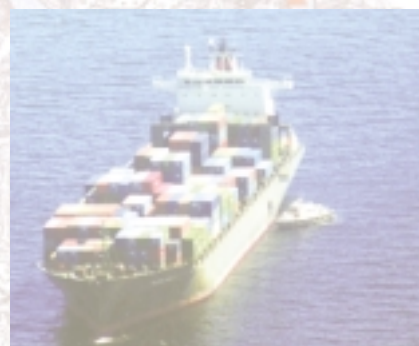


A Guide for

MULTIPLE USE *Waterway Management*

Second Edition



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*Waterway
Management*
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Produced by the National Water Safety Congress, Inc.
in partnership with the
National Association of State Boating Law Administrators



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Acknowledgments

A Guide for Multiple Use Waterway Management is but one tool for resource managers, planners, regulators and other waterway stakeholders and professionals who are trying to make sense of an evolving body of information about multiple use waterway issues and conflicts and site-appropriate ways for coming to terms with them. This body of information, which grounds the analysis and presentations within the **Guide**, is made up of research reports, management plans, process summaries, academic and governmental studies, conference and workshop proceedings, meeting minutes, media articles, and Internet-based sites produced or maintained by public, private and non-profit agencies and organizations.

But the "making sense" part of this project would not have been as rich and multi-layered if it had not been for the active engagement and guidance of individuals and organizational representatives in formal and informal project input and feedback opportunities in 2002 and 2003. They helped to shape this edition by sharing their real-life professional experiences and their varying and valuable perspectives on waterway and multiple use issues and management priorities and approaches.

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Foreword

The National Water Safety Congress (NWSC), in partnership with the National Association of State Boating Law Administrators (NASBLA), is pleased to present the second edition of ***A Guide for Multiple Use Waterway Management***.

This updated ***Guide*** revisits many of the topics presented in the edition first published by the NWSC in 1996. But its perspective, structure and scope reflect the evolution in experience with multiple use waterway issues and management strategies over time, as well as the tremendous amount of information that is rapidly becoming available electronically via the Internet.

While the hallmark of the first edition was a six-step process that could be adapted by users to develop responsible multiple use waterway management plans, this update begins by taking a look at the trends, factors, opportunities and even stumbling points involved in planning for and managing those multiple use public waterways today. At its core are "lessons worth learning" when it comes to formulating viable multiple use strategies, plans and solutions.

Since those lessons continue to be learned by resource managers, planners and other waterway stakeholders, we hope that this new edition will be just the start of a longer-term goal to inform and facilitate ongoing exchanges about the planning, management and regulation of multiple use waterways and the ultimate outcomes of those efforts.

We would like to offer personal thanks to all of the professionals who provided valuable input to the development of this ***Guide***, whether in project meetings, conference sessions, or in untold hours reviewing drafts. Without their cooperation and valuable insights, this project would not have been possible.

Bob Pharr
President
National Water Safety Congress

Ronald J. Riberich
Immediate Past President
National Water Safety Congress

On Using This Guide – Quick Reference

At the core of this edition of *A Guide for Multiple Use Waterway Management* and as *recommended reading for all users*, new to the field and veterans alike, are a set of "lessons worth learning" — key things to keep in mind as gleaned from the experiences of many who have gone through the process of developing viable multiple use waterway strategies, plans and solutions (pp. 27-47).

As you get into the "real work," though, you may need to refer back to this *Guide* for ideas about how to resolve a particular type of problem, take on a task, or just refresh your memory about a resource, method or topic area. The **Table of Contents** and the **Subject Index (p. 101)** are the primary navigational tools, but here is a set of quick pointers to sections or pages addressing areas about which you might have questions.

Where do I look if I want to ...

Get a shorthand version of those "lessons worth learning"? p. xii

Learn more about how we can involve other agencies, citizens and other waterway stakeholders in planning for and managing our multiple use waterway? p. xii

Find out how we can isolate the problems on our multiple use waterway? p. xii

Learn how we can make more sound decisions, or at least make decisions we can explain to the boaters, landowners, interest groups and others who have a stake in the waterway? p. xii

Find out about participation trends for water-based outdoor recreation so we can compare them to our situation? p. xii

Read some examples of multiple use management and planning experiences? p. xii-xiii

Learn more about strategies for monitoring boat traffic on our waterway? p. xiii

Figure out whether we should "zone" to manage conflict between different water-based activities? p. xiii

Figure out how to manage PWCs on our waterway? p. xiii

Find out how we can address user conflicts without creating more regulations? p. xiii-xiv

Learn more about the possible effects of adding to or distributing waterway access points? p. xiv

Find the technical detail for implementing the methods described in the *Guide* (for example, how to locate and size waterway support facilities, like marinas and parking areas)? p. xiv

Find out how we can plan and manage specifically for multiple uses and users on an inland lake? p. xiv

Learn more about user surveys? p. xv

Get the "menu" of management techniques that are available for us to consider? p. xv

Learn just about those techniques that can address some of the biggest complaints we get, like noise and overcrowding? p. xv

Learn about specific things that we can do to make our multiple use waterway as safe as possible? p. xv

Where do I look if I want to ...

Get a shorthand version of those "lessons worth learning"?

See p. 27 for the boxed information titled "Shorthand reminders for planning and decision making..."

Learn more about how we can involve other agencies, citizens and other waterway stakeholders in planning for and managing our multiple use waterway?

See pp. 27-29 and pp. 31-35 for information about participation methods, stakeholder involvement in meetings, a method for achieving consent, and reasons why "process" is becoming important to problem resolution.

Find out how we can isolate the problems on our multiple use waterway?

They are not very clear-cut are they? See pp. 36-37, and in particular, the boxed information titled, "So, what's *your* problem?" It is not the only resource, but it is one way of working through the process of identifying and describing your problem, separating the problem from the symptoms, and targeting what needs resolution.

Learn how we can make more sound decisions, or at least make decisions we can explain to the boaters, landowners, interest groups and others who have a stake in the waterway?

See pp. 38-40 for reasons why principled, science-based decisions are important, and even why "perceptions," and your understanding of them, can play a role in decision-making about multiple use waterways. See p. 39, for an example of "decision criteria" you might want to adapt to suit your situation.

Find out about participation trends for water-based outdoor recreation so we can compare them to our situation?

See p. 14, and the boxed information for key results from the *National Survey on Recreation and the Environment 2000*. For other discussions of boating participation and variations in how we define and calculate that "participation," see p. 10-11. For other major trends affecting or likely to affect the uses, demands and conflicts on waterways, see pp. 9-26.

Read some examples of multiple use management and planning experiences?

The *Guide* is based on and cites hundreds of resources, plans, and other materials and examples relevant to multiple use waterway management (see **Section 4: References and Resources**, pp. 81-99, and the detailed endnotes following each section). But within each section, you also will find highlights of certain aspects of the planning, decision-making, stakeholder participation, management, monitoring techniques and other processes used by selected jurisdictions for their waterways. For more detail on each, always go directly to the source information that accompanies the descriptions.

What you apply from these experiences ultimately should be based upon the unique nature of your waterway and users. Among the illustrations that might be of interest to you:

Boating on Ohio Waterways: A Plan for Access and Use Management, p. 75

Delaware Inland Bays Water Use Plan, p. 30
 Hampton Roads Waterway Management Study, p. 52
 Lake Mead National Recreation Area Lake Management Plan, p. 69
 The Lake St. Clair/St. Clair River Management Plan, p. 34
 Lake Travis and Highland Lakes Recreation Management Plans, pp. 60-61
 North Shore Harbors Plan (Lake Superior), p. 66
 North Landing River Waterway Use Conflict Memorandum of Agreement, p. 55
 Southwest Florida Anchorage Management Program, p. 71
 Tims Ford Reservoir Boating Capacity Study and process, p. 73
 Virginia Coastal Program model for shallow water use conflicts, p. 58

Learn more about strategies for monitoring boat traffic on our waterway?

See pp. 74-76 for more about data collection on and about the waterways, and especially p.76 for some strategies for monitoring traffic and the factors that should weigh into your decision. Take a look at p. 70 and pp. 72-74 for more information on issues surrounding boating capacity on the waterways, and p. 73 for an illustration of a process used in a boating capacity study for a reservoir.

Figure out whether we should "zone" to manage conflict between different water-based activities?

See pp. 57-60 and p. 62 for more about "zoning" as just one method for managing activity on the surface of multiple use waterways, and the pros and cons of employing different types of zones on different types of waterways.

Figure out how to manage PWCs on our waterway?

The *Guide* presents information, statistics and resources related to a variety of recreational boats, including personal watercraft, muscle-powered or paddle craft, motorboats, sailboats and other craft. See the **Subject Index** (p. 101), especially, for pages on which different craft receive significant mention, and **Section 4: References and Resources** (p. 81-99). There are, as described on pp. 49-76, some controls that *are* more effective and appropriate *on certain types of waterways* for managing conflicts between different types of users and crafts or between certain crafts and the environmental resources. Your management objectives for the waterway — including your understanding of the role perceptions play in reactions to certain types of users and activities (see boxed information on p. 40; and pp. 18-19 and pp. 38-41 for example) — will affect the approaches you take and your selection of techniques.

But a premise of this *Guide*, as with the first, is that there is inherent value in *comprehensive* planning for and management of multiple use waterways based on a shared, long-term vision and goals for what a particular waterway *should* be like, for what the recreational experience *can* be, and on assessments of alternatives based on sound, supporting data. That is, not solely on the basis of singling out the latest craft on the waterway. See the question, "Where do I look if I want to ... read some examples of multiple use management and planning experiences?" (p. xii) for more illustrations of management and planning strategies that jurisdictions have used to acknowledge, resolve, or even thwart certain problems.

Find out how we can address user conflicts without creating more regulations?

See pp. 50-51, p. 53, and pp. 68-70, for some of the reasons why alternative methods of resolving conflict — such as efforts to raise boater awareness, education, and collaboration of stakeholder agencies and jurisdictions in voluntary agreements — are among the first steps you

might take to deal with conflict. Take a look at p. 55 and p. 71 for illustrations of management plans that use memoranda of agreement between agencies or jurisdictions and voluntary compliance from boaters to try to achieve waterway goals.

Learn more about the possible effects of adding to or distributing waterway access points?

See pp. 64-67 for some of the implications associated with the way access points are distributed, launch ramps are placed, and support facilities are added to shoreline development. See pp. 53-64, too, because the application of other management techniques also will affect the degree, ease and frequency of user "access" to a multiple use waterway.

Find the technical detail for implementing the methods described in the *Guide* (for example, how to locate and size waterway support facilities, like marinas and parking areas)?

For one answer, see p. 65. But as with other tools and techniques in **Section 3: A Closer Look at Multiple Use Waterway Management Approaches, Tools and Processes** (pp. 49-80), you will need to consult the sources, print and Internet-based, that are cited in the endnotes. One *Guide* cannot authoritatively cover all the detail necessary for implementing each technique.

Find out how we can plan and manage specifically for multiple uses and users on an inland lake?

If you are looking for information that applies to lakes, reservoirs or impoundments, there are many parts of the *Guide* you will want to consult. Given that at least one national survey a few years back reported nearly 60 percent of boaters go out on freshwater lakes and impoundments, the number of references included in the *Guide* should not be surprising.

But that is a good question because what happens in managing a large lake, perhaps with transient users, may be very different than managing a small lake with a residential development along the shoreline. While there will be comparability in the basic planning and participation processes and the application of decision-making techniques, there will be inevitable differences in the alternatives, strategies and techniques that you can consider and effectively apply.

For some of the management techniques and caveats applicable to lakes, see especially pp. 58-59 (zoning for fishing, swimming, water skiing, special events; zoning linked to times or days; or zoning to achieve "no wake"); p. 62-64 (discussions of management practices like the imposition of speed limits, horsepower limits, or even rotational water patterns); and p. 70 and pp. 72-74 (regarding the evolution of "carrying capacity," particularly as the concept has been applied to the management of inland lakes).

For some illustrations of stakeholder involvement in planning for lakes, see p. 34, pp. 60-61 and p. 69; for illustrations of attempts to create uniform management approaches across a system of lakes or to think regionally in planning for different kinds of public recreation, see pp. 60-61 and p. 1, respectively. For a capacity study involving the creation of "management classifications" within a system of reservoirs, see p. 73. And, finally, see "Where do I look if I want to ... read some examples of multiple use management and planning experiences?" (p. xii-xiii), for more illustrations of management and planning strategies.

Learn more about user surveys?

See especially p. 33 (on using surveys as one way of involving waterway stakeholders), pp. 38, 40 (on the importance of understanding user perceptions to better interpret the results of these surveys), p. 42 (for other caveats you should be aware of as you interpret surveys), and pp. 74-76 (for more information regarding data collection processes. As always, consult the endnotes linked to the text.

Get the "menu" of management techniques that are available for us to consider?

See pp. 53-67, "Basic Waterway Management Tools and Techniques" for those associated with the physical aspects of waterways, the crafts and users on them, and the shoreline activities. Although many are interrelated, each technique has been slotted into one of four broad categories: Information & Education; Law Enforcement & Boater Regulations; Water Use Activity Controls & Traffic Management; and Access Distribution & Development.

Learn just about those techniques that can address some of the biggest complaints we get, like noise and overcrowding?

For some of the pages where you will find key information about "noise complaints" and potential ways of alleviating them, see p. 59 ("no wake zoning"), p. 62 (imposing noise regulations and ordinances), and p. 63 (regarding horsepower limitations). For some interesting points regarding other factors that affect our perceptions of noise, see p. 41, and for an example of management actions used to deal with these and other complaints in a uniform way across a system of lakes, see p. 60-61.

When it comes to crowds and "over"crowding, once again perceptions will play a role in how you address it. See pp. 41 for some of those differences based on boater age, experience and expectations. For specific techniques that have been used in other places to address overcrowding, and that may — depending on your situation — become part of a broader management plan, see p. 54 (user information), p. 63 (imposition of user fees), and p. 65 (distribution of launch ramps and access points). See also, p. 71, for an example of a non-regulatory approach to address the declining quality of anchorages due in part to periodic overcrowding.

Learn about specific things that we can do to make our multiple use waterway as safe as possible?

Far too many pages to cite here! This *Guide* — in the information it conveys, the principles it presents, the illustrations it cites — is intended to assist waterway planners, managers and regulators in sorting through, proactively planning for, and then managing and monitoring the waterways to achieve a quality boating experience, a quality and sustainable resource to support recreational activities, and above all, to strive for the safety of the waterway users.

Introduction

"... [The water is] filled with the equivalent of bicycles, rollerbladers, trucks, cars, buses ... As it gets busier and busier, that's going to present a real challenge to public safety..." — Owner of a water taxi service quoted in a New York Times article on overcrowding in New York Harbor ¹

"... Whether as a ship owner, ship pilot, port owner, port authority, the Coast Guard or others involved in marine transportation ... your perspective on the system comes from a professional or perhaps economic standpoint. By comparison, most recreational boaters take to our nation's waterways simply to play ... whether it's fishing, sailing, skiing, cruising or whatever ... they don't share [the same] vision of waterways as working harbors. Bridging that disconnect poses a tremendous challenge for promoting safety and a responsibility for sharing the waterways in a safe manner. It also represents a great opportunity for groups such as harbor safety committees to play a key role in communicating and coordinating on local waterways so we can safely share and minimize the conflicts that can occur with multiple use..." — State boating law administrator addressing the delicate balancing act between recreational boating and the marine transportation system ²

"... Boaters and shore residents need to recognize that there are limits to growth and the time when a boater could go anywhere and do anything on the water has passed. There are just too many of us doing our thing on the water. ... Government at every level is reacting to conflicting and competing uses by imposing regulations that serve as 'fences' in coastal waters.... [But] the only way that competing users can enjoy boating is through cooperation. Sailboaters, power-boaters, jet skiers, fishermen, all have to learn how to accommodate each other..." — University professor emeritus and coastal recreation expert commenting on Florida's boating future and the need for self-regulation and cooperation among waterway users ³

"... Originally, our [lakes] program offered multiple-use of traditional activities, which by their nature were complementary, or at the least not conflicting of each other, such as fishing, camping and picnicking. In recent years, however, [it] has evolved to reflect public interest in water contact activities ... and boating preferences.... In contrast to the lack of conflict with the earlier traditional activities, these new uses and users arrived with inherent conflicts with each other and extraordinary conflicts with our culture of traditional users. Having ten reservoirs in our system gave us the luxury of accommodating multiple interests on a system-wide basis, which has allowed us to maintain higher standards in terms of safety and quality of experience.... Still we have no small amount of competition ... for 'prime' lakes where a combination of time and zone management are employed to minimize conflict where it cannot be eliminated entirely..." — Lakes program manager on the regional nature of multiple use planning for public recreation on water supply reservoirs in southern California ⁴

The nation's public waterways — our valuable, finite resources, often serving multiple purposes — can conjure up a spectrum of images.

And depending on your proximity, point of view, preferences, expectations, needs, most recent experiences and encounters — and even your role in managing or planning activities on them — the mental pictures you develop about those waterways may change hue over time and become very much like or very much at odds with someone else's.

One person's exhilarating hub of recreational activity is another's overcrowded, intolerant and noisy place. Another's tranquil refuge and scenic backdoor vista is somebody's inaccessible space. Someone's productive workplace or

corridor of military or commercial activity is another user's competitive, intolerant passageway.

It's a paradox, but one that in a curious way offers not only significant challenges, but also unique opportunities for multiple use waterway managers and planners.

For one thing, it means stepping into an increasingly vital role in setting, meeting and even exceeding the expectations of waterway users, and — particularly in the case of recreational waters — shaping, "selling" and then maintaining the quality and safety of the waterway experience for populations with less and less leisure time to spend and a rapidly-growing menu of competing recreational options and activities to fill it.

But it also means recognizing and accepting that the most critical aspects of resource management today and well into the future will go beyond tending to the safety, care, enjoyment and efficiency of the waters to mediating the not-always compatible interests of those who take pleasure from them, live nearby, make their living on, study or otherwise rely on access to the waterways.

That can be a tough assignment because like other treasured resources serving more than one viable use public waterways are bound to have more than one source of potential conflict. Different users and behaviors. Different advocates. New watercraft. New water contact activities. Changes in access points. Shifting priorities. Adjacent activities. Policies and political structures that can inadvertently contribute to clashes. The list goes on.

For managers and planners already strapped for time and resources, then, the thought of wading through and untangling all of the

factors, arguments and assorted information to craft logical responses to multiple use challenges or take advantage of strategic opportunities can be overwhelming. So much so that shortcuts to planning and decision-making might seem attractive options, at least at first.

But as some have already learned, there can be unexpected costs — and missed opportunities — in not taking the time to

- Set clear management objectives;
- Gather solid information and scientific data;
- Develop credible, straightforward processes;
- Become familiar with relevant trends and human behaviors;
- Weigh alternatives;
- Apply appropriate strategies and techniques; and then
- Continually measure to see whether those objectives are being achieved.

Without these steps, even the most well-intentioned efforts at the outset may not have very satisfying outcomes in the long-run.

A Guide for Multiple Use Waterway Management, second edition, is a tool for resource managers, planners, regulators and other professionals and stakeholders who are trying to make sense of an evolving and somewhat unwieldy body of knowledge about multiple use waterway issues and conflicts and the methods and processes for coming to terms with them. By design, this ***Guide*** — itself representing an evolution from the first edition — is intended both to inform *and* facilitate ongoing learning and exchanges about planning, management and regulation of multiple use waterways and the outcomes of those efforts.

Origins of the Guide

In the early 1990s — responding to a commission by the U.S. Coast Guard, signs of escalating competition for the use of limited water space and prospects for increasingly unsafe waterways — the National Water Safety Congress (NWSC), in cooperation with a broader group of concerned organizations and waterway management professionals, set to work on the first edition of ***A Guide for Multiple Use Waterway Management***.⁵

Released in 1996 by the NWSC, the ***Guide*** addressed the management of multiple use waterways in a broad way by offering the basics on a range of management tools and techniques; encouraging users to examine them more completely through other resources before adapting them to meet their situations; and exposing readers to the seeds of complicated concepts like "carrying capacity," that even today continue to be debated and refined.

The ***Guide*** represented a collaborative effort to identify and introduce helpful ideas, tools and techniques for what was rightfully described in its Preface as the "rapidly expanding" and "increasingly complex field" of waterway management, and particularly, multiple use management for recreational purposes.

Perhaps the hallmark of the first edition, though, was its promotion of comprehensive, systematic research and analysis, and from those activities, the development of responsive and responsible multiple use waterway management plans.

While the ***Guide's*** authors acknowledged that there were "very few solutions on which all affected parties" could agree, the

common ground was a belief in "more and better planning and management."⁶ In that spirit, the ***Guide*** outlined a generic six-step planning process to introduce users to fundamentals, from "planning for the plan" to monitoring the outcomes of implemented decisions.⁷

Though its basic content remained instructive, the ***Guide*** was due for revisiting after nearly six years of use. The National Water Safety Congress and the National Association of State Boating Law Administrators partnered in late 2001 to take another look at what was happening in this "rapidly expanding" and "increasingly complex field."

After months of research, information searches, and various forums that in combination gleaned the insights of boating and water safety specialists, waterway managers, academic researchers and other professionals representing a range of perspectives from the recreational, commercial, military and environmental arenas, at least one thing became clear: "increasingly complex" might have been a bit of an understatement in describing multiple use waterway management.

Just as in other aspects of life, society, work and policy-making, things *have* become more complicated in the realm of multiple use waterways and in the problem-identification, problem solving and decision-making associated with them.

Revisiting Multiple Use Waterway Management in the New Reality

Multiple use of the public waters did not always spell serious conflict, and it does not assure conflict today. There are and can be

many compatible water-based and adjacent activities, complementary either by their very nature or as a result of effective planning and management.

Even the growing diversity in the backgrounds and interests of water users does not, in itself, herald conflict. After all, the need for and quality of water for recreation and other waterway activities can sometimes be tough to separate from the need for quality water for environmental and other purposes.⁸ Introducing more and different people to the waterways could just mean that a larger group of users comes to appreciate the variety of uses and benefits of the public waters, and takes responsibility for safe behaviors and protection of the resources.

Or it could mean something entirely different.

A few years ago, during a listening session conducted by the U.S. Army Corps of Engineers on what role federal agencies should play in America's water resource issues, one participant said, "... *balance* the *needs* of various recreation types, and find *suitable* multiple-use management *solutions*."⁹

That challenge could have been directed to any number of agencies at other levels in other venues around the country. But depending on who would have issued the challenge, their experiences, and which bodies of water were in question, what they meant by *balance*, *needs*, *suitable*, even *solutions* likely would have been different — and that just in the context of recreational waterways and activities.

Why? There is no single answer, but instead there is an unusual combination of trends and happenings at work, among them the

- Increasing, more intensive and in some areas, new uses of public waters;
- Continuing evolution in the kinds and combinations of watercraft and water contact activities;
- Relatively static surface acreage of the public waters;
- Rapid commercial and residential development along shorelines;
- Expanded boating seasons;
- Enhanced visibility and prominence of environmental issues; and
- Increasing interest in the resource impacts associated with watercraft, water contact and shoreline development activities.

When you toss in other critical elements, like the

- Dramatic demographic and societal changes over the last few decades, and the everyday life style and leisure time changes showing up in outdoor recreation;
- Variations in water users' and craft operators' experience, skill levels, education, interests and even consideration for and understanding of other user groups;
- Varied attitudes and social perspectives about recreation, water resources and the environment in general;
- A changing regulatory environment; and the
- Increasingly strident involvement of citizens, stakeholders and various interest groups in public management and policy decisions.

And mix them up, you get

- Heightened concerns about the safety and capacities of the public waters;
- A jumble of water user needs and values that may be tough to unravel;
- Intensified demands on the very resources that support water-related activities; and
- Sometimes wildly different interpretations of the impacts of those demands.

Finding the common ground on those *suitable* multiple use management *solutions*, then, becomes more problematic. Experts note that it is a sure signal resource managers, planners and regulators must be prepared to not only continuously learn and adapt to new knowledge, information and circumstances, but also pay attention to seemingly obvious, yet sometimes overlooked fundamentals.¹⁰ This second edition of the **Guide** is just one tool to facilitate that process.

Focus of the Second Edition

Readers familiar with the first edition of **A Guide for Multiple Use Waterway Management** may wonder whether the only common bond between it and this **Guide** is the title. In fact, while this second edition uses the first as a springboard and revisits many of the management topics introduced in the original, it employs a different perspective, structure and scope that reflects both the evolution in multiple use waterway issues and management strategies and the wealth of information becoming available on the Internet.¹¹

And while the heart of the first edition was the six-step planning process that could be adapted in developing responsible multiple use waterway management plans, at the core of this update is a set of "lessons worth learning" when it comes to formulating viable multiple use strategies, plans and solutions.

Before taking a closer look at the four sections that follow, readers will want to become familiar with how some terms and examples are used in this **Guide**.

As it was in the first edition, the term waterway is used prominently in the title

and throughout this **Guide**. For purposes of this **Guide** and its general discussions, waterway is used as a generic reference to *any* type of public body of water including rivers and streams, lakes, ponds, reservoirs, canals, bays, coastal waters, and harbor and port areas. When a specific type of water body is relevant to the description or discussion, its appropriate name is used. And though the focus is on *public* waterways, the **Guide** does touch upon some of the issues that may put private activities around the waters at odds with public use, or alternately, may successfully blend public and private interests.

The phrase *waterway management* — which can include all sorts of management and maintenance of the waters and shorelands, from ditching and dredging to flood control and more — is used primarily to refer to management of the surface waters for recreational, commercial and environmental purposes and to the relevant factors that affect their management. When other aspects are critical to discussion, they are noted.

And finally, while this **Guide** draws upon illustrations of *multiple use* waterways from across the country, and presents issues from a variety of recreational, commercial, environmental and social settings, the depth of other water uses, issues and potential conflicts — such as those involving drinking water, irrigation, agriculture, groundwater, and the like — are not and cannot be adequately covered in this single document. However, some of the references cited in the last section of this **Guide** do address these aspects in more detail.

Organization of the Second Edition

The **Guide** is organized into four sections. Readers interested in an introduction to multiple use waterway management or gaining the broadest possible context for thinking about waterway issues and management approaches might find it helpful to "begin at the beginning," and read all the way through. Others might find it more useful to focus on a particular section described below.

All will likely find it helpful to read **Section 2 — Developing Plans and Solutions for Multiple Use Waterway Issues and Conflicts:** *Things to consider ... even if you don't want to*, and to make use of **Section 4 — References and Resources** *A starting point for further exploration*.

Section 1 — Trends and Emerging Issues: *What's shaping waterway uses, demands and conflicts?*

From changes in recreational and commercial waterway uses to boating statistics, demographics, and leisure time and environmental attitude shifts, this section touches lightly on recent past and emerging issues and trends affecting the planning, management and regulation of multiple use waterways.

Section 2 — Developing Plans and Solutions for Multiple Use Waterway Issues and Conflicts: *Things to consider ... even if you don't want to*

Grounded in an exploration of emerging trends and issues, the evolution in thinking about management concepts, and the experiences of different jurisdictions, this section poses a set of sometimes-overlooked but critical elements to factor in along the way to developing viable, credible, defensible and accepted multiple-use management strategies, plans and resolutions.

Section 3 — A Closer Look at Multiple Use Waterway Management Approaches, Tools and Processes: *Tailoring the methods to the priorities and objectives*

An expansion of the first edition's offering on Waterway Management Techniques,¹² this section takes a fresh look at the methods, approaches and tools in light of shifts in how they are being applied to multiple use waterways, what is triggering their use, and the frameworks that are guiding the decisions to use them. And while the **Guide** makes liberal reference throughout of "real-life" examples, this section takes a little deeper dive into multiple use situations where particular strategies and techniques have been implemented.

Section 4 — References and Resources: *A starting point for further exploration*

This edition would not have been possible without the briefs, reports, books, conference and workshop proceedings, media articles, meeting minutes, process summaries, management plans, academic studies and Internet-based sites and documentation produced by a range of public, private and non-profit agencies, organizations, institutions and associations throughout the United States, and even Canada and Australia. Representing varying perspectives on waterways, issues, multiple use conflicts, and management concepts, this section incorporates over 200 reference items with Internet addresses, as available, and hundreds more organizational and web resources.¹³

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- 1 From Andrew C. Revkin, "A Crowded, Uneasy Mix in Hudson and Harbor." September 6, 1998. *The New York Times*. Reproduced on New Jersey Fishing, FishNet USA, at www.fishingnj.org/artnyharbor.htm.
 - 2 From Paul Donheffner, "A Balancing Act: The 'Bubba Factor' and the Marine Transportation System." March 8, 2000. *The Motivators Report*. See www.motivatorsconference.com/report/feat_2.htm.
 - 3 Dr. Gustavo Antonini, "Boating Expert Provides Look at the Future of Boating." Fall 1995. *Fathom Magazine*. Vol. 7, Issue 3. See www.flseagrant.org/science/library/fathom_magazine/volume-7_issue-3/expert.htm.
 - 4 Jim Brown, Lakes Program Manager for the San Diego City Lakes Program, commenting in an email message in May 2002. For more information on the program, see www.sannet.gov/water/recreation/index.shtml.
 - 5 The 1996 edition had its origins in *A Guide to Managing Recreational Boating Areas*, produced by the U.S. Coast Guard in 1983. The increases in boating and waterway uses, changes in types and speeds of watercraft, variety of new water sport products, and the recognized complexities of balanced resource management prompted the Coast Guard to commission an updated, expanded version.
 - 6 See pp. 3-4. *A Guide for Multiple Use Waterway Management*. 1st ed. 1996. National Water Safety Congress.
 - 7 The planning process described in the first edition of *A Guide for Multiple Use Waterway Management* was offered for adaptation to fit the unique circumstances of specific bodies of water. There is at least one example of its adaptation by the Hampton Roads (Va.) Planning District Commission in a waterway management study and development of two pilot plans for local areas. See *Managing Multiple Recreational Use Conflicts in the Waters of Hampton Roads*. March 1998. Vol. 1, Waterway Planning Guidance, and Vol. 2, Pilot Waterways Studies. Hampton Roads Planning District Commission. www.hrpd.org.
 - 8 From *Water Use Conflicts in the West: Implications of Reforming the Bureau of Reclamation's Water Supply Policies*. August 1997. Congressional Budget Office. See www.cbo.gov/showdoc.cfm?index=46&sequence=0.
 - 9 From one of 16 listening sessions conducted by the U.S. Army Corps of Engineers between June and November 2000 on what the federal role should be in addressing water resources. See *A National Dialogue About America's Water Resource Challenges for the 21st Century: National Report on Identified Water Resources Challenges and Water Challenge Areas* at www.iwr.usace.army.mil/iwr/waterchallenges/Docs/National_Report.pdf and *Challenge: Recreation* at www.iwr.usace.army.mil/iwr/waterchallenges/Docs/FactRecreation.pdf.
 - 10 From Glenn E. Haas, *Visitor Capacity on Public Lands and Waters: Making Better Decisions*. 2002. A Report of the Federal Interagency Task Force on Visitor Capacity on Public Lands submitted to the Assistant Secretary for Fish and Wildlife and Parks, U.S. Dept. of the Interior, Washington, D.C.
 - 11 The 1996 *Guide* is no longer in print. However, readers interested in that edition, and in particular the planning process and methods described in it, may obtain a .pdf file at www.nasbla.org (National Association of State Boating Law Administrators).
 - 12 See pp. 29-50. *A Guide for Multiple Use Waterway Management*. 1st ed. 1996. National Water Safety Congress.
 - 13 Readers should be aware that there is no guarantee of the permanence of Internet sites or their contents. As more information and documents are added to sites, webmasters may change their original locations or move materials off of active pages and into "archives." In the event a document or other piece of information is not available at a stated Internet address, check the home or main page of the organization, agency or media in question.
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SECTION 1: TRENDS AND EMERGING ISSUES

What's shaping waterway uses, demands and conflicts?

"...As a greater percentage of the coastal land is developed, there will be a greater pressure on the undeveloped land and bay water resources. The pressures will be from conflicting directions, as some will want to develop it to provide access for the increasing populations, while others will want to keep things the way they are. Many management decisions will be made; some ... in complete ignorance of the realities of the boating situation, some ... with correct facts but wrong interpretation of what the facts mean, and many ... as 'emergency' reactions to trends that were never anticipated. The success stories will come from the managers who correctly anticipate future trends, are able to read the moods as well as the actual movements of the boating population, and work out solutions to problems before they become crises ..." — Researcher commenting on the future of recreational boating traffic monitoring¹

"...Waterways users and managers — both the public and private sectors — are increasingly concerned about safety, environmental protection, system efficiency, and effective management. Some of the factors that affect the capacity of waterways and channels include types and mix of vessels, access, and impacts on a variety of other users. Many ports and waterways are facing significant increases in commercial shipping, growth in passenger ferry operations, a trend towards much larger ships, growth in recreational uses, and numerous changes difficult to predict.... For these and many other reasons, a national perspective is needed concerning the capacity and condition of the U.S. waterway system to safely and efficiently handle projected growth and diverse uses. ..." — Testimony of chairperson of Marine Board Seminar on Waterway and Harbor Capacity to U.S. House committee²

A mixed bag of trends, issues and forces is shaping the context for planning and managing multiple activities on and along the public waterways.

Some of the trends and forces affecting multiple use waterways and their management

- Increasing, more intensive and in some areas, new uses of public waters;
- Continuing evolution in the kinds and combinations of watercraft and water contact activities;
- Relatively static surface acreage of the public waters;
- Rapid commercial and residential development along shorelines;
- Expanded boating seasons;
- Enhanced visibility and prominence of environmental issues;
- Increasing interest in the resource impacts associated with watercraft, water contact and shoreline development activities;
- Dramatic demographic and societal changes over the last few decades, and the everyday life style and leisure time changes showing up in outdoor recreation;
- Variations in water users' and craft operators' experience, skill levels, education, interests and even consideration for and understanding of other user groups;
- Varied attitudes and social perspectives about recreation, water resources and the environment in general;
- A changing regulatory environment; and the
- Increasingly strident involvement of citizens, stakeholders and various interest groups in public management and policy decisions.

In this section, we scan the data, research, expert forecasts, user group and industry advocacy, and even "conventional wisdom" — not only to create a composite picture, but also to learn what these different sources have to say about the roles that certain factors might be playing in the growth, diversity of demands, and conflicts on multiple use waterways.

Dramatic demographic and societal changes — *there's more of us and more variety in our lives*

At a 2001 national symposium on the future of recreational boating, participants were asked to look beyond trends that had obvious links to watercraft or safety — like numbers of boats or accident rates — to shifts in everyday life and work patterns.³

Like the fact that there are simply more people in the U.S., and more diverse people and households.

There is increasing differentiation in education, income, knowledge and values.

*There is increasing transportation gridlock, and there will be a point that **when** we do things will depend on **when** we can get there.*

There is a "mass" customization of work that is narrowing the gap between weekdays and weekends.

Among the speculations about what these and other changes might mean generally for the boating world, were several tip-offs about the future of water use, congestion, and even user conflict on multiple use waterways:

There could be more people using watercraft, and if there are, the users are likely to be more diverse.

There likely will be more variation in the knowledge and skill level of operators.

There could be more conflict concerning what constitutes appropriate watercraft behavior and etiquette.

Attitudes toward marine life, fishing and the protection of marine culture and the environment will vary more dramatically.

Watercraft likely will be used at more diverse times of the day or night, weekdays or weekends, cycles and times of the year.

Some would argue the future is already here.

Increasing, more intensive uses of public waters — *it seems like there's more of everything out there*

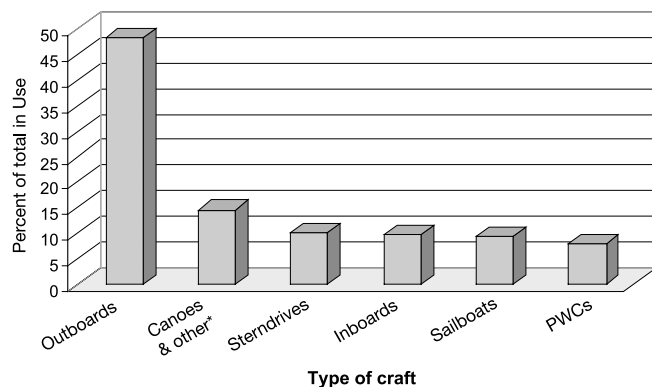
There *is* more of everything out there, from watercraft of various shapes and sizes to participants with different interests. But precisely how many, and how much growth there has been and will be well into the future can make for lively debate in planning and management circles.

Forty years ago, there were an estimated 2.5 million recreational boats nationwide. By the dawn of the new millennium, almost 12.8 million boats were registered in the states and territories.⁴ In the last 10 years alone, boat registrations have risen nearly 16 percent, though not uniformly as about 20 states account for nearly three-quarters of the registration total.

But that count represents *registered* craft. What happens to the national picture when estimates of other, non-registered craft, are factored in?

One definition of recreational "boat ownership" — combining numbers of registered and non-registered recreational watercraft, from motor boats to canoes — puts the national count at around 17.3 million,⁵ comprising, as one boating expert put it, "...America's largest fleet, dwarfing the total vessels in merchant shipping, commercial fishing, passenger traffic, the Navy, and the U.S. Coast Guard."⁶

THE "FLEET" OF RECREATIONAL BOATS



*Includes "miscellaneous" craft registered by the states and estimates of other canoes, rowboats and craft not registered.

Why such big numbers? Among the factors are the newer hull materials, efficiencies in boat manufacturing, and the employment of newer technologies that began driving down operating costs and, over time, changing the level of discretionary personal income needed for the average enthusiast to make the move to ownership.

But the ownership estimate *is* an estimate, and while the figures over time suggest growth — over the last 10 years, apparently a bit slower growth — the actual number of boats in *active* use nationwide remains a question.

If that is the case, then, what about national estimates of boating "participation," a bit broader concept than registration or ownership?

Participation, as evident as it may seem on a sunny weekend in July, is as difficult to gauge precisely as the national boat count. Based on which source is consulted, how participation is defined and measured, and who is doing the measuring, the conclusion alternately may be that boating participation is growing — dramatically or slightly depending on the type of watercraft — leveling off, or dropping a bit.

One set of boating industry estimates, for example, suggests "participation" may have wavered from a high mark of about 78.4 million in 1997 down to about 67.9 million in 2001 and possibly back up to around 71.6 million in 2002.⁷

On the other hand, the most recent National Survey on Recreation and the Environment 2000 estimates that "boating, floating and sailing" activities are enjoyed by an estimated 77.1 million participants, that is, over 36 percent of persons 16 years of age and older. The survey also estimates that nearly 52 million are motor boaters, and a large portion of the remainder partake in the faster growing segments of kayaking, canoeing and other popular "muscle-powered" activities.⁸

But even if we don't know precisely how many boaters and boats there are nationally, we do have a sense of *where* most boaters are doing their recreational boating in the U.S. A 1998 survey reported that nationally 59 percent of boaters go out on freshwater lakes and impoundments; 19 percent, on rivers and creeks; 11 percent, out along the coasts, and about four percent, on the Great Lakes.⁹ Those are interesting "big picture" averages.

But consider that those 59 percent of boaters are spread around on thousands of lakes across the country. Persuade the managers of activities on and around the Great Lakes of the significance of knowing that only four percent of recreational boaters are on their waters. Or Florida boaters that only 11 percent of their counterparts are on coastal waters.¹⁰ Or those on the Upper Mississippi River-Illinois Waterway System that somewhere around 19 percent are out on the rivers.

Especially when the craft on their waters — and those in and around many jurisdictions — aren't just recreational.¹¹ They are commercial fishing boats, naval vessels and a variety of craft making up commercial marine transportation.

All states east of the Mississippi River, and 41 states overall, are served by commercially navigable waterways.¹² Cargo traffic, tankers, tow and tug vessels, passenger cruise ships, passenger ferries and water taxis are out there with those millions of recreational craft. And while the *number* of big ships is not growing as rapidly as other craft, the amount of cargo is. That increased tonnage means larger and deeper ships on the waterways.¹³

Add to this the resurgence in many metropolitan areas of an interest in passenger water transportation. At most recent count, there were about 70 high-speed ferries operating in the U.S.,¹⁴ but with more crowded highways, the increase in waterfront real estate development in urban areas and the rehabilitation of obsolete or underused maritime facilities, the implementation of passenger ferry plans is expected to quicken.¹⁵ That is an attractive alternative to some, but a source of concern about safety, collision risk and environmental pollution to others.¹⁶

At least according to available aggregate numbers, then, there *are* more watercraft around today — maybe not all seaworthy and maybe not all out on the waters, but more of them. And in some areas, there are indicators of more intensive use of the waterways — though national averages alternately tend to mask or overlay the levels of intensity and fluctuations in use that often show up in state or local level boater studies.

But while there might not be firm agreement on those numbers and what they mean now and for the near future, even observation bears out assertions that the combinations of *what* and *who* is on and around the waterways are different than 10, 20 and certainly 40 years ago when the first large-scale outdoor recreation surveys were conducted.¹⁷

Recreational versus commercial navigation conflicts — how significant?

At least one study suggests that commercial and recreational navigation conflicts might not be as significant as once thought. The Upper Mississippi River-Illinois Waterway System Navigation Study took a look at the phenomenon of commercial shippers and recreational boaters using system locks in the passage between pools. The concerns were whether the conflicts encountered were significant; whether or not these conflicts caused or increased commercial delays; and whether or not the system could adequately accommodate both competing activities. The analysis was based on trends in the number of lockages, lockage delays and vessels locked.

The study found that

- The greatest number of commercial delays, total hours of delay and average hours per delay occurred at locks with the greatest concentration of commercial traffic, and generally the least relative recreational traffic;
- Lock sites with the greatest concentrations of recreational craft being locked experienced low levels of commercial delay. These sites also appeared to more efficiently lock recreational craft, as measured by average number of boats per lockage; and
- Based on data trends, correlation analysis, and recreational craft lockage capacity, it did not appear that there were significant conflicts between commercial and recreational users of the navigation system resulting in increased commercial delays.

The U.S. Army Corps of Engineers' Districts of Rock Island, St. Louis and St Paul conducted the UMR-IWW System Navigation Study under the authority of Section 216 of the Flood Control Act of 1970. The study scope was to examine the feasibility of navigation improvements to the river and waterway to reduce delays to commercial navigation traffic. It has since, however, refocused on environmentally sustainable development of the river system. These changes were made in consideration of a set of recommendations from the National Research Council and input from a federal agency task force.

Evolution in watercraft, combinations of activities ... and variations in water users and craft operators' experience, skill and consideration — *they're on, in and hovering above the water ... and some users may just be better at it than others*

Every few decades — perhaps more frequently now because of technological leaps — watercraft have pushed the limits of conventional design and capability, and maybe even the capability of potential users.

For the longest time, as one boating professional described, the "traditional boater" was someone who had a yacht, a small sailboat, a rowboat or a canoe.¹⁸ Often, their deliberate purpose for being out on the water was hunting, fishing, camping or some other related activity.

By the middle of the 20th century, the "traditional boater" included the owners of those boats, plus the cruiser in a wooden runabout or a fisherman in a small outboard motorboat. From the 1950s to the 1970s, fiberglass runabouts and water skiers were added to the mix.¹⁹ In the 1960s and 1970s, paddlers made their push into kayaks, and then whitewater rafts. Personal watercraft — known by assorted names, and capable of moving at greater speeds, through tighter areas and in shallower waters — were next on the scene, picking up participants to the tune of about 20 million, surpassing water skiing in popularity by the turn of the millennium.²⁰

So nowadays, it's not just outboards, inboards, sterndrives, and sailboats, and not just boaters out on the water to cruise, sail, fish, water-ski, swim and sunbathe. It's water users with sailboards, high-performance speedboats, hovercraft, airboats and flying boats built to operate on and fly above the

water surface. It's craft of varying shapes, sizes, speeds, conditions and sea worthiness.²¹ Add these to the muscle-powered boating and floating craft and the sum, depending on your perspective, either represents a wonderful array of recreational opportunity or an odd and incompatible combination.

It isn't likely to end here either. Technological innovation and the development of new materials are expected to transform boat design and production well into the future, and there are signs that the quest for something different in outdoor activities will continue.

"Traditional boating" and activities that boaters and other users might have pursued on or around the waters — like sunbathing, swimming, water-skiing and fishing — are showing evidence of only modest growth since the mid-1990s *relative* to other outdoor activities, and in the case of fishing, showing evidence of holding steady or declining in popularity.²²

What has been and what likely will continue growing in popularity, though, are opposing pursuits along the outdoor recreation spectrum — viewing and learning activities *and* risk adventure activities — both on land and on the waterways.²³ That combination invites the potential not only for even greater diversity of activities, but also for more ready-made incompatibilities among waterway users.²⁴

What, if anything, does this ongoing evolution in craft and activities signal for the safety of multiple use waterways and what might it foretell for the future? Although regulators and user and industry groups and advocates on all sides have been

Trends in water-based outdoor recreation participation

Covering more than 50 activities — from casual walking to mountain biking and scuba diving — the National Survey on Recreation and Environment (NSRE) 2000 surveyed nearly 58,000 people across the U.S. between July 1999 and July 2002. The most popular types of activities — with walking right up there at the top — likely owe their larger numbers to their relatively low cost and to the fact that they can be enjoyed with minimal physical exertion and no special equipment or skills requirements.

Nevertheless, water-based activities remain relatively popular. According to the weighted versions of the NSRE data, the most popular is motor boating with an estimated 51.8 million participants, or 24.3 percent of the population 16 and older. Associated with motor boating is water skiing, in which just over 17 million people participate. Jet skiing's popularity, according to the survey, has reached almost 20.3 million participants.

Wind-powered boating — including sail boarding and windsurfing — comes in at just over 11 million sailing and 1.7 million windsurfing. These activities likely are less popular than motorized forms because of the types of water bodies required or the relatively high amount of skill involved.

Of the muscle-powered boating and floating activities covered in the survey — canoeing, kayaking, rowing and floating or rafting — the first two are pulling in significant numbers. Over 20 million people are estimated to canoe, while 7.9 million kayak. A significant industry has developed to facilitate kayaking, rafting and other floating on whitewater or other fast-moving streams. The survey results suggest this form of recreation outfitting is growing rapidly as an estimated 20 million people float or raft.

According to the survey, of the estimated 72.2 million people in the U.S. who fish, nearly 62 million fish in fresh water — mostly lakes, reservoirs, large rivers and ponds. Another 22.2 million people fish in salt water, including oceans (from shore and by boat), ocean inlets and sounds, tidal estuaries, and inland saltwater lakes.

And of the 130.6 million people the survey indicates participate in some form of swimming activity, over 88 million spend some portion of their time away from the pools and into the streams, lakes, ponds and oceans. Just over 14 million are estimated to snorkel, and just under 4 million scuba dive one or more times over the course of a year. An estimated 87.2 million people visit beaches, while over 54 million visit other waterside areas.

From *Americans' Participation In Outdoor Recreation: Weighted Data Results From NSRE (National Survey on Recreation and the Environment) 2000*. Versions 1 to 13. U.S. Forest Service. See www.srs.fs.usda.gov/trends/NSRE/nsre2.html and www.srs.fs.usda.gov/trends/NSRE/Rnd1t13weightrpt.pdf.

taking different positions using the same data, the response probably is closer to a dissatisfying "no one really knows with full certainty."

Since 1990, according to U.S. Coast Guard statistics, there has been an overall decrease in actual numbers of boating fatalities by about 19 percent, down to a rate of 5.45 fatalities per 100,000 boats in the year 2001. More than 60 percent of the deaths are attributed to capsizing, falling overboard or flooding and swamping.²⁵

On the flip side, the total numbers of recreational boating accidents and injuries as reported to and recorded by the Coast Guard

have gone up. Despite peaks and valleys in the years since 1990, overall, the total number of accidents has increased nearly 21 percent, and the total number of injuries, nearly 14 percent.²⁶

Although certain types of accidents appear to be more predominant than others for specific types of craft — such as capsizing for canoes or collisions for open and cabin motorboats and personal watercraft — the vast majority of accidents, according to the Coast Guard, may be "operator controllable," not the result of craft, equipment or environmental factors.²⁷

There's a caveat, though. While the numbers of incidents reported have gone up, it's not entirely clear whether it's a "real" increase or an artificial jump that's the result of enhancements to reporting procedures. It's not even certain if the numbers are high or low enough because of inaccurate or insufficient reporting.²⁸

There's just not enough consistent, reliable and valid data to tell the full story yet. But in the late 1990s, there was at least one attempt to begin putting the questions about safety on the waterways into perspective by taking a look at exposure hours.

Risk is a factor of exposure to an activity, and until the 1998 National Recreational Boating Survey,²⁹ no one had an overall sense of how much time people were spending on — exposed to — different boating activities. The results suggested that during the survey year, boaters spent an aggregate 7.7 billion hours boating (nearly half those hours in open motorboats), and the operator's usage — at least for the boat they used most often — was an average 20 days a year, four hours per day. When the researchers used the 1998 exposure survey data and the 1998 U.S. Coast Guard statistics to calculate a fatality rate per million hours of operation, though, they revealed some interesting variations by type of watercraft, level of operator experience, and extent of boating education.³⁰

In the study, canoes and kayaks showed the highest fatality rates — double that of personal watercraft and almost four times higher than open motorboats; boaters with less than 100 hours of operating experience showed the highest fatality rates; and those with over 500 hours of experience or with boater education, didn't register significant fatality rates.

How many days spent on the water?

The 1998 National Recreational Boating Survey found that operators of larger boats tended to use them more often:

- Cabin motorboat operators averaged 24.8 days on board in 1998;
- Open motorboat operators - 22.9 days;
- Auxiliary sailboats - 19.8 days;
- Personal watercraft operators - 15 days; and
- Canoeists - 8 days

National Recreational Boating Survey. 1998. Thomas W. Mangione. JSI Research and Training Institute, Inc., Boston, for the U.S. Coast Guard. See survey summary, reformatted from BoatUS Magazine, November 2000, at www.apg.army.mil/SIBO/safexp1.htm.

Though not definitive, given differences in the use of personal flotation devices, communications equipment, and even the characteristics of waterways, the effort did represent a positive step toward figuring out the relationships between exposure of use and safety. For multiple use waterways visited by a range of watercraft and operators — some more, some less experienced — it puts the spotlight on yet another set of safety factors that has been and likely will continue testing their management.

One other thing the study suggested — and perhaps with more reliability — was that the operators of certain kinds of watercraft may just be more likely or able to spend more hours of more days on the waterways than others.

Whether that holds true in the future increasingly may depend on whether or not they can find an open space and an access point between the new developments along the waterfront.

The static surface acreage of the public waters and the booming development of commercial and residential activities along the shorelines — *there's only so much water ... only so many ways to get to it ... and these days, it might just be through someone's backyard*

Over the last few decades, and to a much greater degree since the 1990s, three phenomena have been converging to create what might be some of the most significant markers for congestion and escalating conflict on some multiple use waterways — not only among water users, but also between transient users and those who live and work nearby.

At least according to one estimate, the U.S. boasts more than 7.2 million acres of national rivers, lake shores, seashores and recreation areas; that figure doesn't even include state and locally-owned waters and properties.³¹ But the enormity of it and other estimates start to fade when the three factors — the increases in recreational and other water uses, the "finite" nature of the water resources themselves, and the migration to the waters' edge — are factored into the mix. The full effects might not be fully realized for quite some time, but already many waterways, coastal and inland, are being transformed into places and spaces nothing like their pasts.

And for some users and their craft, the available water surface acreage continues to shrink as a result of additional access restrictions, use rationing and other regulations.³²

While public officials and resource managers have been grappling with how to allocate and manage the space on the waters, in many areas of the country they've also been

Enhancing the federal lakes

There have been efforts to try to maximize the use of the water space already out there, especially for water-related recreation. A range of opportunities and concerns associated with the nearly 1,800 federal lakes hastened the work of a National Recreation Lakes Study Commission and its successor activities. The resulting Federal Lakes Recreation Demonstration Program and designation of 31 pilot lakes in 20 states was expected to offer a chance to share "lessons learned" with other federal recreation lake managers across the nation. But with no federal funding earmarked for the projects, thus far, and largely grassroots management improvement efforts to date, it might be some time before significant, widespread enhancements are realized.

For more information, see *Reservoirs of Opportunity*, the June 1999 Report of the National Recreation Lakes Study Commission. www.doi.gov/nrls/findings/final.html. See also the National Recreation Lakes Coalition www.recreationlakes.com.

figuring out how to cast their role in allocating activities — including waterway access points — along publicly owned waterfronts.³³ That doesn't make for an easy round of decision-making, especially when potentially lucrative commercial activities and more — and more demanding — residents are on the doorstep.³⁴

Since the 1950s, for reasons as diverse as increases in real personal income and advances in transportation technologies, "urban sprawl" has been on the rise.³⁵

What does that have to do with the waterways?

For one thing, recent research suggests that by the year 2025, sprawl — spreading out commercial and residential activities and transforming the land in the process — will consume about 5.8 million acres of coastal land that today is either agricultural or open space. That acreage is roughly the equivalent of the combined urban land areas

in the New York, Boston, Chicago, Los Angeles and San Francisco metropolitan regions.³⁶

On top of that are the real population shifts that have been creating more demands on the Atlantic and Gulf coastal areas.³⁷ What has been described as an "unprecedented influx of residents" — an estimated 41 million persons from a variety of other places around the country — is turning seasonal resort towns into year-round communities, with year-round demands and the prospect of year-round pressures on the waterways.³⁸ Add the inland residents with second homes near the shores, and the count goes up by several million.

To get some perspective, that means more than one in seven Americans live in a county adjacent to the eastern or southern seaboard. Analysts suggest that barring a major disruption in current demographic, economic and social trends, this accompanying growth pattern along the coasts is not likely to stop anytime soon.³⁹ Even in other parts of the country, though not in as dramatic fashion, the move is and likely will continue to be on to develop and live near the waters — inland lakes, rivers, reservoirs. The attraction to the water is that strong.

But for all of the attraction and benefits associated with this development, increasingly there have been unanticipated downsides, from significant strains on the infrastructure and environment of the towns, shorelines and waterways to growing tension between the residents and the water users themselves.

When the "boating season" doesn't end, and the tourists don't go home...

For decades, according to the USA Today analysis that took a closer look at the changing coastal populations, permanent Cape Cod residents "gathered on highway overpasses to wave goodbye — and good riddance — to hordes of summer visitors heading home in bumper-to-bumper Labor Day traffic." But increasingly, the tourists aren't leaving.

This once sparsely populated coastal resort for 10 months of the year has become a suburbanized extension of metropolitan Boston. In just five years, the year-round population increased 12 percent, and according to the analysis, growth is likely to continue given that a third of the Cape's land remains available for development.

Each day, on average, six new homes are built on the Cape. There have been increased incidents of well-water pollution from septic tanks, which serve 86 percent of the homes. Even the tidal Mashpee River has algae buildup created by increased run-off from the septic systems. Runoff from new roads and parking lots is being blamed for higher levels of contaminated water.

Some shellfishing areas have been restricted, in part because of coliform counts.

To the South, in Beaufort County, S.C., another area reaping the benefits and the detriments of rapid and explosive coastal growth, the transplants are coming from the East Coast, Midwest and Southeast, and its residences hold an appeal to people across the economic spectrum.

Since 1990, the county's population has grown 31 percent, three times the national average.

"People used to come Memorial Day and leave Labor Day. Now they're here to stay," sighed the owner of the general store in Bluffton, population 800, and surrounded by the growth. "It's sad. It's the end of an era. Our small town is gone."

From "Growth reshapes coasts." *USA TODAY* (on-line) 7/28/00. Owen Ullmann, Paul Overberg and Rick Hampson, www.usatoday.com.

Among the unexpected by-products of the fusion of increasing development and increasing user pressures on the waterways are disagreements and lawsuits over resource quality, user conflicts, landowner rights, easements and restrictions to public access to navigable waters — even when those additional access points potentially could redistribute use and reduce some of the congestion and conflict.⁴⁰

Varied attitudes and social perspectives about recreation and water resources — our individual and collective diversity is showing

Whether it's the newer landowners along the shorelines, the long-time residents, the newcomers to the waterways or the experienced operators, each has a different context for the experience of living, working or just being on the waterways. The reality doesn't always match up.

Researchers have been taking a closer look at the social and attitude adjustments that accompany development-related reductions in public access to the shorelines, the conversion of once pristine areas to residential and commercial uses, overcrowding, the competition for limited resources, and the deterioration of resource quality.⁴¹

The days of living without thought to the impact of actions are long gone. Whether by default or formal regulation, people increasingly are being restricted from using the water and shoreline resources in ways that otherwise would have been possible if the areas had remained underdeveloped and uninhabited.⁴²

And there is an unexpected twist: none of the affected groups — typically and simplistically labeled as "boaters" and

"property owners" and "environmentalists" — is likely to be satisfied with the restrictions and decisions for very long.

Instead, put simply, depending on where they "sit" on or along the waterways, they may be:

a) *Happy* to know that personal watercraft won't operate all hours of the weekend on the water out their back door, and paddlers with craft hoisted on their car roofs won't be driving alongside their property to get onto the water; *but unhappy* because the more development there is (the same development that brought them there), the less scenic the view out their back window — *their shoreline experience just isn't the same anymore.*

Or,

b) *Happy* to know that another type of watercraft user — who used to annoy them anyway — will no longer be adding to the numbers on the already crowded water; *but unhappy* because the more development there is, the less scenic the view, and the more likely it is that their craft will be next on the restricted list — *their boating experience just isn't the same anymore.*

Or,

c) *Happy* to know that watercraft are being restricted so that they won't damage the aquatic vegetation and pollute the waters; *but unhappy* because it was development of the shorelines that precipitated the restrictions in the first place — *their waterway just isn't the same anymore.*

To make things even more complicated, there's likely even some mix and match of sentiment, because the labels attributed to "boaters" or "property owners" or "environmentalists" aren't mutually exclusive.

Increasingly, and into the future, then, managers and planners of multiple use waterways face the prospect of peeling through layers of issues and concerns that have collapsed on each other, layers of incremental decisions, and layers of interests that have been organized in recent years to represent a spectrum of opinions on recreation, residential and commercial activity, the environment, and more.

And no set of issues has surged to the forefront and become entangled with more aspects of boating, water-related activities, and multiple use waterways themselves than

those multifaceted issues related to the environment.

Increased visibility and prominence of environmental issues and interests — *shaping the context of individual responsibility ... and the regulatory environment*

From the Marine Mammal and Endangered Species Protection Acts to the National Environmental Policy and Clean Water Acts; from wilderness, refuge and sanctuary designations to essential fish habitats and

PWCs — the compact craft that provokes a big reaction

The fodder of lawsuits, recent National Park Service decisions, and local ordinances and proposals intended to restrict or outright ban their operation, personal watercraft — and their operators — seem to elicit a spectrum of reactions from other recreational boaters, environmental interests, enforcement officers and resource managers, among others. And the relative scarcity of scientific data on the specific impacts of their use does not do much to help inform the debates and problem-solving about their role in multiple use conflicts, in accidents and other incidents, or in damage to the environment or the more intangible "quality of life" on or around the waterway.

But are the "clashes" between traditional recreational boaters and PWC operators really so unlike that of past "conflicts" that occurred when newer and different types of craft were introduced on the waterways?

The Recreational Boat Building Industry took a look at past outdoor recreation conflicts to see whether or not conflict reduction used in those cases might be applied in this updated scenario. For the most part, they found that the current conflicts parallel the conflicts that have arisen in the past. How so?

- They have been technology driven. Many recreational conflicts have involved newer more intrusive — noisy, faster, wider ranging, greater environmental impact — technologies;

- Many recreational conflicts of the past can be characterized as mechanized versus non-mechanized, and though it might be a bit of a stretch, since PWCs are so fast and intrusive compared to some other boats, the latter might almost be considered "non-mechanized" in comparison;
- The conflicting groups have tended to be of different ages and lifestyles. In current case, the average motor boater tends to be older, while PWC operators tend to be younger, and perhaps more tolerant of different lifestyles than older people. If nothing else, the stereotypes would suggest that PWC operators seek adventure and physically demanding recreation with strong social experiences, while more traditional recreational boaters tend to seek quieter, relaxing, nature oriented, non-physical leisure experiences;
- One group generally was well established before the other came along. In this updated case, traditional recreational boaters had the water to themselves for a long time. PWCs are a recent development on the "boaters' water"; and,
- And, as in other conflicts, there has never been unanimity of "annoyance." Some members of the "offended group" have not been and will not be offended. There are recreational boaters and shoreline residents who are tolerant of PWCs and their operators.

All of which suggests that PWCs and PWC operators are just some of the more recent in the evolutionary lineup of watercraft and "new" boaters on the waterways.

See *Discussion of the Boaters vs. PWCs Conflict Based on the Research Literature*. Recreational Boat Building Industry. See www.rbbi.com/white/conflict/discuss.htm, and *Personal Watercraft (PWC) Management Guide: a Comprehensive Reference Handbook*. July 2002. Shari Currey. Prepared for the Massachusetts Office of Coastal Zone Management and Massachusetts Bays National Estuary Program. www.state.ma.us/czm/pwcmgmtguide.htm.

everything in between — keeping up with the nuances of legislation and layers of regulations and designations to protect or redirect resources can be a challenge in itself.⁴³ Another challenge these days? Keeping track of the status and outcomes of litigation.

Conservation and protection issues have been a part of our often-contentious environmental history as a nation. And while the demand for and strains on resources may be unprecedented, the environmental concerns and clashes themselves are not as new as we might think.⁴⁴

Where we seem to be parting company from the past is in the volume and variety of special protections for a variety of resources and of formal groups advocating on behalf of those resources and interests; in the increasing reliance on lawsuits; and in more recent years, in the framing of a range of very significant waterways-related environmental issues in ways that have had the effect of squaring recreationists against recreationists, recreationists against shore residents, recreationists and tourists against government and industries, and — adding yet another dimension to the concept of conflict among users of the waterways — squaring recreationists, tourists and industry against manatees, waterfowl, submerged aquatic vegetation and other wildlife forms along and in the waterways.

And today, there often is more debate about *observations* of the impacts of recreational activity and boating on the waterways, shorelines and marine wildlife, waterfowl and vegetation, than there is scientific and causal evidence of the exact nature of those impacts, their cumulative effects, and the relative impacts of different types of craft and activities.⁴⁵

Endangered Species Act — from Endangered Rivers to Piping Plover habitat

The Endangered Species Act — its intent and application — has been at the center of controversies ranging from water levels to maintenance dredging.

In April 2002, American Rivers released its *America's Most Endangered Rivers Report*, with the Missouri River at the top of the list. Using a National Academy of Science (NAS) report of the Missouri River as the backdrop, the American Rivers report pointed to NAS findings that indicated "dam operations — with steady navigation flows 'counter to established river science' — had cost the region 'nearly one million recreation-based days of hunting, fishing, sightseeing, and boating annually' for the benefit of 'just a handful of barges on the lower river.'" The American Rivers assessment ended with a plea for the Corps — and a plea to the U.S. Congress — to select the "flexible flow" alternative in its environmental impact statement and in doing so, satisfy its obligations to the Endangered Species Act.

In another incident, the Gulf Intracoastal Canal Association (GICA), originally organized in 1905 to promote the idea of a single channel that would connect all major Gulf coast ports, listed among its initiatives, "defending the (Gulf Intracoastal) waterway from 'misguided' attempts to apply the Endangered Species Act on several fronts."

More specifically, it was referring to Louisiana's Coast 2050 Program, along with the U.S. Fish and Wildlife Service's proposal to designate thousands of acres of Gulf Coast wetlands as critical Piping Plover habitat, thereby threatening the "viability of the waterway." "Left unanswered," GICA argued, "these initiatives have the power to stop all maintenance dredging on the waterway."

Why? One reason is that sorting through and pinpointing the effects or the severity of effects of watercraft and water contact activities from those of other possible sources calls for longer-term and more consistent monitoring.⁴⁶ Despite the fact that the outcomes of such monitoring might thwart the need for repeated amendments to actions taken in the absence of complete information, the

long-term process flies in the face of what has increasingly become a national, perhaps even media-driven, "need to know ... now" orientation.

And whether perceived as "good" or "flawed," this combination of available information and arguments — based on rhetoric, science, observation, research, speculation and everything in between — has contributed to the content of decision- and policy-making in recent years. The outcomes will continue to affect how and to what extent multiple use waterways are managed well into the future.

EPA 2006 emission standards

As much a "multiple use" waterway conflict as two boaters vying for the same spot of water, the "clashes" between polluting, inefficient, noisy watercraft and the perceived and real quality of the boating and resource experience have spawned regulatory and behavioral shifts in recent years.

When the Environmental Protection Agency issued a rule revising the Clean Air Act of 1990 and setting a 2006 deadline to reduce hydrocarbon emissions from spark ignition marine outboards and personal watercraft engines by 75 percent, perhaps few would have predicted that the marine industry could meet the compliance schedule. But part of the way into the nine-year phase-in program — which began with the 1998 model year and was intended to become progressively tighter each year through 2006 — engine manufacturers are priding themselves on meeting and even exceeding the requirement with the development of new four-stroke and direct-injection two-stroke engines. And though the less efficient and less clean pre-1997 marine engines remain "legal" on the waters,¹ the push is on to get the older equipment into "early retirement," not only through aggressive technological improvements, but also industry marketing and even state-level consumer education efforts.

For the language of the EPA final rule, see www.epa.gov/fedrgstr/EPA-AIR/1997/August/Day-07/a20821.htm.

¹ All waters except Lake Tahoe and specific reservoirs in California.

At the beginning of this section, the opening quote speaks to the management "*success stories*" that will come from those who "*correctly anticipate*" trends and "work out solutions to problems before they become crises." But even then, as the second quote suggests, there will still be those "*numerous changes difficult to predict.*"

"... The greatest threat along the river is from a small vessel loaded with explosives that could be detonated near an oil tanker or a cruise ship..."

— Remarks of a U.S. Senator at a hearing conducted in New Orleans early in 2002 ⁴⁷

Whatever definitions we had for *safety* and *security* and even *conflict* on the waterways took on entirely new dimensions and reexamination after the horrific national events of September 11, 2001.⁴⁸

With impacts ranging from minor inconvenience to severe restriction, a series of actions and alerts have added to the already-complex operations and management of some multiple use waterways.

Existing security zones⁴⁹ have been modified and expanded to safeguard naval vessels and other waterside facilities and to prevent recreational and commercial watercraft from interfering with military operations. For the first time since World War II, and continuing as of this writing, 100-yard security zones are in effect around all U.S. naval vessels.⁵⁰

Recreational boaters have been called upon to report suspicious activity and serve as extra eyes to the U.S. Coast Guard, now housed in a recently created Department of Homeland Security and remaining on a heightened state of alert and patrol. And as of this writing, in some parts of the country,

boaters entering municipal water supply reservoirs that double as recreation areas have to get used to the possibility that their vessels may be inspected upon entry to the waterway.⁵¹

A different world since 9-11, making for those *"numerous changes difficult to predict."*

All the more reason for the managers, planners and regulators of multiple use waterways to prepare for continuous observation, learning and adaptation.⁵²

- 1 From Paul W. Box, *Bottom-Up Simulation for Evaluation of Recreational Boat Traffic Monitoring*. 1997. Dissertation. University of Florida. See www.gis.usu.edu/~sanduku/public_html/dissertation/outline/node1.html.
- 2 From the testimony of Rodney Gregory, Chair of the Marine Board Seminar on Waterway and Harbor Capacity, to the U.S. House Committee on Transportation and Infrastructure, Subcommittee on Coast Guard and Maritime Transportation Oversight Hearing on Port and Maritime Congestion, May 23, 2001. The Marine Board of the National Research Council's Transportation Research Board conducted the seminar on April, 23, 2001, Washington, D.C. For Gregory's testimony, see www.nas.edu/trb/publications/MarineBoard/2001Waterway&Harbor/GregoryTestimony.pdf.
- 3 From remarks by Geoffrey Godbey, The Pennsylvania State University, at *The Futures Forum on Recreational Boating Highlights*. April 1-3, 2001, St. Petersburg, Fla. Sponsored by the National Association of State Boating Law Administrators (NASBLA), and produced under a grant from the Aquatic Resources (Wallop-Breaux) Trust Fund administered by the U.S. Coast Guard. See www.nasbla.org/pdf/Forum_Highlights.pdf.
- 4 Calculated from *Boating 2002, State Recreational Boat Registrations* (using state figures compiled and provided by the U.S. Coast Guard), National Marine Manufacturers Association (NMMA) Facts & Figures, online, www.nmma.org/facts. While these figures suggest a 429 percent increase over time, caution must be exercised in using registration counts as a sole point of reference. There are many small, non-powered craft that are not required to be registered by the states or are not registered by owners; those non-registered craft include large categories such as canoes and utility boats.
- 5 Calculated from *Boating 2002, 2002 Population Estimates*, National Marine Manufacturers Association (NMMA) Facts & Figures, online at www.nmma.org/facts. Just over 48 percent of the estimated 17.3 million boats owned are outboard motor boats, according to industry figures. Sterndrives represent about 10 percent; inboards, 9.8 percent of the total; sailboats, 9.3 percent; and personal watercraft, 7.8 percent. "Miscellaneous" and "other" craft — that is, canoes, rowboats, dinghies, and others, whether registered or not by the states — account for a large portion of the total. They represent about 14.6 percent.
- 6 "A Profile Of Recreational Boating In The United States." 1999. Ryck Lydecker and Margaret Podlich. From *Proceedings of a Workshop*, January 22, 1999, Washington, D.C. in *Trends and Future Challenges for U.S. National Ocean and Coastal Policy*. August 1999. Cicin-Sain, B., R. W. Knecht, and N. Foster, eds. Center for the Study of Marine Policy, University of Delaware. See www.nos.noaa.gov/Products/retiredsites/natdia_pdf/14boatus.pdf.
- 7 Calculated from *Boating 2001, 2001 Population Estimates*, and *Boating 2002, 2002 Population Estimates*, National Marine Manufacturers Association (NMMA) Facts & Figures, online, www.nmma.org/facts.
- 8 See the "The National Survey on Recreation and the Environment 2000," U.S. Forest Service, at www.srs.fs.usda.gov/trends/Nsre/Rnd1t13weightrpt.pdf.
- 9 *National Recreational Boating Survey*. 1998. Thomas W. Mangione. JSI Research and Training Institute, Inc., Boston, for the U.S. Coast Guard. See survey summary, reformatted from *BoatUS Magazine*, November 2000, at www.apg.army.mil/SIBO/safexp1.htm.
- 10 In just one example of the importance of distinguishing local activity from national boating averages, a study on southwest Florida boating activity reported that while there had been a 100 percent increase in the number of registered recreational boats nationwide in the period 1973 to 1989, there had been a 300 percent increase in the state's southwest coastal counties during the same period. See Gustavo Antonini and Paul Box, *A regional waterway systems management strategy for southwest Florida*. 1996. Technical Report TP-83, Florida Sea Grant College Program, University of Florida, Gainesville. As reported in Box, *Bottom-Up Simulation for Evaluation of Recreational Boat Traffic Monitoring*.
- 11 For information on the Marine Transportation System, and "Vision 2020," an initiative to develop a common vision of the future of the MTS, see www.dot.gov/mts. For a PowerPoint briefing on the MTS, see [www.dot.gov/mts/document/Brief for D8 CO Conf – Nov 00.ppt](http://www.dot.gov/mts/document/Brief%20for%20D8%20CO%20Conf%20-%20Nov%2000.ppt)
- 12 From *Navigation – Waterways Facts*. U.S. Army Corps of Engineers. See <http://education.wes.army.mil/navigation/waterwy.html>.
- 13 *Marine Board (of the National Research Council's Transportation Research Board) Seminar on Waterway and Harbor Capacity*, April 23, 2001. Washington, D.C. See Introduction, www.nas.edu/trb/publications/MarineBoard/2001Waterways&Harbor/Introduction.pdf See Transcripts, [www.nas.edu/trb/publications/MarineBoard/2001Waterway&Harbor/Transcript 1.pdf](http://www.nas.edu/trb/publications/MarineBoard/2001Waterway&Harbor/Transcript%201.pdf) and [www.nas.edu/trb/publications/MarineBoard/2001Waterway&Harbor/Transcript 2.pdf](http://www.nas.edu/trb/publications/MarineBoard/2001Waterway&Harbor/Transcript%202.pdf). See Testimony of Rodney Gregory (Seminar Chair), House Committee on Transportation and Infrastructure, Subcommittee on Coast Guard and Maritime Transportation Oversight Hearing on Port and Maritime Congestion, May 23, 2001. www.nas.edu/trb/publications/MarineBoard/2001Waterway&Harbor/GregoryTestimony.pdf
- 14 From Lt. Alan L. Blume, Office of Vessel Traffic Management, U.S. Coast Guard Headquarters, "Waterway Management and the Operation of High-Speed Ferries. 2001." *Marine Log Ferries Conference on TEA-21 Funding for Ferries and Terminals*, Orlando, Fla., Nov. 2001. See [www.uscg.mil/hq/g-m/mw/documents/wwm and operation of HS Vsls.pdf](http://www.uscg.mil/hq/g-m/mw/documents/wwm%20and%20operation%20of%20HS%20Vsls.pdf)
- 15 *Narragansett Bay Summit 2000 (April 24-25, 2000, Providence, R.I.), Reports and Recommendations*. "White Paper Commercial Marine Transportation On Narragansett Bay: Status, Trends & Issues," see www.nbep.org/summit/pdf/marinetrans.pdf. "Marine Recreation and Tourism in Narragansett Bay: Critical Values and Concerns," see www.nbep.org/summit/pdf/rectour.pdf. "Summit Recommendations," see www.nbep.org/summit/pdf/rep2000.pdf.
- 16 For more on the concerns associated with operating these vessels at higher speeds, see Blume, "Waterway Management and the Operation of High-Speed Ferries."

For example, according to Blume, two nautical miles is a probable range at which the operator of a high-speed vessel is likely to detect and monitor small commercial and recreational vessels. Many commercial vessels, including most high-speed ones, are fitted with an automatic radar plotting aid (ARPA). However, the operator of a vessel fitted with an ARPA unit cannot rely exclusively on it to track other vessels, such as sea kayaks or other small recreational vessels that might only be detected and tracked under certain favorable conditions. Most high-speed vessels in the U.S. currently operate at speeds between 30 and 40 knots, and the vessels that will most likely be overtaken within three minutes or less will probably be smaller commercial vessels and a significant portion of the recreational fleet.

For commentary on the prospects of pollution and other environmental concerns, see *Fast Ferries: Clean Water Transit or More Dirty Diesel?* See www.bluewaternetnetwork.org/campaign_ss_ferries.shtml. For information from the High Speed Ferry Task Force of Long Island Sound, formed to discuss and resolve safety and environmental issues in that area, see www.fastferryinfo.org.

- 17 Begun in 1960 by the congressionally-created Outdoor Recreation Resources Review Commission, the first National Recreation Survey was a four-season, in-the-home survey of outdoor recreation participation in the U.S. Since that time, five additional surveys have been conducted in 1965, 1970, 1972, 1977, and 1982-83, and two National Surveys on Recreation and the Environment in 1994-95 and 2000-2001. See www.srs.fs.usda.gov/trends/Nsre/nsre2.html.
- 18 From Jeffrey Hoedt, "Recreational Boating – Are the Waters Too Crowded?" Report prepared for the 1999 Congress on Recreation and Resource Capacity, Aspen, Colo., November/December 1999.
- 19 *Ibid.*
- 20 See the "The National Survey on Recreation and the Environment 2000," U.S. Forest Service, at www.srs.fs.usda.gov/trends/Nsre/Rnd1t13weightrpt.pdf.
- 21 For an extreme example of "varying" sea worthiness, see the unusual case of a "dock-turned-boat" — an effort by one Connecticut family with a deeded right of way on an inland lake to be free of their town's zoning regulations by transforming their dock into a "boat," complete with temporary boating registration. See Jennifer A. Peyton, "A floating disagreement," *Waterbury Republican-American*, Sunday, Jan. 5, 2003 at www.rep-am.com.
- 22 See especially, *Participation in Boating and Fishing: A Literature Review—Executive Summary and Full Report*. September 2000. Anthony J. Fedler. Human Dimensions Consulting, Gainesville, Fla., for the Recreational Boating and Fishing Foundation. See www.rbff.org/research/ExecSumm-LitReview.pdf (Executive Summary) and www.rbff.org/research/Lit-Review-Final.pdf (Full Report); and *Factors Related to Recreational Boating Participation in the U.S.: A Review of the Literature Final Report*. August 16, 2000. Responsive Management, Inc., Harrisonburg, Va., for the National Association of State Boating Law Administrators. See www.nasbla.org/pdf/Boating_Participation_report.pdf.
- 23 See remarks of Ken Cordell, U.S. Forest Service, on "The National Survey on Recreation and the Environment 2000," from the *Futures Forum on Recreational Boating Highlights*. April 1-3, 2001, St. Petersburg, Fla. Sponsored by the National Association of State Boating Law Administrators (NASBLA), and produced under a grant from the Aquatic Resources (Wallop-Breaux) Trust Fund administered by the U.S. Coast Guard. See www.nasbla.org/pdf/Forum_Highlights.pdf.
- 24 According to Cordell, the National Survey on Recreation and the Environment 2000 and preceding recreation surveys even show very different demographic and socioeconomic "footprints" of traditional boaters. See "The National Survey on Recreation and the Environment 2000," from the *Futures Forum on Recreational Boating Highlights*. See www.nasbla.org/pdf/Forum_Highlights.pdf.
- 25 See *U.S. Coast Guard Recreational Boating Accident Report Database and Recreational Boating Statistics* for given years. See www.uscgboating.org/stats.htm; and *Factors Related to Recreational Boating Participation in the United States*. August 16, 2000. Responsive Management, Harrisonburg, Va. See www.nasbla.org/pdf/Boating_Participation_report.pdf.
- 26 *Ibid.*
- 27 From "2000 Recreational Boating Statistics, Accidents by Boat Type," in *Resources and Statistics, 2002 North American Safe Boating Campaign*. See www.art4use.com/o2statistics/o2statbook.pdf.
- 28 See Hoedt, "Recreational Boating – Are the Waters Too Crowded?"; and Shari Currey, *Personal Watercraft (PWC) Management Guide: a Comprehensive Reference Handbook*. July 2002. Prepared for Massachusetts Office of Coastal Zone Management and Massachusetts Bays National Estuary Program. See www.state.ma.us/czm/pwcmgntguide.htm.
- 29 From Thomas W. Mangione, *National Recreational Boating Survey*. 1998. Conducted by JSI Research and Training Institute, Inc., Boston, for the U.S. Coast Guard. See survey summary, reformatted from *BoatUS Magazine*, November 2000, at www.apg.army.mil/SIBO/safexp1.htm.

Boat owners, operators and renters in 46 states and the U.S. Virgin Islands were surveyed about their boating experiences in 1998. The survey had an 80 percent response rate out of a total sample of 36,000.
- 30 *Ibid.* To get the number of fatalities per million hours of boating, the results were compared to the 1998 U.S. Coast Guard boating fatality statistics.
- 31 From Mary Bielen, et. al., *Providing Public Access in Coastal Areas: Options for Landowners*. 1996. A fact sheet produced by the Great Lakes Sea Grant Network, Coastal Land Use Committee. See www.cce.cornell.edu/seagrant/tourism/publicaccessfs.html.
- 32 Despite the amount of recent publicity on personal watercraft, the users of those craft are not the only ones affected by restrictions. The demand for river recreation floating opportunities has caused river managers to limit and ration use. At last count, about 19 popular river segments in the western U.S. had rationed use limits in place, most for more than 20 years. See more in session paper abstract, "Comparison of Strategies for Rationing and Managing use on Selected Western

Rivers in the United States in 1986 and 1998." *1999 Congress On Recreation And Resource Capacity Book Of Abstracts*. Susan Scott Lundquist and Glenn E. Haas, Compilers. Nov. 29 – Dec. 2, 1999, Aspen, Colo. Hosted by The Human Dimension in Natural Resources Unit, College of Natural Resources, Colorado State University, Fort Collins, Colo. See www.cnr.colostate.edu/nrrt/capacity.

- 33 See for example, "Marine Recreation and Tourism in Narragansett Bay: Critical Values and Concerns," *Narragansett Bay Summit 2000* (April 24-25, 2000, Providence, R.I.), *Reports and Recommendations*. See www.nbep.org/summit/pdf/rectour.pdf.
- 34 Competing demands for use of the shoreline and the increasing value of waterfront property have displaced many traditional waterfront activities. State and local governments have responded with innovative policies and techniques to preserve water-dependent uses and traditional working waterfronts. Today, state and local policies that give preference to water-dependent uses cover 97 percent of the U.S. shoreline. See "Preserving Waterfronts for Water Dependent Uses," Kenneth Walker and Matt Arnn. In NOAA's *State of the Coast Report 1998*. Silver Spring, Md.: National Oceanic and Atmospheric Administration. See http://oceanservice.noaa.gov/websites/retiredsites/sotc_pdf/wdu.pdf.
- 35 From "Coastal Urban Sprawl Projected to Consume 5.8 Million Acres in Next 25 Years." 12-07-00. Illinois-Indiana Sea Grant College Program. See www.seagrantsnews.org. Researcher Daniel McGrath, Coastal Business and Environmental Specialist for Illinois-Indiana Sea Grant and a Fellow at the University of Illinois at Chicago's Great Cities Institute, has been studying the urban sprawl patterns of the top 20 coastal metropolitan regions ranked by population. Using population statistics from the 1990 U.S. Census and urban land area data from the past five decades, McGrath arrived at his forecast for the year 2025.
- 36 *Ibid.*
- 37 From Owen Ullmann, Paul Overberg and Rick Hampson, "Growth reshapes coasts." *USA TODAY* (on-line), 7/28/00., www.usatoday.com.
- 38 *Ibid.* According to the *USA Today* analysis, the West Coast has not experienced the same recent mass migration, because its beaches and bluffs are more protected from potential development. Climate also is a factor. Unlike the north-flowing Gulf Stream, which tempers surf temperatures along the East Coast, the south-flowing California current isn't quite as warm.
- 39 It may have to slow at some point, however. The expectation has been that as America's 78 million baby boomers age, they are going to look for more pleasant surroundings to spend their retirement years. Until the years 2001-2002, boomers were expected to have the financial resources to fulfill their retirement hopes. But a lengthy period of economic and stock market downturns that have put personal financial retirement plans in jeopardy may modify at least some of the earlier trend line projections.
- 40 See the examples in "Recreational Boating Carrying Capacity: A Framework for Managing Inland Lakes: Proceedings of a Workshop," August 23, 1995. 1996. Edward M. Mahoney and Daniel J. Stynes. Sponsored by Michigan Boating Industries Association and the Department of Park, Recreation and Tourism Resources, Michigan State University. See

www.msu.edu/course/prr/879/spring2000/boatrcc.doc

- 41 See Box, *Bottom-Up Simulation for Evaluation of Recreational Boat Traffic Monitoring*, and examples of attitude changes among recreational users of Florida's coastal environments documented in Gustavo Antonini and Paul Box, *A regional waterway systems management strategy for southwest Florida*. 1996. Technical Report TP-83, Florida Sea Grant College Program, University of Florida, Gainesville; Gustavo Antonini and Charles Sidman, *Feasibility of a non-regulatory approach to bay water management*. 1994. Technical Report 74, Florida Sea Grant College Program, University of Florida, Gainesville; and Gustavo Antonini, et.al. *Boat live-aboards in the Florida Keys: A new factor in waterfront development*. 1990. Technical Report SGR-98, Florida Sea Grant College Program, University of Florida, Gainesville.
- 42 See Box, *Bottom-Up Simulation for Evaluation of Recreational Boat Traffic Monitoring*.
- 43 For just one example of how environmental designations might be used or interpreted in ways unintended or unexpected, see "Apostle Island Proposal would limit boating," *Boating Industry International Online*, 7/26/2002, www.boating-industry.com. The U.S. National Park Service (NPS) sought public comment as part of an ongoing wilderness study for Apostle Islands National Lakeshore. According to a press release issued by a group called the All Volunteer Yacht Club (AVYC), environmental groups seeking restrictions on motorboat access in the Lake Superior, Wisconsin area had submitted most of the response to the alternative development phase. The AVYC argued that while the Park Service was maintaining that a wilderness designation would not infringe on motorboat access to the islands as the waters of Lake Superior were not included in the area under consideration, the designation had the potential to 'severely restrict where docks are located' and 'prohibit the development of new docks and visitor use facilities, in effect limiting power/sail boat access' since much of the shoreline is shallow, rocky and exposed to the elements. The Park Service has maintained that existing docks will not have to be removed if a wilderness designation is made because they extend out into the lake and rest on state-owned submerged land. Both the AVYC and the Park Service, however, do seem to agree that any goal of a sailboat- or motorboat-free Lakeshore is not entirely feasible as the NPS jurisdiction only extends a quarter of a mile from shore.
- 44 From the plenary remarks of Professor Louis Warren, University of California-Davis, on U.S. environmental history at the *1999 Congress On Recreation And Resource Capacity*, Nov. 29 – Dec. 2, 1999, Aspen, Colo. Hosted by The Human Dimension in Natural Resources Unit, College of Natural Resources, Colorado State University, Fort Collins, Colo. See *Book Of Abstracts*. Susan Scott Lundquist and Glenn E. Haas, Compilers. www.cnr.colostate.edu/nrrt/capacity.
- 45 For more detail, see references in Section 4. References and Resources: A starting point for exploration, in this *Guide*. Also, see Shari Currey, *Personal Watercraft (PWC) Management Guide: a Comprehensive Reference Handbook*. July 2002. Prepared for Massachusetts Office of Coastal Zone Management and Massachusetts Bays National Estuary Program. See www.state.ma.us/czm/pwcmgntguide.htm. See especially pages 15-47 for discussion, and pages 40-47 for more references on noise, marine engine emissions, wildlife, and submerged aquatic vegetation.

- 46 *Ibid.* For more detail, see references in Section 4. References and Resources: A starting point for exploration.
- 47 Remarks attributed to U.S. Senator John Breaux, D-La., chairman of the Senate Surface Transportation and Merchant Marine Subcommittee at a hearing in New Orleans, La., and included in a presentation by Joan M. Bondareff, "Boating in an Insecure World: Recreational Boating's Role in Port & Harbor Security," at the *International Boating and Water Safety Summit, April 30, 2002*, Daytona Beach, Fla. Originally reported in "Plugging Security Gaps," Bill Hensel, Jr., January 21, 2002, *JoC (The Journal of Commerce) Week*. See www.joc.com/jocweek.
- 48 Even before the terrorist attacks on the World Trade Center and the Pentagon, the U.S. Navy had been reviewing all aspects of its anti-terrorism and force protection posture in response to the earlier attack on the USS COLE.
- 49 **Security zones**, established under the Magnuson Act (50 USC 191), are intended to protect ports against sabotage or subversive acts. They can be permanent or temporary, over land or water, and can move. **Safety zones**, established under the Ports and Waterways Safety Act (33 USC 1221) for safety or environmental purposes, can be permanent or temporary, over water or land, and the zone can move.
- 50 Boats must operate at minimum speed within 500 yards of any naval vessel. If a boat needs to pass within 100 yards in order to ensure safe passage in accord with the Navigation Rules of the Road, the operator must contact the vessel on VHF-FM channel 16. Violations are more than serious, with charges as a felony offense, punishable by up to six years in prison and/or up to \$250,000 in fines.
- Also as of this writing, the Coast Guard remains on heightened state of alert at over 361 major ports, and continues to escort cruise ships in Miami, Honolulu, New Orleans, Hampton Roads, Los Angeles and San Diego.
- 51 For example, the San Diego City Lakes Program website, warns boaters that "due to increased security measures, vessels may be inspected as a requirement for entry into the lakes. For more information on the program, see www.sannet.gov/water/recreation/index.shtml.
- 52 See discussion on pages 3-5 of this *Guide* and in Glenn E. Haas, *Visitor Capacity on Public Lands and Waters: Making Better Decisions*. 2002. A Report of the Federal Interagency Task Force on Visitor Capacity on Public Lands submitted to the Assistant Secretary for Fish and Wildlife and Parks, U.S. Dept. of the Interior, Washington, D.C.

SECTION 2: DEVELOPING PLANS AND SOLUTIONS FOR MULTIPLE USE WATERWAY ISSUES AND CONFLICTS

Things to consider ... even if you don't want to

"Most solution-finding exercises fail because people do not properly identify what they don't like and why it's happening. That is, they don't properly define the problem and show what is causing it. ... you may think you already know what the problem is, what is causing it, and therefore how a [restriction] will be the answer. Perhaps you think the problem is that there are too many boats on your lake and that there are no rules to stop them from traveling too fast, too often, or too close to shore. But that's not the problem. It is merely a symptom of what might be a problem. ..." — Canadian regulatory process expert in the local authorities guide on Boating Restrictions¹

"... [T]hey don't properly define the problem and show what is causing it. ..." That's one of the potential hazards of taking shortcuts in planning and decision-making.

Even if you don't take shortcuts, though, there are plenty of other things that can complicate the problem identification, problem solving and management activities associated with multiple use waterways.

Like the implications of those broad trends, issues and forces touched upon in the previous section, or the unique circumstances of a waterway and its surroundings.

In this section, we offer some things to mull over along the way to developing viable, credible and defensible multiple use management strategies, plans and resolutions.

Some are fundamental in any efforts to identify issues, analyze and solve problems, balance interests or resolve conflict. Some are based on simple but timely "lessons worth learning," "reminders" and "things to be aware of," offered by resource managers,

planners, regulators and other waterway stakeholders. Some, read at a comfortable distance from the epicenter of a conflict, might seem "obvious."

Sometimes, we just overlook them.

Shorthand reminders for planning and decision making...

- Bring waterway stakeholders from other agencies and organizations "to the table" early on and allow them to reveal their different, perhaps disconnected or conflicting agendas, objectives and priorities.
- Make an effort to gather and understand the views of the "general public."
- Decide and state upfront what you want to accomplish in your planning activities ... and what you and other stakeholders want to achieve for the future of the waterway.
- Create indicators that can be measured and monitored over time to determine whether your strategies are bringing those hoped-for conditions closer to reality.
- Factor in the broader regional or systemic impact of your decisions when you are considering management changes.
- Pay attention to the layers of jurisdiction over your waterway and shorelines, and the complex regulatory and policy frameworks that could affect your plans and actions.
- Develop explicit decision criteria that factor in everything from the degree to which a management decision is backed by science to how a decision might affect the integrity of the recreational experience or the environment.
- Get a better handle on the perceptions of parties affected by waterway management decisions in order to improve your information gathering, participation, communication and implementation approaches.
- Learn to use data and information appropriately in your planning, management and monitoring activities.
- Become well informed about what's happening in other places, but set management priorities based on your understanding of your users and the features of your waterway.

So, what are you planning?

Slide out of crisis mode, start looking ahead ... and be prepared to work with what you discover

The first edition of the **Guide** put the spotlight on the "how-to's" and benefits associated with responsible multiple use waterway management planning at a time when there was little else in the way of guidance for developing these sorts of plans.²

Today there's more planning advice and a lot more activity that has assumed the "planning" label.

Over time, strategic and management and other kinds of planning processes gravitated from the private into the public sector for application in all sorts of functional areas.

After a bit of trial and error, though, it became increasingly clear that some planning components and activities would have to be rearranged or tweaked to accommodate the often-unique circumstances of planning for public matters, including public multiple use waterways. Like the fact that legislation may not only dictate that you *have* a management plan before you take action, but also *how* you develop and conduct it.

Nevertheless, some things about planning just seem to transcend sectors.³

Things like how difficult it can be to generate widespread interest in initiating a methodical, time-consuming planning process when there's no crisis to propel it. Or how it can be even more difficult to maintain a high level of interest in pushing plans toward implementation and monitoring and evaluation. Or how hard it

Some principles that can guide waterways management planning

"Community" support and understanding

- For the plan to be relevant and accepted, the community should be involved in decisions about the vision, objectives and strategies for management.
- Involve the community in decisions about trade-offs between short- and long-term management objectives (for example, short-term economic gain versus long-term environmental sustainability).

Gain the best-available understanding of the waterway system

- Having an understanding of the system will facilitate and inform decision making and planning.
- For true long-term sustainability, a multidisciplinary approach encompassing a broad range of biological, physical and socioeconomic views is essential.
- Recognize the knowledge gaps that may prevent attainment of the most effective management of the waterway.

Work with the system

- Plan management options within appropriate spatial and temporal scales.
- When information or understanding is limited, adopt a conservative management approach.

Consistency with other plans and strategies

- The waterway management plan should acknowledge and as much as possible be consistent with existing management strategies.

Evaluate past management decisions

- The waterway management plan should learn from and build upon what has gone before.

Consider legislation, regulations and policy

- Objectives and strategies within a plan should be in accord with state and federal laws, regulations and policies.

Be internally consistent

- Objectives and strategies should not conflict with one another; otherwise implementation of the plan will be difficult, if not impossible.
- Each objective or strategy needs to mesh with the others so that the plan works as an integrated whole to achieve the vision.

Consider social, cultural and scientific requirements

- Objectives and strategies need to be understood and accepted by the community, and need to be technically and scientifically correct and achievable.
- Where an issue is highly contentious, or where there is scientific uncertainty, a process of facilitation and negotiation may be required.

Adapted from *Planning for Waterways Management: An Overview*. Water and Rivers Commission Waterways WA (Western Australia) Program. April 2001. See www.wrc.wa.gov.au/public/RiverRestoration/publications/rr11/.

can be to convince participants — after they've just spent months pulling together *the* planning document — that planning is an ongoing process.

In the world of multiple use waterways, management plans and studies may not even be initiated until someone notices that the waterway's uses or traffic or quality or conflicts are somehow different than before. By the time complaints and concerns are raised about the nature of that use, the kinds of watercraft, the users' behaviors, safety, and the possible environmental and other impacts, there's not much left to do but react.

There might not even be baseline data to make comparisons or enough information about implications to either counter or back arguments in favor of certain actions, restrictions or other changes on the waterway.

And it might be hard to turn everyone's eyes *away from the current aggravations* for a time and get them to take the long view and *envision the future* of the waterway — the experience they want to create for users or the context in which they want the waterway to operate.⁴ Any "planning" that takes place, then, may not have a broad enough framework to guide decisions about problems or opportunities that come up later.

Not the best set of circumstances, particularly given some of the trends and issues described in Section 1 of this **Guide**.

But visioning, goal and objective setting and then planning and devising management strategies to achieve them can — and does — happen, even under less-than-ideal circumstances. Often, it takes a "champion" from among the waterway's stakeholders to facilitate and take ownership of the

management planning process to ensure that it gets done, and its results get measured and monitored.

Those champions can help ensure that what comes out of the planning process ends up being more than a book on a shelf.

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Continuous planning: *the Delaware Inland Bays Water Use Plan*

Planning, indeed, is a continuous process. The water use plan for Delaware's inland bays had its roots in surveys and studies begun in the mid 1980s — starting off with a recreation use survey in 1986, followed a few years later by aerial surveys to document peak use boating activity and phone surveys to gauge residents' opinions on water use issues, and then, the formation of a water use plan work group to oversee a plan and marina assessment study. Though that plan fell short of making firm recommendations to control water use activities in the bay, the work pressed on. A 1992 study, which included both field and mail surveys of bay users, identified primary concerns of the many groups who used the inland bays for recreation. By 1995, when the Inland Bays Estuary Program completed a Comprehensive Conservation and Management Plan (CCMP), one of its nine key goals was to develop a comprehensive water use plan for the bays. In 1999, the Inland Bays Comprehensive Water Use Plan was completed.¹

Why such an interest? The outlook on the population and tourism in the area. With the expectation that the resident population of Sussex County would increase 35 percent by the year 2020 and that tourism growth in coastal areas of the county would be on a similar rise, there was concern about escalating demands on the resources of the inland bays. In fact, when the water use plan was identified among the CCMP's nine goals, it was placed under the Habitat Protection Action Plan to indicate the priority of the ecosystem's natural resources. So, with the intent of striking a balance between protecting those resources and allowing public use for the current and future generations, the valued aquatic habitats, living resources and human activities were all considered in the use plan.

But the plan didn't address all of the issues and problems facing the bay waters, such as those related to the agriculture industry, or concerns related to land development or land use on a large scale. And at the time of the planning, there were no attempts to eliminate any

traditional bay uses or create zones for any specific uses. Yet it did identify conflicts between uses and various users, identified a number of user impacts on the environment, recommended actions to decrease environmental impacts, and encouraged safer uses of the bays to minimize accidents and personal injuries.

During the plan development process, 15 key issues were identified by stakeholder groups ranging from private citizens to governmental representatives and others interested in the bays' future. Organized into three major classifications, the issues were: 1) Habitat, or those addressing environmental impacts; 2) Use, pertaining to activities and water user concerns of safety, conflicts or other people impacts; and 3) Habitat/Use, related to both environmental and user concerns.

From these 15 issues, more than 45 targeted actions — including enforcement, education and awareness, administrative, regulatory, waterway improvement, and other actions — were recommended to help alleviate the problem areas. After the plan's initial completion in June 1999, a water use plan implementation committee was appointed to oversee progress, and various state agencies and organizations with interest in the bays have since taken leadership roles to insure that the actions are completed and that periodic reviews of progress are undertaken.

For more information, see *Recreational Boating on Delaware's Inland Bays: Implications for Social and Environmental Carrying Capacity*. 1992. J. Falk, et.al. Delaware Sea Grant Report. *Water Use Planning in Delmarva's Coastal Bays: Addressing Carrying Capacity Issues*. James M. Falk. University of Delaware Sea Grant College Program. See www.epa.gov/maia/html/dl3-wate.html. And *Water Use Planning and Management: Delaware Inland Bays*. SeaGrant, University of Delaware. www.ocean.udel.edu/mas/wateruse.html - inlandbays

¹ The University of Delaware Sea Grant College Program coordinated the plan's development. See <http://www.ocean.udel.edu/mas/wateruse.html#inlandbays>

Not another meeting ...

Create *meaningful, transparent participation processes for waterway stakeholders, including the general public*

Town meetings, task forces, blue ribbon commissions, public hearings and advisory groups are but a handful of the dozens of events and methods used to bring folks from outside of immediate management and planning circles into some aspects of deliberations, reviews, decision-making and monitoring.

But whether you're doing it under mandate or because somebody said it was a good idea, if the thought of another meeting is enough to make you cringe, you're probably not alone in your sentiment. Those who end up on your "invite list" may feel the same way, because these potentially valuable and productive in-person opportunities for involving the citizens and groups who are going to be most affected by decisions and for engaging key agencies that have to support or implement them often end up yielding less than expected. That's assuming, of course, that there *are* any expectations in the first place.

In reality, participants often don't have a clear idea of why they are being brought together or what they're supposed to contribute or accomplish.

They might feel they don't get enough information or, alternately, that there's too much for them to absorb in one sitting. They might suspect that the "real" decisions have already been made and they're just there "for show." They might come away with the sense that their individual ideas haven't really been "heard" because they didn't come with a particularly vocal group.

Yet meaningful and clear processes that do not overshadow the reasons for doing them *can* be devised. Some are simple; some require more commitment. All involve waterway "stakeholders" — the individuals, agencies and organized groups, both public and private, that have good reason to care about decisions made regarding the public waterways. They have a personal or professional interest in what goes on now or in the future, because they or something they hold in value or in the public trust is or will be affected in some way.⁵

They are the parties you hope will "buy in" to any planning and decision processes and help create successful outcomes — or at least not deliberately stop or sidetrack a process or outcomes that other stakeholders strongly support.

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Getting stakeholders' "informed consent"

To guide them through the intricacies and controversies of engaging very diverse, many times contentious audiences in comprehensive public involvement planning, some state and local government agencies and other public organizations have taken to using the Systematic Development of Informed Consent (SDIC) process or a modification of it. The intent of SDIC is not only to establish the public agency's "legitimate role" (in part by casting its program as one aimed at problem-solving), but also to communicate to the public the very serious nature of the problem the agency is trying to address.

The premise is that accomplishing these two objectives — in combination with a thorough public involvement process that connects the techniques and methods of involvement to the specific objectives — will allow an agency to achieve "informed consent." This "consent" usually falls short of unanimous support or consensus, but is agreement enough that each interest or individual who holds veto power over a proposed course of action actually is persuaded they can live with its consequences.

The SDIC process is rigorous, identifying 15 citizen participation objectives along the way to developing this informed consent. These objectives are grouped into the categories "responsibility," "responsiveness" and "effectiveness" and pose a detailed set of questions to gauge what the agency and agency personnel know about each or still need to do about each.

The Responsibility Objectives (how responsible you are and are perceived to be) are to:

1. Establish the Legitimacy of your Agency and your Project
2. Maintain the Legitimacy of Your Agency and Your Project
3. Establish the Legitimacy of Your Processes
4. Maintain the Legitimacy of Your Processes

5. Establish and Maintain the Legitimacy of Assumptions and Earlier Decisions

The Responsiveness Objectives (how responsive, how sensitive you are and are perceived to be) are to:

6. Get to Know All your Potentially Affected Interests
7. Get to See the Project Through Their Eyes
8. Identify All Potentially Relevant Problems
9. Generate Solutions
10. Articulate and Clarify the Key Issues

The Effectiveness Objectives (dealing with credibility, effective two-way communication, and de-polarizing polarized interests) are to:

11. Nurture and Protect Your Credibility
12. Have Your Communications Received and Understood
13. Receive and Understand Information that's Communicated to You
14. Search for Common Ground among Polarized Potentially Affected Interests
15. Mediate Between Polarized Interests

So, what's the background behind this intricate process? The developers argue that SDIC is the outcome of years of observing the methods and strategies of public officials who routinely get their proposals implemented, as opposed to sidetracked, stalled or flat out stopped. The point, they argue, is that these public officials and agencies use citizen participation solely as a "tool" for getting informed consent, not as an end in itself. And while over the years there's been growing mistrust toward public agencies and professionals, the developers say the research shows that it is feasible for them to earn consent provided that they know how to "be brutally honest with all their various publics," "be the harshest critics of their own work," and "look at what they are doing from the points of view of people who have different values and concerns."

For more information see *Getting The Public And Other Stakeholders Involved. Processes You Can Use. Information on Systematic Development of Informed Consent (SDIC)*. Also, *Citizen Participation Handbook for Public Officials and Other Professionals Serving the Public*. Hans Bleiker. The Institute for Participatory Management and Planning, Monterey, Calif. See www.ipmp-bleiker.com/.

Whatever their interests, these stakeholders, with their varied experiences or positions or the insights they bring to the table, can serve different and valuable roles and functions: from identifying waterway needs, problems and opportunities to implementing, managing and monitoring their solutions.

Getting to know who they are (not just those who share the same perspectives), what they're thinking, and what their priorities are can be an accomplishment in itself.

Indeed, when it comes to agency and organizational stakeholders, their separate and targeted missions likely will mean they're going to have different,

disconnected, maybe even conflicting agendas, objectives and priorities — from yours, from each other, and maybe even from the general public's.⁶

Do yourself and them a favor by bringing them to the table to reveal those things upfront. An overall positive experience might even lead to new levels of coordination and reductions in the replication of activities like research or data collection.⁷

And do look for ways to gather and understand the views of those stakeholders known collectively and generically as the "general public." Their opinions may not be as polarizing as those of some competing, organized stakeholder groups, and they might actually help you mark out some of the common ground on highly controversial issues.⁸

As important as knowing who these different types of stakeholders are and where they fall along the spectrum of interests in the waterways, though, is knowing when and how they should be, maybe even want to be involved, and how the lines of communication need to be set up to get their most effective participation.⁹

After all, "involving" the stakeholders can range from soliciting their opinions in a survey or bringing them in for preliminary conversations on their concerns to formally engaging affected agencies as collaborators over the life of a waterway planning process and its implementation.

Continued on page 34...

Can the media help us find common values among dissimilar groups?

Despite its sometimes polarizing and often oversimplified presentations of very complex issues, the media, and particularly news accounts of the actions of groups, may actually help planners find the common values among seemingly disparate groups. At least that's what an interdisciplinary team of Texas A&M researchers looking at media representations of stakeholders in legal disputes over the Edwards Aquifer, the sole water supply for San Antonio, has suggested.

The project team analyzed a year's worth of newspaper articles about Edwards Aquifer conflicts from two databases, with the intent of finding the ways that various stakeholders "framed," or represented, two important aspects of the conflict — their values and their beliefs about what it would take to manage or resolve the conflict.

Their analysis showed that the value and conflict frames were systematically related. One of the researchers remarked, "This is a public dispute, and that's what makes media important. Groups may not talk to each other, but they look at how each presents itself in the media." Then, too, the media presentations showed that the groups had multiple interests and values, making it more likely they could indeed find something in common and therefore solve conflicts, the researchers concluded.

While the findings might seem like a no-brainer to some, the research team said that conflict resolution often requires parties to step back and think about the ways they communicate, sometimes with the help of consultants or others outside the conflict.

From "Good News: Water Conflicts Can Be Solved, (Texas A&M) Researchers Say." June 1, 1998. Steve Hill. See <http://agnews.tamu.edu/dailynews/stories/RPTS/Jun0398a.htm>.

A bi-national structure for stakeholder involvement: *The Lake St. Clair/St. Clair River Management Plan*

Authorized by the federal Water Resources Development Act of 1999, this comprehensive management plan — intended to identify causes of environmental problems facing Lake St. Clair and the St. Clair River and recommend measures to address them — might not seem unusual at first glance. But it has a slight twist. The U.S. Army Corps of Engineers and Great Lakes Commission have been developing it in collaboration with a range of U.S., Canadian and tribal/First Nation stakeholders.

This bi-national structure features:

- A project management team with representatives from U.S., Canadian and tribal/First Nation agencies that have planning and management responsibilities for Lake St. Clair and the St. Clair River and their watersheds. Its role: to provide overall leadership and direction in developing the management plan and serve as the primary mechanism for coordinating public agency participation.
- A management plan advisory committee encompassing a larger group of local agencies and

nongovernmental stakeholders with an interest in the lake and river. This committee's role: to provide input on the purpose and scope of the management plan, review and comment on the draft plan, and plan a "State of the Lake" conference.

- Technical workgroups composed primarily of agency staff with technical knowledge related to specific sections of the plan. The workgroups' role: to serve as the primary mechanism for drafting the major topical chapters of the final management plan.

Taking an ecosystem approach that considers the full range of issues affecting the lake and river, the planning effort's goals are to: evaluate the causes of environmental stress to the St. Clair River and Lake St. Clair; determine management goals and objectives; review ongoing management activities; and develop recommendations for management priorities. Each chapter — including ones on the vision for the waterways, land use and coastal management, recreational boating and commercial navigation, monitoring and data management, and economic benefits and impacts — is intended to reflect the different issues on the U.S. and Canadian sides of the lake and river, and discuss bi-national issues and recommendations.

Lake St. Clair is the smallest lake within the Great Lakes system and is located between Huron and Erie. For more information see the Management Plan update at www.glc.org/stclair/update. Also see *The Lake St. Clair/St. Clair River Management Plan: An Overview. Management Plan Update: A Periodic Status Report on the Lake St. Clair/St. Clair River Comprehensive Management Plan* (March 2002) at www.glc.org/stclair/documents/mpupdate1.pdf; and *Management Plan Update: A Status Report on the Lake St. Clair/St. Clair River Comprehensive Management Plan* (October 2002) at www.glc.org/stclair/documents/mpupdate2.pdf.

And since not every type of stakeholder is going to be effective at every stage in every process, you'll need to carefully consider where each of them best "fits in."¹⁰ Local residents around a waterway, as one example, may be key players in a process that calls for input on user preferences for certain types of water and shoreline activities. But they're not going to be effective players in the technical design of an environmental impact assessment.

Why all this talk of *process*? For a variety of reasons, the *process* used to arrive at a waterway decision, management action, plan, program or some other kind of activity *is becoming part of the solution*. How the process is conducted, who's involved, and its

overall credibility and outcomes end up being as critical as the decisions that result. There's not much tolerance nowadays for decision-making behind closed doors, with little regard for what anybody outside thinks.

In certain situations, managers and planners even have found that involving several types of stakeholders — from waterway users to agency administrators — in the *ongoing* management and monitoring of the waterway is a useful way of anticipating and reducing user conflict, encouraging sustainable use of the resource, and improving the acceptance of decisions.

But for stakeholders to be involved that way, they have to be fully integrated into the process. Their participation will be

different, much more intensive, and may call for something more akin to an ongoing forum for raising concerns, identifying conflicts, and studying environmental impacts or any of a range of issues that can arise within multiple use waterways. More traditional forms of participation, like one-time opportunities to sit in public hearings or input meetings, just won't allow them to engage in continuing dialogue, learn from one another or develop trust and working relationships.¹¹

No matter the mode of participation or the composition of the stakeholders' group, though, there may be at least one thing they hold in common — they're going to be reluctant to spend their time on endless discussions or processes that don't have a clear intent or objectives.¹²

Plain talk ... up-front ...

Set out management intent and objectives

Key to meaningful stakeholder participation and to creating a transparent process, whatever form it takes, is determining and saying upfront what you want to accomplish, and not just what you want to accomplish by the end of a meeting. It's what you, your agency and those stakeholders hope to achieve for the future of the multiple use waterway — the desired conditions.

Management objectives are those judgments of what *should be*, and with indicators that can be measured and monitored, they become the yardsticks for evaluating whether or not the chosen management decisions and strategies are bringing those hoped-for conditions closer to reality.

If a particular action isn't working, then it might be time to consider other protections

or approaches to bring the conditions back into alignment with the objectives.¹³

Why is this so important to talk about upfront? Because it emphasizes the greater expectations for the future of the waterway, and helps shift us away from our natural inclination to look at parochial interests, limitations and restrictions. It helps stakeholders think "big." It gives resource managers and planners a context for developing alternative strategies.

But make those objectives meaningful and measurable, not clichés or generalities. Develop them with stakeholder input and clear understanding of their preferences. Develop them with a sense of the tradeoffs that might be associated with achieving them. And develop them with a commitment to systematically collect data and information about what's happening on your waterway.

Taking a look through the wide-angle lens ...

Plan with the region or system in mind, if you can

Thinking that a planning effort you undertake or a management decision you make for your multiple use waterway won't affect somebody or someplace else could be a miscalculation.

Whether a limit, expansion or some other change, the execution of even well-intended decisions made in the absence of broader thinking, consultation, maybe even formal coordination, *could* produce unintended consequences — like steps taken to ease congestion and environmental concerns on one waterway that end up aggravating safety issues and environmental quality concerns or even diminishing the recreational or commercial value for

another; or imposing restrictions that conflict in a significant way with those of others in the area or system and end up frustrating and confusing water users, maybe even hindering their compliance.

Unfortunately, there aren't yet reliable methodologies to pinpoint *exactly* how restrictions or other management changes on one or several waterways — particularly recreational waters — will negatively affect the use or quality of others in the same region or system.¹⁴ But taking into consideration the broader impact of your decisions could have some tangible overall benefits.

For example, planning different waterways for different management objectives — perhaps designating different bodies of water within a reasonable distance of each other to accommodate different types of watercraft or water-contact activities — might actually yield some opportunities to reduce multiple use conflicts, promote safety and balance user opportunities.

And taking a regional or system-wide approach to management and planning might alleviate some of that pressure to accommodate every possible activity and interest, which may not be the best management strategy in all cases.¹⁵

Sometimes, it's just not possible, and sometimes, it just might not make sense.

So, who *is* responsible for what? ...

Map out and peel through the layers of jurisdiction, existing regulations and policies

If, after having read all of what's preceded this sentence, you're still not convinced that you have to involve other stakeholders in

your decisions or planning, or that you're not going to have to look beyond your own waterway to see the broader implications of your decisions and actions, then this might be the point where you discover that was just wishful thinking.

Waterways can cross a number of jurisdictional boundaries. Local, state and federal authorities often overlap, and one waterway may encompass resources or specific uses that are managed by different agencies.¹⁶

In just one small example, while state laws may relate to water surface use, they also may recognize or delegate to local jurisdictions the authority to regulate in the interests of public health, safety, welfare, or of preserving the state's natural resources. And they may set out the types of local regulations that are permissible.

As a resource manager or planner or regulator of a multiple use waterway, then, you're going to have to pay close attention to the multiple layers of jurisdiction over your waterway and shorelines, and the increasingly complex federal, state and local regulatory and policy frameworks that are very likely to affect any management plans, decisions and actions.¹⁷

A complex mix of problems

Take time to sort through and define your problems before you start to look at alternatives.

When it comes to multiple use waterways, the problems may not be very clear-cut. Often at their core are interconnected, changing mixes of activities, water conditions, user behaviors, attitudes and

other, equally hard-to-separate factors and impacts.¹⁸

That complexity, though, is not likely to discourage water users, property owners, concerned citizens, and other waterway stakeholders from offering hearty and vocal pronouncements as to the exact nature of the problem. It may not even deter resource managers, planners and regulators from making quick declarations.

But as the opening excerpt of this section suggests, solution-finding exercises can fail for want of a more precise identification of what is happening that people don't like and, every bit as critical, *why* it's happening.

Defining a problem based on a narrow assessment or a specific incident could lead to a "fix" that gets rid of symptoms, but doesn't address what's really going on. Worse yet, it could create problems you never would have anticipated.

Sometimes, just taking the time to separate the problem from the behaviors that are exacerbating it, or even "reframing" a problem — deliberately examining it from different perspectives — can help target what really needs to be solved.¹⁹

So, knowing what your problem is *before* deciding on a solution and defining it in a way that gives each alternative solution a real chance at consideration sounds pretty elementary, but it couldn't be more important.²⁰

So, what's *your* problem?

Three "keys" to identifying and describing a problem:

1. Separate the problem itself from the behaviors causing the problem. Identify all of the possible behaviors that might be contributing to any or each problem;
2. Write a statement of the problem in the widest context possible. Create a problem statement that leaves open the widest range of options; and
3. Don't describe the problem in terms of the lack of your preferred solution. The statement of the problem is *not* just the opposite of one solution or the absence of a solution. The problem statement shouldn't dictate one and only one solution. Instead, describe the problem as a threat to something.

When you try to define the problem:

1. Describe the extent of the problem;
2. Describe what people or things are doing to create or cause the problem (what behaviors?); and
3. Describe who's doing what and why? Who are the different groups of people who have these behaviors?

The third step in defining the problem helps you discover whether people are deliberately and knowingly creating a problem or whether they never knew or thought about the consequences. If you find they just don't know what they should do, then that signals an information gap, not a need for a restriction. On the other hand, if they know what they should do, and just don't do it, then a restriction of some sort may be in order; but you'll need to have law enforcement available.

These "keys" to identifying and defining a problem were adapted from the *Boating Restrictions: The Local Authorities Guide*. March 1998. 2nd ed. Office of Boating Safety, Canadian Coast Guard. Made under the provision of the Boating Restriction Regulations Canada Shipping Act. Canada Shipping Act, Ottawa, Ontario K1A 0N7.

Defend with a clear rationale ... not rationalizations

Make reasoned, principled and science-based decisions

Decision-making is complicated for a lot of reasons, not the least of which is that as individuals we can approach the very same situation from very different perspectives and concerns. And although we might not want to admit it, researchers tell us we just naturally have a limited capacity for considering the multiple factors that will be important to a decision.

Those reasons alone seem to pretty much stack the deck against multiple use waterway decision-making.

But as resource experts have described, it is possible to make complex decision-making for multiple use waterways more manageable and defensible by using explicit decision criteria that factor in anything from the degree to which a potential decision is supported by science to how the decision would affect the integrity of the waterway's recreational experience or the environment.

Adopted early on with the help and blessing of waterway stakeholders, criteria like these can help make the decision process more open, credible and trackable.²¹ They might even force more studied consideration of the potential "residual impacts" of multiple use waterway management decisions — like the economic or revenue fallout or benefits associated with decisions to limit, alter or enhance waterway uses or development.

Perception or science? ...

Pay attention to both, at different times and for different reasons

As some resource managers have discovered, the involvement of stakeholders in decision-making also means that more questions — coming from more directions — will be raised about a lot of things, including complicated actions and policies.

But it's hard to effectively and consistently explain complex policies if they were shaped largely by individual judgment, attitudes or perceptions of problems and issues rather than scientific documentation.²² That's just one reason for developing a set of decision criteria.

So, taken in that context of making decisions based on perceptions and personally-held attitudes or values instead of replicable scientific evidence and valid data, it's easy to see why "perception" might have picked up a not-so-favorable connotation among some circles in recent years.

In reality, though, *understanding* the varying perceptions of affected parties *can* help shape the approaches you may need to effectively gather information, solicit participation, structure your communications and implement decisions.²³

It also can offer a better context for interpreting waterway user surveys, or for shaping a more "accurate" set of expectations about the waterway experience for the user, or perhaps unbelievably, for helping locate the common ground among what might seem on the surface to be polar opposite viewpoints.

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Deciding on decision criteria

A set of criteria, developed early in a planning process with stakeholder and public input, can help make complicated decisions a little less complex and decision-making more transparent and trackable. They can form the basis for developing a set of alternative actions.

The following criteria were adapted from a report of the Federal Interagency Task Force on Visitor Capacity in Public Lands as a tool for assessing the overall consequences of decision alternatives related to "visitor capacity" on public lands and recreation areas. But the criteria can be modified to assess potential consequences of multiple use waterway management decisions and alternatives, particularly in recreational areas.

Do you need such a long list? Not necessarily. But the number should reflect the complexity of the decision to be made. As complexity increases, the number needed to fairly reflect the situation will increase as well.

Effects on ecological integrity. Degree to which the alternative:

- affects unique or sensitive resources locally, regionally or nationally;
- affects the ecological integrity of the site, local vicinity, or bio-region;
- may compromise desired future conditions or quality standards;
- affects the important or priority resources or values the area is being managed to protect;
- helps to build or connect a larger regional system of resources;
- provides an appropriate recreation experience by the least intrusive means on the important resources;
- has irreversible effects or the effects cannot be restored or recovered.

Supported by science. Degree to which the alternative:

- is supported by scientific study and consensus;
- is supported by professional staff, advisors and consultants;
- may lead to consequences that are highly uncertain or risky;
- is based on unavailable or incomplete scientific information;
- will secure needed scientific information;
- and its consequences can and will be monitored.

Level of public support. Degree to which the alternative:

- is controversial among or is supported by visitors, locals, regional and national publics;
- contributes to the desired welfare of stakeholders;
- builds meaningful and appropriate partnerships with collaborators;
- causes harm or a disproportionate share of negative consequences to less advantaged people;
- preserves opportunities and options for future generations.

Effects on integrity of the recreation experience. Degree to which the alternative:

- affects the integrity of the recreation experience the area is managed for;
- is appropriate and consistent with the management objectives for the area;
- may compromise desired future conditions or quality standards;
- affects existing appropriate recreation opportunities;
- affects unique or rare recreation opportunities locally, regionally, or nationally;
- is the same or similar to opportunities available locally or regionally;
- contributes to a large regional system of recreation opportunities;
- will make recreation opportunities more available to less advantaged publics;
- will attract visitors who otherwise would not visit;
- considers the latent or unmet demands or those publics not visiting;
- provides an appropriate recreation experience by the least intrusive means on other visitors;
- allows for personal choice, freedom and spontaneity among visiting publics.

Consistent with management suitability and capability.

Degree to which the alternative:

- affects commemorative integrity (legislated purpose) of the area;
- may affect public health and safety or contribute to public risks;
- addresses consequences of delaying or not taking action;
- can be changed or adapted given new science, information or circumstances;
- complements other important resource uses and users;
- sets precedent for future actions;
- represents a future decision or commitment in principle;
- and its cumulative effects are likely to be significant;
- requires reallocated or increased resources in services, personnel, facilities, etc.;
- is administratively feasible;
- will affect other management programs and services;
- consequences can be mitigated.

Adapted from *Visitor Capacity on Public Lands and Waters: Making Better Decisions. A Report of the Federal Interagency Task Force on Visitor Capacity in Public Lands*. 2002. Glenn E. Haas. Submitted to the Assistant Secretary for Fish and Wildlife and Parks, U.S. Dept. of the Interior, Washington, D.C.

So, *that's* an 'asymmetric conflict' ...

The study, *Recreational Conflicts and Compatibility Between Motorboat Owners, Personal Watercraft Owners and Coastal Landowners Along New York's Great Lakes Coast*, conducted along New York's Great Lakes coast, found a series of "asymmetric conflicts" — that is between landowners who were bothered by both personal watercraft (PWC) users and motorboaters; motorboaters who were bothered by PWC users, but not much by landowners; and PWC users who did not seem to be affected by either motorboaters or landowners.

The series of asymmetrical conflicts points out a potential problem in multiple use areas when several conflicting uses may be present at the same time. The researchers suggest that recreation planners and managers may have to identify the groups experiencing more interference and minimize potential conflict for them. Failing to maintain the recreation quality for users and landowners who are most sensitive to interference and conflict, they suggest, could cause the affected groups to be even more dissatisfied and increase their sensitivity to interference and conflict.

But the study results also suggested that *education programs might help to reduce the conflict as well as offer opportunities to enhance user's knowledge of boating regulations and increase tolerance among different user groups*. In this study, PWC users perceived that other users did not appreciate them and they thought safety issues and their behaviors were not as bad as other groups thought. Motorboaters perceived interference from jet skiing, but did not perceive that they also caused problems to landowners.

To make things more interesting, though, both motorboaters and landowners with PWCs had more sympathy for PWC use and users, likely because these people had similar recreational motivations as PWC users and perceived what PWC users were experiencing during their activities. A similar situation happened between motorboaters and landowners. Landowners with motorboats were not against motorboating as much as landowners without watercraft.

This suggests that *people who participate in multiple activities, with the potential conflicts, may have more empathy and tolerance for other types of visitors*. Therefore, the researchers suggest that recreation managers may reduce some perceived recreation conflict by increasing users' tolerance through understanding or "experience sharing" among different user groups.

From *Recreational Conflicts and Compatibility Between Motorboat Owners, Personal Watercraft Owners and Coastal Landowners Along New York's Great Lakes Coast*. July 1, 2000. Cheng-Ping Wang and Chad P. Dawson. See www.cce.cornell.edu/seagrant/great-lakes-marinas/pwcreport.html

For whether you've discovered it through research studies or learned by experience and observation, water users and law enforcement and managers and planners often see things differently. So do water users and property owners. And so do different groups of water users.²⁴ In some cases, users who participate in a variety of activities — or who share the characteristics of several groups — may actually have more empathy and tolerance for other users.²⁵

Equipped with knowledge and understanding of what's behind those perceptions, then, resource managers and planners may be in a better position to increase tolerance and reduce some of the conflict — perhaps through education or awareness programs, information and experience sharing between groups or other strategies that acknowledge and make good use of those perceptions.

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The 'oddity' of perceptions

Who's got access rights? — the (mis-)perceptions of land ownership

According to data collected by the Oregon State Marine Board as part of a larger needs assessment, privately-owned lands above normal high water accounted for 76 percent or 4,075 miles of all lands along rivers and streams; public ownership was limited to the remaining 1,300 miles. While ownership patterns often are mixed along popular recreation rivers, the finding of a predominance of private lands was considered surprising.

It would come as a surprise to area boaters and anglers, too. According to the assessment findings, they perceived

that the public owned most of the land along the rivers. In fact, when asked to estimate the percentage of public and private lands along the segments they used, 66 percent indicated that they believed ownership was in public hands. This discrepancy between actual and perceived ownership, the assessment noted, could have been one explanation for many of the problems and conflicts that had been occurring between users and landowners on the rivers. That such a severe anomaly existed even among the more knowledgeable users, such as club members, suggested a strong need for better and more readily available information about land ownership along the rivers.

For more information, see *Managing River Recreation: A Statewide Assessment of Needs for Boating Access, Facilities, Enforcement, and Education*. December 1998. Oregon State Marine Board. Report to the Joint Legislative Interim Committee on Navigability. See www.marinebd.osmb.state.or.us/Library/finalreport.pdf

Different frames of reference ... the newcomers versus 'oldtimers'

In Tennessee, one of the findings of the Tims Ford Reservoir boating capacity study was that boaters with more experience — generally greater than five years — were more likely to want to return to past, less crowded conditions or, at the very least, to maintain the status quo. A simultaneous finding was that greater numbers of complaints about crowding and noise were coming from shoreline property owners than from ramp users. Signs pointed to an automatic increase in user conflict with increased populations.

For more information, see *Tims Ford Reservoir Recreational Boating Capacity Study*. February 2002. Park Studies, Inc., for the Tennessee Valley Authority.

Visitors and perceived crowding ... what makes the difference?

A long-term study of crowding perceptions among boaters at the Apostle Islands National Lakeshore— using data from 1975, 1985 and 1997 — revealed some interesting findings. The number of overnight boater visits had increased from just over 7,000 in 1975 to nearly 16,000 in 1985, but then remained roughly the same through 1997. Yet the "1997 boaters" reported feeling more crowded than the 1985 boaters. What had changed about the Islands' visitors that made them evaluate crowding so differently?

Using an equation that factored in visitors' socioeconomics, perceptions and behaviors, the study results showed unique characteristics and response patterns for each sample. For one thing, the analysis

But the analysis offered some additional food for thought about what could happen in the future. The relative newcomers — holding a different frame of reference and context for the boating experience — might just end up accepting higher density conditions and the prospect of more frequent conflicts as they become a larger part of the boating population and as long timers stop or reduce their boat usage because of age or infirmities. So, even as density on the waters increases, complaints may actually decrease.

showed an "aging" population of boaters in 1997. While the average age in 1975 and 1985 was roughly 36 years old, the average age of the 1997 boaters was 44. And they felt "crowded." The 1985 boaters, on the other hand, were more likely than boaters in the other years of the study to actually prefer more encounters with other boats while anchored or to have no real preference for more or less contact. They felt less crowded. To complicate matters, the results also showed that boaters with more experience at the Apostle Islands in 1975 and 1985 felt more crowded, while that experience level for the 1997 boaters did not predict crowding. The moral? According to the researcher, know that visitor composition within a single activity can change dramatically over time, and these changes can mean significant shifts in the visitors' evaluations of their experience. Just one more reason to consider long-term monitoring.

For more information, see "Changing Visitor Composition and Perceived Crowding Across 22 Years at the Apostle Islands National Lakeshore: Tracking a Moving Target," a report prepared by Dr. Thomas A. Heberlein, University of Wisconsin – Madison for the 1999 Congress on Recreation and Resource Capacity, Aspen, Colo., November/December 1999.

That's what it says, but is that what it means?

Use caution when interpreting and applying data and information

Learning to use data and information appropriately — that is, figuring out what they really mean, how and when to apply them, what their limitations are, and what their "shelf life" is — can be time consuming. But it's an important foundation for planning, managing and monitoring multiple use waterways.

Why? For one thing, information is *everywhere*, and savvy waterway stakeholders aren't necessarily going to rely solely on what you provide them. With the aid of the Internet and rapid communication outlets like news groups, on-line forums, email and electronic media, they're more likely than ever before to find, pull, share and use data and information from sources near and far so that they can offer input, raise issues, make arguments, suggest causal links and question decisions.

Not all of the information will be "good" and not all of it will be applicable, but they — and maybe even you — might be tempted to use it anyway because it's readily available and seems credible, particularly when it's been repeated enough times in enough places.

But while there's no shortage of what passes for data and information, what's out there may not meet your real requirements.

Whether to answer questions, identify alternate management strategies, support decisions, measure objectives or cope with and monitor impacts associated with changes in the water surface, shoreline, traffic and other aspects of the waterways, you'll need useful, systematic data and

information *gathered over time*. Even the process of gauging diverse tastes and needs among water users calls for the *methodical collection* of both quantitative and qualitative data on their preferences and characteristics.²⁶

The breadth, detail, specificity and reliability of data you really need may not be at your fingertips. And some managers and planners have found out the hard way that the data and analysis from many major, readily available and otherwise solid, state and national level studies are neither meant for nor designed to feed into local decision-making.²⁷

That means you'll have to sort through the data with a discriminating eye, acknowledge what's useful, work within their limits, and dismiss or accept them as warranted.²⁸

As for knowing the "shelf life" of the data you use or collect yourself? How long they're "good for" — that is, how long they remain meaningful and applicable to your situation — will depend on the data, how they were collected and for what purposes.

In the case of user surveys, as one example, if the groups that were surveyed have been pretty stable — they haven't changed very much over time — then the data may be applicable for a little longer. But if you are relying on the results of a five-year-old survey to help you make decisions about a high growth area with more new users who have very little experience on the waters, the data probably won't be too meaningful — except as a point of comparison for how much things have changed.²⁹

But, in that study ...

Understand and learn from others' experiences, issues and methods, but work and act within your framework and situation.

This **Guide** references and relies on hundreds of waterways-related studies that have been conducted for a variety of purposes by a range of interest groups, research and academic institutions, government agencies and other organizations. Representing different jurisdictions, perspectives and issues, conflicts and management concepts and approaches, these studies are valuable for their examples and insights *and* their findings.

But resource managers and planners have to remember that there can be huge differences between a national experience and a local experience, between different regions of the country or a state, and between different types of sites. Even variations in regulatory settings, policies and definitions — for words seemingly as simple as "vessel" or "personal watercraft" or "owner" — can cause confusion in interpreting policies or in translating them from one jurisdiction to another.³⁰

And if you're not paying attention, you could inadvertently find yourself adopting a set of practices, processes or actions that don't really suit your situation.

There is little question, for example, that what happens in the management of a large lake with transient users in the middle of a national park setting can be extremely instructive. Concepts can be transferred, insights into user impacts and solutions can be shared, and some of what is happening on that lake might even foretell what could

happen on your waterway at some point in the future.

But if your waterway is a small reservoir with residential and commercial development nearby, then transplanting an intriguing approach or conflict resolution from that national park setting, without thoroughly studying or even modifying it, might not be fruitful or appropriate for dealing with your local issues. It might not even be necessary. After all, you may have more ongoing opportunities to become intimately aware of your users' needs, behaviors, values and preferences, and how best to approach their conflicts and craft solutions because, relatively speaking, they just might be *your neighbors*.

Does that mean you shouldn't pay attention to those other studies or examples? If it did, you certainly wouldn't have any need to read beyond this point.

Do read through national studies and their results. Read results from studies conducted by other states and localities. Become well informed about the bigger picture of multiple use waterway management.

But understand who *your* users are and the features of *your waterway*, and then identify and set priorities based on issues that you and your stakeholders discover — not solely on what transpired or was evident from another setting.

When it comes to multiple use waterways management you'll likely find that more often than not the "one size fits all" principle doesn't apply.

In the next section — an update of what appeared in the first edition of this **Guide** — we'll take a look at management tools,

methods, and approaches in light of shifts in how they're being applied to multiple use waterways, what's prompting their use, and the frameworks that are guiding the real-life decisions to use them — from education and self-regulation to restrictions and enforcement.

1 From *Boating Restrictions: The Local Authorities Guide*. March 1998. 2nd ed. Office of Boating Safety, Canadian Coast Guard, Made under the provision of the Boating Restriction Regulations Canada Shipping Act. Canada Shipping Act, Ottawa, Ontario K1A 0N7.

2 Readers interested in the first edition of the *Guide*, and in particular, the generic planning process described in it, may obtain a .pdf file at www.nasbla.org.

3 As an example, the National Environmental Policy Act of 1969 (also known as NEPA) provides very specific guidance to ensure environmental protection is addressed within the planning of major actions. It establishes policy, sets goals, and provides a means for carrying out the policy. The procedures require that natural, cultural, historical and social information be available to officials and the public before decisions are made and any action is taken.

Accurate and available scientific analysis, expert agency comments, and public review and comment are essential components, then, in completing the policy standards set within the NEPA guidelines. The process is intended to help officials make decisions that are based on an understanding of environmental consequences, develop methods and procedures to protect these resources, and consider economic and technical considerations.

4 As one example, Florida planners involved in implementing a memorandum of agreement that established a non-regulatory approach to anchorage management acknowledged that the lack of dramatic and widespread problems associated with anchoring "may suggest to the casual observer that there is no need for action. However, planners, resource managers, and informed users agree there must be a management framework in place now to deal with potential problems associated with increasing use — problems such as ecological damage, user conflicts, availability of support services, and declining quality of anchorages subject to periodic overcrowding." See the Southwest Florida Anchorage Management Program at www.flseagrant.org/science/anchorage.

5 Sometimes the ways that particular stakeholders are affected will be narrow, tangible and direct — like waterway management decisions that directly affect boat owners' use of their craft, commercial fishermen's ability to fish in particular zones, property owners' placement of docks, or an agency's need to redirect resources to enforce new restrictions.

However, in other cases, stakeholders' interests in the impacts may be much broader and perhaps less easy to decipher — like local residents' concerns about regulations and activities that affect their "quality of life," a concept that can be interpreted and defined a variety of ways.

6 As an example, because of their separate missions, some agencies may promote increased use of the waters, while others may push for limits. Indeed, this can occur within agencies as well. So while some resource managers may feel compelled to limit or restrict recreational boating activity, for any of a variety of reasons, others may promote increases to boating or water-related activity and participation.

7 See for example, discussions in *Marine Protected Areas: A discussion with stakeholders in the Gulf of Maine Summer & Fall 2001*. Report by the New England Aquarium and

Massachusetts Institute of Technology Sea Grant. Released November 22, 2001. See summary, www.atlantisforce.org/gommpaexec.html.

8 See for example, findings of Florida Fish and Wildlife Conservation Commission (Strategic Planning) *Stakeholder Input*. 2002. See <http://floridaconservation.org/planning/index.html>, for strategic planning survey and related documents associated with planning process attended by over 90 leaders of organizations that use the Commission's products and services.

9 See for example, discussions in *Marine Protected Areas: A discussion with stakeholders in the Gulf of Maine Summer & Fall 2001*.

Communication with stakeholders may require expanding traditional methods of outreach for disseminating information and educational materials on particular topics or policies. These "traditional methods," such as newspaper announcements and *Federal Register* notices, have been criticized for not always reaching all of the stakeholders relevant to the process and discussion. But just as the mode of outreach affects whether or not the information gets to stakeholders, the timing of outreach matters as well. There are certain times during the day or year when they are more likely to pay attention. A combination of methods, then, including newspapers, newsletters, emails, phone calls, information posted at public places, news radio and so on, might end up being more effective. It's equally important to disseminate information when it's most convenient and appropriate for the stakeholder populations. For example, if the resident population along lakes and ponds is largely seasonal, then it would be unfair to conduct a public forum on a policy change in the middle of winter and expect balanced input. There is no question, though, that making these kinds of accommodations requires much more awareness and knowledge about the stakeholders and their preferences.

10 *Ibid*. Some stakeholders want to be involved before policy proposals are made so that they can help shape the proposals. Others would rather get involved after a proposal has been made by an agency with authority for implementation.

11 One format for encouraging more systematic and ongoing participation from a cross-section of stakeholders can be found in Harbor Safety and related local coordinating committees. While the composition of these entities varies from place to place, the committees are intended to engage a spectrum of waterway users — from governmental agencies, maritime labor and industry organizations to public interest groups and everything in between — in local issues critical to the Marine Transportation System (safety, security, mobility and environmental protection).

For example, the Ports and Waterways Safety Committee was formed over 10 years ago as a consolidated effort to deal with the problem of recreational fishing vessels anchored in the marked navigation channel of the Columbia River and impeding passage of commercial vessels. Since then, this 40-member committee, typically meeting on a quarterly basis, has evolved into a forum for discussing a wider variety of safety issues affecting vessel operations on the Columbia River System. In another example, the Cuyahoga River Safety Task Force — a multi-agency group consisting of law enforcement, industry, commercial and recreational users, and representatives of the city and entertainment district — was established in the late 1980s to focus on resolving conflicts

between recreational and commercial users of the river which runs through Cleveland, Ohio.

To provide a "cyber-forum" for communication among various participating local committees and elevating the safety issues and concerns that cannot be solved locally, the U.S. Coast Guard has established a Harbor Safety Committee website at www.uscg.mil/hq/g-m/harborsafety/.

- 12 See discussions in *Marine Protected Areas: A Discussion with Stakeholders in the Gulf of Maine* Summer and Fall 2001.
- 13 See discussions in Edward M. Mahoney and Daniel J. Stynes, *Recreational Boating Carrying Capacity: A Framework for Managing Inland Lakes: Proceedings of a Workshop*, August 23, 1995. 1996. Sponsored by Michigan Boating Industries Association and the Department of Park, Recreation and Tourism Resources, Michigan State University. See www.msu.edu/course/prr/879/spring2000/boatrcc.doc.
- 14 See discussions in Mahoney and Stynes, *Recreational Boating Carrying Capacity: A Framework for Managing Inland Lakes*.
- 15 The San Diego City Lakes Program offers an example of providing multiple recreational opportunities within a system-wide approach. See San Diego City Lakes Program. See www.sannet.gov/water/recreation/index.shtml

See also *Recreational Conflicts and Compatibility Between Motorboat Owners, Personal Watercraft Owners and Coastal Landowners along New York's Great Lakes Coast*. July 1, 2000. Cheng-Ping Wang and Chad P. Dawson. Study funded by New York Sea Grant Institute, New York Sea Grant Extension and State University of New York College of Environmental Science & Forestry at Syracuse, N.Y. www.cce.cornell.edu/seagrant/great-lakes-marinas/pwcreport.html. The study results revealed a series of "asymmetrical conflicts" implying that multiple use recreation at the site under study might not be the best strategy.
- 16 Conflicts can arise when local, state and federal agencies try to regulate the same waterways, particularly when their statutory concerns are different. See discussion in "Purposes and Cross-Purposes to Waterway Management." June 1996. In *Northwest Indiana Public Work Group Reports: 865 Annotations* by the Indiana Dept. of Natural Resources. www.in.gov/nrc_dnr/lakemichigan/3v5wetdr/3v5wetdr2.html
- 17 One of the things to consider is that there may already be a state law or rule on the books to handle a specific problem and stricter enforcement, rather than additional restrictions, may be needed.
- 18 See discussions in Edward M. Mahoney and Daniel J. Stynes, *Recreational Boating Carrying Capacity: A Framework for Managing Inland Lakes: Proceedings of a Workshop*, August 23, 1995. 1996. Sponsored by Michigan Boating Industries Association and the Department of Park, Recreation and Tourism Resources, Michigan State University. See www.msu.edu/course/prr/879/spring2000/boatrcc.doc.
- 19 From Glenn E. Haas, "A Reframing of Visitor Capacity," *Parks & Recreation*, July 2001, Vol. 36, No. 7. pp. 68-79.
- 20 From *Boating Restrictions: The Local Authorities Guide*. March 1998. 2nd ed. Office of Boating Safety, Canadian Coast Guard, Made under the provision of the Boating Restriction Regulations Canada Shipping Act. Canada Shipping Act, Ottawa, Ontario K1A 0N7.

- 21 From Glenn E. Haas, *Visitor Capacity on Public Lands and Waters: Making Better Decisions*. 2002. A Report of the Federal Interagency Task Force on Visitor Capacity on Public Lands submitted to the Assistant Secretary for Fish and Wildlife and Parks, U.S. Dept. of the Interior, Washington, D.C.
- 22 See discussions in *Tims Ford Reservoir Recreational Boating Capacity Study*. February 2002. Tennessee Valley Authority.
- 23 In at least one methodology for citizen and stakeholder participation, the Systematic Development of Informed Consent, one of the objectives involves seeing the problem through the eyes of the "potentially affected interests" — that is, how those "PAIs" perceive the problems that an agency is working on, what their major likes and dislikes are, how they perceive the agency, and so on. See "Getting stakeholders' 'informed consent,'" on page 32 of this **Guide**. Also see *Getting The Public And Other Stakeholders Involved. Processes You Can Use. Information on Systematic Development of Informed Consent (SDIC)*, and *Citizen Participation Handbook for Public Officials and Other Professionals Serving the Public*. Hans Bleiker. The Institute for Participatory Management and Planning, Monterey, Calif. See www.ipmp-bleiker.com/.
- 24 See discussions in Edward M. Mahoney and Daniel J. Stynes, *Recreational Boating Carrying Capacity: A Framework for Managing Inland Lakes: Proceedings of a Workshop*, August 23, 1995. 1996. Sponsored by Michigan Boating Industries Association and the Department of Park, Recreation and Tourism Resources, Michigan State University. See www.msu.edu/course/prr/879/spring2000/boatrcc.doc. Recreational boaters may weigh encounters with other boaters and recreational users quite differently depending on the nature of the encounter. Watercraft speeds and the activities of boaters (e.g., fishing, power boating, sailing, etc.) along with congestion at launch sites can explain more variation in perceived crowding than actual numbers of boats on the lake. A single incident of an unsafe or discourteous boater can have a greater influence on perceived satisfaction of the experience than the actual overall numbers of boats or activities taking place on the water.
- 25 As one example, in a study that used observational and survey data to describe and understand encounters among groups of boaters on the Colorado River in the Grand Canyon, as well as the effects on their experiences and the changes over time, there were significant differences between commercial motor, commercial oar, and private boaters in perceptions of crowding. Motor passengers were least sensitive and private boaters most sensitive. Despite increases in the total number of boaters over the past 25 years, however, perceptions of crowding and the number of encounters did not increase dramatically. See more from "Evaluating Social Conditions on the Colorado River in the Grand Canyon: Effects on Experiences and Changes Over Time," in *1999 Congress On Recreation And Resource Capacity Book Of Abstracts*. Susan Scott Lundquist and Glenn E. Haas, Compilers. Nov. 29 – Dec. 2, 1999, Aspen, Colo. Hosted by The Human Dimension in Natural Resources Unit, College of Natural Resources, Colorado State University, Fort Collins, Colo. See www.cnr.colostate.edu/nrrt/capacity.

- 26 See for example, discussions in *Tims Ford Reservoir Recreational Boating Capacity Study*. February 2002. Tennessee Valley Authority.

Also, see Jeffrey Hoedt, "Recreational Boating – Are the Waters Too Crowded?" Report prepared for the *1999 Congress on Recreation and Resource Capacity*, November/December 1999, for a discussion of some of the cautions in interpreting use or satisfaction surveys. Some surveys have asked boaters if they would like to see fewer boats on the waterways, a question that leads many to respond "yes." But upon follow-up with some of these individuals, they say they gave an affirmative response because they perceived that their **own** access on the waterway would not be restricted, and that they would be on the water to actually "see fewer boats" there. Their answer might have been different if they had been asked the question in this way: "Would you like there to be fewer boats on the water, even if it means your access to the waterway would be restricted?"

- 27 From Arrowhead Regional Development Commission. *Director's Report* for May 2002. May 16, 2002. See www.ardc.org/info/exec/edro502.pdf.
- 28 See Hoedt, "Recreational Boating – Are the Waters Too Crowded?" for a discussion of some of the caveats associated with data on boating accidents and injuries and the problems of determining whether density and activity can be shown to directly affect safety. For example, Hoedt notes that there are times when boating activity is at its peak and accidents occur. But some pertinent questions — such as How many boats were in a given area around the accident scene at the time of the accident? What were the other craft doing at the time? Were they stationary? Moving? At what speed? And what types of boats were they? — have not been addressed.

Also the U.S. Coast Guard's recreational boating statistics, which include national and state-by-state statistics on boating accidents, fatalities and property damage are based only on those incidents where boating accident reports have been submitted.

- 29 See discussions in *Tims Ford Reservoir Recreational Boating Capacity Study*. February 2002. Tennessee Valley Authority.
- 30 For example, in state statutes or regulations, "vessel" is commonly defined as "every description of watercraft used or capable of being used as a means of transportation on the water." However, other definitions specifically exclude seaplanes. Some states distinguish between commercial and non-commercial vessels in their definition and others exclude watercraft less than a certain size.

State definitions of "personal watercraft" vary too, though two common elements include the motive powering mechanism and from what position the craft is operated.

For more information on variations in state regulations, see *Reference Guide to State Boating Laws*, 2000. 6th ed. National Association of State Boating Law Administrators. See [www.nasbla.org/pdf/Nasbla Ref Guide 6.pdf](http://www.nasbla.org/pdf/Nasbla%20Ref%20Guide%206.pdf).

SECTION 3: A CLOSER LOOK AT MULTIPLE USE WATERWAY MANAGEMENT APPROACHES, TOOLS AND PROCESSES

Tailoring the methods to the priorities and objectives

"... The combination of natural recreational use increase, increased requests for marina and public use area expansions, and new residential developments with associated private water use facilities created a scenario for decision making in which the information that would fuel the decision was lacking. Add to it an influx of the recreation public from other parts of the region seeking a less crowded boating experience, and the TVA faced a critical need to study the issue and explore ways that it could effectively answer the questions of whether the [visitor] experience was overcrowded and unsafe and whether the area could handle additional pressure."

— On a Tims Ford Reservoir pilot project that collected boating data and evaluated a methodology for assessing recreational boating capacity on the Tennessee River system¹

"... Some surveys have asked boaters if they would like to see fewer boats on the waterway, which leads many people to respond 'yes.' Upon follow-up discussion with some of these individuals, they [say they] stated 'yes' because they perceived that their access to boat on the waterway would not be restricted, and that they would be on the water to actually 'see fewer boats' there. What if they had been asked, 'Would you like there to be fewer boats on the water, even if it means your access to the waterway would be restricted?'"

— A former state boating law administrator on boaters' perceptions of questions about waterway limits and their opportunity to boat ²

"... [In past public input efforts,] staff had met with individual stakeholder groups and conducted large workshops to receive public information on issues and critiques on proposed management actions. . . While the large workshops provided forums for various vocal boating groups, they seemed to leave the average user without a comparable forum. As a result, staff used a different process for involving the public and their representatives [in the update]... A stakeholder committee representing 22 different groups whose members or constituents would be affected by the management actions assembled to evaluate staff's recommendations and, by consensus, propose alternative methods for solving problems. The incentive? If [the committee] could not come up with [100 percent] consensus solutions, then the staff-driven recommendations would prevail...." — On one element of the Lower Colorado River Authority's process for updating the Lake Travis Recreation Management plan³

"... With nearly 15 different rowing organizations in the area, including high school, private club and university teams, the problem [of rowers and rowing clubs using the Tennessee River's main channel and not paying as much attention to commercial traffic as they needed to] was increasing. A meeting ensued with area rowers, commercial marine operators, the U.S. Coast Guard, the Coast Guard Auxiliary, the U.S. Army Corps of Engineers, and the Tennessee Valley Authority. The result?: a tentative operating plan for rowers to allow them to operate safely on a specific stretch of the river. The Coast Guard issued a Marine Safety Information Bulletin for commercial traffic alerting the towing industry of the rowers in that area. Recommendations also were made for rowers to use more safety equipment, including PFDs and illuminated markings on their craft, when practicing for their events...." — On establishing a safety operation plan to head off conflict between commercial operators and participants in the growing sport of rowing in the Tennessee Valley⁴

"... 'Regulatory approaches to keeping boats from anchoring in various locations left many boaters bewildered ...' Cities and counties were developing their own restrictions on where and how long a boat could anchor. [Yet] few cities and counties ... had the resources to enforce their regulations. Meanwhile, sea grass beds and corals in the most popular spots were getting torn up as anchors were dropped and pulled up. '... Boaters were anchoring in the wrong places and didn't know they were impacting grasses and corals.... So we're giving them information on places to anchor and how many boats can anchor at each site without harming grasses and corals. ... We're not just asking them to make safety decisions, but environmental decisions as well. That's new ...' — University professor emeritus and coastal recreation expert on a non-regulatory approach to anchorage management ^{5 6}

... The river's configuration and broad range of on-water uses — commercial (including barge traffic) and private recreational boat traffic (including fishing, water and jet skiing, canoeing and kayaking) — gave rise to a number of user conflicts ... A Water Use Conflict Memorandum of Agreement [MOA] established four categories of voluntary water use areas segregating potentially conflicting uses and protecting fragile wetlands. ... The intent was that the cities and the resource agencies with river and adjacent land management responsibility use the MOA map and categories in boater safety programs, literature, signage and other educational programs. ... A second aspect of the public awareness strategy would involve siting new boat launching facilities in locations minimizing on-water use conflicts, visual impact on natural surroundings, and adverse impacts on aquatic and shoreline ecosystems. Signatory agencies would agree to consult before siting such facilities. ... Why the voluntary route on water use? For one thing, many problems were attributed to lack of public awareness about the location of environmentally sensitive areas and the impact of human activities. MOA partners thought many river users might not be aware of the areas most suitable for their activities, leading to conflicts between different uses and causing damage to fragile areas of the river. — On creating a Water Use Conflict Memorandum of Agreement for the North Landing River in southeast Virginia⁷

"... Staff became concerned about the consistent complaint that the lake was too crowded with boats. Although this was not new ... it was apparent that something had changed. The increased presence of jet skis seemed to be the catalyst. The existing boating capacity of 40 vessels had been in place for over 20 years and had served as a realistic upper limit of use until the recent increase of personal watercraft use elevated the boat accident rates over the normal low rate of 2-3 per year to 10-11 per year. ... [So] staff researched the varying methods that several parks had used to establish boating carrying capacity. It became very apparent that the method for determining the capacity is a very individual situation and differed markedly from park to park. The essence of the existing information on boat capacity was that there is no formula that works for all the many varied waters that have vessel use. The method advocated was to use local conditions and site-specific management mechanisms in combination with input from local users to solve capacity issues..." — Colorado state park manager on the individual nature of boat capacity decisions⁸

"... There is no single solution for how to optimize a balance between the goals of safety, mobility and natural resources. So what constitutes an appropriate solution for reducing risk on one waterway may not be appropriate for another...." — Resource expert on "reframing" the concept of "capacity" on public waters⁹

At first read, this litany of waterway management excerpts might seem little more than a random collection of approaches and ideas. On second read, though, it might become more evident that as a collective they speak to some of the significant shifts in multiple use waterway planning and management in recent years, and four areas of increasing emphasis:

- More recognition that gathering and interpreting sound information is essential to addressing questions you *need*, not just *want*, to answer;
- Active incorporation of a wider range of waterway stakeholders into multiple use problem solving and management decision making — and, as important, modification of participation processes that haven't yielded meaningful results;
- Serious consideration of non-regulatory, voluntary and education-oriented approaches as viable first steps or as alternatives to adopting new restrictions and regulations; and
- Growing acknowledgment that a single, meaningful template or formula for resolving all waterway capacity issues really doesn't exist.

The first edition of this **Guide** — in its offerings on Waterway Management Techniques¹⁰ and Research, Planning and Management Guidelines¹¹ — touched upon aspects of each of those areas, but gave full voice to that final point:

"... Some [waterway management] techniques are easy to define, while others are troublesome and difficult to administer. ... Various waterway conflicts and carrying capacity problems often require the application of different techniques. ... The techniques in this section are not recommendations. Rather, there are many ... from which to choose, given your particular waterway area and circumstance. There is no one single, best technique. ..."

In this section, we'll revisit some of the basic waterway management techniques outlined in the original **Guide**, focusing primarily on those most applicable to multiple use situations in today's environment. Many will be familiar to readers of the 1996 document, prompting some to ask, "So what really is the difference in this 'update'?"

The biggest differences it turns out are not so much in the "tools" of the waterway management trade itself — there remain only so many from which managers and planners can choose to ease or resolve conflicts between waterway uses, alter the quality of the experience for the waterway user, or respond to shifts in waterway conditions.

Instead, some of the major differences, as evidenced in examples drawn from across the country, are in:

- Which techniques are being applied, how they're being applied, and in what combinations — decisions that in many instances are being influenced by the trends and issues described in Section 1 of this **Guide**.
- The "yardsticks" that are being used to measure their effectiveness, and the push to ensure that science plays a primary role in gauging their potential impacts.
- The integration of individual techniques and tools into longer-term strategies and more comprehensive planning and decision making frameworks that look beyond the most immediate "annoyance" to a vision of the total waterway experience, as described in Section 2 of this **Guide**.
- The players in the decision-making — "who" is involved in the critical decisions to use, keep and modify those techniques over time?

Regional guidance to local waterway planning: *Managing the waterways of Hampton Roads*

The Hampton Roads region of Virginia, one of the fastest growing in the state, is made up of a vast network of canals, rivers, bays and oceanfront holding natural resources integral to the region's identity, character, economy and quality of life. Those waterways also provide the region and its growing numbers of recreational enthusiasts, a wide variety of outdoor opportunities, including boating, fishing, water skiing, sailing, windsurfing, surfing, swimming and nature observation.

But in recent years, those increased numbers have been giving rise to conflicts and incompatibilities between recreational users, the natural resources and waterfront residents. Left unaddressed, they were expected to increase, and eventually diminish the public safety, recreational, and environmental qualities of the waterways.

Intent on taking a comprehensive approach to multiple use waterway planning — addressing public safety, environmental and recreational issues in resolving use conflicts — the Hampton Roads Planning District Commission (HRPDC), with a grant from the Virginia Coastal Program, initiated a waterway management study in 1996. As part of that effort, it also developed pilot management plans for two waterways in the region: the Hampton River and the Lynnhaven River system.

Using a modified version of the planning guidance provided in the first edition of *A Guide for Multiple Use Waterway Management*, HRPDC staff held meetings and interviews with representatives from state and local agencies and regional interest groups to gather information about current waterway use conflicts and any obstacles to conflict resolution.¹ State park managers and officials from local parks and recreation, planning and marine patrol officers were invited to share potential management alternatives. Information from a simultaneous study on boating safety by the state's Department of Game and Inland Fisheries also was integrated into the waterway management study, as was input received during public meetings and local advisory committee meetings.

The Waterway Management Study identified two key issues of concern in the region:

- A lack of awareness by the recreational public of existing natural resources in waterways and the effects their activities may have on these resources; and
- A lack of understanding by watercraft operators of existing waterway regulations and rules of navigation and safety.

What the study also uncovered were legal, fiscal and interagency issues that restricted efforts to manage waterway uses, among them: limited funding, confusion about the extent of state and local authority on public coastal waters, a lack of interagency communication on waterway use issues, and a lack of legal authority by the state's Department of Game and Inland Fisheries to pass rules to protect natural resources from recreational water uses.

As significant as the study's findings was the preparation of those pilot waterway management plans to help guide local waterway planning efforts should they be undertaken in a more comprehensive manner. The plans provided information on the legal and institutional waterway use management framework, and recommended management options and actions — from educational and administrative to legal and financial — to reduce waterway use conflict in the region.

But while the plans emphasized — as the preferred management alternative — the need to improve the public's knowledge of existing natural resources on the waterways and of existing rules and regulations (by posting signs and developing comprehensive boater guides), they also provided for supplemental regulatory measures to reduce certain waterway use conflicts.

Those regulatory measures recommended by the plans included: establishing a "slow-no wake zone" within 50 feet of all vessels, shorelines, docks, swimmers and other waterway users; restricting vessel parking along beaches in narrow waterways to a designated vessel parking area; and prohibiting fishing in heavily trafficked areas to certain hours. The plans also recommended increasing public access in areas identified as potential access sites.

See also, *Boosting public awareness when a regulatory approach isn't feasible: the North Landing River Waterway Use Conflict Memorandum of Agreement*, p. 55 of this edition. And *Managing Multiple Recreational Use Conflicts in the Waters of Hampton Roads*. March 1998. Vol. 1, Waterway Planning Guidance, and Vol. 2. Pilot Waterways Studies. Hampton Roads Planning District Commission. See www.hrpdc.org.

¹ Representatives included staff from the Virginia Coastal Program, Department of Environmental Quality, U.S. Coast Guard, U.S. Coast Guard Auxiliary, Department of Game and Inland Fisheries, Virginia Marine Resources Commission, Department of Conservation and Recreation, and the Hampton Roads Recreational Safe Boating Coalition.

In this section, we'll also take a look at three areas of increasing interest, and in some respects controversy, in the realm of multiple use waterway management: what's fueling the interest in *non-regulatory* and *voluntary approaches* to managing multiple uses; the evolution of *carrying capacity* and rethinking of the effectiveness of waterway limits and restrictions based on numbers alone; and *data collection for the waterways*, particularly in monitoring boat traffic and in gaining knowledge about boaters and their opinions as input to planning.

But before we begin the exploration, a word of caution similar to that extended in the first **Guide**: the descriptions and discussions of waterway management techniques, the issues surrounding them, and examples of their use throughout this **Guide**, are meant neither as recommendations nor as endorsements.

In the case of some illustrations here and in other sections of the **Guide**, even the implementers likely would agree their work really is "not done," and is being "tweaked" to better meet management goals and objectives. In others, implementation hasn't been underway long enough to collect the volume or quality of data that will reveal how close they are to achieving longer-term objectives.

But these examples — as well as the discussions on methods, tools and processes — are presented in the spirit of this edition's primary intent: to inform and to facilitate ongoing learning and exchanges about multiple use planning, management and regulation and the outcomes of these efforts.

Basic Waterway Management Tools and Techniques

And some thoughts about "selecting" from the menu ...

When the first edition of the **Guide** presented these techniques, it did so after describing a generic management planning process, a framework for recommendations on everything from the "physical element" — the water surface and shoreline — to the operational, legal, financial and promotional elements necessary for implementing a waterway management plan.

The techniques presented in this update focus primarily on those associated with the physical aspects of the multiple use waterway, the craft and users on it, and the shoreline activities. For reference, though interrelated in many cases, they are grouped under four broad categories similar to those presented in the first edition: Information & Education, Law Enforcement & Boater Regulations, Water Use Activity Controls & Traffic Management, and Access Distribution & Development.

Before you read the "menu," keep in mind:

- Section 2 of this **Guide** offers preparatory information about principles that can guide waterways management planning (page 28), keys to identifying waterway problems (page 37), and possible decision criteria that can form the basis for developing and weighing alternative actions (page 39).
- The tools you use should be driven by the objectives and priorities you and your stakeholders set for the waterway and its users.

- Several important conditions and characteristics will influence the types of controls you can select — if indeed, controls are an integral part of the strategies that will help achieve your objectives — and they will dictate how well certain techniques will work. They include: the waterway type; its size, depth and shape; the presence or prospect of shoreline development; the waterway's relationship to others in the region; environmental factors; accident and safety records; waterway use patterns; and the compatibility or incompatibility of uses and watercraft that you determine through observation, data collection and analysis.

INFORMATION & EDUCATION

Several types of informational and educational products can complement other techniques. Whether rules and regulations or some other less restrictive tools are adopted, accompanying information and educational materials could make a major difference in compliance — mandatory or voluntary.

User information and education about how to use, protect and enjoy the waterway

Information media and materials that can educate users and make them more aware of how to have a safe experience, along with their ethical responsibilities for protecting natural resources and the quality of the experience for themselves and other waterway users, can be used to help lessen or even prevent activity

conflicts, reduce accidents, or mediate user overcrowding and overuse of resources.

"Traditional" media, such as tried and true print education packets, might include summaries of boating rules and regulations — something particularly important for rentals and boaters from out-of-state; lists of special boating regulations for the waterway and safe boating practices and common courtesies; boater safety checklists; a waterway boaters' guide; boaters' rules of the road; and special highlights of any speed or proximity rules.

But newer and younger water users might be more attuned to electronic technologies for tapping into this information, such as websites that they can search before arrival, or on-site launch ramp kiosks with colorful, interesting graphics, like interactive maps outlining restricted areas and even information about watchable wildlife and fowl on or near the waterway.

Boating guides and maps, navigational charts and aids

Mentioned above, these graphic depictions of boating rules and regulations, including any restricted and limited boating use areas or potentially hazardous areas, can be incorporated into well-designed, clearly written guides. Navigation charts, maps, waterway markers and vessel traffic systems also can be used to help reduce water use conflicts and promote safety, especially at larger, heavily used waterways.

But it pays to remember that just because you post signs and markers or put up charts doesn't mean that boaters

Continued on page 56...

Boosting public awareness when a regulatory approach isn't feasible: *the North Landing River Waterway Use Conflict Memorandum of Agreement*

The North Landing River, designated as a state scenic river and part of the Intercoastal Waterway, is located in southeastern Virginia in the cities of Chesapeake and Virginia Beach. Its narrowing and winding configuration, broad range of on-water uses – including a large volume of commercial traffic and private recreational boat traffic – and rare and unique wetlands types, have combined to give rise to user conflicts.

To begin addressing these concerns, the Hampton Roads Planning District Commission (HRPDC) coordinated creation of a Waterway Use Conflict Memorandum of Agreement (MOA), intended to establish a set of voluntary waterway use areas that would segregate potentially conflicting uses and protect fragile wetlands. The need for the MOA actually emerged during goal setting for the Southern Watershed Area Management Program, which had its own goal of achieving a set of management enhancements intended to balance natural resource protection and sustainable economic development.

The North Landing River MOA was designed with two primary goals in mind:

- To promote safe boating through increased public awareness of existing and potential waterway use conflicts; and
- To protect rare and unique ecosystems from damage by on-water uses, most notably by raising public awareness of the importance of these native ecosystems to the river's health and the continued viability of this important natural and recreational resource.

It features use categories ranging from low-impact and general recreational to high speed and special use. What are the differences?

Low Impact Recreation – To promote safe boating by separating conflicting uses and to protect and preserve wetlands areas. Recommended policies include the use of no wake speeds, the avoidance of high speed recreation, and the encouragement of activities best suited to the areas, including wildlife observation, canoeing, kayaking and fishing.

General Recreation – To promote motorized recreational activities in the safest areas while minimizing adverse environmental impact. Recommended policies include keeping motorized

boating 500 feet from shore where possible and no wake speeds within 500 feet of shore or low impact uses and non-motorized craft.

Special Use/High Speed Recreation – To focus high speed motorized recreation in the safest and least environmentally sensitive areas. Recommended policies include encouraging jet skiing, water skiing and other high speed uses only, and discouraging other recreational activities in these areas.

A map included with the MOA depicts the recommended use areas, but adherence is strictly voluntary, with no intention that the categories or the map be used as a water zoning system or as a basis for enforcement action. Instead, the two cities and the resource agencies with management responsibility on the North Landing River and adjacent lands can use the map and use categories in boater safety programs, literature, signage and other educational programs.

A second aspect of the MOA's public awareness strategy involves the appropriate siting of new boat launching facilities. The intent is that new facilities be located to minimize on-water use conflicts, and designed to minimize the visual impact on natural surroundings and adverse impacts on aquatic and shoreline ecosystems. Signatory agencies would agree to consult with each other before siting such facilities, but again, the information exchanged would be purely advisory.

Why? It was the most feasible approach. Many of the problems were attributed to a lack of public awareness about the location of environmentally sensitive areas and the impact of human activities. Partners in the effort thought that many river users simply might not be aware of the locations most suitable for their activities, thus leading to conflicts between uses and damage to fragile areas. There were other reasons too. For one, HRPDC research indicated that a regulatory approach to use conflicts was not possible since Virginia lacked an existing enabling authority to regulate waterway activities for the sake of environmental protection; then there was a lack of available resources for enforcement.

What was the framework for developing the MOA approach? It was a product of the earlier study on *Managing Multiple Use Conflicts in the Waters of Hampton Roads* (see "Regional guidance to local waterway planning: Managing the waterways of Hampton Roads," p. 52 of this edition). That effort provided the methodology for addressing waterway conflicts and solutions in the region.

For more information, see "Water Use Map for the North Landing River." 2000. *Virginia Coastal Program News*. Publication of the Virginia Dept. of Environmental Quality. Special Edition 2000. p. See www.deq.state.va.us/coastal/images/news2000.pdf. Also see, "Final Agreement Approved for North Landing River." Winter 2002. *Hampton Roads Review*. Quarterly Publication of the Hampton Roads Planning District Commission. p. 2. See www.hrpdc.org/publications/newsletters/winter2002.pdf; and See also www.hrpdc.org/pep/presentations/NorthLandingMOAJuly00_files/frame.htm and www.hrpdc.org/xx_archive/northlanding/moa.shtml for the Draft MOA

will necessarily notice them, fully understand or obey them. If your waterway has more transient boaters, then more signs at launch ramps and access points may help. More regulars? — then more written guides and brochures might be the key.¹³

Network of numbered and lighted buoys or markers.

In darkness or poor visibility and especially on larger waterways with irregular or heavily-populated shorelines, navigation systems of numbered and lighted buoys or fixed marks positioned so that the watercraft user can see the next one in the line of travel from any other buoy, can give useful assistance to boaters.

There can be drawbacks, though, primarily from the costs and maintenance of such markers and the difficulties of publicizing them both to locals and transient users.

Some jurisdictions have already discovered another drawback: with the convergence of the development of shoreline properties, the use of restricted areas along the waterway, and the exacerbation of conflicts between private landowners and other water users, come some unique problems in ensuring markers' uniformity. At least one state had to enact a new set of provisions to stop private landowners and local authorities from a growing practice of placing signs of their choice along the waters.¹⁴

LAW ENFORCEMENT & BOATER REGULATIONS

From tighter enforcement to boater licensing, these are surely more straightforward than some other management tools that might be considered more "creative." But with today's fiscal environment and increasingly strained resources, these more "traditional" means of managing multiple use waterways might need some innovation to ensure they serve their purposes and yield results.

Stepped up rules/regulations enforcement and patrols

Increased patrols and more strict and consistent enforcement of existing rules and restrictions — especially during the waterway's peak use periods, weekends and holidays — can make watercraft operators and water users more cautious, impart an implicit safety message, and demonstrate that rules will be enforced. While it might not be a pleaser with every group along the waterway, stricter enforcement, though costly, is more likely to be favored by users over the creation of more rules and regulations.

But in the future, any common wisdom about what constitutes "peak periods" and when to increase patrols and officers — including cooperative arrangements with local police departments for patrols — could give way as a result of shifts in leisure time and opportunities. It's also likely that "different," not just "more" law enforcement will be needed.¹⁵

Age minimums

At most recent count, 40 states, plus the District of Columbia, had imposed age restrictions for operating motor powered watercraft. Of those states imposing minimum ages on vessel operations, about 80 percent require adult supervision. Forty-six states, plus the District, had imposed a minimum personal watercraft operator (PWC) age. And of the states imposing minimum ages on PWC operations, 63 percent require adult supervision.¹⁶

Education, certification, and licensing

Although not mandatory in all jurisdictions, boater education and licensing — intended to make waterways safer and to potentially reduce conflict and reckless behavior — are becoming more prevalent methods of managing use on the waterways than they used to be.

The 1988 *Boating Safety Manual* produced by the U.S. Coast Guard revealed at the time that no states had mandated operator licensing or boating safety education. Today, the states have a mix of requirements affecting operators of different ages and of different types of craft, such as personal watercraft. As of spring 2003, 39 states, plus the District of Columbia, Puerto Rico and the Virgin Islands, required some form of operator education, while several others had legislation pending. Four had mandatory licensing provisions, one requiring education along with the licensing.¹⁷

WATER USE ACTIVITY CONTROLS & TRAFFIC MANAGEMENT

From zoning and speed limits to permit issuance and commercial traffic lanes, these techniques are among the options available for managing the surface and activities on multiple use waterways. But each has a set of requirements, and if used improperly or without a significant investment of time to educate and inform users, can end up creating confusion and discontent rather than harmonious compliance.

Zoning

There are several kinds of zoning policies briefly described here that can be implemented on multiple use waterways, but each needs to be responsive to the unique waterway situation. And while zoning the waterway or areas within it may well separate incompatible watercraft and water contact activities, heighten safety, control congestion, keep traffic moving, or have any number of other desired outcomes,¹⁸ there can be costs to using — or over-using — it as a primary management technique.

With concerns among some waterway users about increasingly inaccessible waters and limited water space, it's important to remember that zoning does reduce the area that everyone gets to use. At the same time, there can be additional direct costs associated with purchasing markers, creating informational materials, and enforcing the zones to make them meaningful. But it might be the "hidden" costs that end up thwarting zoning's effectiveness, particularly if its use is not adequately couched in a broader view of the waterway and understanding of the waterway users.

Consider the prospect of a family with a motorboat, personal watercraft, and a couple of swimmers in the pack. Zoning for each activity might have one of at least two outcomes: splitting up the family, perhaps creating more discipline and behavioral problems on the water, or spurring them to look elsewhere for their recreational opportunity. Just another reason to carefully weigh alternatives and make studied decisions about any of the techniques listed here.

• Zoning for certain activities

- *Fishing zones.* To preserve fishing quality, these zones may be created in upstream or cove areas, and established by making an area "No wake" (see "No wake" zoning, p. 59 of this *Guide*) or by setting a watercraft speed limit below 6 mph. Alternately, an area can be marked with buoys or indicated on a map.
- *Swim zones.* On lakes, ocean bays and flat water rivers, swim zones may be established by sectioning off an area with floating buoys. Placing a set of navigational "No Boat" buoys beyond the swim area also can create a "buffered" zone where neither swimmers nor boaters are allowed.
- *Water skiing and other activity area zones.* Whether marked by buoys or indicated on a map, these zones may be used on lakes and bays for safety purposes and to reduce activity conflicts.

• Special event zones

For lakes, ocean bays and flat water rivers that host high-speed events such as water skiing tournaments and boat races, segregated special event zoning may be an option to consider. Highly specialized zones, such as competitive

To zone or not to zone?: the Virginia Coastal Program's model for determining potential for shallow water use conflicts

As Virginia's coastal population has continued to grow, recreational and commercial demands – everything from boating to aquaculture – have been placed on the near shore, shallow waters that also provide critical ecological functions and habitats for a variety of finfish, shellfish, marine mammals, sea turtles and birds.

Would there be a way – beyond zoning – to handle growing conflicts and ensure that each type of use got the space and conditions it needed?

The Virginia Coastal Program posed that question to the Virginia Institute of Marine Science (VIMS) beginning in 1999, when the concern was a perceived conflict between restoration of submerged aquatic vegetation (SAV) and clam culturing operations on the bayside of the eastern shore. But with the population growth in the area, the concern expanded to include all uses and all coastal waters.

With funding from the Coastal Program, the Institute of Marine Science began creating a mapping model that would allow managers to see where uses could overlap and where conflicts could arise.

To build the model, the Institute laid out the following steps:

- Identify all potential uses;
- Identify environmental conditions required for the uses;
- Map where conditions are appropriate for particular uses;
- Analyze the use conflict areas to determine if one use impacts or precludes the other;
- In areas of potential use conflict, weigh the ecological, social and economic value of each activity;
- Identify the policy options to optimize use of an area;
- Review existing legal and regulatory mechanisms; and
- Involve stakeholders in development of use plan

Though VIMS and the Coastal Program recognize that there are likely "many gaps" in their understanding of required environmental conditions and their locations, already some uses have been mapped. For example, VIMS has developed charts of required environmental conditions for recreational swimming and boating, shellfish aquaculture and fisheries. One map overlays potential crab scraping, swimming, SAV and recreational boating in Mobjack Bay and then color codes areas by the number of potential conflicting uses – from one use to four uses – that could occur. In the initial mapping of that Bay, only a very small area showed a potential for high conflict.

For more information, see *"Shallow water use conflicts."* 2002. Laura McKay. **Virginia Coastal Management.** Publication of the Virginia Department of Environmental Quality (www.deq.state.va.us). Spring/Summer 2002. pp. 4-5. www.deq.state.va.us/coastal/documents/magazine.pdf.

water sport areas, would have permanent courses isolated from other water traffic and activity.

- **Anchorage / no anchoring zones and mooring / no mooring areas.**

Intended to prevent obstructions and congestion on heavily used channels and scenic areas or to protect water quality and prevent damage to sensitive aquatic areas, these zoning techniques can alternately keep water traffic on the move or offer boaters safe anchorage locations for overnight or extended periods of time (see an example of an anchorage management program in Collaborating on a non-regulatory approach: Southwest Florida's Anchorage Management Program on page 71 of this Section).¹⁹

- **Pass through zones**

Along rivers and narrow waterway segments, especially those near private waterfront developments, "pass through" zones and regulations can help move boat traffic more safely and reduce conflicts between recreational water activity and adjacent development. The zone serves solely as a transportation channel prohibiting recreational activities.

- **Time or day zoning**

For areas where certain water activities bring high traffic density or space limitations, especially on particular days or at particular times of the day, this zoning can be used to help reduce conflict and competition for space. For example, a lake with higher levels of activity on weekends could prohibit

water skiing and high-speed traffic in coves or other areas to increase safety. Or areas that experience very different, incompatible activities over limited water space could be managed with different time zones or alternate days for activities. Like other zoning types, though, compliance often requires a strong public awareness program and law enforcement presence.

- **"No wake" zoning**

Alternately called "no wake" or "slow and no wake," this zoning also can be implied by setting speed limits for watercraft in the range of 5 or 6 mph. A recent survey of the states' practices on inland lakes suggests that about 40 percent use "no wake" or its equivalent on the entire waterway.²⁰

Applied typically within 100 to 300 feet of shorelines or in other areas with shallow depth or submerged objects, this zoning has been used with the intent of reducing activity conflicts; addressing noise complaints from shoreline residents; alleviating shoreline erosion and damage to sensitive wildlife, plant life and natural areas; preventing damage to shoreline structures and craft moored in shallow waters or tied to docks; or preventing collisions, groundings and swamping.

If shoreline erosion is a primary concern on your waterway, remember that wind wakes create erosion as well. Knowing more about the science and causes of damage is always critical before you automatically assume that implementing and enforcing this type of zone is going to clear up resource damage.

At least according to one university study, though, a "no wake zone" or a steerage speed zone – the minimum speed necessary to maintain steerage of the craft while producing no wake – might really be better than using the "no wake-implied" lowered speed limit to prevent the pollution and water quality problems that can occur when boats stir up a lake bottom.²¹ The findings suggest that imposing a uniform speed limit could lead to significantly different impacts for boats of different sizes. Between 6 and 8 mph, in waters shallower than 6 to 8 feet, there is maximum potential for prop wash to stir up lake sediments. An 8 mph speed limit, then, could actually aggravate rather than reduce turbulence problems.

- **"No boat" zones and "restricted" areas for hazard management**

These zones can be used to prevent watercraft from operating too close to dams, spillways, power lines, waterfalls and other potentially life-threatening hazards. Where a strong current exists or steady water flows over dams or falls, warning signs and buoys would be placed far upstream and downstream from the hazardous area. Having a means of portage available also could help boaters trying to get past hazardous areas.

- **"Speed in proximity" zones**

This zoning requires watercraft to operate at slower speeds within a designated distance of other watercraft and water users. For example, it might require watercraft to slow down to 5 mph or "no wake" when it comes within

Continued on page 62...

Updating a lake management plan ... and creating uniform management actions: *Lake Travis and Highland Lakes Recreation Management Plans*

The Highland Lakes Recreation Area — comprised of lakes Buchanan, Inks, LBJ, Marble Falls and Travis, and located northwest of Austin, Texas — has become one of the more popular areas in the state for boating and other recreational activities. With one exception, the Lower Colorado River Authority (LCRA) manages the surface of each of the Highland Lakes. It prepares lake management plans to fulfill its responsibilities for water quality, parks and recreation, and lake surface management in the lower Colorado River basin. The goal is to preserve the safety and quality of the lakes and their recreational opportunities, and the objectives include improving water safety and user enjoyment; maintaining and improving the water quality of the lakes; and providing public access to the lakes at appropriate locations.

In the case of Lake Travis, the LCRA prepared the first recreation management plan in response to a state Parks and Wildlife Department report that showed the waterway as having 51 boating accidents in a five-year period, the most reported in the state.

Beginning in 1993, the LCRA gathered information on lake management issues and proposed solutions through a series of user group meetings and community workshops; based on that input it identified and addressed a number of issues in the 1994 plan. They included law enforcement; voluntary boater education; lake levels and navigation and hazard buoys; regulatory needs; lake access; boater information and communications; and fishing enhancements.

Over the next two years, the LCRA undertook 52 separate actions, among the major ones: purchasing a second patrol boat; stepping up enforcement of provisions against boating while intoxicated, excessive speed, and reckless operation; installing mile marker and channel marker buoys; and designating "no swimming" areas within 50 feet of public boat ramps. Another was to hire a consultant to conduct a capacity study, the results of which would provide the baseline snapshot of boating conditions that could be compared to the results of future studies to determine trends in use and safety.¹

The LCRA updated the 1994 plan, using not only data from that capacity study, but also input from five community workshops and 10 stakeholder meetings. This time, the updated plan would contain 24 additional actions, including focusing law enforcement on the high use/high conflict areas of the lake and preparing a

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responsive law enforcement plan, and developing and distributing voluntary construction standards for private boat docks.

By 1999, it was clear that since the last planning process, the population base of central Texas had grown rapidly, with more residents and more boats around Lake Travis. These factors, along with an increasing number of complaints about deteriorating recreation conditions on the Lake —especially noise and speed often associated with personal watercraft and high-performance boats — prompted the LCRA staff to consider revising the 1996 plan.

To gauge the trends in lake use and conflicts, the LCRA sponsored a second snapshot of lake conditions and comparison of the two to determine how well the previous management actions had worked; to identify continuing and new problems; and to solicit new solutions.

For the 2000 Lake Travis plan update, though, there would be some changes to the public involvement and representation process. For one thing, a stakeholder committee representing 22 different groups whose members or constituents would be affected by the management actions was assembled to evaluate staff recommendations and, by consensus, propose alternative methods for solving problems. As part of the process, the LCRA established general expectations and guidance and "job descriptions" for those representatives.² The ground rules were that the committee needed to arrive at 100 percent consensus for its solutions; if the members couldn't, then the staff-driven recommendations would prevail.

Another change involved conducting a public hearing on the proposed rules that the LCRA Board would consider for the Lake. And finally, the LCRA's Lake Travis web page was upgraded to include copies of previous plans, other pertinent legal information, the planning schedule and an experimental issues discussion forum.

The six problem areas in which LCRA staff made preliminary recommendations for the stakeholder committee to evaluate were: watercraft noise, the primary reason boaters cited for avoiding some areas of Lake Travis; watercraft speed; watercraft congestion and

conflicts; boating and swimming education; law enforcement; and private boat docks and marinas. In evaluating alternatives and selecting the proposed rules and other recommendations, each had to meet five criteria —be understandable; legally defensible; enforceable; affordable; and technically achievable.

In making the recommendations, though, staff recognized that lake conditions and the rules and management actions on one lake might affect recreational use of the other LCRA-managed Highland Lakes. For example, one lake's ban of personal watercraft on summer holiday weekends could force those boaters to visit other lakes, creating congestion at boat ramps and on the water. For that reason, the LCRA considered applying some of the rules and management actions to all of the lakes, an action that would help the public remember the regulations as they moved between lakes and would allow for more uniform law enforcement.

At the time of the Lake Travis planning process, the LCRA also was preparing management plans for two other lakes and was set to begin a plan for a third the following spring. Staff waited until new Lake Travis rules and management actions were adopted by the LCRA Board and then incorporated what was appropriate into the three new plans. Staff also reviewed the 1998 plan for another lake and recommended changes. Ultimately, the Lake Travis stakeholder committee adopted 33 proposals, LCRA's Board of Directors adopted the plan in January 2000, and the Board later extended the Highland Lakes Recreational Management Plan (which incorporated the Travis recommendations) to lakes Buchanan, Inks, LBJ and Marble Falls.

Among the uniform management actions: setting the watercraft noise regulation of 92 decibels, as measured using the Society of Automotive Engineers standard J2005 for pleasure boats; establishing a rule that no person may operate a vessel within 50 feet of the shoreline, structures or swimmers at a speed greater than the minimum speed necessary to maintain steerage and headway (a no wake speed); adding law enforcement personnel; and continuing the requirement that watercraft not operate faster than 20 mph or the minimum planing speed at night on the lakes.

For more information, see the Lower Colorado River Authority website at www.lcra.org; the *1999 Lake Travis Boating Recreation Study: Recommendations on Key Issues*. September 1999. Park Studies, Inc., for the Lower Colorado River Authority; and the *Highland Lakes (Texas) Recreation Management Plan*. 2000. Lower Colorado River Authority. See www.lcra.org/lands/lakeplan/.

¹ With the understanding that recreational carrying capacity was not a "magic" number of boats or an arbitrary space standard, the LCRA used a process to tap public perceptions and take into consideration the environment, safety and recreational quality. The LCRA hired U.S. Army Corps of Engineers' researchers to perform the capacity study using random boat counts and on-site and mail-back surveys to gather information from shoreline property owners, marina slip renters, and boaters using public launch ramps.

² Those groups included the local and county governments; chamber of commerce; neighborhood council; powerboat, bass club, marina, sportsmen conservationist, jet ski, yacht, and environmental associations; and the LCRA and Texas Parks and Wildlife Department. All meetings were open to the public and conducted by professional facilitators.

100 or 200 feet of moored vessels, fixed objects, swimmers, anglers, water skiers or the shoreline.

But, as with other methods described here, there are caveats. The water users' and enforcement officers' perceptions, the type and size of the waterway, and bank and shoreline situations are all important considerations. For example, even though water users might prefer greater distances between themselves and other users doesn't mean that this type of distance regulation can be generalized to all areas. It might be appropriate in large open water areas, but might not even be feasible for narrower rivers or bays.²² Then again, watercraft operators and enforcement officers alike might have some difficulty accurately judging the prescribed distance.

Speed limits

On heavily used waterways, speed limits can be established to reduce water use conflicts and enhance boating safety. Limits can be imposed for day and night or might be imposed only during peak use periods. Multiple speed zoning, using two or more speed zones, can be applied on larger bodies of water with moderate to high-density traffic and with many islands, coves and channels.

A recent survey of the states' practices on inland lakes suggests that about 70 percent have provisions for some method of lake wide speed limits, but the majority of those use lake wide limits on a quarter or less of their water bodies.²³

Just how difficult, though, is it to use and enforce this technique? Written

materials and posted speed limits at public and commercial launch ramps and marinas can be used to inform waterway users of the limits. But enforcement may be a problem for a variety of reasons, including the technical difficulties of determining accurate boat speeds, the lack of a speedometer or a functioning one on the watercraft, and the personnel required to enforce the speed limits.

Noise regulations and ordinances

Watercraft noise — interfering with some users' or landowners' overall enjoyment of a waterway or at "expected" quiet times, like early morning or late evening — has spawned various types of mitigating methods. Though sometimes difficult to evaluate — particularly with variations in sound travel during certain climatic conditions — noise mitigation includes restricting watercraft hours of operation, keeping "noisier" craft at further distances from the shore or "quieter" water use activities, or actual limits on the maximum noise levels emitted from watercraft.

As of the most recent survey of the states, 30 had set maximum noise levels for motorboats, with the standard for maximum noise level ranging from 75 to 90 decibels. Twelve jurisdictions allow local governments to enact ordinances governing boat noise. The standards used by most states are SAE J-2005 (stationary test) and SAE J-1970 (shoreline test), sound testing procedures developed by the Society of Automotive Engineers to measure the decibel level of stationary and moving motorboats, respectively.²⁴

Watercraft horsepower limitations

Limits on horsepower or motor size limits, as a management tool on multiple use waterways, might be desirable for controlling noise from varied craft, controlling wakes, and even preserving wildlife viewing. Since it can also serve as a not-so-subtle means of controlling access by certain types of craft, once again, the physical features of the waterway, a good understanding of boat usage and users, and overall objectives should be factored into any decision to use horsepower limits.

This technique usually means no motors, electric motors only or, generally, less than 10 horsepower. A recent survey of management practices on inland lakes suggests that nearly 70 percent of the states have provisions for horsepower limits, with over 60 percent of those for "no motors," and nearly 70 percent of those for "electric only."²⁵

Permits and permit systems

For multiple use waterways that hold special events, like fishing tournaments or regattas, a permit process may be one way of preventing scheduling conflicts — assuming users are informed beforehand — and of determining accountability if any problems do arise.

In a broader sense, though, permit systems can serve other ongoing management purposes. For example, permit issuance is one method for controlling the number or specific type of users within a given area on a waterway between designated controlled access points. These systems, which have

developed their own level of controversy among paddlers in particular, most often are used during peak seasons at whitewater paddling areas. Typically, the issuance of these permits — via first-come-first-served, price, lottery, merit or advanced reservation system — is allocated between private boaters and commercial outfitters on a percentage basis.²⁶

Apart from controlling numbers of users, though, permit systems also can serve as a way of informing and educating waterway users — get a permit, receive a map of the waterway, buoy system and environmentally sensitive areas, and a list of facilities, rules and regulations — and of offsetting management costs.

User fees

Another, somewhat related way of producing revenues to help defray management and maintenance costs of multiple use waterways, is the imposition of user fees.

Many jurisdictions that manage recreation resources and provide public facilities and services have found themselves resorting to fees due to reductions in other traditional revenue sources.

In other cases, though, user fees are part of a conscious decision to ration, control overcrowding, and reduce conflicts and resource overuse. But as with some of the other techniques, they also have drawbacks. They may have the unintended effect of discouraging use, be unacceptable to many users, restrict use to those most able to afford higher fees — something that needs to be carefully

weighed in the context of public waterways — and perhaps even increase user expectations about the experience and level of service.

Rotational watercraft traffic patterns

Especially on small- to medium-sized lakes and bays, with fairly round and regular shoreline configurations, a preset, marked pattern — applied to specific activities, to activities within a water area or to the entire waterway — could create a more uniform traffic flow that helps ease congestion, and in the process, reduces activity conflicts and creates a more leisurely experience.

Speed lanes for hazard management

Used for segregating high from low speed traffic and for managing waterway hazards like submerged objects, this technique is intended to increase safety by inhibiting the opportunity for watercraft groundings, collisions with stumps, rocks and other objects, skiing accidents and watercraft damage. Lanes are set up where no submerged objects exist, thus creating a marked "safe boating" area. Use outside the designated speed lane is at the user's risk.

Commercial traffic lanes and information

Big commercial and military vessels typically must stay within marked channels, and Rule 9 of the "rules of the road" specifically states that small watercraft "shall not impede the passage of a vessel which can safely navigate only within a narrow channel or fairway." In heavy use areas such as harbors, ports and larger rivers then, commercial traffic

lanes or "safety areas" marked by buoys and indicated on charts and other navigational information are used to help reduce the potential for water conflicts.

But these designations work most effectively when all users are informed, when recreational boaters are educated about the dangers of traveling too close to these vessels and the constraints under which the big boats operate,²⁷ and when all parties involved in the use and management of the area can monitor and collaborate on the most appropriate management approaches.

ACCESS DISTRIBUTION & DEVELOPMENT CONTROLS

In reality, many of the techniques described to this point — from time or day zoning to user fees — can affect the degree, ease and frequency of "access" that a watercraft operator or water user has to a multiple use waterway.

And as we've already seen among the trends described in Section 1 of this *Guide*, access policies and practices are under the microscope of a range of fervent and, in some instances, quite different kinds of users who aren't uniformly happy to watch from the sidelines as their available water surface acreage and access shrink in the face of private commercial and residential shoreline development, public waterfront activity, and increasingly, designations of environmental, marine life and wildlife protected areas.

That means the technical aspects of access point distribution, launch ramp placements and support facilities location need to be

coupled with the broader and longer term answers to that bigger question of what it is that stakeholders want to achieve for the waterway. And it means that managers and planners need to become very familiar with riparian and water access laws.

Distribution of launch ramps and access points

The dispersion of launch ramps and other access points along a waterway can have the effects of thinning out its use and reducing congestion, perhaps even enhancing the users' experience. The environs and the types of watercraft that use the waterway are among the factors that will dictate the types of access and the distance between those points.

Like launch ramp closings, though, the method of distributing the access points also may raise the ire of some waterway users. Moreover, distributing rather than concentrating access points — potentially more satisfying from the standpoint of reducing "negative interactions" and downright conflict among crowded users in a relatively small area — is likely to increase operation and maintenance costs.²⁸

Support facilities size and location

The location, number and size of support facilities²⁹ — including parking areas, restrooms, marinas and campgrounds — have a direct relationship to the volume of waterway use, and in many respects, to the waterway users' overall experience.

Distributing them more evenly along the waterway *may* help alleviate overcrowding and overuse. Or not. Thorough

examination of their potential future impact has to be a critical part of the planning for support facilities and activity areas.

Entrance gates

For controlling use levels, this technique may be applied at boat launch and other individual activity areas. When parking areas fill up, gates are used to allow vehicles in only as others leave. But this is less likely to be effective where large private land holdings surround the waterway, and where there are numerous private slips and docks. And apart the downside of requiring significant management effort, it's also likely to be unpopular with "late risers," as it benefits most those users who can get to the waterways fairly early in the day.

Shoreline and vicinity management

Management of the water surface is important, but management of the shoreline and vicinity development is becoming increasingly so, especially at smaller and mid-sized waterways in urban areas and coastal resort locations.³⁰ Unplanned and uncontrolled waterfront development can be a major cause of activity conflicts, usurp prime waterway access, destroy a waterway's natural appearance, and potentially accelerate resource degradation.

But the shoreline management approach, like most other management aspects described here, depends heavily on the situation. Federal, state, county and local governments can have established regulations relating to shoreline and vicinity management,³¹ that include everything from wetlands protection and

Taking a comprehensive look at harbor facilities: *Lake Superior's North Shore Harbors Plan*

A number of studies conducted by Minnesota Sea Grant, the state's Department of Natural Resources (DNR) and other organizations pointed to an unsatisfied demand for recreational boat launching facilities, protected harbors, and to a lesser extent, marina slips on Lake Superior. In fact, a 1988 boater survey indicated that the greatest barrier to more frequent use of the lake was a lack of protected harbors on the coastline, locally known as the "North Shore."

In 1987, a North Shore Management Board (NSMB) was established. As a state-funded, multi-jurisdictional planning agency — with representatives of local government units and guided by citizen and technical advisory committees — the Board was deemed responsible for developing comprehensive solutions to Lake Superior coastal resource and development issues.

With the increasing demand for harbors, the NSMB initiated comprehensive planning to guide the location and development of harbor facilities, to protect the resource value of the North Shore, and to ensure that the public would be involved in and supportive of the process. The North Shore Harbors plan was completed in 1991, following a two-year planning process.

Under the plan guidelines, it would be the local governments' role to initiate activities to develop, build and operate the harbors, while the NSMB would be charged with monitoring their effectiveness in applying and enforcing the management plan, and the state's DNR would cooperate in sighting, designing and finding funds for construction. The NSMB anticipated that implementation would be slow because the costs of building a harbor breakwater were likely to exceed existing resources of local North Shore governments.

Based on boating characteristics, surveys, existing use, boating registration growth, community interest and concerns, and active projects along the North Shore, though, the NSMB still believed there was justification for a network of harbor facilities designed for multiple use, provided that the design and implementation were sensitive to environmental and aesthetic resource values. At the same time, however, the Harbors Plan acknowledged that a network of harbors could have certain effects that communities needed to be aware of as they proceeded with implementation, including the likelihood that:

- A network of safe harbors would increase boating use on the lake;
- Increased boating use of Lake Superior would provide a positive economic impact through increased tourism dollars for the North Shore;
- Additional harbor facilities could increase the financial burden on local communities, though it would be partially offset by revenues generated by the harbor facilities;
- Development of additional harbor facilities and increased boating use would create environmental concerns that would need to be carefully monitored and considered in planning and design; and
- Increased boating use of Lake Superior would increase the probability of boating-related accidents or safety incidents on the North Shore, thus requiring boater safety training to accompany harbor establishment.

The initial belief that implementation would require a multi-year time frame, has proven correct.

Implementation of the Harbors Plan and subsequent legislation establishing safe harbors began in 1999 with the completion of the Silver Bay safe harbor and marina. Taconite Harbor, a boat access and safe harbor only, was completed in fall 2001. More recently, state and federal funds were appropriated for additional harbors and accesses at Two Harbors and McQuade Road (Duluth). All of the sites have active local participation. All facilities provide boat access and protection from storms, and some will provide gas, dockage, sewage pump outs, and other boating and fishing services.

For more information, see *North Shore Harbors Plan, Recreational Boating Harbor Plan for the North Shore*. 1991. North Shore Management Board. Duluth, Minnesota; *Providing Public Access In Coastal Areas: Options For Landowners*. A fact sheet produced by the Great Lakes Sea Grant Network, Coastal Land Use Committee. 1996. Mary Bielen, et.al. See www.cce.cornell.edu/seagrant/tourism/publicaccessfs.html; and the Minnesota 2004-2005 *Biennial Budget Background for the Department of Natural Resources*, 11/26/02, p. 43. See www.finance.state.mn.us/budget/operating/200405/prelim/192358.pdf.

sewage disposal controls to tree and vegetation removal. In some cases, much of the shoreline may be in public ownership for parks, natural areas and other public or institutional uses.

Local governments, using authority delegated from the state and through zoning ordinances, in particular, are likely to play the biggest role in regulating the specific type and density of land uses. Typically, these ordinances regulate the types of permitted uses, development density, procedures for submitting development plans and development standards. At least until recently, most did not delve into

regulating the size, spacing and extension of docks; the number of vessels allowed per dwelling or use; or the number of anchoring buoys, floats and other features at the waters' edge. Some of that is changing, however, with the rapid onset of "gated" and waterfront communities and the increasingly vocal participation of residents along the waterways.

Increasing public access through redevelopment and private land acquisition

In the mid 1990s, the Great Lakes Sea Grant Network's Coastal Land Use Committee developed a fact sheet to help both government agencies and private landowners examine the possibilities for expanding coastal access to the public. As the authors described, private landowners have many options available to them, although those options and landowner liability differ according to state law. Some include arranging an easement with a land trust or donating land to a not-for-profit organization or government agency. Government agencies, by organizing agreements with private developers or directly purchasing coastal property, also can increase public coastal access.

But the authors cautioned of "lessons learned" about coastal redevelopment as a result of looking at Great Lakes states' case studies on each of the options for providing public access. First, they warned, redevelopment actions are likely to take many years. Second, each step in the process requires a reassessment of the public goals for the project. Finally, alternative means of achieving each priority goal must be assessed. As they suggested, in some cases priority goals might be achieved more effectively and efficiently under private development.

In yet another lesson to be learned about coastal redevelopment, and as is often the case with "case studies," there's bound to be change.

One project, the development of Whiskey Island Marina (Cleveland, Ohio) through a public-private agreement, was highlighted for meeting a significant public need on a lakefront that lacked varied opportunities for public access. Another benefit was the revitalization of an obsolete industrial site "into a new enterprise with positive economic impact." The Whiskey Island Partners, owners of the full service marina entered into an agreement with the state to develop 10 acres for public access within eight years, a provision that became part of the lease. Additionally, according to the authors, the city of Cleveland agreed to contribute to the project by financing improvements to the marina's main access road. In testimony to the complexity of public-private relations, though, after years of marina development and operation, in December 2002, the Cleveland-Cuyahoga County Port Authority adopted a resolution approving and authorizing a purchase offer for the lakefront property owned by the Partners, including the marina and an area of green space.

For more information, see *Providing Public Access In Coastal Areas: Options For Landowners*. A fact sheet produced by the Great Lakes Sea Grant Network, Coastal Land Use Committee. 1996. Mary Bielen, et.al. See www.cce.cornell.edu/seagrant/tourism/publicaccessfs.html. And *Cleveland-Cuyahoga County Port Authority Report Update*. January 2003. Lynn Tick. League of Women Voters of Cleveland. See www.lwvcef.org/newsletter/jan03/port.htm.

Taking a Look at Alternative Management Methods

Limits and exclusions? Or self-regulation and education?...

*"...A first approach is to use 'planning' and 'information and education' techniques. Strict enforcement of existing rules and regulations might also be part of this initial approach. These techniques are usually more subtle and generally are more widely accepted among waterway users than heavy-handed techniques, such as using entrance gates. ... An overall approach is to move through a continuum of progressively more difficult techniques, while continuing to monitor their success and eventually arriving at the 'best' solution." — Advice from the first edition of *A Guide for Multiple Use Waterway Management* on the selection of appropriate techniques.*

Astute readers probably noticed that the word "ban," as in bans or exclusions of watercraft, technically did not appear among the items in the management techniques menu just presented — although the same readers likely would have recognized that an outcome of using a tool or some combination of tools could be the exclusion of particular watercraft or users from the waterways.

Some readers familiar with the first edition of this **Guide** might even have noticed that the word "plan" did not appear in the list as a separate management technique, though it did in the original document.

Neither was an oversight.

In the case of "plan," given the title and content of Section 2 of this **Guide**, it should be pretty clear there's an assumption that some level of planning and analysis will result in goals and objectives and in weighing alternative solutions for a multiple use waterway *before* specific techniques are selected for implementation. After all, in the

absence of a broader, guiding framework, an individual decision to restrict a particular type of watercraft or user could mean revisiting the "drawing board" when the next offending craft or misbehavior arrives on the waterway.

Now, regarding "ban." If goals and objectives are developed and alternative solutions weighed, then a "ban" — or any of the other techniques that severely limit or restrict use — might not be the first choice for implementation. But if it is, then it would be with the understanding that the decision was made with the input of stakeholders, the analysis of sound data, and a determination that it represents that "best solution" and preferred direction for the future of the waterway.

There is no doubt, though, that in some areas serious questions about environmental impacts, safety, and perceived or real overcrowding have been producing more calls for more intensive management approaches and limits on boating use in the genre of a "carrying capacity" or formula estimates of the preferred number or type of craft on the waterways.

Yet academic and "in the field" research findings have consistently concluded that rather than heading directly for use limits to mitigate negative impacts, greater attention should probably be paid to sound management, user education and enforcement of rules already in place.³²

And if user perceptions are any indication of compliance, then starting off with less, rather than more regulation might be the way to go. When faced with a list of potential management methods and asked to indicate how effective each might be in

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Assessing the alternatives: *the Lake Mead National Recreation Area Lake Management Plan*

The Lake Mead National Recreation Area¹ includes Lake Mead with its massive water surface and shoreline area, but also takes in the smaller Lake Mohave. While a general management plan and environmental impact statement from the mid-1980s had spelled out land-based management zones and strategies for meeting the goals and general purposes of the area, by the early 1990s the increased recreational use of the lakes, visitor conflicts and safety, potential impacts of water-related recreation on park resources, and personal watercraft (PWC) use² demanded new or renewed attention.

In May 1993, park managers initiated the lake management planning effort and environment impact assessment that when completed would guide management actions for 15 to 20 years. After a lengthy process of developing criteria to characterize the "recreational opportunity spectrum" (primitive, semi-primitive, rural natural, urban natural and urban park settings), set out desired future conditions, and develop and modify management alternatives based on public comment gathered at various points and in various ways, the interdisciplinary planning team came down to four alternatives presented in a draft environmental impact statement/lake management plan released for public review in April 2002.

The four alternatives — three taking action of varying degrees, and one essentially staying within the direction set in the earlier general management plan — identified proposed actions related to recreational and shoreline zoning, developed areas, facilities and recreational services, recreational conflict, sanitation and litter, resource protection and park operations. Each alternative was evaluated for its impact on air quality, geology and soils, water resources, vegetation and shoreline vegetation, wildlife and wildlife habitat, threatened and endangered species, cultural resources, soundscapes, visitor use and experience, safety, park operations, and socioeconomic resources.

For detail, see www.nps.gov/lame/planning.

1 The National Park Service (NPS) and the Bureau of Reclamation jointly administer portions of the recreation area.

2 This is an abbreviated version of PWC use issues and related events that paralleled development of the lake management plan; a discussion of PWC operations in the National Park System, and as applicable to the Lake Mead National Recreation Area, can be found in documentation at www.nps.gov/lame/planning.

In light of emerging findings about PWC impacts and escalating controversy, the NPS reevaluated its method of grouping the craft with other vessels for regulatory purposes, and subsequently stopped PWC use in seven park units by imposing horsepower restrictions, management plan revisions, and park-specific regulations. In 1998, the Bluewater Network petitioned the NPS to prohibit PWC use system-wide.

Ten thousand comment letters later, and following an evaluation to determine whether further modification of the alternatives or their issues and impacts was required, the "preferred alternative" C was modified slightly and presented in the Final Environmental Impact Statement / Lake Management Plan in January 2003; on April 8, 2003, the notice of the approved record of decision was published in the Federal Register.

Among the key elements of the approved management plan:

- Five percent of the park waters are designated primitive or semi-primitive, with the former managed for non-motorized uses and the latter managed for flat-wake speed in all areas except one.
- PWCs are prohibited in those areas, but may be used on the remaining 95 percent of the lakes.
- The total number of boats to be allowed at any one time on both lakes — through limits on parking spaces at each of the lakes' access sites — is 5,055. This figure was based on capacity studies conducted prior to the management plan preparation and additional information gathered during its preparation.
- In response to public comments and Nevada and Arizona state agency requests to establish a safer shoreline environment, a 200-foot flat-wake zone is established around beaches occupied by bathers, around boats at the shoreline, and persons in the water or at the shoreline.
- The NPS is to work with the states of Nevada and Arizona to develop uniform boating laws and mandatory education programs.
- Beginning December 31, 2012, boats not meeting the EPA standard for gasoline spark-ignition marine engines will be prohibited; only four-stroke engines, direct-injection two-stroke engines, or equivalent technology will be allowed.

In response, the NPS issued an interim policy requiring superintendents of parks where PWC use could — but never did — occur, to close the parks to their use until a regulation could be finalized. After public comments and further review of a proposal premised on differences between PWCs and other craft, the NPS amended the regulation, and allowed the designation of PWC areas by special regulation in 11 parks, including Lake Mead, and by amendment to the superintendents' compendiums in 10 others. Bluewater sued, challenging the selective continuation of PWC use. A negotiated settlement stipulated that the NPS's park-specific regulations to continue PWC use be based on environmental analyses conducted in accord with the National Environmental Policy Act. Moreover, PWC use would be prohibited unless appropriate for the park unit. On April 9, 2003, the NPS issued a final rule authorizing PWC use in the Lake Mead recreation area (*Federal Register* Vol. 68, No. 68), consistent with the modified preferred alternative described in the Record of Decision for the Management Plan (*Federal Register* Vol. 68, No. 67).

helping to address problems and conflicts, users are more likely to pick strategies and approaches that are non-regulatory or self-regulatory in nature — that is, volunteer projects, information, education and cooperative efforts over fees, limits on use and additional rules and regulations.³³

Is this just another indication of users not wanting to be told what to do, or is it something else?

Though it's still a bit unclear, some research suggests that the sheer diversity of and often the inconsistencies in the application of boating restrictions from one place to the next might not only hinder compliance and create frustration, but also inadvertently lead to the very things managers, planners and regulators are trying to avoid — negative impacts on environmentally fragile areas, on local economies, the boating business, safety and the "waterway experience." Another reason might be that self-imposed regulation and conformity simply come from an internal recognition of the benefits of doing so.³⁴

Then again, it might be that there isn't much of a choice.

At least some coastal resource and recreation experts are convinced that non-regulatory or self-regulatory approaches — coupled with intensive public education, close coordination among and monitoring by agencies, and the knowledge that something stronger will be on the way if they don't work — offer waterway stakeholders like boaters and shore residents an opportunity to have a say in determining their destiny in using the waterway resources. Perhaps as importantly, they argue that boaters are genuinely hungry for the information that

will not only make their experience more enjoyable, but also afford them the opportunity to do the "right thing" — because, if they don't become pro-active by taking needed corrective actions, government will react and impose restrictions.³⁵

All of this "non-regulation" and voluntary compliance through user awareness, though, doesn't come easy. With these approaches, "less" really does mean "more." They call for the adoption of bottom-up, group-developed goals and "codes of conduct," well-developed communication strategies for conveying them, methods for monitoring results, ways to arbitrate complaints and issues, and a good idea of what comes next if they don't change behaviors.³⁶

They require "buy-in" from and a lot of consultation between the affected agencies, waterway users and other stakeholders. And because of that, self-regulation might not be the most feasible alternative for waterways that have a lot of users just passing through.

Carrying capacity: it's not just by the numbers ...

So, what about that more restrictive notion of "carrying capacity" mentioned earlier?

The concept got a fair amount of coverage in the first edition of this *Guide*, and with good reason: it has a long history and has received a lot of attention in academic and resource planning circles, particularly in the management of inland lakes.³⁷

Yet while it seems on the surface to be straightforward and easy to understand and

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Collaborating on a non-regulatory approach: *Southwest Florida's Anchorage Management Program*

Built on supporting research, the overriding belief that boaters care deeply about the environment, the idea that educating them would do more to preserve the fragile coastal ecosystem than regulating them, and the reality that few localities had the resources to enforce their anchorage regulations, a pilot anchorage management program was launched in southwest Florida in the mid 1990s.

In the region, there already was evidence of significant and increasing use — overnight or for extended periods of time — of dozens of anchorages along scenic and protected coastal waters. While there wasn't yet evidence of widespread problems associated with anchoring, area planners and resource managers saw the need for a management framework that would acknowledge the potential for problems like ecological damage, user conflicts, inavailability of support services, and declining quality of the anchorages subject to periodic overcrowding. At the same time, though, the parties involved also intended to limit the role of regulations in the overall management scheme. Implementation of the management plan would offer an opportunity to see just how feasible it would be to have and continue a non-regulatory approach to regional anchorage management.

The overall goal of the initiative — recognized in a memorandum of agreement between five local, state and regional agencies and organizations — was to preserve the ecological and recreational values of the region's waterways in a way that maintained the widest possible degree of freedom for users. Being successful, though, would require several things, including:

- A system of properly sited, high quality anchorages, with restrictions limited to that required for environmental protection, public safety, and ensuring equal user access;
- Ensuring that the types of uses taking at particular anchorages were consistent with the resources and other attributes of the anchorage;
- Ensuring that individual boaters would be responsible users and promote boating practices that protect water quality and minimize adverse impacts to bottom habitat such as sea grasses; and
- Having a management system in place that would be protective of natural resources, as well as boaters' rights to anchor, and be responsive to anchoring issues as they arose.

The goals would be pursued through a combination of management tools:

- Boater education through personal contact, brochure and map distributions, and other means to convey information about proper disposal of sewage and other wastes; ways to create cooperative relationships between boaters and shoreside residents; and site specific information about anchorage characteristics;
- Use of peer pressure and "friendly persuasion," with boaters working with boaters informally to resolve management problems;
- Evaluating and monitoring anchorages, including use patterns, levels and effects to determine whether state goals were being achieved; and
- Creating an arbitrating mechanism, in this case the Southwest Florida Regional Harbor Board, to direct and coordinate program implementation. Notably, anchoring issues arising from any person, local government, appropriate state agency or other source were to be referred to the Board; if an issue couldn't be resolved through the plan provisions and use guidelines for unrestricted, restricted and managed anchorages, then it could recommend options for future recourse. In determining when an area needed to be restricted or managed, the Board would have to base its conclusions on the identification of any one of the following three conditions: demonstrated environmental damage; chronic user conflict or overcrowding; or a petition requesting establishment of a managed or restricted anchorage.

In fact, since its creation in 1995, the Board has worked with the Florida Sea Grant Program to identify anchorages in the region that require more active management based on current conflicts and to provide technical assistance in developing appropriate anchorage management plans. As part of those continuing efforts, the Board commissioned the development of an annotated model harbor ordinance for consideration by local governments. The ordinance sets out the Board's principles and minimal rules of anchoring and mooring to be adopted for all waters in a given city, with enactment of additional rules and regulations warranted only when those aforementioned conditions come to light.

For more information, see *Anchoring Away: Government Regulation and the Rights of Navigation In Florida*. Thomas T. Ankersen and Richard Hamann, Center for Governmental Responsibility, Levin College of Law, University of Florida, Publication No. TP-99. http://conservation.law.ufl.edu/resources_clinic.html. *Evaluating Recreational Boating Patterns at Selected Sites in Southwest Florida for Regional Anchorage Management*. August 2000. Charles Sidman, Gustavo Antonini, et.al. Florida Sea Grant College Program Technical Paper 105. *Goals of the (Florida) Anchorage Management Program* at www.flseagrant.org/science/anchorage/index.html. "New Approach to Managing Recreational Anchorages Saves Money and the Environment (five year pilot)." 10-19-95. See www.seagrantnews.org. Southwest Florida Anchorage Management Program. at www.flseagrant.org/science/anchorage. Annotated (draft) Model Municipal Harbor Management Ordinance prepared for the Southwest Florida regional Harbor Board by the University of Florida — Levin College of Law. April 20, 2000. See http://conservation.law.ufl.edu/pdf/harbor_ordinance.pdf.

assess, it actually is a complicated concept that can be difficult to define, enforce and manage. One result of a wealth of research on carrying capacity over nearly 40 years is a set of many and varying definitions. Among some of the more basic:

- *Physical carrying capacity*, defined in terms of absolute space standards and representing the maximum number of craft or craft per acre that can be accommodated at one time, usually for safety and efficiency reasons. The waterway capacity is "exceeded" when there are more boats in use at a particular time and location.
- *Social carrying capacity*, referring to the effects of use levels and intensity on the quality of recreational experiences. A user's satisfaction, then, is influenced not only by numbers, but also by types of encounters between users.
- *Ecological carrying capacity*, concerned with the effects of recreational use on the natural environment, and defined as the maximum level of use, in terms of numbers and types of activities, before an unacceptable or irreversible decline in ecosystem values occurs.

But along with these and other definitions has come widespread debate and controversy among researchers and practitioners as to the overall merits of the concept, the usefulness of what some have called "simplistic" formula estimates of capacity, and the limits of their scientific basis and applicability to different waterways and situations.³⁸

In the last decade, though, were the seeds of a change in the concept and in the processes used to arrive at "capacity." The emphasis

began to shift from more cumbersome, time-consuming and extremely expensive capacity "planning" processes — like Limits of Acceptable Change (LAC)³⁹ and Visitor Enjoyment and Resource Protection (VERP), used by the U.S. Forest Service and the National Park Service — to somewhat leaner, less time-consuming "decision-making" based systems, like Quality Upgrading and Learning (QUAL).⁴⁰

In many ways, these changes represented a bend in the philosophy behind carrying capacity. While the concept by its nature limits numbers to prevent deterioration of resources and social conditions, later work on the processes used to arrive at capacity began turning attention away from "preventing" and toward identifying and maintaining the "desired" future resource and social conditions through monitoring and management.

In fact, heading into the current decade, there have been significant efforts to improve the overriding concept of carrying capacity, not only by suggesting that its moniker be changed to "visitor capacity," but also by improving the tools used in those capacity decision-making and decision analysis.⁴¹

"Visitor capacity," the argument now goes, should be based on things like well-defined management objectives, desired future conditions, quality standards, current resource and experiential conditions, trends, foreseeable events or changes, management capability, best available science, public preference, the regional supply of same or similar opportunities, the expected quality of the future monitoring program, and the level of uncertainty and risk surrounding decision consequences.⁴²

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Evaluating methods for determining capacity: *Tims Ford Reservoir Recreational Boating Capacity Study*

The Tims Ford Reservoir, a nearly 11,000 acre impoundment on the Elk River in Tennessee, was selected by the Tennessee Valley Authority (TVA) in 2000 as an initial pilot project to evaluate a methodology for assessing recreational boating capacity and gathering boating data related to balancing and optimizing competing demands on the Tennessee River system. The hope was that the project would create an information base to support implementation of an existing land plan strategy; address anticipated increases in the reservoir's use, shoreline development and new and expanding commercial and marina facilities; and help determine how best to protect the reservoir's resources and preserve the quality and diversity of recreational opportunities.

An obstacle to the TVA's goal of achieving balance among social, resource and management conditions had been the absence of a systematic process for giving managers the data they needed to fulfill or reject requests for new or expanding facilities and uses. Add to that, citizen stakeholders questioning whether the reservoirs could accommodate the prospect of more boat traffic in the face of more or larger access points.

To develop that systematic process and take a step toward determining the reservoirs' capacities, TVA elected to pilot a proactive approach in its Tims Ford Reservoir boating capacity study. Drawing upon a hybrid of the Quality Upgrading and Learning Process (QUAL) and Recreation Management Information System (RMIS), the project was intended to move beyond boating capacity as a limit on the number of boats that a reservoir system could support. Instead, it would characterize the reservoir setting in terms of resource conditions, social conditions and managerial conditions. The intent was to obtain useful data for understanding future desired boating conditions and offer resource managers choices for altering management strategies.

The model called for a three-phase, five-step process, each resulting in a product that could be distributed or accessed via the Internet, thereby enhancing communication and the credibility of decision makers with the public and agency partners. The Tims Ford study, though, stopped at the end of the first two steps, which are described here; when the study team deemed it had enough data and findings to support improved management decisions.

Step 1 Identifying Management Goals and Study Objectives

- Defining desired future conditions of a reservoir setting by developing different scenarios;
- Using these parameters to formulate specific goals and objectives for conducting the study.

Step 2 Conducting the Study: Inventory Reservoir Existing Conditions

- Inventorying existing reservoir conditions by collecting boating survey and on-water boat count data within defined service areas or "lakes within a lake" with unique attributes;
- Coding and entering data into a geographic information system (GIS) database for retrieval and spatial analysis with accompanying map products;
- Creating "management compartments" – reconfigured service areas developed by visually analyzing the boat survey spatial responses and weekend boat count composite maps to identify logical breaks in user patterns and to facilitate the formation of management strategies; and
- Integrating boat density with boater conflict information using a classification criteria matrix that ranks management compartments from the highest density and conflict to the least.

Ultimately, the pilot project came in on time and budget, and according to the study team, proved to be flexible enough to apply to any TVA reservoir. But the project also yielded important findings for management. For example, it showed that the reservoir as a whole had not reached a critical threshold for capacity; that it had a higher percentage of PWCs than reservoirs of similar size nationally; and that adding new water-based infrastructure would likely improve some boaters' recreation experience. The project also yielded information about how boaters spend their time on the reservoir and their preferences for calm waters, few wakes, solitude and the presence of fewer boats.

Along with these findings, though, the analysis offered several important considerations for developing management strategies in the form of desired conditions for each of the management compartments.

Some examples of strategies suggested by the study data?

- Using the data and the compartment classification system, reservoir managers can anticipate how new development is likely to affect recreational activity within a specific reach. A key strategy would be to direct development to places with adequate water surface area and adjacent shorelines capable of sustaining more watercraft activity and shoreline growth.
- The management compartment classifications can be used to develop a sense of where enforcement problems are most likely to occur and provide a road map for state and local law enforcement officials to redirect their limited resources.
- Management strategies and actions to protect and maintain the unique conditions of escape coves – the minimally developed, quiet areas especially important to users – could preserve these recreational opportunities.

For more information, see the *Tims Ford Reservoir Recreational Boating Capacity Study*. February 2002. Park Studies, Inc., for the Tennessee Valley Authority.

Easier said than done. But it is certainly testimony to the notion that capacity goes beyond "just the numbers" and encompasses an entire package of qualities and conditions.

And while much of the work has centered on public lands, it still holds value for assessing multiple use waterway management decisions and alternatives, especially those with a recreational emphasis.

One of the more helpful and transferable results has been the development of decision criteria that can be adapted to gauge the degrees to which management alternatives containing some sort of "visitor capacity" element are likely to affect critical aspects of water use. An adaptation of these criteria appears in Section 2, page 39 of this **Guide**.⁴³

What is another unexpected benefit of the efforts to improve the capacity concept and processes? The efforts are focusing attention squarely on the importance of information and systematic processes, whether as a prelude to discussions of desired conditions or as a way of understanding user preferences and perceptions.

They depend upon good data and information and sound processes for collecting them.

Data collection on the waterways... it's counts and a lot more

"...While censuses and boat counts will continue to be an integral part of boat traffic monitoring, those who rely on those techniques alone will be working with an incomplete picture of their traffic situation. To effectively monitor boat traffic one needs a thorough understanding of who the boaters are and what makes individual boaters tick. Those who fail to recognize boat traffic as an aggregate manifestation of many individual agendas will either be overwhelmed by the complexity of the situation, or

draw oversimplifying conclusions that satisfy nobody. You must know boaters to know boat traffic." — One researcher's perspective on what it takes to do effective boat traffic monitoring⁴⁴

Interesting point. And whether information is being gathered for the first time, or the first time in a long time, or is being gathered as part of a ongoing monitoring process to determine whether strategies are kicking in and what sorts of impacts are becoming evident from water use activity, it's worth considering.

What this researcher suggests, at least in the case of recreational watercraft traffic, is that the studies that hone in on boater motivations, their reasons for selecting destinations, and the values and perceptions that these users hold toward the waterway resource are likely to yield more valuable insights into the overall system than traditional counts and censuses.⁴⁵

Why? Because while a census will yield information about *what is there* at the time of the study, an "attitude picture" will tell you *why* those patterns are there, and *what* patterns to expect in the future given certain changes. Censuses and boat counts will play a role in short-term management goals, but an understanding of the system in terms of individuals' motivations will help build pro-active policies toward longer term goals.

Does that mean you do one *or* the other? A boat count or a boater opinion survey? Simulations? Or something else entirely?

Several of the illustrations presented in this **Guide**, from boating capacity studies to more comprehensive management plans couched in the results of data gathered on many aspects of their problem areas, suggest that these and other kinds of information

Gathering the information: *Boating on Ohio Waterways — A Plan for Access and Use Management*

Recognizing the need to work in a targeted way to improve the quality of boating in the state — especially in light of the prospect of increasing pressure, greater diversity and more widely varying user expectations along the waterways in the future — the Ohio Division of Watercraft embarked on a Strategic Plan for the 21st Century. The planning process, supported by customer input, identified six strategic priority issues. Water use conflicts and crowding were up there among the six, and following some investigation, the final report in 1999 called for more study and work on waterway congestion, especially on inland, unlimited horsepower lakes; the availability and quality design of launch ramps and marina facilities; and environmental issues.

The Boating on Ohio Waterways Plan project was subsequently launched to create a framework for future local and state planning efforts in these strategic areas; in the process it would gather and analyze a lot of information via inventories, focus groups, and surveys about boater wants and needs, the ease of boating access to Ohio waterways, existing regulations, and opportunities to create a more favorable boating environment.

Apart from tapping the insights of waterway managers, facility grant recipients and marine patrol grant recipients in open-ended questionnaires and focus groups, the Waterways Plan process incorporated focus groups of Ohio boaters in various locations around the state over a seven-month period. The efforts yielded about 25 broad categories of waterway issues widely ranging from boating on Lake Erie and inland lakes, to lake amenities,

paddler access, user conflicts and crowding, and launch ramp designs.

Using the identified issues as guidance, the next step was to conduct a survey of a random sample of registered Ohio boaters in 2002 to add to the information cache. Among the areas addressed in the eight-page questionnaire:

- the types and features of boats used most often by household members;
- the waterway locations most frequented during 2002;
- the importance of features at marinas, launch ramps and at put-in/carry-in access points;
- boater satisfaction with availability of ramps at the waterways they frequent;
- boater experience with accumulations of silt and natural debris in the waterway;
- frequency of overnight stays and boater experiences with destinations and facilities;
- the relative importance of particular features on inland lakes;
- boater ratings of the need for speed limits or for horsepower limits; and
- how often boaters experienced selected conditions that caused a problem for them.

An interesting preliminary result? Of more than 1,300 responses, “other boaters’ lack of knowledge” and “other boaters’ discourtesy” were two areas at the top of the list of situations that caused the most problems.

At the time of this writing, the results of the survey, along with those of a survey of the states regarding horsepower and speed limits management practices, were being analyzed for inclusion in the final Plan, which was scheduled for release in 2003.

For more information, see *Boating on Ohio Waterways: A Plan for Access and Use Management*. Ohio Department of Natural Resources Division of Watercraft. See www.dnr.state.oh.us/watercraft/plan/default.htm.

activities can play significant roles in helping managers and planners learn more about what’s happening on the waterways.

As we’ve already touched upon in Section 2 of this **Guide**, though, there can be danger in assuming too much about what the data “say,” in collecting data with one purpose in mind only to find that they would have better served another, or in collecting them over too short a period of time.

So, if you’re interested in environmental impacts from watercraft or water contact activities, a weekend count of boats along the waterway will tell you something, but probably not what you’d hoped to learn. Long-term collections, counts and measurements will be the key.⁴⁶

Boat traffic and impact studies: *Waterway characteristics that weigh into your strategies, and newer technologies for doing the work*

Want to monitor recreational boat traffic? You have various monitoring strategies from which to choose, including:

- Shoreline counts;
- Counts conducted along the waterways;
- Counts from marinas or ramps;
- On-the-water counts from boats;
- Aerial surveys;
- Intercept interviews at boat launch ramps or other access points;
- Telephone and mail surveys; and
- Boat facility censuses or inventories.

But which are more effective? Like many other aspects of waterway management, *it depends on the nature of the waterway, the watercraft and user activities, and what you need to accomplish ...*

While many traffic studies have been and are being conducted, the body of research to assess the relative effectiveness of one data gathering technique over another is lacking in some ways. Still, some tips and cautions have emerged from work to date.

Is your boat traffic uniformly distributed throughout the waterway? If it is, then you could be safe in sampling a small number of locations in an area and extrapolating that information to the entire waterway region. If traffic tends to be random, then you might do better with observation methods that sample entire regions, either through aerial surveys or random samples throughout each region.

For example, if there is a main channel through which all boat traffic must pass to enter or leave a system, then observations could center on that channel. If most is confined to discrete passageways, then adapting some car traffic monitoring techniques might be in order. More open areas would call for more frequent counts of boats within defined areas of interest, and how you define those

areas would depend largely on your management goals.

To make sense of and capture recreational boat traffic, then, think about its properties, including:

- Where the boats are coming from;
- Where they're going;
- What kinds of boats and other craft are on the water;
- The types and intensities of the waterway activities; and
- The duration of those activities.

But if your boat traffic is associated with key environmental features, gathering more detail around those features will give you a more complete picture of the amount of activity and may help you better define possible impact areas.

For that, technologies like geographic information systems (GIS) and global positioning systems (GPS) are making their way into waterway management applications. The Tims Ford Reservoir Study (see page 73 of this **Guide**), already mentioned use of a GIS database to code existing conditions. In another test application — this one on a Florida bay where an increase in boating activities was resulting in seagrass scarring, overcrowding and conflicts with shore residents — GIS and GPS, in combination with other data gathering and analysis methods, were used to monitor and evaluate boating impact.

In that application, biophysical features — the shoreline, bottom sediments, seagrass beds — were mapped with a GPS and verified by divers. Shore resident tolerance of boating activities was gauged through a mail survey and the results mapped as distance isopleths. Boating activities were inventoried over a year with a GPS and laser range-finder. Finally, the biophysical, social and activity information were integrated within a GIS to create map-defined water use suitability zones (low, medium and high activity). To identify vulnerable areas for management purposes, boater activity monitoring was used to compare observed on-water use to those zones.

From Paul W. Box, *Bottom-Up Simulation for Evaluation of Recreational Boat Traffic Monitoring*. 1997. Dissertation. University of Florida. See www.gis.usu.edu/~sanduku/public_html/dissertation/outline/node1.html. And from Charles Sidman, University of Florida Sea Grant Program, presentation on "A GIS/GPS-Based Strategy to Monitor and Assess Recreational Boating Impacts on Florida's Urban Bay Waters." See 1999 Congress On Recreation And Resource Capacity Book Of Abstracts. Susan Scott Lundquist and Glenn E. Haas, Compilers. Nov. 29 – Dec. 2, 1999, Aspen, Colo. Hosted by The Human Dimension in Natural Resources Unit, College of Natural Resources, Colorado State University, Fort Collins, Colo. www.cnr.colostate.edu/nrrt/capacity.

On the other hand, if you're interested in managing activities in a relatively compact waterway area, longer term counts may not be as useful as knowledge of the resident and user population in the area.

It comes back down to the basics. Tailor your management methods, whatever they might be, to your waterway priorities and objectives.

- 1 See discussions in *Tims Ford Reservoir Recreational Boating Capacity Study*. February 2002. Tennessee Valley Authority.
 - 2 "Recreational Boating – Are the Waters Too Crowded?" Nov/Dec 1999. Jeff Hoedt. *Report for the 1999 Congress on Recreation and Resource Capacity*. Nov. 29 – Dec. 2, 1999, Aspen, Colo. Hosted by The Human Dimension in Natural Resources Unit, College of Natural Resources, Colorado State University, Fort Collins, Colo. See www.cnr.colostate.edu/nrrt/capacity.
 - 3 See *1999 Lake Travis Boating Recreation Study: Recommendations on Key Issues*. September 1999. Park Studies, Inc., for the Lower Colorado River Authority, and *Highland Lakes (Texas) Recreation Management Plan*. 2000. Lower Colorado River Authority. See www.lcra.org/lands/lakeplan/.
 - 4 National Water Safety Congress, Board of Directors' meeting, April 7, 2001, Nashville, Tenn.
 - 5 Dr. Gustavo Antonini, University of Florida professor. "Boating Expert Provides Look at the Future of Boating." Fall 1995. *Fathom Magazine*. Vol. 7, Issue 3. See www.flseagrant.org/science/library/fathom_magazine/volume-7_issue-3/expert.htm.
 - 6 See "Educated Boaters Will Protect Coastal Environment (Florida)." 3-7-96, and especially the comments of Dr. Gustavo Antonini. See <http://news.ifas.ufl.edu/news.php>.
 - 7 "Final Agreement Approved for North Landing River." Winter 2002. *Hampton Roads Review*. Quarterly Publication of the Hampton Roads Planning District Commission. p. 2. See www.hrpd.org/publications/newsletters/winter2002.pdf.
 - 8 Comments by Chris Foreman, Park Manager, Highline Lake State Park Colorado Division of Parks in a panel on "Boating Capacity Management Plans: Successful Case Studies" from the *1999 Congress On Recreation And Resource Capacity*. See *Book Of Abstracts*. Susan Scott Lundquist and Glenn E. Haas, Compilers. Nov. 29 – Dec. 2, 1999, Aspen, Colo. Hosted by The Human Dimension in Natural Resources Unit, College of Natural Resources, Colorado State University, Fort Collins, Colo. See www.cnr.colostate.edu/nrrt/capacity.
 - 9 For more information on changing concepts of capacity, see Glenn E. Haas, "A Reframing of Visitor Capacity," *Parks & Recreation*, July 2001, Vol. 36, No. 7 and *Visitor Capacity on Public Lands and Waters: Making Better Decisions* 2002. A Report of the Federal Interagency Task Force on Visitor Capacity on Public Lands. Submitted to the Assistant Secretary for Fish and Wildlife and Parks, Department of the Interior, Washington, DC.
 - 10 See pp. 29-50. *A Guide for Multiple Use Waterway Management*. 1st edition. 1996. National Water Safety Congress.
 - 11 See pp. 51-73. *A Guide for Multiple Use Waterway Management*. 1st edition. 1996. National Water Safety Congress.
 - 12 See pp. 29-50. *A Guide for Multiple Use Waterway Management*. 1st edition. 1996. National Water Safety Congress.
 - 13 From *Boating Restrictions: The Local Authorities Guide*. March 1998. 2nd ed. Office of Boating Safety, Canadian Coast Guard. Made under the provision of the Boating Restriction Regulations Canada Shipping Act. Canada Shipping Act, Ottawa, Ontario K1A 0N7.
 - 14 *Uniform Waterway Markers in Florida Waters*, Chapter 68D-23, Florida Administrative Code. See <http://fac.dos.state.fl.us/faconline/chapter68.pdf>. The new code is intended to provide for uniformity in design, construction and coloring of markers so that all watercraft operators can easily recognize, identify and distinguish between authorized markers and unlawfully placed ones; provide a means by which law enforcement can determine with reasonable certainty which boating restricted areas are lawfully established and marked; and ensure that regulatory markers giving notice of boat restricted areas are authorized only for purposes of protecting human life and limb, vessel traffic safety and maritime property and manatees.
- At the same time, it was the intent of the new code that no boating restricted area be established, continued in effect, or enforced for the purpose of noise abatement or for the protection of shoreline, shore-based structures or upland property from vessel or shoreline wake. "The wake resulting from the reasonable and prudent operation of a vessel is a force which should be anticipated by the owners of property adjacent to the navigable waters of [the] state." (Chapter 68D-23.101)
- The new provisions go into great detail defining only the symbols and devices that can be used, but also the terms to be used on the regulatory markers, their placement, and the criteria for approving those markers in restricted or exclusion areas (Chapter 68D-23.103-105).
- 15 See for example, some of the results regarding law enforcement emerging from the *Florida Fish and Wildlife Conservation Commission (Strategic Planning) Stakeholder Input*. 2002. See <http://floridaconservation.org/planning/index.html>, for strategic planning survey and related documents. Law enforcement is one way each group of users or stakeholders can ensure that other groups are doing their part, and is increasingly called upon to ensure compliance. If a group is experiencing diminished use of a resource, they might want to ensure others are still not reaping benefit. That means "more" law enforcement might not be the answer. Rather, the answer might be "different" law enforcement. The input from stakeholders suggested that having a vision critical focus for law enforcement would be essential.
 - 16 *Reference Guide to State Boating Laws*, sixth edition. National Association of State Boating Law Administrators, 2000.
 - 17 From *Reference Guide to State Boating Laws*, sixth edition, with updated information from the NASBLA and state websites, and as compiled by the National Transportation Safety Board and U.S. Coast Guard, as of May 15, 2003.
- Note that nearly half of the states have implemented mandatory special education in response to concerns for operators of personal watercraft. The Model Personal Watercraft Operations Act developed by the Personal Watercraft Industry Association (see www.pwia.org/modelbill.html) incorporates mandatory education requirements along with PWC operation regulations. The PWIA Model Bill addresses minimum operating age (16 years old/18 to rent), requires mandatory education of all operators, prohibits nighttime and reckless operation, and requires all operators and passengers to wear Coast Guard approved personal floatation devices, and to use their lanyard stop switches (for vessels so equipped).

- 18 In the state of Florida, it is manatees that have been at the center of continuous debate and in some cases lawsuits over federal and state efforts to protect the large mammals from harm through various zoning techniques while minimizing impact on boating activities. Boaters, environmentalists, the marine industry, local governments and other waterway stakeholders have been kept busy learning about and reviewing everything from proposals designating special protection regions or zones in which boat dock permits could be denied in the face of unsatisfactory biological opinions to proposals establishing mandatory 25 or 30 mph or slow-speed zones in particular areas. For more information on manatee zones and comparisons of federal and state requirements, see <http://myfwc.com/manatee/> on the Florida Fish and Wildlife Conservation Commission website.
- 19 See also the Code of Federal Regulations, 33 CFR Part 109, which deals with anchorage grounds, anchorages under the Ports and Waterways Safety Act, and special anchorage areas.
- 20 February 2003 compilation of survey results on state boating management practices, conducted by the Ohio Division of Watercraft as part of its development of a statewide boating plan. See www.dnr.state.oh.us/watercraft/plan/history.htm.
- 21 "Pleasure Boat Speed Limits Can Stir Up Trouble in Shallow Lakes." Nov. 16, 2001. David Hill and Michele Beachler. The Pennsylvania State University, University Park, Penn. Originally presented at *North American Lake Management Society Symposium, Madison, Wisc.*, as "The Hydrodynamic Impacts of Recreational Watercraft on Shallow Lakes." See [www.engr.psu.edu/news/News/2001/Press Releases/November/boat.html](http://www.engr.psu.edu/news/News/2001/Press_Releases/November/boat.html)
- 22 Recreational Conflicts and Compatibility Between Motorboat Owners, Personal Watercraft Owners and Coastal Landowners along New York's Great Lakes Coast. July 1, 2000. Cheng-Ping Wang and Chad P. Dawson. Study funded by New York Sea Grant Institute, New York Sea Grant Extension and State University of New York College of Environmental Science & Forestry at Syracuse, N.Y. See www.cce.cornell.edu/seagrant/great-lakes-marinas/pwcreport.html.
- 23 February 2003 compilation of survey results on state boating management practices, conducted by the Ohio Division of Watercraft as part of its development of a statewide boating plan. See www.dnr.state.oh.us/watercraft/plan/history.htm.
- 24 Using the SAE J-2005 stationary test, most states set maximum noise levels at 86 to 90 decibels; when the SAE J-1970 shoreline test is used, the maximum noise level is commonly 75 decibels. See *NASBLA Reference Guide to State Boating Laws*, sixth edition, 2000.
- 25 February 2003 compilation of survey results on state boating management practices, conducted by the Ohio Division of Watercraft as part of its development of a statewide boating plan. See www.dnr.state.oh.us/watercraft/plan/history.htm.
- 26 In Western states alone there are at least 13 whitewater rivers or river segments where boaters are required to possess a boating permit. On many of these rivers, an application fee plus a use fee is charged to those who receive one of the limited numbers of permits available. Typically, this is a per-person fee on a per-trip or per-day basis. See *Managing River Recreation: A Statewide Assessment of Needs for Boating Access, Facilities, Enforcement, and Education*. December 1998. Oregon State Marine Board. Report to the Joint Legislative Interim Committee on Navigability. See www.marinebd.osmb.state.or.us/Library/finalreport.pdf.
- 27 For example, it takes four to six minutes and 3,000 to 4,000 feet for a ship to stop after its engines are reversed; larger, difficult-to-maneuver ships cannot successfully avoid smaller craft in narrow channels; and it often takes less than 10 minutes for a fast ship to reach a craft once it's spotted in clear weather; reduced visibility shortens this time.

A "Collision Avoidance Checklist," or helpful information such as *Life Lines* produced by the American Waterways Operators Foundation, can be provided to recreational boaters. See www.boatingsafety.com/wow/artframe.htm.
- 28 See the *Design Handbook for Recreational Boating and Fishing Facilities* prepared for States Organization for Boating Access by Waterways Development Public Sector Consultants, Inc., April 1996. See www.sobaus.org for ordering information. The Design Handbook discusses considerations and possible standards for locating and acquiring launch sites, design and construction of landside facilities and waterside components, docking and fishing facilities, and ADA compliance.

Also see the *Operations and Maintenance Program Guidelines for Recreational Boating Facilities*, also published by the States Organization for Boating Access, September 1999. These Guidelines address risk management, operational considerations, maintenance and signage.
- 29 Facility size can be determined by establishing standards as the minimum water frontage desired, the area needed for the intended launch ramp and amenities, and the area required to buffer the site from neighbors. Most states recommend minimum frontages of 50 feet for launching canoes and other car-top craft and 100 feet for larger boats. If demand cannot be met at a single site on a given water body, multiple sites may be considered. See the *Design Handbook for Recreational Boating and Fishing Facilities* prepared for States Organization for Boating Access by Waterways Development Public Sector Consultants, Inc., April 1996. See www.sobaus.org for ordering information.
- 30 See "Preserving Waterfronts for Water Dependent Uses," Kenneth Walker and Matt Arnn. In NOAA's *State of the Coast Report 1998*. Silver Spring, Md.: National Oceanic and Atmospheric Administration. See http://oceanservice.noaa.gov/websites/retiredsites/sotc_pdf/wdu.pdf.

- 31 See, as an example, the Tennessee Valley Authority's new Shoreline Management Policy, which became effective November 1, 1999. Working with the public, TVA began the Shoreline Management Initiative (SMI) to examine the system by which permits for docks and other shoreline development are granted. The primary goal of the SMI was to establish a new Valley-wide shoreline management policy that would improve the protection of shoreline and aquatic resources while allowing reasonable access to the water. Standards address the type, size and design of boat docks. Among the key elements: continuing to allow docks and other alterations along shorelines where access rights exist; requirements for vegetation management plans; a 50 foot shoreline management zone retained on TVA land that adjoins newly-developed residential areas; promotion of best management practices for the construction of docks, management of vegetation, stabilization of shoreline erosion and other shoreline alterations; and emphasis is on education activities and incentives as important components of shoreline management. See *TVA (Tennessee Valley Authority) Shorelinks II The Shoreline Management Policy: Key Elements*. See www.tva.gov/river/landandshore/pdfs/shorelnk.pdf.
- 32 See *Recreational Boating Carrying Capacity: A Framework for Managing Inland Lakes: Proceedings of a Workshop*, August 23, 1995. 1996. Edward M. Mahoney and Daniel J. Stynes. Sponsored by Michigan Boating Industries Association and the Department of Park, Recreation and Tourism Resources, Michigan State University. See www.msu.edu/course/prr/879/spring2000/boatrcc.doc.
- 33 See *Managing River Recreation: A Statewide Assessment of Needs for Boating Access, Facilities, Enforcement, and Education*. December 1998. Oregon State Marine Board. Report to the Joint Legislative Interim Committee on Navigability. See www.marinebd.osmb.state.or.us/Library/finalreport.pdf. The Marine Board obtained information about boating and fishing on Oregon's rivers from a variety of sources using a variety of approaches. The principal tools used included: questionnaires distributed to clubs, organizations, and agencies; a telephone survey of randomly selected households in the state; and public informational meetings held in ten separate locations around the state.
- 34 From Paul W. Box, *Bottom-Up Simulation for Evaluation of Recreational Boat Traffic Monitoring*. 1997. Dissertation. University of Florida. See www.gis.usu.edu/~sanduku/public_html/dissertation/outline/node1.html
- 35 "Boating Expert Provides Look at the Future of Boating." Fall 1995. *Fathom Magazine*. Vol. 7, Issue 3. See comments of Professor Emeritus Gustavo Antonini at www.flseagrant.org/science/library/fathom_magazine/volume-7_issue-3/expert.htm.
- 36 See also discussion in *Boating Restrictions: The Local Authorities Guide*. March 1998. 2nd ed. Office of Boating Safety, Canadian Coast Guard. Made under the provision of the Boating Restriction Regulations Canada Shipping Act. Canada Shipping Act, Ottawa, Ontario K1A 0N7.
- 37 A comprehensive discussion of the problems associated with carrying capacity can be found in *Recreational Boating Carrying Capacity: A Framework for Managing Inland Lakes: Proceedings of a Workshop*, August 23, 1995. 1996. Edward M. Mahoney and Daniel J. Stynes. Sponsored by Michigan Boating Industries Association and the Department of Park, Recreation and Tourism Resources, Michigan State University. See www.msu.edu/course/prr/879/spring2000/boatrcc.doc.
- 38 For example, the Michigan report describes a publication that uses a "cookbook" method for estimating carrying capacity and provides a Keyhole zoning ordinance. The ordinance establishes a base carrying capacity for lake usage and limits the size and type of multi-boat launch and docking sites. The workshop presenters argued that the publication, like many dealing with the issue of carrying capacity, takes a rather simplistic formula approach to a very complicated issue. And they argued that individuals and lake associations that may have little or no knowledge of carrying capacity concepts could mistakenly conclude that estimating carrying capacity is a relatively straightforward calculation. The biggest problem, though, they argued, is that most elected officials, local zoning officers, judges and attorneys have little experience with carrying capacity concepts or methods.
- 39 "Limits of Acceptable Change" is a planning system that is an alternative implementation of carrying capacity. While the locus of a carrying capacity is that it limits numbers of people to prevent deterioration of resource and social conditions, the limits of acceptable change or similar methodologies focus on maintaining *desired future resource and social conditions* through monitoring and management actions targeted at specific problems.
- Why the name "limits of acceptable change"? In the process, participants select indicators of resource and social conditions. To do the rest, though, requires a systematic monitoring plan, to determine the point at which an indicator tells whether or not the change — if there is one — is acceptable. Exceeding the standard should trigger a management action. See *Limits of Acceptable Change Planning System: An Alternative Implementation of Carrying Capacity*. Ed Krumpe. See www.ets.uidaho.edu/rrt287/287lac7.pdf. Also, see *What is the Limits of Acceptable Change (LAC) Process?* See www.southernregion.fs.fed.us/gwj/nra/LACWhat is LAC.htm.
- 40 See "Evolving Concepts of Recreational Carrying Capacity Management." Kenneth Chilman, et.al. Submitted paper from *Trends 2000: Shaping the Future*, Sept. 17-20, 2000, Lansing, Mich., for discussions of the methods and three case examples, at www.prr.msu.edu/trends2000/pdf/chilmanCC.pdf. The shorter 5-step capacity management process, Quality Upgrading and Learning (QUAL) was developed to facilitate management communications. Two key elements were identified: 1) the need for place-specific "social inventories," that is, counts and surveys of visitors at area access points or on water surfaces; and 2) the need for training in social data collection and utilization so that managers could communicate more effectively in decision situations. An outline of procedures for social data collection and utilization, or the Recreation Management Information System (RMIS), was developed for manager training.
- The QUAL process emphasizes two aspects of quality-of-visit experiences: the reasons visitors choose the place for the desired recreation activity (i.e., what is important to the visitor for the experience), and the changes that visitors observe in the area in the way of important visit attributes (i.e., if the visitor is a repeat visitor).

The key step in planning, then, becomes the inventorying of existing conditions. That systematic measurement and documentation of existing conditions can then be used to discuss desired conditions or objectives. Usually an examination of conditions on large water areas will show diverse conditions in various parts or zones, which can then be managed in ways that provide different kinds of recreation opportunities for different kinds of visitors.

41 See Haas, "A Reframing of Visitor Capacity," July 2001.

42 *Ibid.*

43 See Haas, *Visitor Capacity on Public Lands and Waters: Making Better Decisions*. A Report of the Federal Interagency Task Force on Visitor Capacity on Public Lands. Submitted to the Assistant Secretary for Fish and Wildlife and Parks, Department of the Interior, Washington, DC. 2002. The decision analysis approach is intended to help ensure the decision is principled, reasoned and afforded the thoroughness and legal sufficiency of a NEPA compliant planning process.

44 From Paul W. Box, *Bottom-Up Simulation for Evaluation of Recreational Boat Traffic Monitoring*. 1997. Dissertation. University of Florida. See www.gis.usu.edu/~sanduku/public_html/dissertation/outline/node1.html

45 *Ibid.*

46 *Ibid.*

SECTION 4: REFERENCES AND RESOURCES

A starting point for further exploration

The references and organizational resources in this section represent varying perspectives on waterways issues, multiple use conflicts, and management concepts and approaches. Their inclusion does not constitute "endorsement." Rather all are presented in the spirit of fostering information exchange and learning. Readers also should be aware that there is no guarantee of the permanence of Internet sites or their contents. As more information and documents are added to sites, webmasters may change their original locations or move materials off of active pages and into "archives." In the event a document or other piece of information is not available at a stated Internet address, check the home or main page of the organization, agency or media in question.

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ORGANIZATIONAL AND OTHER WEB RESOURCES

All About Rivers www.allaboutrivers.com

America Outdoors www.americaoutdoors.org

American Association of Port Authorities www.aapa-ports.org/index.html

American Boat and Yacht Council www.abycinc.org

American Canoe Association www.acanet.org

American Professional Mariners Association www.webcom.com/maritime/apma.html

American Recreation Coalition www.funoutdoors.com

American Rivers www.americanrivers.org

American Sailing Association www.american-sailing.com

American Sportfishing Association www.asafishing.org

American Watercraft Association www.watercraftassociation.com

American Waterways Operators www.americanwaterways.com

American Whitewater www.americanwhitewater.org

Arkansas Headwaters Recreation Area <http://parks.state.co.us/arkansas>

Assateague Coastal Trust www.actforbays.org

Assateague Island National Seashore www.nps.gov/asis

Association of State and Interstate Water Pollution Control Administrators www.asiwpca.org/

Barneget Bay Personal Watercraft Task Force www.bbwa.org

Blue Ribbon Coalition www.sharetrails.org

The Bluewater Network www.bluewaternetwork.org

Boating Industry International Online www.boating-industry.com

Boating Safety Institute of America www.BoatSafety.org

BoatUS www.boatus.com

Bureau of Land Management www.co.blm.gov

Bureau of Reclamation www.usbr.gov

Canadian Coast Guard www.ccg-gcc.gc.ca/

Canadian Heritage Rivers System www.chrs.ca

Canadian Recreational Canoeing www.crca.ca

Center for Watershed Protection www.cwp.org

Chesapeake Bay Program Office www.epa.gov/r3chespk/index.htm

Chesapeake Bay Foundation www.savethebay.cbf.org/

Delaware Center for the Inland Bays www.udel.edu/CIB

Delaware Coastal Management Program www.nos.noaa.gov/OCRM/czm/czmdelaware.html

Delmarva Low Impact Tourism Experiences (DLITE) www.delmarvalite.com

EnviroLink www.envirolink.org

Environmental Council of the States www.sso.org/ecos

Environmental Defense Fund www.edf.org/pubs/Reports/

Environmental Law Institute: National Wetlands Newsletter www.eli.org/bookstore/nawene.htm

Environmental Protection Agency River Corridor and Wetland Restoration
www.epa.gov/owow/wetlands/restore

Environmental Protection Agency Office of Wetlands, Oceans & Watersheds www.epa.gov/OWOW

Federal Emergency Management Agency (FEMA) www.fema.gov

Federal Lakes Recreation Leadership Council www.doi.gov/nrls/index.html

Florida Inland Navigation District www.aicw.org

Florida Keys National Marine Sanctuary www.fknms.nos.noaa.gov

Friends of the River www.friendsoftheriver.org

Global Rivers Environmental Education Network www.earthforce.org/green/

Great Lakes Commission www.glc.org

Great Lakes Regional Waterways Management Forum www.uscg.mil/d9/www/forum/managementforum.htm

Gulf Intracoastal Canal Association www.gicaonline.com

Hampton Roads Planning District Commission www.hrpdc.org

Harbor Safety Committees www.uscg.mil/hq/g-m/harborsafety/docs/html/hscsurvey.html

International Association of Marine Investigators www.iamimarine.org

International Association for Probabilistic Safety Assessment and Management (IAPSAM)
www.enre.umd.edu/IAPSAM

International Rivers Network www.irn.org

Izaak Walton League www.iwla.org

Inland River Ports & Terminals www.irpt.net

Institute for Participatory Management and Planning www.ipmp-bleiker.com

Institute for Water Resources www.iwr.usace.army.mil

Interagency Wild and Scenic River Coordinating Council www.nps.gov/rivers/wildriverscouncil.html

International Navigation Association www.pianc-aipcn.org

Know Your Watershed www.ctic.purdue.edu/kyw/kyw.html

Leave No Trace www.lnt.org

Lower Colorado River Authority www.lcra.org

MARC 2000, the Midwest Area River Coalition www.marc2000.org

Marine Retailers Association of America www.mraa.com

Marine Transportation System Initiative www.dot.gov/mts

Maryland Coastal Bays Program www.dnr.state.md.us/mcbp

Maryland Coastal Zone Management Program www.nos.noaa.gov/OCRM/czm/czmmaryland.html

Massachusetts Office of Coastal Zone Management www.state.ma.us/czm

Michigan Sea Grant Coast Watch www.coastwatch.msu.edu/index.html

National Association of Counties: Environmental Programs www.naco.org/programs/envIRON/index.cfm

National Association of Recreation Resource Planners www.narrp.org

National Association of State Boating Law Administrators www.nasbla.org

National Association of State Park Directors www.naspd.org

National Audubon Society www.audubon.org/

National Boating Federation www.boatopia.com/nbf/index.html

National Boating Safety Advisory Council www.uscgboating.org/

National Center for Small Communities www.smallcommunities.org/ncsc

National Marine Fisheries <http://kingfish.ssp.nmfs.gov>

National Marine Manufacturers Association www.nmma.org

National Marine Sanctuaries www.sanctuaries.nos.noaa.gov

National Oceanic and Atmospheric Administration (NOAA) www.noaa.gov

National Coastal Services Center www.csc.noaa.gov

NOAA Coastal Zone Management Program www.ocrm.nos.noaa.gov/czm

National Outdoor Leadership School www.nols.edu/NOLShome.html

National Parks and Conservation Association www.npca.org

National Park Service www.nps.gov

National Recreation Lakes Coalition www.recreationlakes.com

National Recreation and Park Association www.nrpa.org

National Safe Boating Council www.safeboating.org

National Safety Council www.nsc.org

National Transportation Safety Board www.nts.gov

National Water Safety Congress www.watersafetycongress.org

National Waterways Conference www.waterways.org

National Wildlife Federation www.nwf.org/water/

Natural Resources Defense Council www.nrdc.org/

Navigation Information Sharing <http://f7784.lrh.usace.army.mil/default.htm>

North American Safe Boating Campaign www.safeboatingcampaign.com

North American Lake Management Society www.nalms.org

Northern Association of Boating Administrators www.nasbla.org/naba.htm

North Shore Harbormasters Association www.harbormasters.org

Ohio Dept. of Natural Resources Division of Watercraft www.dnr.state.oh.us/watercraft

Oregon State Marine Board www.marinebd.osmb.state.or.us

Outward Bound www.outwardbound.org

Pacific Rivers Council www.pacrivers.org

Personal Watercraft Industry Association www.pwia.org

PWC Zone www.pwczone.com

Prevention Through People – U.S. Coast Guard PTP Partnerships www.uscg.mil/hq/g-m/nmc/ptp/ptppart.htm

Private Boaters Coalition www.privateboaters.org/PrivateBoatersMainFrame.htm

Professional Paddlesports Association www.propaddle.com

Recreational Boat Building Industry www.rbbi.com

Recreational Boating and Fishing Foundation www.rbff.org

Recreational Boating and Fishing Foundation Aquatic Science, Fishing and Boating Education web directory
www.rbff-education.org/directory/

River Industry Bulletin Board (RIBB) www.ribb.com

River Management Society www.river-management.org

San Diego Marine Safety Information System www.sdmis.org

Save Our Wild Salmon www.wildsalmon.org

Sierra Club www.sierraclub.org/

Society of Naval Architects and Marine Engineers (SNAME) www.sname.org

Southern States Boating Law Administrators Association www.nasbla.org/ssblaa.htm

States Organization for Boating Access www.sobaus.org

Tennessee - Tombigee Waterway Development Authority www.tenntom.org

Tennessee Valley Authority www.tva.gov

Trade Association of Paddlesports www.gopaddle.org

Tread Lightly! www.treadlightly.org

Trends 2000 www.prr.msu.edu/trends2000

USA Canoe/Kayak www.usack.org

US Army Corps of Engineers www.usace.army.mil

USA Water Ski www.usawaterski.org

US Coast Guard Harbor Safety Committee website www.uscg.mil/hq/g-m/harborsafety

US Coast Guard (USCG) www.uscg.mil

USCG Auxiliary www.cgaux.org

USCG Office of Boating Safety www.uscgboating.org

USCG Office of Investigation & Analysis www.uscg.mil/dotinfo/uscg/hq/g-m/moa/mao1.htm

USCG Office of Waterways Management Policy and Planning www.uscg.mil/hq/g-m/org-mw.htm

USCG MSO Hampton Roads (VA) www.uscg.mil/d5/mso/hamptonroads/lessons.htm

USCG Group Charleston (SC) www.awod.com/gallery/uscg

USCG MSO Portland (ME) www.biddeford.com/~msoport/

USCG MSO LA/LB (CA) www.cglalb.com/

USCG MSO Honolulu (HI) www.aloha.net/~msohono/

USCG MSO San Francisco (CA) www.tcpet.uscg.mil/msosf

USDA Forest Service, Recreation, Wilderness, Urban Forest & Demographic Trends Research Group
www.srs.fs.usda.gov/trends

US Department of the Interior www.doi.gov

US Environmental Protection Agency www.epa.gov

US Fish and Wildlife Service www.fws.gov

US Geological Survey <http://water.usgs.gov/>

US Power Squadrons www.usps.org

US Rowing Association www.usrowing.org

US Sailing Association www.ussailing.org

The Waterways Journal www.waterwaysjournal.net

Waterways Work www.waterwayswork.org

Water Works Wonders www.waterworkswonders.org

Western States Boating Administrators Association www.nasbla.org/wsbaa.htm

Wild and Scenic Rivers www.nps.gov/rivers/

World Resources Institute: Coastal and Marine Resources www.wri.org/biodiv/marihome.html

Sea Grant Links

Alabama (Mississippi/Alabama Sea Grant-MASGC) www.masgc.org
Alaska Sea Grant (AKU) www.uaf.edu/seagrant
California Sea Grant (CUIMR) www-csgc.uscd.edu
California (Southern) Sea Grant (SCU) www.usc.edu/org/seagrant
Connecticut Sea Grant (CONN) www.seagrant.uconn.edu
Delaware Sea Grant (DELU) www.ocean.udel.edu/seagrant
Florida Sea Grant (FLSGP) www.flseagrant.org
Georgia Sea Grant (GAUS) www.marsci.uga.edu/gaseagrant
Hawaii Sea Grant (HAWAU) www.soest.hawaii.edu/SEAGRANT
Illinois/Indiana Sea Grant (ILIN) www.iisgcp.org/
Lake Champlain Sea Grant (LCSG) www.seagrant.sunysb.edu/LChamplain
Louisiana Sea Grant (LSU) www.laseagrant.org
Maine Sea Grant (MEU) www.seagrant.umaine.edu
Maryland Sea Grant (MDU) www.mdsg.umd.edu
MIT Sea Grant (MIT) <http://web.mit.edu/seagrant>
Michigan Sea Grant (MICHU) www.miseagrant.org/
Minnesota Sea Grant (MINNU) www.seagrant.umn.edu
Mississippi/Alabama Sea Grant Consortium (MASGC) www.masgc.org
National Sea Grant Office (SGO) www.nsgo.seagrant.org/
New Hampshire Sea Grant (NHU) www.seagrant.unh.edu
New Jersey Sea Grant Consortium (NJMSC) www.njmsc.org/
New York Sea Grant Institute (NYSGI) www.seagrant.sunysb.edu/
North Carolina Sea Grant (NCU) www.ncsu.edu/seagrant
Ohio Sea Grant (OHSU) www.sg.ohio-state.edu/osgrant/o-osgrant.html
Oregon Sea Grant (ORES/OREXT) www.seagrant.orst.edu
Pennsylvania Sea Grant (PENN) www.pserie.psu.edu/seagrant
Puerto Rico Sea Grant (PRU) www.seagrant.uprm.edu
Rhode Island Sea Grant (RIU) www.seagrant.gso.uri.edu
South Carolina Sea Grant Consortium (SCSGC) www.scseagrant.org/
Southern California Sea Grant (SCU) www.usc.edu/org/seagrant
Texas Sea Grant (TAMU) <http://texas-sea-grant.tamu.edu/>
Virginia Sea Grant (VSGCP) www.virginia.edu/virginia-sea-grant
Washington Sea Grant (WASHU) www.wsg.washington.edu
WHOI Sea Grant (WHOI) www.whoi.edu/seagrant
Wisconsin Sea Grant (WISCU) www.seagrant.wisc.edu

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