Monitoring Bathing Waters - A Practical Guide to the Design and Implementation of Assessments and Monitoring Programmes
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Chapter 5*: MANAGEMENT FRAMEWORKS

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> *"Beach management seeks to maintain or improve a beach as a recreational resource and a means of coast protection, while providing facilities that meet the needs and aspirations of those who use the beach. It includes the framing and policing of any necessary regulations, and decisions on the design and location of any structures needed to facilitate the use and enjoyment of the beach environment"* (Bird, 1996).

In most countries, a single "beach manager" who undertakes all the activities such as monitoring, planning and decision-making does not exist. These activities are generally devolved among different persons and authorities at various levels (national, federal, regional, provincial, local). In order to achieve effective management of recreational water use areas, managers should have background knowledge on a range of aspects concerned with the coastal or freshwater area, such as inflows and outflows, water quality, physical aspects of the water use area and potential health hazards. Beach managers should, therefore, be aware of the social and economic dimension embedded in their decision-making. Of importance to beach managers and decision-makers are:

- The techniques available to measure the impact of tourism.
- Notions and principles of sustainability.
- Local strategies towards sustainability.
- Sustainability indicators and issues related to water quality management.
- Water analysis and water safety.

5.1 Management concerns and approaches

The coastal zone and freshwater bodies are important areas for human habitation, industry and recreation. There are thus competing uses, not only of water for bathing, surfing, sailing, scuba diving, aquaculture and other maritime industries, but also of land use, such as for residential developments, harbours, ports, marinas and tourism industries. Offshore activities such as oil and gas exploration, disposal of sewage or radioactive waste and shipping, are also responsible for the release of contaminants into the aquatic environments. Many of the pressures mentioned above are common throughout the world and many of the threats facing the quality of recreational water bodies have arisen as a direct or indirect consequence of human activities. Such conflict of uses makes management of recreational water use areas a particular challenge.

Water bodies are often used as a repository for waste and the relatively concentrated period of tourism activity in specific areas increases the environmental pressures on such water bodies. Recreational use of water and tourism activities depend highly on the quality of the natural environment for their continued success. Lack of effective management can lead to the loss of habitats, over exploitation of resources and an associated loss of income.

5.1.1 Tourism

The coastline is a major element in the geographic, recreational, commercial and ecological fabric of many countries and provides major destinations for local, national and international tourists. Freshwater areas, such as large lakes, are popular for recreation and in many cases are being developed for tourism. Associated villages and towns grow and develop their economy in accordance with the prevailing and seasonal tourism needs (main commercial streets, hotels, restaurants, clubs, shops and related activities; recreational activities on the beach or on lakes; transportation facilities, etc.). Socio-economic problems usually derive from the seasonality of the pressures on tourism-related facilities. There are a few data available on the contribution of coastal zone tourism to national economies (Grenon and Batisse, 1989) but for smaller coastal countries and island countries, especially those without industrial or agricultural outputs, tourism can be a substantial part of the economy.

There are concerns associated with the development of touristic ventures that can apply to both marine and freshwater areas. These concerns include tourism-associated aquatic transportation and the resulting pollution from vessels (oil, tar or litter on the adjacent area), as well as stress on populations and the environment where tourism is the major factor in the economy (Bird and Nurse, 1988). The development of tourist facilities may have a particular effect in developing countries where food security problems, pressures from recreational lobbies and public opinion may threaten alternative sources of income, such as the local fishery economy. Mariculture and the recovery of oil and gas can compete for the same space as that desired by recreational users. Tourists themselves can contribute to the waste and pollution of the host area, with a degrading influence on the quality of the recreational water use area arising from noise (primarily from transportation), recreational activities such as boating, and from solid and liquid wastes. Biodiversity reduction, resource depletion and human health problems may result from the accumulated environmental effects of tourism, including direct human impact (such as trampling).

There are a number of issues that may deter tourists from a recreational water use area. These include aesthetic and health problems arising from domestic waste disposal into marine and freshwaters that jeopardises the quality of food and the possibility of recreational activities on beaches in developing and developed nations. Eutrophication can degrade beaches and adjacent waters aesthetically through the accumulation of rotting marine plants; this can lead to a significant loss in tourist revenue. Aesthetic factors, such as litter, have a high deterrent value on visitors to bathing water areas (see Chapter 12).

5.1.2 Integrated management

Integrated coastal zone management (ICZM) is understood most simply as management of the coastal zone as a whole in relation to local, regional, national and international goals. It implies a focus on the interactions between the various activities and resource demands that occur within the coastal zone, and between coastal zone activities and activities in other regions. This might mean, for example, the incorporation of coastal environment protection goals into economic and technical decision-making processes or the co-ordination of tourism policies with nature conservation policies. Although ICZM has been promoted widely in recent years, it has not always been implemented successfully. This was mainly because of a lack of understanding of underlying coastal processes and it has only become apparent relatively recently that multidisciplinary land-use planning in the coastal zone is essential. Financial constraints have also been a contributory factor.

The same principles of ICZM can be applied to freshwater management and therefore marine and freshwater zones will be treated as synonymous in this chapter. In general, recreational water use areas, whether fresh or coastal waters, require similar management actions. However, lakes and other freshwater recreational water use areas are generally smaller bodies of water and are, by nature, more fragile than seas and oceans. The impact of human activities are apparent more quickly and failure to ensure adequate management will accentuate any degradation (Box 5.1).

Box 5.1 Problems of management of a freshwater recreational water-use area: Lake Geneva

Lake Geneva provides a unique example of a freshwater recreational water use area. It lies on the border of Switzerland and France and thus requires the integrated management of the two area authorities. A total of 41 beach resorts cover 4.5 per cent of the lake shore. These are artificial beaches with access to the lake, natural beaches and artificial beaches with a swimming pool. Boating and windsurfing are popular with visitors to the Lake and about 35,000 boats are registered on the Lake. To accommodate these, several yachting harbours and boat yards have been constructed. The main activities in the Lake Geneva basin are trade, tourism, banking and insurance and wine growing.

The bacteriological quality of the water in the beach resorts may vary considerably. There are a number of local pollution “blackspots” and restrictions in many areas prohibit swimming. On the Swiss side of the Lake the water is monitored according to the EU Directive on the quality of bathing waters (CEC, 1976) and also according to the procedure described in 'Examen et évaluation de la qualité hygiénique des bains de lac et de rivière' (Eschmann and Lüönd, 1965). Monitoring is only undertaken for Salmonellae and *E. coli.* On the French side, the monitoring is undertaken by the Ministry of Health, in compliance with the EU Directive (CEC, 1976). Domestic and industrial sewage systems have been installed and storm drains are being phased out. The quality of the water is therefore expected to improve. Human activities around the Lake are generally in conflict with the natural environment. There is intensive development around the shores of large private properties and woodland estates, that is having direct physical and aesthetic effects on the landscape.

In terms of management of the shores of Lake Geneva there is very little co-ordination between France and Switzerland despite certain provisions, such as France's Coastal Law and Switzerland's Cantonal Masterplans, because priority is given to the economy. There is, however,

more co-ordination between the Swiss and French laboratories in relation to monitoring water quality in the Lake.

There is a real need for integrated lakeside management in order to consider all activities in the lakeside area. Development should be restricted to suit the capacity of the natural environment and specific lakeside provisions need to be drawn up and enforced. A trans-border structure for collaboration and co-ordination is also required which would promote an integrated approach to management. Economic instruments, both as incentives and disincentives, should be developed to integrate the environment into lakeside management. It is of paramount importance to promote environmental awareness and education throughout society if integrated and environmentally sound lakeside management is to be achieved.

Source: Adapted from OECD, 1993

Integrated coastal zone management programmes must address a range of issues, including habitat (loss of habitat or degradation of coral reefs, seagrass beds, wetlands, beaches and dunes, lagoons and estuaries), water quality (sources and nature of pollution, reduction and flow rates); management of natural hazards, and degradation of cultural resources and management of developments (mariculture, extractive industries, tourism, shore front development, major facility siting). Coastal managers must also consider any decline in fisheries, public access, biodiversity protection, sea level rise and degradation of scenic quality.

Integrated management ensures that priorities are given to all users of the water zone. Through policy supported by legislation and regulations, the most appropriate activity or activities can be given preference and investments in the area can concentrate selectively on these activities. Funding is a common problem in environmental management and for this reason some form of classification scheme combining priority for action and type of action required is especially useful. The classification then becomes an important tool in assisting planners in developing a strategy for improving the quality of the bathing water and the beaches. When the problem can be rectified through local efforts (such as beach cleaning), the management process should seek appropriate action from the municipality and reclassify the beach accordingly. Where the cause requires major investments or decisions on regional or perhaps national level, the authority should ensure that health concerns are represented adequately.

It is important to emphasise that improving the bathing water and beach quality strictly with the purpose of increasing the amount of tourists visiting a region or a country, can conflict with interests in protecting ecologically important areas or designated sensitive areas, etc. It must be an important issue for planners at regional, as well as national level to develop a plan for selecting and protecting these areas that are not to be transformed into large intensive tourist resorts. This is a premise for working with a classification scheme (see also Chapter 9).

5.2 Management framework

The WHO *Guidelines for Safe Recreational-water Environments* (WHO, 1998) present a management framework within which different levels of health risk and associated

interventions are ordered in four major fields under the umbrella of integrated management (see Figure 1.1). The major fields of intervention are clustered as regulatory compliance, public awareness and information, control and abatement technology, and public health advice and intervention.

5.2.1 Legislation and regulation

Effective coastal or freshwater zone management requires an effective legislative framework to define the roles of different bodies and levels of government, as well as to provide environmental objectives. Management is not restricted to national issues - water quality, pollution control, international tourism and shipping are amongst the activities that affect the coastal zone and that extend beyond the national boundary. It is therefore obvious that a single government or agency cannot be responsible for the wide range of issues that need to be addressed in the coastal or freshwater zone. Effective legislation must provide a framework within which the roles and responsibilities of different organisations or interested groups are defined and must accommodate capacity to act at the international, national and local levels.

At an international level, legislation of particular relevance often relates to the management of international or transboundary waters. Whilst the legislation itself may be “hard law” or “soft law”, it may provide for harmonisation or standardisation in data generation and exchange, and create obligations to notify other concerned parties regarding hazards and quality changes.

At a national level, regulatory measures are often considered to be inflexible but they are easy to operate and provide a clear and common framework for all parties concerned. In general, some form of basic water law provides a framework within which specified agencies are empowered to regulate. In the field of recreational water use, the national level is particularly important in establishing common ground for the assessment and reporting of safety and thereby supporting “informed personal choice”. However, laws and regulations of relevance to safe beach management may derive from diverse influences, such as public health, social integration and rights of the disabled people, navigation for pleasure purposes, aquatic sports, fishing activities (in the sea and on the shore, e.g. bivalves), relevant flying activities, trade activities on public areas and the concession of State lands.

The diversity of national regulatory structures requires diverse approaches and solutions but, in general, managers concerned with recreational water use areas should consider both common law and statutory law. In most countries under common law, liability and negligence arise from the breach of duty known as “duty of care”. This applies to members of the public as well as to operators. The duty specified is to take reasonable care. In the case of the safe management of the beach, the responsibility for taking adequate precautions rests with the operator. Of particular importance to those concerned with beach operation is the standard of care arising from their activities, i.e. that of an ordinary skilled person exercising or professing to have a particular skill. This is of particular relevance to lifeguards, for example, who are expected to conduct themselves as one would expect of the competent qualified lifeguard.

Those who employ staff on a beach may have specific duties to those staff under statutory law. In general these duties cover premises, written operating procedures,

general working conditions, training, appropriate health and safety policy statements, consultation with safety representatives, safety procedures, the free provision of appropriate uniform, protective clothing and personal safety equipment and the provision of adequate first aid facilities for employees. For the employers there is an obligation to conduct operations in such a way as to ensure that members of the public are not exposed to risks to their health and safety.

The occupier of premises has a duty of care to any visitor using the premises for the purpose for which he is invited or permitted to be there. In general the operator of a natural beach will not be exposed to liability, although only one attraction, such as a diving platform, would expose the operator to liability if the duty of care is breached. The same applies to any operator deriving income from the provision of services for visiting swimmers. The operator may be exonerated from liability if a danger is brought to the visitors' attention and the operator takes appropriate measures.

5.2.2 Public awareness and information

The concept of reciprocal rights and responsibilities (as implicit in the concept of duty of care) highlights the importance of the capacity of the individual to make healthy or safe choices. In order to participate successfully in healthy recreation, members of the public require awareness (i.e. in this context knowledge regarding hazards and safe behaviours) and access to information to enable them to make informed choices. However, informed personal choice contributes not only to the protection of the individual but creates an incentive for improvement in the quality and safety of recreational water use areas - as users demand safer locations, the economic incentive to provide safe and attractive facilities increases.

Education and awareness

A basic appreciation of the health hazards that may be encountered during recreational water use and regarding safe behaviours is a prerequisite to health protection through the exercise of improved personal choice. A variety of special interest groups, such as lifeguard organisations, are instrumental in promoting education and public awareness activities. Watersport clubs, such as sailing, scuba diving, canoeing and swimming clubs, teach members basic first aid, safety procedures and a respect for the water environment. All watersports are potentially hazardous and participants should be made aware of the particular hazards associated with their sport. A variety of formal courses, usually culminating in an examination, are in existence to ensure that such activities are undertaken in a safe and responsible manner.

Beach classification

One tool to support informed personal choice that has received great attention in recent years is that of beach classification. In order to be effective a beach classification scheme needs to be based upon health and safety and must be of interest to users. It must also be based on reliable comparable data and overseen by a credible and impartial agency. Whilst classification schemes (e.g. Chapter 9) are often designed specifically to support and encourage informed personal choice, other classification schemes may be used for purely management information purposes (see Chapter 6), such as for determining beaches inappropriate for tourism development, or for identifying

those suitable for the encouragement of tourism and perhaps those eligible for certain forms of aid or awards from a national or regional authority.

In order to decide to which class a beach belongs, certain criteria for each class need to be defined. The issue of beach classification systems and associated management response is discussed fully in Chapter 9. A classification system allows differences between classes to express differences in the problems to be solved. This means that different programmes or plans are needed depending on what class a specific recreational water use area belongs to. It also implies that the classification of beaches and water is a continuous process. A certain beach or water may belong to one class in one year, but as different measures are taken and problems are solved, the beach or water may change class next year.

On-site and local information

Users of recreational water use areas rely on information about safety, hazards to health and facilities, that comes from the news media, local authority notice boards and signs, environmental groups and tourist publicity, as well as relying on their own perceptions. Users can only control risks actively by acting on knowledge provided to them. Public awareness measures at the local level, in combination with national policies, are thus essential in order to achieve effective management of the recreational water use area and to reduce risks to users (see Chapter 7).

5.2.3 Control and abatement technology

Not all hazards encountered during recreational use of the water environment may be addressed effectively, or their associated adverse health effects averted, through informed personal choice. In some instances removal of the hazard or preventing access to the hazard is the preferred management option. In precluding access to a hazard high intervention approaches (such as fencing) or low intervention such as making access difficult (no development of car parks or public transport access), can be used. Such measures are relevant to a range of hazards, such as areas with strong currents, rocky environments, poor water quality or areas subject to toxic cyanobacterial blooms. To achieve long-term improvements in the quality of recreational waters investment must be made in pollution abatement technologies (see Chapter 9).

5.2.4 Public health intervention

Despite concern for the aesthetic aspects of recreational water use areas, the driving force behind much activity is public health and safety. In many cases circumstances may lead to situations that present an unfamiliar or unacceptable risk to public health. Such circumstances may relate to a breakdown in sewage treatment and disposal infrastructure, to toxic cyanobacterial blooms or to new or transient water uses that are incompatible with existing patterns of use. Under such circumstances the authorities responsible for public health are generally required to take a lead role in determining what actions should be taken and for what period. Such decisions are, in practice, often made under pressure of time and with inadequate information, but may be assisted by the existence of a national point of reference where experience and information on such incidents is maintained.

In addition to emergency response, some countries have, in recent years, instigated some form of accident emergency plans. These deal with, for example, major oil accidents at sea, or a chemical industry or nuclear accident. A structure for alert systems or notification relays, including home numbers for authority staff, may already exist. Unfortunately, the more common pollution accidents, such as failure of a sewage treatment plant or unusual wind direction forcing polluted waters onto a beach which is normally clean, or an algal bloom causing skin irritation, are often not included in this system. They do, however, affect the public more directly. It is therefore preferable to establish warning systems for these kind of events.

Beaches with a full lifeguard or warden service have most of an alert system in place, i.e. a dedicated person with warning signals on site during the bathing season. However, lifeguards are often only responsible for alerting the public to specific hazards, such as high winds, and not to pollution incidents, although in reality they, along with other coastal workers (e.g. rangers, wardens or coastguards) would alert the public to such incidents.

5.3 The role of organisations or individuals with a vested interest

The large number of interested organisations at all levels involved in the coastal and freshwater zones requires particular co-ordination and co-operation (see Figure 1.1). Central and local governments have a particular responsibility to establish standards and regulations to limit the health hazards to users of recreational water environments. Of particular importance is the layout of a management strategy for the achievement of integrated management. This requires addressing the issues of resources, economic development activities and societal needs in recreational water use areas. National government is also instrumental in directing, promoting and co-ordinating all activities relating to the application of laws concerning the coastal zone, including defining general criteria and methodologies for the monitoring of recreational water environments and activities, mode and frequency of sampling and analytical techniques. Organisations such as the World Health Organization Advisory Committee on the Protection of the Sea and other such bodies can provide advice and guidance. Research institutions, universities, non-governmental organisations (NGOs), special interest groups and the tourism industry can aid in the technical assessment of hazards and in monitoring changes. Industry, in particular the tourism industry, is increasingly adopting a more proactive role in monitoring the environment. Local interest groups, NGOs, local authorities, the tourism industry and the media are involved in raising awareness of users to some of the hazards associated with recreational activities (see Chapter 6). Citizens are often instrumental in contributing to remedial measures and are increasingly involved in public participation activities, such as beach cleaning, riverine fly tipping area cleanups and monitoring (see Chapters 6 and 12).

5.3.1 Municipalities

Local authorities are frequently the legal agency of the government. They often take a key role in bringing interested organisations together and gaining their collaboration and co-operation in decision-making, and participation in the implementation of decisions. Local authorities also contribute to the development and enforcement of standards and regulations. In general, public health laws and acts state that a local authority may make bylaws with respect to public bathing and beach management, including public bathing

and coastal zone management. Municipalities may therefore be responsible for regulation of the areas and the hours when bathing will be permitted; they may also be responsible for requiring the persons providing accommodation for bathing to provide and maintain lifesaving appliances and lifeguards, as well as being responsible for the regulations for preventing danger to bathers. Municipalities may also enforce regulations regarding the navigation and speed of vehicles for pleasure purposes within any area allotted for public bathing. This is of particular importance because it permits the zoning of pleasure vehicles in relation to bathers. Municipalities may also be responsible for all the inland and adjacent areas above the low water mark where these bylaws have affect; protection of public health and safety, including monitoring of water and adjacent land. Protection, preservation, restoration and enhancement of coastal natural resources (including beaches, floodplains and dunes) as well as the use of beachfront property in a manner compatible with preserving public property may be the responsibility of the municipality. Municipalities may be required to produce coastline management plans as part of their normal planning responsibilities and any local authority with land subject to coastline hazards should plan and manage that land in accordance with its hazard susceptibility. Local authorities are therefore responsible for the investigation, design, construction and maintenance of works and measures to mitigate coastline hazards and also for promoting hazard awareness in their community in an attempt to reduce the social disruption and damage caused by coastline hazards. The latter can be done by supplying information and advice to property owners, residents, visitors, potential purchasers and investors (see Chapter 6). It is also a local authority responsibility to improve and maintain beaches and their amenity.

The structure and responsibilities of local governments differ throughout the world. In the UK, for example, County Councils are responsible for strategic planning, structure plans and waste disposal and the District Councils are responsible for housing, local planning, environmental health, coast protection, waste collection and noise control. In Australia, the Local Councils have general responsibilities for the production of coastline management plans, coastline hazard mitigation, hazard awareness and beach management, as well as specific responsibilities under the Environmental Planning and Assessment Act. In general, however, the fragmented and often duplicated responsibilities in the coastal zone are identified as severe impediments to effective planning and management.

Specific regulations for a beach are disseminated at the local level on the basis of the physical, environmental and social characteristics of the area. Regulations for the management and operation of a beach and for water activities are usually promulgated by the City Council or (as in Italy) by the nearest Harbour Maritime Authority and are addressed to the concessionaires or managers of the maritime State land.

5.3.2 Facility operators

Once a beach manager has a complete picture of the beach characteristics (beach registration and classification) all decision elements are available for the daily operation of the beach and for (mid- to long-term) management plans. It is suggested that the competent authority should designate an operator, or another responsible person, to be on duty when a beach is open for visitors. This operator should take decisions relating to the beach and should take appropriate action when requested by the authority when accidents or spills take place leading to beach contamination or when water quality

becomes unacceptable or for safety reasons (such as weather, inadequate lifeguards or safety equipment).

There are also a number of considerations to take into account when designing the facilities to support a public beach. Resources become an important issue and therefore the provision of facilities should be prioritised according to the needs and uses of the area under question. Monitoring for potential health hazards and associated management actions should always be considered a priority over the provision of shops and refreshment kiosks when developing recreational water use areas. However, it is acknowledged that this approach would not always attract tourists and the associated finance to an area. Research has shown that visitors to the coastline place more value on the cleanliness of an area and on the provision of facilities than on unseen human health hazards such as microbiological parameters (Oldridge, 1992; Morgan *et al.,* 1995) (see also Chapter 12). Education and public awareness must, therefore, become an essential part of integrated management, especially where resources are low and prohibit the provision of facilities (see Chapter 6). Consultation between those with a vested interest and local communities is essential if the various conflicts of use are to be resolved.

5.4 Management options

The various different attitudes of visitors to the recreational water use area also determine the necessary level of facilities that are desired. Different cultural contrasts exist in the use of beaches; in many tropical areas the sea is used as a cleaning place or for trade amongst fishermen, whereas throughout Europe beaches are generally used as places of passive activity. Despite many people looking for seclusion at a beach, the pressures to develop recreational water use areas to support growing populations and increases in tourism are so great that it is becoming very difficult to find underdeveloped beaches, particularly in countries with a warm climate.

Management options and preferences vary according to the level of development of an area and the preferences of visitors to that area. Management actions need to take into account local economic needs as well as the desires of the users. In general, two broad categories of user can be identified: those seeking resort areas with facilities, entertainment and easy access, and those seeking secluded or rural areas.

5.4.1 Resort beaches

The following guidelines are provided for management of resort beaches where tourism is a priority. Where resources are a restraining factor careful prioritisation should occur that will minimise public health risks. Topography, including slope and bottom material, need to be considered. Beach cleaning should also address the removal of litter and debris from the lake or seabed where they present a hazard to bathers. Specific regulations may be adopted for the prohibition of potentially hazardous items, such as glass, on the beaches. In addition, adequate litter bins should be provided. Clearly visible depth markers should be provided at the points of maximum depth of all designated areas and at diving boards, platforms and similar facilities. Zoning is an important measure in minimising risk where different user groups coexist within a confined area (i.e. dog-free zones, conservation areas and naturist zones, zones for swimming, sailboarding, powerboating, etc.). Swimming may be limited to a specific area,

i.e. the least hazardous, which also facilitates supervision and segregation of incompatible activities (see Chapter 7). Wastewater from toilets and showers should be discharged to the local municipal sewage system. If that is not possible an alternative treatment should be established that is acceptable to local or national standards. Where possible, toilet facilities and showers should be provided in adequate number. To prevent cars and vehicles driving on the beach, access facilities should be provided to beach parking areas. Access to beach areas for emergency vehicles should be provided and appropriately signposted. Easily read and understood information boards should be used to display beach regulations, general information on beach and water quality and facilities. The signs should be located so that they will be seen at the access points before entering the beach, the resort or the swimming area. Where appropriate, more formal regulations, in the form of bylaws, may be adopted to control activities at the coastal zone, particularly noise, fires, dog fouling and litter.

Safety aspects are of particular importance to coastal managers of tourist beaches (see Chapter 7). Clearly identified warning signs should be provided where appropriate indicating, for example, when the beach is closed for swimming, the times when lifeguards are on duty, danger of swimming during heavy storms or after sunset or in dangerous currents.

5.4.2 Rural beaches

Ideally, as with resort beaches, rural beaches should be monitored for potential health risks as a priority. Rural beaches are generally popular with walkers, naturalists, and fishermen and for other kinds of casual enjoyment. Such beaches should be cleaned “as needed” but at least four times a year. Beaches that are particularly frequently used shall be cleaned at least once a week during the summer and each month during the winter.

On rural beaches, safety boards should be displayed at all principal access points to beaches, in car parks (if present) and at particular hazard spots. The hazards of the particular beach should be clearly indicated, together with the times of high and low water, the distance of the nearest telephone and some useful telephone numbers, and the location of the nearest first aid facilities. It is suggested that public rescue equipment should also be in place in the more frequented rural beaches.

5.5 Elements of good practice

• The management framework developed for a bathing water area must take into account the impact of various competing activities, sustainable management processes, water quality issues and associated safety issues.

• Such a framework must reconcile development pressures with socio-economic, cultural and environmental criteria.

• The full range of legislative and regulatory controls that interplay with coastal or freshwater recreational water management must be incorporated into the management framework including duty of care, health and safety legislation, water quality regulations, pollution control and international articles governing international tourism and shipping. Such measures will vary from local bylaws through national to international law.

• The development of an integrated management framework must include a range of issues including nature conservation, water quality, management of coastal development access and environmental degradation.

• The role of a local municipality is central to an effective coastal management framework. Their activities must be co-ordinated within a coherent national context.

• A beach classification scheme can be constructed which provides a discreet hierarchy of categories and concomitant management activities.

• On completion of a full catalogue of the characteristics of a particular recreational water area, the beach manager has the framework from within which to establish the operational activity.

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