houses.
- What do they suggest as the causes of the algae.
- What do they think should be done.
- By whom – the local council, National Parks and Wildlife Service, or the Environmental Protection Authority.

# Red Algae Bloom

## Background

Marine algae are the primary producers of the ocean, if not the earth. Producing more than 50 per cent of the world's oxygen supply, some estimates suggest that if marine algae were to perish, life on earth would be seriously threatened. On a smaller, more local scale, the health of the marine environment of a bay can be measured in part by the diversity and health of the marine algae growing in it.

For many years, and particularly since December 1994, red algae deposits have appeared on some of the Jervis Bay beaches at one time or another. Depending on the weather and the tides, the deposits are quickly removed or they may stay around for many weeks. If they do not get washed away they begin to decompose and release hydrogen sulphide which produces the characteristic unpleasant rotten egg odour.

Many people believe that the increases in nutrient levels that promote algae growth are due not to natural causes but to urban runoff and sewage outfall in the Bay. The cautious opinions of the scientific community, who understandably are reluctant to commit themselves to a direct cause and effect answer in the absence of hard data, offer little comfort to the local community and to those involved in the tourist industry.

The situation is exacerbated by the reluctance of any one government agency or the Local Government Council, due to the lack of clear legislative jurisdiction, to take responsibility. In fact, several agencies, and Council, all have some responsibility. A successful solution to the problem therefore can be achieved only through a cooperative program.

The NSW National Parks and Wildlife Service has prepared a pamphlet on behalf of all relevant agencies to educate the community about red algae and to let them know that solutions are being pursued (see accompanying Information Sheet).

### The Issues

There is a need to:

- Determine the causes of the phenomena by gathering quantifiable data over a long time period instead of relying on anecdotal information.
- Reduce the inputs from human induced activity.
- Decide whether or not algae can or should be removed from the beaches.
- Develop an effective public education program about the causes and effects, directed at changing people's attitudes.
- Establish a long term management strategy.

# Red Algae Bloom

## Red Algae in Jervis Bay

Extensive deposits of red algae on the beaches of Jervis bay are of concern to both local residents and tourists. The pleasures of recreational pursuits such as swimming, boating and sunbathing are significantly reduced by the presence of such large amounts of the weed on the beaches and in the swash zone. As the algae decomposes, there is a nauseating smell. Huge piles of dead algae have accumulated along some of the beaches. There is a concern that the algae will cause a downturn in tourism and more seriously, that local residents will consider selling their properties, many of them expensive houses with views, and moving away.

## An Information sheet

by Michael Murphy, Project officer, NSW National Parks & Wildlife Service

State Government Agencies and the Shoalhaven City Council are aware that the Jervis Bay Community is concerned about the deposits of red algae that have appeared on our beaches in recent months. Several meetings have been held to discuss short and long term solutions to the problem. Removal of the deposits from the beaches is not possible due to the costs involved and the risk of damage to sand dunes. There appears to be no easy solution at this time but agencies will continue to actively seek options. This pamphlet is intended to provide information on the problem.

**What are algae?**

Marine algae are commonly known as seaweeds. Approximately 500 species are known to occur in Jervis Bay, which makes it one of the richest areas in the State. Marine algae are divided into three groups: the Green Algae; Brown Algae; and, Red Algae. Many species of green and brown algae occur in inter-tidal areas, while the red algae are more common in deeper waters. Marine algae work in the same way as forests on land, producing oxygen and soaking up carbon dioxide. They are an essential part of the Bay's marine environment, providing food and shelter for numerous marine invertebrates and fish, which in turn support the Bay's populations of penguins, dolphins, and seabirds, as well as commercial and recreational fisheries.

**What is the red weed?**

The species currently occurring as large masses on beaches is the red algae *Acrosorium venulosum.* This is a bottom-dwelling species which is known to have been present in considerable quantities throughout Jervis Bay for many decades.

**Why does it bloom?**

The relatively warm, calm waters of the Bay are favourable for the growth of seaweed, and most years have seen different species bloom. Usually, these 'blooms'remain out of sight below the water's surface, but occasionally wind and currents will drive them ashore.

**Is it a natural event?**

Marine scientists have studied Jervis Bay and believe these blooms are probably a natural part of the marine environment. Similar blooms occur both on open coasts and in other bays of Australia. Nutrients from agriculture, urban development, and effluent discharge may possibly be contributing factors, but are not believed to be the direct cause. The relative importance of natural and human nutrient sources is being examined.

# Red Algae Bloom

**Is it safe?**

Despite the unpleasant odour from decaying seaweed, it is not poisonous or dangerous. It is not related to the 'red tides' which have been known to kill fish. Various species of shorebird, including gulls, plovers, oystercatchers, and turnstones forage among the beachdrift seaweed. The seaweed is broken down by invertebrates and microorganisms and the nutrients eventually returned to the Bay.

**What is being done?**

- Signs will be erected on affected beaches explaining the phenomenon and redirecting residents and tourists to unaffected beaches.
- Aerating the masses of algae on the beaches to alleviate the unpleasant odour will be trialled.
- The quantity of algae present on the beaches will be measured for future reference and comparison.
- The Lower Shoalhaven Total Catchment Management Committee is to manage a water quality monitoring programme in the Bay. The aim is to identify the cumulative effects of the various natural and human nutrient inputs into the Bay.
- The Shoalhaven City Council has started the process of replacing the effluent outfall at Plantation Point with land-based effluent disposal.
- Healthy Cities and the Shoalhaven City Council are undertaking a community awareness programme regarding urban run-off.
- The recently prepared draft Jervis Bay Regional Environment Plan sets guidelines for future development to minimise the impact on the environment.
- The protection of part of the Bay's catchment in the NSW and Commonwealth Jervis Bay National Parks, and the proposal for a Marine Park are all positive steps toward protecting the exceptional natural environment of this beautiful area.

**Implications**

There is a perception by the local community that the continued presence of red algae will have serious long term implications for the future of a number of industries based in the area. These include:

(a) The fishing industry: the weed gets caught up in nets making it very difficult to haul them in.

(b) The real estate industry: there is real fear by local residents that house values will drop because of the red algae.

(c) Tourism: relies very heavily on the clean clear waters and the extensive stretches of white sand as the major attraction of the bay. The industry may be reluctant to promote the area if it is perceived to be 'polluted' by red algae deposits.

(d) Beach based recreation by visitors and residents: One of the major attractions of staying in the coastal villages is the ability to pop down to the beach for a swim before breakfast. There is a reluctance to swim in the water or even go onto the beach if it is covered in red algae.

# Survey of a National/Marine Park

## Level

7-8+

## Key questions

What are the natural attractions of this Park or Reserve? What facilities are provided for the public to utilise the area? How are the public using the area? What management issues arise from this utilisation?

## Key outcome

Understand some of the characteristics of a national or marine park and how these features are manage.

Adapted from the Royal National Park Field Studies Centre and discussions at the Jervis Bay Field Workshop.

## What you need

Field survey sheet, clip board, pen
Map of the Park

Many National Parks around the Australian coastline include access to the shore and beach, or are National Park Islands, surrounded by Marine Parks or Reserves. Many Marine Reserves also include some land, so the following field surveys are appropriate for a wide range of protected areas.

This study is divided into three parts:

(a) Field survey of the Park or Reserve

(b) Questionnaire for users of the Park

(c) Analysis of field results and extension with research.

Field sheets are provided for sections (a) and (b).

## What you do

### (a) Field Survey

You could work in pairs or small groups or utilise the following survey as an individual field study.

### (b) Questions to users of the Park

Many of the questions below could be the subject of interviews of Park users or Park Managers (such as Rangers or Interpretative Officers). It may also be necessary to get the Ranger's permission to interview user groups within the Park boundary.

### (c) Classroom Research

Following your field survey, you may be able to investigate:

- the influence visitors have on the local economy
- physical, cultural and other features likely to attract tourists to Parks
- potential of a developed or undeveloped area
- implications of publicising and thus attracting larger numbers of visitors to Parks
- problems and management solutions to different issues in different Parks.

# Survey of a National/Marine Park

**Debate or discuss these statements:**

- "Now that most National Parks charge admission, parks are no longer for all the people, just for those who can afford them".
- "Marine Reserves and National Parks adjacent to the coast can always cope: after all, the ocean is just a big sink which can adjust to any pressure".
- "The wilderness of many of our Parks has disappeared for ever now that we have put in showers and toilets".
- "There should be some areas of Parks and Marine reserves where no one is allowed to go".

Extension

Do the 'Red Algae Bloom' and the 'Rock Platform' activity units.

# Survey of a National/Marine Park

## Field sheet 1. Field survey

Once you are in the Park or Reserve, gather information on the following topics:

**Accessibility**

- distance from centres of population
- type of road surface entering the Park
- type of road surface in Park
- quality of road surface in park
- provision of signposts
- public transport services to the Park.

**Parking**

- location of parking facilities (if there are several car parks feeding into the Park, each group could select one to study)
- number of vehicles which can be accommodated
- surface of the car park
- its position relative to other facilities.

**Facilities**

- charge for entering the Park
- facilities within the Park
- facilities outside the Park
- availability of toilets and/or showers
- numbers and location of
  - picnic tables
  - shelter sheds
  - water taps
  - rubbish bins
  - barbecues (gas/wood) or pits
- which of these facilities have to be paid for by the user
- provision and adequacy of fuel supplies
- provision of information about the Park and the various walks or water trails
- quality of walking surfaces
- safety factor provision made with handrails, fences etc
- variety of walks based on:
  - interest
  - difficulty
  - length

- provision and adequacy of sign posts and information about points of interest
- if in a Marine Reserve, you may also find out about:
  provision for moorings and anchorages
  underwater trails
  special signage (e.g. for zoning use).

**Maintenance**

- parking area
- picnic areas (especially, fittings, fuel, & litter disposal)
- walks especially in relation to:
  track surface
  quality of sign or guide posts
  alteration with reference to
  environmental presentation.

**Natural attractions**

- landforms, type and location
- unusual rock formations
- water – running, smooth, offshore
- flora – variety, quality, accessibility
- fauna – variety, frequency, ease of observation
- particular attractions of renown.

**Usage statistics**

You may have to request this information later from the Park Ranger or the Central office of the Department of Conservation/Environment.

- number of visitors (daily and seasonal)
- number of vehicles at different times of the day and year.

**Use of the Park**

- What are visitors doing?
- Where are most grouped?
- What signs are there that the Park is under visitor pressure (if any)?
- Are there any obvious problems about the Park and its visitors which you think might require action?
- Are there noticeable differences between use of the land Reserve and the adjacent Marine Park or protected waters?

# Survey of a National/Marine Park

## Field sheet 2. Interviews and questionnaires

A Ranger or Manager may address the group as a whole to answer questions on these topics:

**Questions to the Rangers**

- history of the Park, its controlling authority
- types of visitors
- from which locations
- seasonal peaks in numbers
- interpretation program or public contact program
  illustrated talks
  guided walks
  displays
  games
  nature-based activities, etc
- how the Park is financed
- number of people employed in the Park
- type of work done
- any need for workforce expansion
- areas in need of improvement or expansion
- methods of improvement
- comparison between numbers using the Park and the facilities available for them
- management problems being addressed
- management problems not being addressed
- long term plans for this Park .

**Use, abuse or mis-use**

- litter survey or results
- cumulative records of flora and fauna – are there species lists
- prevalence of vandalism – deliberate, accidental
- risk of bushfire or floods or other hazards.

**Development of Publicity**

- existing sources
  posters
  photographs
  booklets and leaflets
  local newspaper stories
  improved sign posting

- campaign targeting major user groups and local accommodation outlets
- future plans?

**Questions to individual users**

Preface your interview with a polite request to ask the user a few questions. Try to select a range of people, of differing age groups who are using the Park in several ways.

**Personal**

- approximate age group, and sex structure
- where do you live
- how often do you visit this Park
- how did you get here
- how long do you intend to stay
- do you intend to return?

**Reasons for visits**

- why did you come here, accident or design
- recreational or educational use
- how did you get your information about the Park
  word of mouth
  signposting
  local agency
  state authority
  magazine, newspaper or TV advertising
  guide book
  recommended by motoring or tourist
  agency.

**Evaluation of the area**

- good and bad features
- possibility of further visits and the reasons
- would you recommend this Park to your friends
- why?