

Application of guidelines and management options for safe recreational water use

Recreational use of inland and marine waters is increasing in many countries worldwide. These uses range from whole-body contact sports (where there is a significant risk of water ingestion), such as swimming, surfing and slalom canoeing, to non-contact activities, such as fishing, walking, birdwatching and picnicking. Although these activities can benefit health, they may also be associated with adverse health outcomes, as described in previous chapters. These possible adverse health outcomes result in the need for guidelines that can be converted into locally (i.e., nationally or regionally) appropriate standards and associated management of sites to ensure a safe, healthy and aesthetically pleasing environment. The management interventions that may be required to ensure a safe recreational water environment include compliance and enforcement measures, application of control and abatement technology, public awareness and information initiatives and public health advice, which are best brought together in an integrated management framework (summarised in Figure 1.4). This chapter brings together the conclusions of the management strategies and options discussed in previous chapters.

13.1 Application of guidelines

Recommended guidelines for a number of hazards and associated risks to public health have been outlined in preceding chapters. The guidelines and recommendations range from identifying the need for providing advice to the public (chapter 3) to numerical guidance levels (chapter 8) to a system of classification (chapter 4). Chapter 1 and several other chapters have emphasized the need to adapt these guidelines to suit local circumstances.

Guidelines are intended to be flexible and should be adapted to suit regional, national and/or local circumstances by taking into consideration socio-cultural, environmental and economic conditions. An initial assessment of issues and priorities can, for example, include an assessment of the number of drownings or serious injuries sustained (i.e., severe health effects) in comparison to, say, cases of mild illness as a result of bathing in microbially contaminated water (see Figure 1.2). Initial assessment would preferably be complemented by a risk-benefit approach (qualitative or quantitative) and in some circumstances a full cost-effectiveness or cost-benefit analysis may be undertaken. The outcome of such analyses should inform the process of standards development and the measures that are put in place to implement the standards.

The agency responsible for health will take a leading and coordinating role in the application of guidelines. However, the health authority should ensure the active participation of the other key stakeholders as outlined in chapter 1 (Figure 1.3). A wide variety of elements of legislation and regulation may contribute to ensuring and/or improving the safety of the recreational water environment. Not all are relevant or appropriate to all types of hazard and the balance among them will depend on the nature of the hazards of priority concern for human health. Experience suggests that overall health protection is most effective when a number of complementary mechanisms are employed. The potential “actors” and functions involved in improving safety are outlined in Table 13.1.

TABLE 13.1. EXAMPLES OF ACTORS AND FUNCTIONS THAT MAY BE EXERCISED IN MANAGING RECREATIONAL WATER ENVIRONMENTS FOR SAFETY

Example of authority or activity	Comments
Facility operator/service provider	Agencies developing facilities or providing services may be responsible for the safety of those locations, or this may be seen as an element of ‘duty of care’ or ‘due diligence’. Recreational water-specific requirements may include the establishment and implementation of a ‘safety plan’ (in consultation with other stakeholders, including agencies responsible for safety and health—see section 13.2). This would normally include an assessment of hazards, including reference to user groups; a programme for monitoring and assessment; a water safety plan (which would include ‘normal’ and ‘incident’ circumstances and include a communication strategy to stakeholders).
National authority responsible for public health	Responsible to maintain and update national standards, e.g., recreational water quality standards, including sampling regimes and methods, analytical methods, analytical quality control and inter-laboratory comparisons, reporting. Maintenance of lists of national recreational water use locations. Surveillance of injury and illness in the community.
Local authority responsible for public health	Authority and responsibility to advise local facility developers/service providers and municipalities on public health aspects of the activities and resources under their supervision. Authority and responsibility to intervene when made aware of imminent or actual severe threat to public health at a recreational water location, including advising against use for a determined period or until safe conditions are re-established.
Authority responsible for safety	May be multiple and some may be non-governmental (e.g., lifesaving federations). Often responsible for development and implementation of voluntary codes of good practice (e.g., for lifeguard qualifications and activities). The fact that they are voluntary does not reduce their importance and they may be a major aspect of safety promotion.
Local tourism body	Provision of information to the public.
Certification agencies	The certification process is used to verify that devices (such as life belts) meet a given level of quality and safety based on agreed standards.
Recreational water/facility user	Exercise informed choice and take personal responsibility (e.g., use of sunscreen, avoiding excess alcohol).

In regulatory monitoring programmes factors, such as frequency of inspection and/or sampling, analytical methods, data analysis, interpretation and reporting,

sample site selection and criteria for recreational water use areas will generally be defined by the regulatory agency and should take account of the principles outlined in chapter 12.

Box 13.1 uses the implementation of the recreational water quality classification system (outlined in chapter 4) to illustrate points to be considered in adaptation of guidelines to specific, locally-appropriate regulatory provisions, as it is potentially the most complex.

BOX 13.1 GUIDELINE ADAPTATION (USING THE RECREATIONAL WATER QUALITY CLASSIFICATION SYSTEM AS AN EXAMPLE)

The principal requirements that would need to be incorporated into provisions would normally include:

- 1) The definition of “water user” or “bather”, “recreational water” and, if the use is seasonal for the majority of users, “bathing season”.
- 2) The establishment of a water quality classification system based on:
 - a) defined statistics from microbial water quality assessment;
 - b) defined levels of the probability of the sewage pollution of the recreational water (with the assessment to be based on inspection of the conditions during the defined bathing season);
 - c) defined means to combine a) and b) to provide a broad classification of risk to public health.
- 3) The obligation upon national/regulatory authorities to maintain a listing of all recognized recreational water areas in a publicly accessible location. This would, typically, be the same location as used to inform the public of the recreational water classification.
- 4) The establishment of procedures, responsibilities and authority for progressively updating 2a) and 2b) in light of new scientific information and developments.
- 5) The definition of responsibility for:
 - a) establishing a water safety plan (including “posting” to warn of poor water quality, monitoring and sanitary inspection) and its implementation (e.g., local authority, private facility manager or service provider, lifeguard association, etc.);
 - b) independent surveillance, including recreational water classification (e.g., local government, public health body, environment agency/authority);
 - c) provision of information to the public (e.g., public health body, local authority, local tourism body);
 - d) interpretation of the significance of “exceptional circumstances” (e.g., public health body).
- 6) The obligation to act. This would include:
 - a) the requirement that on detection of conditions potentially hazardous to health, or uncharacteristic of the location, to immediately consult with the public health body and inform the public as appropriate;
 - b) a general requirement to strive to ensure the safest achievable recreational water use conditions, including implementation of measures in order to improve classification of recognized recreational water areas by available means (including pollution control and abatement) and the discouragement of the use of locations that present an especially high risk (i.e., the worst classification category);
 - c) encouragement of advisory action at times of high risk of disease at locations where water quality deterioration is sporadic and predictable. Where such action can be shown to be effective, this should be taken into account in the classification scheme outlined in 2).

Most of the factors outlined in Box 13.1 will apply to the derivation and adaptation of any recreational water standard. In addition to illustrating the application of guidelines, Box 13.1 also highlights the importance of the multiple stakeholders (see Figure 1.3) involved in the process of adapting and applying guidelines and standards.

13.2 Recreational water safety plan

One way in which all the potential hazards outlined in previous chapters can be brought together, on a location specific basis, is through a recreational water safety plan. As outlined in Table 13.1 this would include an assessment of locally relevant hazards (including reference to user groups), a programme for monitoring and assessment and a management plan, which would detail both normal and incident (or exceptional) circumstances. It is suggested that such a safety plan is adapted from a country or regionally specific generic plan which could include a hazard rating scheme and also an overall recreational water rating, as outlined in chapter 2. The advantage of adapting a generic plan is that all recreational water areas in a specific area would then be rated against the same scale, improving informed personal choice.

13.3 Compliance and enforcement

“Watchdog” institutions responsible for the programmed process of monitoring quality indicators—i.e., sampling, measurement and subsequent recording of various characteristics (e.g., governmental environmental agencies/local authorities, with analysis being carried out by hospitals, public health or university laboratories)—should assess the conformity of recreational water areas to local or national standards. In those countries where it is difficult to achieve guideline objectives, central and local governments may set interim standards to ensure a progressive improvement towards local regulatory limits and possibly to desirable conditions.

13.3.1 Responsibility for risk management

Risk management is the making of decisions on whether or not risks to well-being are acceptable or ought to be controlled or reduced, based on evaluation of risks together with the identification and application of preventative or control strategies. The making of these judgements involves value judgements of some kind, whether a formal evaluation of costs of detriment from the hazard and the benefits of improvements or a subconscious personal evaluation.

Responsibility for managing risks in water recreation takes place at two distinct levels:

- society regulators, through central and local government and providers of recreational facilities; and
- participants in the activities, whether personally or collectively (see section 13.5).

The regulatory functions in risk management are very much the same as in other systems where public health and well-being are involved, such as drinking-water

supply and food hygiene. They involve a devolvement of responsibilities downward and of reporting upwards. Responsibilities for monitoring may be devolved to an environmental agency or to local authorities, with analysis being carried out by hospital, public health or university laboratories. Local authorities may own or control access to public beaches and recreational water areas and thus fall into the category of provider. This role should be independent of a local authority's responsibility for public health (e.g., closing beaches and other recreational facilities deemed hazardous to health and safety). This latter responsibility is a well-defined role of a local authority's department of environmental health, the local medical officer for environmental health or equivalent. Central government and local authorities have a responsibility for informing the public about health issues in water recreation (Table 13.1).

13.3.2 Regulatory compliance

A number of problems affect the application of regulatory compliance and restrict the usefulness of this approach. For example, a marginal failure in water quality may be due to one of a number of contributing pollution sources. In the case of microbial quality, it is frequently the case that a number of sources—which may include riverine discharge, sewage, storm outflows, solid waste and agriculture—may all contribute and may be the responsibility of different authorities (hence the usefulness of an “umbrella” type of management framework, such as that provided by ICAM). A further problem concerns the issue of temporal variation. While most regulatory regimes require compliance based on a proportion of time, periods of high risk may be brief and either undetected by such regimes, which exposes the public to increased risk, or overestimated, thereby condemning an otherwise safe location. Finally, it should be recalled that legislation generally applies to specifically designated areas, e.g., government-defined bathing beaches, rather than to all potential recreational water use areas. Special interest groups and users of less-frequented locations may not be properly protected under such regimes.

An alternative approach to assessing regulatory compliance as a failure of a recreational water to achieve a certain water quality is provided by the “obligation to act” stipulation outlined in Box 13.1 and Section 4.7.3. This requirement would mean that failure to respond to the detection of conditions potentially hazardous to health would lead to non-compliance rather than the measured water quality (for example) falling below a certain measure.

The role of regulatory compliance is not, however, restricted to pollution control and may successfully be extended to the implementation of policy regarding areas suitable for development and provision of minimum facilities and supervision by local operators—for instance, in terms of lifeguards (see Appendix A) and first aid facilities.

There are two kinds of regulatory action. *Local action* consists of improvements to facilities to eliminate hazards and thereby to reduce risks. Examples are the construction of sewage treatment works and long sea outfalls to reduce contamination of the sea with sewage or designating areas to be used for waterskiing, which do not

conflict with bathing. *Policy implementation* (regional, national or international) usually takes the form of creating standards or guidelines to control risk. Inherently, standards provide a means of judging whether conditions are acceptable or not and, therefore, whether improvements are needed. They also provide a means of identifying whether intervention to reduce exposure is required, such as through provision of public advice, closing areas etc. Purpose-designed programmes of monitoring (see chapter 12) and analysis must accompany them, which provide information on quality.

13.3.3 Enforcement

Enforcement is an essential component of the regulatory system. Strong enforcement of a regulatory approach, however, may also focus attention on the high cost of, for example, pollution control intervention, and in some cases it has been argued that this is disproportionate to the public health benefit obtained. Again, an “obligation to act” regulation may minimise this problem. As point 6b) in Box 13.1 suggests, a general requirement to ensure the safest achievable recreational water use includes the discouragement of use of inappropriate or very polluted sites and not just pollution control measures.

Pollution control measures are most effectively deployed within a wider context of ICAM (see Box 13.2). In order to be effective, standards, guidelines and codes of practice must address the root causes of hazards. For example, medical waste found on a beach should be cleared, but sourcing it and preventing ongoing contamination is the prime consideration.

13.3.4 Monitoring and reporting

One purpose of guidelines, standards and regulations should be to promote improvement, and thus monitoring and enforcement should focus upon this. Proper information and positive incentives are often more effective ways to achieve improvement than the implementation of sanctions.

Results of monitoring programmes should be made readily available to participants in a timely manner, so that they can make informed decisions on using the facilities, and to regulators, so that they can take decisions with facility owners to carry out needed improvements. The public is also entitled to receive the results of monitoring so that individuals can choose whether or not to visit a particular beach or recreational water (see section 13.5 and Box 9.2).

13.4 Control and abatement technology

As health risks in certain environments become apparent (because of either changing risks or improved detection), responsible institutions (e.g., water companies, agricultural agencies, beach or recreational facility managers and so on) should identify the causes and put in place measures to combat the risks. Detection of health risks should be objective, e.g., based on systematic surveys. Implementation of remedial action should be in accord with an integrated management framework as outlined earlier and may include the control and abatement of pollution discharges with

respect to the various levels of sewage treatment (chapter 4), control of agricultural runoff (chapter 8), fencing of dangerous areas (chapter 2), beach cleaning (chapters 2 and 6), provision of lifeguards (chapter 2 and appendix A), etc. Zoning and use separation can also be simple, but effective, control measures (chapter 2).

In terms of pollution control and abatement technology, the *required* design criteria for an intervention would result in a low to intermediate health risk, while the *preferred* design criteria would result in a minimal or low health risk (Figure 1.4).

Within an integrated planning process, tools (such as environmental health impact assessment, environmental audits and quality standards) can be designed and enforced. Stakeholders including industrial representatives should be involved in the discussion throughout the whole process to ensure that priority concerns are taken into consideration and that the proposed tools are generally acceptable, which would facilitate compliance. A development plan would also include land use plans, overall legislation and regulation and could advocate the use of such tools as economic instruments to manage the recreational waters.

13.4.1 Health impact assessment

Planning for the development of new recreational water projects or for the upgrading of existing ones offers ample and timely opportunities to incorporate human health considerations. A health impact assessment (HIA) provides the method and procedures to ensure such incorporation in a systematic, comprehensive and focused manner. The HIA approach considers changes in environmental and social determinants of health resulting from development. Both types of health determinants are relevant in the context of recreational water projects. HIA should be linked to the environmental assessment, but must maintain a distinct profile.

The rationale for HIA is firstly economic. It allows design options and management measures to be integrated into the project rather than relying on strengthening health services or the need for subsequent remedial action to be implemented at a generally higher cost. Such an after-the-fact remedial approach is undesirable, because it usually signifies a transfer of hidden costs to the health sector. HIA will also contribute to improving the health status in the project area. It aims to identify not only adverse health effects but also health opportunities. The measures recommended on the basis of the HIA should be designed to take into account inequities in health status and to overcome a disproportionate burden of exposure to health risks of vulnerable groups.

HIA starts by setting boundaries and priorities, a process known as scoping and screening. In recreational water projects, the physical boundaries for HIA will often coincide with the project boundaries, but they may stretch beyond, to include communities downstream from a project on a river system or further along the coast, depending on prevailing currents. HIA is a predictive exercise, and it should, therefore, not only include communities currently inhabiting the project area, but also groups of people that may enter and settle temporarily or permanently. In recreational water projects, these may include temporary labour employed during the construction phase, new staff that have come to work at the recreational facilities and the

project's target group itself: people who come to use the recreational facilities. Within these groups, those with particular vulnerabilities should be identified.

HIA should cover the full range of health issues potentially affecting these different groups: accident and injury, communicable diseases, non-communicable diseases, malnutrition, and psycho-social disorders. In the case of recreational water projects, it is likely that the screening process will result in a health focus on two major groups:

- accidents and injury
 - hazards and risks to construction workers related to increased traffic and transportation once the project becomes operational;
 - accidents and injury due to tourists' engagement in high-risk activities (whitewater rafting or scuba diving, for example) or their increased exposure to natural risks (shark attack, snake bite, jellyfish sting).
- communicable diseases
 - mainly waterborne (and foodborne) diseases associated with a deterioration of water quality;
 - water-related vector-borne diseases, because of ecosystem changes resulting in the increased breeding of mosquitoes and other insect vectors. Such changes include hydrological changes, biodiversity loss and an increased air humidity.
(There may also be an impact on respiratory infections (non water pollution related), sexually transmitted infections and HIV/AIDS. There are, however, no design, engineering or water management measures that can help prevent these.)

There may be other health issues associated with recreational water development such as, increased risks of excessive UV exposure due to sunbathing, psycho-social effects especially among indigenous communities in the project vicinity or malnutrition among groups primarily depending on fisheries that are adversely affected by the project. There is, however, little that improved environmental management can do about such problems, with the exception, perhaps, of the last example.

Screening and scoping should lead to a decision concerning the need for a full HIA. A number of countries have legislation in place that contains criteria with minimum values only, about which an impact assessment is required. Some authorities have also advocated sentinel health monitoring to identify health impacts of development projects.

HIA results in a package of recommended measures to safeguard health or mitigate health risks, as well as health promotional activities. In recreational water projects, the resulting environmental management plan will aim to tackle the risks resulting from changes in the environmental determinants of health; moreover, regulatory measures, including financial instruments such as taxes or subsidies, will deal with risks resulting from social change.

Environmental management may involve permanent and capital-intensive measures often of an infrastructural nature. In the context of recreational water projects, this may include:

- wastewater treatment plants;
- systems of dykes, sluice gates, pumps, weirs and other hydraulic structures to optimize hydrological features;
- construction of pipelines to drain or desalinate coastal lagoons where mosquitoes breed; and
- protection of water storage ponds and tanks.

Environmental manipulation aimed at eliminating health risks is a recurrent action. Cleaning aquatic weeds that may harbour vector insects or snails from water bodies is an example.

Some remedial measures may themselves need an assessment for their possible environmental and health impacts. This is particularly true for the chemical control of insect vectors of disease using residual insecticides. Indoor residual spraying poses risks to the members of the spray team. Larviciding introduces the insecticides into the environment at large, where it may disrupt ecosystems and enter the food chain.

Once an action plan based on the HIA recommendations has been initiated, monitoring is a critical component. It should ensure compliance with the agreed design, construction and management changes. It should also follow the health status of the various groups to identify any unexpected health issues arising.

13.5 Public awareness and information

Awareness raising and enhancing the capacity for informed personal choice are increasingly seen as important factors in ensuring the safe use of recreational water environments and an important management intervention. They act both directly (i.e., users are less likely to choose an area that is known to be less safe or to practise unsafe behaviours, so that overall exposure of the population, and hence adverse health outcomes, will be reduced) and indirectly (the exercise of preference for safer environments may induce competition between resorts/destinations based upon relative safety and encourage investment in improvements). In order that these contribute to improved safety, it is essential that the public is generally aware and that information is available, comprehensible, delivered in a timely manner and standardized to enable comparison between alternative locations.

The general public has to rely on information about safety, hazards to health and well-being and facilities as it is able to gain from the news media, local authority notice boards, environmental groups and tourist publicity, as well as its own perceptions. Local NGOs, the tourism industry and local authorities contribute to the distribution of information brochures, the training of consumers in safe conduct and practice, the posting of warning notices, the zoning of dangerous areas and provision of lifeguards. In so doing, they need to translate data gathered by scientists and technicians into understandable and user-friendly messages. The media is also a powerful tool in awareness raising and information dissemination.

Awareness raising is of particular importance among certain specialist user groups and should concern both the hazards that they may reasonably encounter together with the hazards that they may present to other users. With the increasing use of

recreational water areas by multiple user types (e.g., beaches used for swimming, jetskiing and sailboarding), this is of particular importance. Clubs and other user group associations have a special role to play in this regard.

Participation in leisure activities is essentially a voluntary activity. Committed participants may choose to belong to clubs and, in turn, clubs may be affiliated to regional and national organizations, which promote development of the sport at the highest national and international levels and issue rules and codes of practice to clubs and the wider membership. Clubs may own facilities and stretches of water. In general, the level of organization shown in Table 13.2 will ensure that club members enjoy the advantages of well maintained facilities, training in proficiency and personal safety and knowledge and awareness of hazards. The degree of development of this structure is dependent upon economic factors and the degree of commitment of participants to the development of their sport.

Participants can control risks actively by acting on knowledge provided to them in the form of guidance, codes of good practice, rules, training and information on the existence of local hazards (such as poor water quality, strong tidal currents, the existence of wrecks underwater and so on).

TABLE 13.2. PUBLIC AWARENESS INFORMATION: ORGANIZATIONAL LEVELS AND RESPONSIBILITIES

Participant	Expert advice	Regulator
<p>National sports organizations Issue codes of practice and newsletters for membership, regulate competitive sport, promote training. International liaison.</p>	<p>Public health body Provide public health information. Liaise with user groups and media to disseminate appropriate health messages.</p>	<p>Central government Legislate standards, publish results of national monitoring, conduct national health surveillance, involved in finance of capital improvements.</p>
<p>Affiliated clubs Informing members of codes of practice, setting rules of conduct for members, supervising organized events, promoting high standards of performance, providing training.</p>	<p>Professional institutions, experts Current awareness of health and safety issues, legislation, research. Liaison with, and expert representation on, government committees and national sports organizations.</p>	<p>Local authorities and government agencies Monitoring, reporting results to central government, displaying results to public. Giving information on health. Enforcing public health measures, closing facilities if conditions are hazardous to health.</p>
<p>Club members Responsible to club for conduct and act on club's advice, in addition to making their own value judgements.</p>	<p>National and international lifesaving federations Lobby group. Dissemination of safety information.</p>	<p>Providers of facilities May be local authorities (public facilities) owners or service providers, including clubs with their own facilities. Adopting and implementing local codes of operational practice, providing safety facilities, preparing a recreational water safety plan, carrying out improvements. Publicizing facilities and results of monitoring.</p>
<p>General public Make own value judgements from personal awareness and knowledge.</p>		

Increased public awareness regarding recreational water use and health is likely to lead to a number of direct benefits where the principal factor leading to accident or disease is individual error of judgement. This may be the case regarding a number of accident hazards, including, for example, diving into shallow water or overestimating swimming abilities. Increased awareness may also lead to greater availability of rescue and lifesaving skills among the general and water user population. The objective of awareness-raising activities is not only to raise the individual's ability to correctly appraise the risk but also to raise the level of confidence of the public that the issue is being addressed and monitoring measures are being undertaken.

Personal perceptions of pollution are most influenced by sight and odour, while physical danger is often based on a visual assessment. Choice of venue is strongly influenced by the availability of appropriate water conditions and areas most suitable for the activity (Cutter et al., 1979). The general public is therefore largely reliant on effective risk management.

One important tool used by associations and governments to enhance the public's capacity for informed personal choice is beach grading or award schemes. For example, since 1987, the Foundation for Education and Environment in Europe has attributed a quality label (in the form of the "Blue Flag") to European beaches and also to marinas. The Blue Flag award takes into account water quality, as well as restrictions on dogs, toilet facilities and so on. It encourages coastal municipalities to improve the public awareness of both visitors and residents.

Government authorities are also developing effective incentive systems. The tourism industry is increasingly conscious of the need to promote safety and environmental concerns and now sponsors "green quality labels". In addition, users and sports participants may develop schemes, such as that used to assess the conditions of surfing areas initiated by a surfers' association.

Although such schemes can improve public awareness and act to inform public choice, a lack of coherence and compatibility among award schemes may undermine their effectiveness and credibility. Issues related to such schemes are discussed in greater detail in Box 13.2.

13.6 Public health advice and intervention (including prevention and rescue services)

Public health advice is a key input to public awareness and informed personal choice, be it with regard to avoiding excessive UV exposure (chapter 3), being aware of what precautions to take against leptospirosis (chapter 5) or malaria (chapter 11) or knowing that an area is unsafe for swimming (chapter 2).

Public health advice and intervention includes response to short-term incidents and breaches of standards. When a guideline or standard is exceeded, the authority responsible for public health should determine if immediate action is required to reduce exposure to the hazard and whether measures should be put in place to prevent or reduce exposures under similar conditions in the future.

BOX 13.2 GRADING AND AWARD SCHEMES

A number of international and national award/grading schemes for water use areas (most commonly beaches) that include safety-related information have been developed. International examples include the Blue Flag (which is the most popular in Europe) and Coastwatch programmes. In addition, many countries also have one or more national equivalents. In the United Kingdom, for example, there are a number of other rating schemes in use, including the Seaside Awards, Good Beach Guide and Beachwatch. These schemes are used at a variety of recreational-water environments, ranging from large-scale resorts to undeveloped rural beaches. Award schemes can have a large influence on tourism (e.g., the beach award schemes in the USA) (Leatherman, 1997) and, as a result, are generally seen as desirable by local authorities and agencies responsible for tourism.

These schemes were designed to inform the public about a recreational area's quality so that users and potential users can make an informed choice regarding the area. Nevertheless, it appears that confusion exists about the implications associated with these schemes (Williams & Morgan, 1995). They are used to:

- give consumers information about water quality so that they can make informed choices about holiday destinations and assess risks when bathing in coastal waters;
- advise businesses that operate nearby and that want to reduce the risks caused by adverse publicity about poor water quality; and
- help resort managers and local authorities that wish to ensure that there are common standards and a common system for measuring those standards (Nelson et al., 1999).

In some of these programmes, however, human health concerns comprise only a small component, or it is possible for areas that present a significant public health risk to receive a high grading if other facilities are good or extensive. Such approaches are likely to undermine the contribution of informed personal choice to the promotion of user safety. In general, health-related aspects in such schemes should assume a dominant character in classification if there is any likelihood that users will interpret them as indicating safety.

A specific problem that is commonly encountered in the development of award schemes is that information may not be comparable between locations. For example, it may be difficult to generate comparable information on microbial water quality because of problems with interlaboratory comparability; where such information is locally generated, it may be difficult to ensure the impartiality of laboratories and surveyors. At an international scale, differing legislation, practice and interpretation between countries compound such problems.

The success of award schemes in terms of informing the public depends upon active information dissemination as well as the required technical interventions. While comparison of different locations constitutes an important part of the information required for improved personal choice, active information dissemination at a local level and related to short-term changes is also necessary. For example, in some recreational water use areas, changes in local conditions may be extreme or rapid, such that areas are unsafe for physical or quality reasons. Such areas require "posting" and also information dissemination where a beach is unsafe at certain times—for instance, because of weather conditions or because of local water quality changes. Ideally, the requirement for such information dissemination should constitute an important part of award schemes.

Available evidence suggests that many hazards associated with the recreational use of the water environment are of an instantaneous or short-term nature. Drowning has been associated with offshore winds carrying inflated toys and buoyancy aids away from the coast. In the case of water quality, certain beaches or areas are known to register increased pollution under certain conditions, relating to tide, wind direction or rainfall, for example. In eutrophic fresh water, wind may be associated with the accumulation of cyanobacterial “scums” in some areas, which may present a special hazard to children who are tempted to play in the scum material. Whenever such conditions occur and constitute a risk to public health, short-term advisory notices may be considered necessary, and the decision to place such notices should be based upon public health considerations. This approach may, through low-cost measures, enable safe use of areas that might otherwise be considered inappropriate for recreational use. Examples of conditions that may result in a severe health outcome and thus merit a public health advisory and levels at which they may be implemented are summarised in Table 13.3. Specific conditions require definition on a location by location basis depending upon local circumstances and the user groups and activities typically undertaken (a white water canoeist, for example, may be actively seeking river flood conditions).

TABLE 13.3. CONDITIONS THAT MAY MERIT INTERVENTION BY SAFETY OR PUBLIC HEALTH AUTHORITIES

Hazard	Examples of conditions meriting immediate action
Drowning	High surf conditions Development of a strong rip current Dam release of water on an impounded river
Microbial	Presence of human sewage (e.g., due to a pipeline breakage) 95% percentile value of intestinal enterococci/100ml greater than 500 (or greater than 200 if source mainly human faecal pollution) in consecutive samples. Presence of a large outbreak of faecal-oral illness in the local community (especially if the agent is resistant to sewage treatment processes and has a small infectious dose)
Algal and cyanobacterial	Presence of scums or detection of 100,000 cells/ml
Chemical	Chemical spill or significant contamination
Dangerous aquatic organisms	Presence of organisms associated with human fatalities such as sharks, hippopotami, crocodiles, alligators or box jellyfish (for example) close to the recreational area.

Prevention and rescue services can also be considered to fall within this intervention. Provision of lifeguards (see Appendix A) is a highly visible measure that may contribute to safety in various ways: by directly assisting in prevention of drowning (rescue, resuscitation), by assisting in injury prevention (e.g., advising users not to

enter dangerous areas) and by playing a more general educational role (concerning water quality hazards and exposure to heat, cold or sunlight, for example).

13.7 Operating within an integrated coastal area management framework

One way in which all the relevant stakeholders can be brought together is through the establishment of an integrated management system for marine and freshwater recreational areas based on the concept of integrated coastal area management (ICAM), as outlined in chapter 1 and Box 13.3.

BOX 13.3 INTEGRATED COASTAL AREA MANAGEMENT

An integrated coastal area management (ICAM) framework is a “continuous and dynamic process that unites government and community, science and management, sectoral and public interests in preparing and implementing plans for the protection and development of coastal systems and resources” (GESAMP, 1996).

The main premises of ICAM are:

- Natural resources are finite, and their use must be allocated prudently.
- The functional integrity of the resource systems must be protected.
- Resource management involves changing human perceptions and behaviour.
- Resolution of multiple-use conflicts needs a holistic approach through policy, management and technical innovations.
- Planning and management processes are dynamic and should respond to ecological and socioeconomic conditions and evolve with time.

Ideally, ICAM seeks to address all activities and resources within a defined area. Thus, the need for and requirements of such economic and social activities, including fisheries, non-renewable resource extraction, waste disposal, agriculture and aquaculture, tourism, recreation, transportation and development, should be considered.

ICAM involves comprehensive assessment, the setting of objectives and the planning and management of coastal systems and resources. It also takes into account traditional, cultural and historical perspectives and conflicting interests and uses. The individual elements and some of the main linkages of the ICAM framework are shown in Figure 13.1.

ICAM is an iterative and evolving process for achieving sustainable development (UNCED, 1992) and continuous management capability that can respond to changing conditions. As such, the framework permits integration of the various needs and requirements for the coastal area and coordination of the actions, whether preventive or remedial. Integration relates to both vertical (levels of government and NGOs) and horizontal (cross-sectoral) coordination among stakeholders whose actions influence the quality/quantity of water-based resources reflected in the planning and management strategies.

Continued

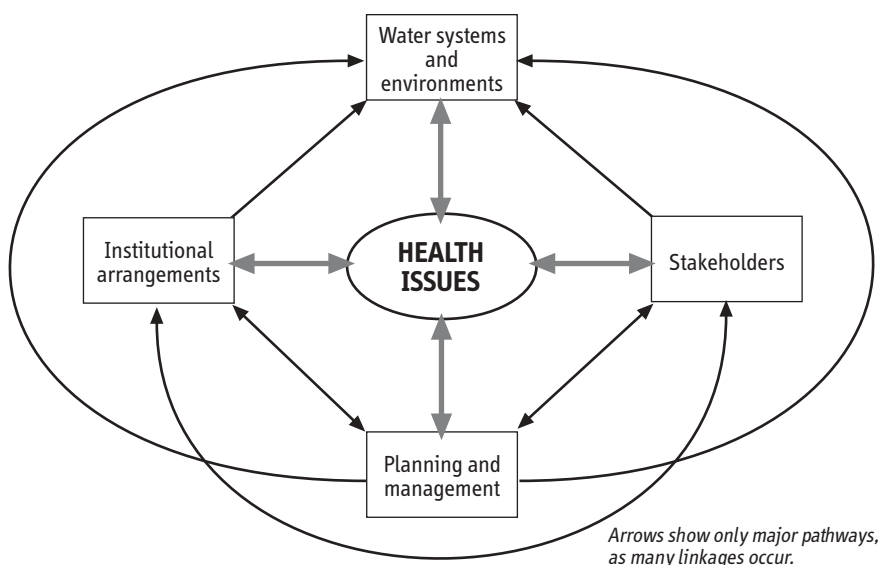


FIGURE 13.1. A SCHEMATIC VIEW OF THE INTEGRATED MANAGEMENT OF RECREATIONAL WATERS

An ICAM programme can be directed to one or more types of coastal areas, which can extend from coastal mountain watersheds to offshore coastal boundaries, and can also encompass river catchment areas.

Management options may vary, for example, from educational projects to construction work or from no-cost actions to heavily funded development. The exact package of management options to reduce or eliminate health hazards and risks related to recreational water uses will be driven by the nature and severity of the health impacts.

Based on assessment of risk, three levels of response may be considered:

- The basic response should guarantee that an ICAM management framework is established to prevent the occurrence of significant adverse health outcomes and facilitate the implementation of remedial actions. This could include the dissemination of minimum public awareness messages, the establishment of an integrated recreational water committee with participation of various stakeholders and the development of a streamlined monitoring programme.
- The expanded response would provide an enhanced institutional setting with more sophisticated legislation and increased participation of stakeholders in the development and implementation of solutions, targeted intervention to areas prone to health hazards, rapid response when problems are identified, and a greater public awareness activity together with the mobilization of local NGOs to support the effort.

- The full response would ensure a comprehensive package of management options with a clear strategic plan for implementation of the various interventions and establishment of an integrated coastal area/recreational waters management system, which would, in turn, develop appropriate tools (legislation, incentives, economic instruments, participation, etc.).

These three levels of response correspond to the assessed level of health risk in a recreational water area and should be complemented by the corresponding levels of monitoring outlined in chapter 12. Levels of response apply both at progressive national implementation and that appropriate to specific local circumstances.

A basic response may suffice in an area that is rarely frequented, with little or no record of health effects due to recreational activities and with no development plans to alter the nature and use of the recreational water zone in the medium term. The response should ensure that a potential danger situation can be dealt with effectively and immediately. The expanded and full levels of response would need to be adapted to local conditions, taking into consideration past occurrences and likely trends. Preventive actions are effective in areas with good general awareness levels, which have available resources and no imminent health danger and threats. Remedial actions would be required to minimize existing negative health effects. Usually a combination of the two would be selected, with respect to local conditions, availability of resources and valuation of the danger and impacts. The selection of level of response is clearly also linked to the availability of funding, technical support and advice.

Four major management interventions were identified in chapter 1. These comprise compliance and enforcement, control and abatement technology, public awareness and information (this includes support for informed choice, such as clear recreational water grading/award schemes) and public health advice and intervention (including prevention and rescue services). Some activity in each of these areas is possible and advisable at all three levels of response in terms of national implementation.

13.8 References

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