

THE RIGHT TACK: Charting Your Harbor's Future



A Publication of the Maine Coastal Program
and the Maine State Planning Office

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**"Our plans miscarry because
we have no aim;
when a man does not know
what harbor he is heading for,
no wind is the right wind."**

Seneca, 4 B.C. - 65 A.D.

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FRIENDSHIP

PLANNING TOOLS: FIGURING OUT WHAT TO DO

Interest in harbor planning is growing by leaps and bounds. As recently as 1987, no town in Maine had really done such a plan. Yet today, practically all coastal communities have heard of them. The surge in interest may be explained by these facts:

Only 10% of Maine's 3,500 mile coastline is characterized by deep, sheltered water adequate to support harbor-related types of uses. Yet, the number of boats registered in the state that use Maine's coastal waters has nearly tripled from about 21,000 in 1970 to 56,000 in 1989. Of the approximately 175 miles suitable for harbor-related activities, more than half are already occupied by a variety of residential, commercial and industrial uses. On top of it all, property values along the coast and the demand for good waterfront has skyrocketed.

As a result of all these demands on our harbors, town and harbor officials have reacted in a number of ways. Some towns have passed shoreland zoning ordinances setting up "commercial fisheries/maritime activities" districts where only "functionally water-dependent uses" are allowed. Boiled down, this means uses that don't need to be on the waterfront shouldn't locate there.

Towns like Scarborough, Freeport, Bucksport, Jonesport, Eastport, and a host of others have drawn up harbor plans, set up harbor committees, appointed harbor masters, and passed harbor ordinances. We'll have more to say about all of these shortly.

Still other towns, such as Eastport, decided in their harbor plans to segregate recreational boating to a second breakwater basin in order to minimize conflicts with commercial activities at the cargoport.

The News from South Addison

No one likes regulations. Unfortunately, as use increases, so does the need for rules. Consider South Addison in Washington County where up to 400 families depend, directly and indirectly, on the harbor for their livelihood. South Addison is a classic Maine Coast fishing harbor. Until recently, informal access to the water was always possible and there had not been a need for formal harbor management. As the Harbor Master says, "In the past, when two guys had a problem, they'd have a little tête-à-tête rather than try to get the Town to pass a bunch of rules." Now that's changing. More boats need to be squeezed in. "Trouble is, when you go out and ask a fellow who's had his boat moored in the same place his father and grandfather did, to shorten the scope on his line, you might as well go out and ask him to shoot his dog!"

There have even been officials in a few towns who have thrown up their hands and decided to let the chips fall where they may. For example, after seeing a proposed harbor ordinance go down to defeat at Town Meeting in 1991, officials in the Town of Blue Hill say, "Nothing's going to happen," despite severe overcrowding in the harbor. Basically, there are no easy answers. People want to do what they do with as few restrictions as possible. The dilemma is

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this: how can the average coastal town maintain a healthy inflow of harbor activity, accommodate all present and potential users, avoid conflicts between them, not have a detrimental impact on the environment, and all without tying anyone's hands? The solution to this dilemma, of course, is (1) do a plan, and (2) implement it.

WHAT THIS HANDBOOK DOES AND DOESN'T DO

Certainly, there are many ways of getting things done. The authors of this handbook, being planners, will suggest that a thorough, comprehensive planning process be followed, and on the following pages we do just that: outline from A to Z what is involved in doing a plan for your harbor. On the other hand, we also know that some people prefer the "plan as you go" approach, and that's okay too. That's why this is not a how-to manual. This handbook provides resources, describes options, lists principles, outlines what others have done, but **doesn't prescribe a particular approach**. This may sound like a technicality, but it's an important one. Too formal a planning process can occasionally become intimidating, sometimes stifle discussion and creativity, and smack of too much "outsider" influence. On the other hand, too informal an approach sometimes takes on the personality of its advocates, wallows from a lack of direction, or tends towards defensive posturing. When people take sides early on, tempers flare, learning stops, and progress grinds to a halt. Clearly a balance is needed. Above all, this handbook encourages you to go your own way.

There is another important point to be made on this subject. Though much attention is given herein to the ideal planning process, anyone who is really familiar with it knows it doesn't always quite work the way it's supposed to. Don't be fooled, **a plan is only a tool**. Somebody with an ounce of passion and good idea will be worth more than a pound of plans any day. We think you'll find the following ideas interesting and helpful in making your passion and ideas effective.

PLANNING IS GETTING TO "AH-HAH! THAT'S IT!"

Here the general principles of the planning process are set forth. One of the keys to your success will be setting up an inclusive harbor committee and conducting meetings in a way that is effective. This will be our first order of business. Second, a sense of common purpose has to inform everyone's efforts. Consequently, setting goals is the next step that we discuss. In order to set goals, you need to mobilize as many people as possible and create widespread ownership of the process. We've included a table of ideas for encouraging public participation. Next, we talk a bit about information you'll need to collect and where to obtain it. The final section outlines some things to pay attention to in order to produce the results you desire.

In colloquial English, people exclaim "ah-hah!" when they understand clearly, for the first time, something they knew before only in a partial or

There are approximately 100 significant harbors in the State of Maine, according to the Department of Economic and Community Development. In 1985, the Maine Department of Transportation (MDOT) considered 59 ports along the coast of Maine commercially significant. Their survey inventoried 500 various types of marine facilities, including 92 public wharves, 21 public fish piers, 103 private wharves, 115 private fish piers, and 90 boat launch ramps located in 59 coastal communities. These areas comprise only 10% of the 3,500 mile coastline.

confused way. The challenge here, then, is to get as many people as possible to "ah-hah! That's It!" In this manner, problems that might otherwise seem inscrutable, overwhelming, or depressing may become easy, obvious, and fun. To paraphrase a famous witticism, "using this method can help us see the unseeable, solve the unsolvable and unscrew the inscrutable!"

A NEW APPROACH

Before you start, put aside all of your received wisdom about how committees are supposed to do things. Instead, concentrate on meeting the needs of your "customers" (in this case, the citizens at large), as well as current harbor users. That's why we stress public participation, citizen involvement, and running good meetings. Third, planning of any sort is as much about dialogue as it is about data. It's important to talk to as many people as possible and keep goals somewhat flexible. All too often, everything changes in the process anyway. Another issue that occurs with all kinds of planning is that there are bound to be times when you're not sure what to do, or it's virtually impossible to outline in detail how you are going to attack a problem. Sometimes a group with a "start-doing-something" attitude needs to proceed empirically, adjusting as they go in light of information and knowledge gained by trying out various approaches. The rule used to be "know as much about the subject as you can before you act." Now the rule is, "If you really don't know what to do, simply jump in and learn as you go."

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SETTING UP HARBOR COMMITTEES

A local harbor committee will play a central role in harbor management and planning. Typically, a harbor committee is made up of five unpaid members appointed by the selectmen or town council, with the harbor master serving as a sixth member. Committee members tend to be the most knowledgeable "boat people" in the community. They serve as advisors to the selectmen. Usually, they see a plan through to implementation. State enabling legislation has stressed that towns can delegate a wide range of authority to a harbor committee. Ideally, committee members should not have a particular ax to grind, they should be concerned with the successful present operation of the harbor, and they should have a good sense of the harbor's future. An involved committee is the blood in the vein, the meat on the bone, the smile on the face of a healthy harbor.

At right is a list of some of the typical problems you're likely to grapple with in a harbor management plan. The next page has a table of Maine harbor committees and the methods they use to deal with the issues most important to them.

Typical Harbor Planning and Management Issues

- proliferation of moorings
- overcrowding in the harbor
- dredging of the harbor and/or its approaches
- too many piers, docks, wharves
- lack of waterfront access for the public
- use conflicts, i.e., between recreational boaters and fishermen
- dilapidated waterfront buildings and facilities
- competition between water and non-water dependent uses
- need for shoreside support services such as fuel, groceries, and other supplies
- declining water quality



Some Maine Harbor Committees		
Organization	Membership	Responsibilities
Bangor Harbor Committee	<ul style="list-style-type: none"> • Appointed each year by City Council • Composed of five members, one from general public, three with recreational boating interests, and one connected with downtown business community 	<ul style="list-style-type: none"> • Review operation and maintenance of waterfront • Review and establish fees for moorings • Oversee float and mooring use, planning of future development • Review boating activities
Belfast Harbor Advisory Committee	<ul style="list-style-type: none"> • Appointed by City Council • Five residents 	<ul style="list-style-type: none"> • Advise city manager and harbor master on custody, care and management of the harbor and its facilities • Act as Board of Appeals
Bucksport Harbor Committee	<ul style="list-style-type: none"> • Three members of Town Council serve as Harbor Committee • Members appointed yearly 	<ul style="list-style-type: none"> • Advise Town Council on harbor issues and operation • Harbor master serves as staff for Committee
Camden Harbor Committee	<ul style="list-style-type: none"> • Appointed annually by Selectmen • Representatives of the varied recreational and commercial interests using harbor 	<ul style="list-style-type: none"> • Advise selectmen about: <ul style="list-style-type: none"> ✓ ordinance implementation ✓ development proposals ✓ problems associated with harbor use • Act as Board of Appeals
Cape Elizabeth Harbor Advisory Committee	<ul style="list-style-type: none"> • Appointed by Town Council • 10 residents representing various interests in local harbor issues 	<ul style="list-style-type: none"> • Solve multiple use problems of Kettle Cove, including conflicts between pleasure boats and commercial fishermen • Prepare harbor ordinance • Review potential sites for additional public boat access
Freeport Coastal Waters Commission	<ul style="list-style-type: none"> • Appointed by Town Council • Seven residents, serving staggered terms 	<ul style="list-style-type: none"> • Study and evaluate usage of and access to coastal waters • Advise Town Council on policy matters and proposed regulations • Supervise enforcement of rules and regulations through the harbor master • Oversee maintenance and care of Town-owned waterfront facilities through harbor master • Act as Board of Appeals
Scarborough Harbor Committee	<ul style="list-style-type: none"> • Nominated by town manager/appointed by Town Council • Not less than five members, no more than nine • Two-year terms • Residents representing as many diverse interests as possible (i.e., commercial boat owners, recreational boat owners, abutting land and business owners, members of town boards and committees, etc.) • Includes Town employee as non-voting member if a special skill needed (planning, engineering, recreation, etc.) 	<ul style="list-style-type: none"> • Oversee harbor planning, operation and regulation except for duties of harbor master • Advise Town Council on harbor issues, including fees and operational budgets • Act as Board of Appeals

CONDUCTING EFFECTIVE MEETINGS

In the beginning . . .

- Declare that this is not just another meeting or a study, but is intended to lead to a plan for action ... and mean it.** When people realize you're serious about coming up with solutions, they are more likely to stay involved. Stating this as your goal in the beginning helps to focus discussions. It also forces the group to be practical and helps ensure that the discussion doesn't become too theoretical or abstract. Generally, it is not a lack of information that keeps people from taking action, but rather a lack of confidence or ability in analyzing the information they already know.

- Create a safe place for people to talk freely and openly about their experiences and what they want to see happen.** Given a chance, people will share what they know, as long as:
 - A. the focus is on the issues, not on the personalities (no personal attacks);
 - B. you welcome new ideas (there's no such thing as a dumb question);
 - C. you seek agreement as to how choices will be made according to objective criteria;
 - D. you discuss options based on the objective criteria;
 - E. everyone is given a chance to have their say (no one interrupts someone who's speaking); and
 - F. people are asked to focus on their interests, not their "position." (Position: "I think we ought to hire a new harbor master." Interest: "I want a place where my boat can be tied up without running up against someone else's.").

- Get to know who's there.** A degree of trust and familiarity must exist among participants before honest sharing and discussion can take place. If this is an initial meeting, time should be allowed for people to get to know each other and to develop a basis of trust. One method used is to begin pairing off participants to interview each other and then to introduce the other to the rest of the group. It's a good idea to start with each participant's life and work experience. Most people have no difficulty talking about themselves and their own experience. Talking about themselves and their work anchors the discussion in specifics and ensures that the issues and themes most critical to those involved are handled. It also tells you what the skills of the group are.

- Don't discourage emotion, but don't let it take over, either.** Getting participants to talk about themselves sometimes brings out strong emotions and creates a high level of interest and participation. In meetings about harbors, often people's livelihoods and self-images are

In 1960, 24 million pounds of lobsters were caught in Maine and approximately 700,000 lobster traps were set by 6,600 lobster harvesters. In 1990, almost 3 times as many traps were set by roughly the same number of lobster fishermen. The catch in 1991 was 31 million pounds.

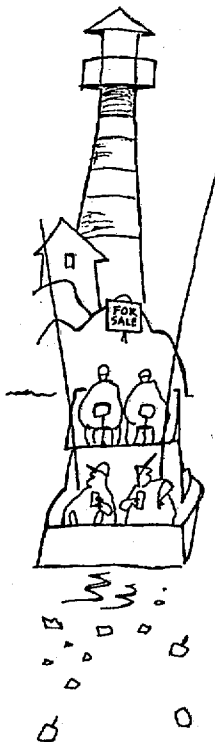
The National Marine Fisheries Service has estimated that a total of 267,000 recreational fishermen used Maine's coastal waters in 1987.

at stake. It is understandably difficult to be objective and dispassionate. A lot of sensitivity is required on the part of those leading the meeting to deal with these emotions in a positive and supportive way. While there are risks involved, emotions or passion are essential both to motivate and to mobilize people.

- ☑ **Pay attention to the details of how and where the meeting will be conducted.** Arrange chairs in a circle, bring refreshments if you can, and make the meeting as cordial and friendly as possible. Little things like this help melt formality and reserve and promote free-flowing discussions.
- ☑ **Make sure to set a positive tone for future meetings.** Participants should leave the meeting with a sense of accomplishment, and a feeling that their point of view was heard. Remember, to paraphrase Voltaire, every meeting that is not boring is a good one!

As you get going . . .

- ☑ **The first few meetings should be used to get everybody working together** to identify and clearly state practical and action-oriented goals agreed to by the whole group. Before each meeting, it's useful to check out the goals again and reformulate or modify them if necessary. It helps to have the goals pinned up where everyone in the group can see them, so they can be referred to easily during meetings. An agenda should be prepared for each meeting and a firm time established as to how long the meeting will last. It is important to achieve the stated purpose of the meeting.



- ☑ **It is critical that everyone in the group participates** in order to make the discussion effective. If one or two people are dominating, or if some are not speaking at all, this should be put to the group as a problem to be resolved. Breaking into smaller groups for part of the meeting can help broaden participation.
- ☑ **A basic premise of running a good meeting and accomplishing the project's goals is to allow the group to take responsibility for the project's outcome.** However, this does not mean that someone shouldn't take the lead. The main leadership role should be assumed by a group-chosen chairperson. The chairperson plays a crucial role in guiding meetings by helping the group clarify its own objectives and determine its own agenda. The chairperson has the responsibility to ask the questions that help draw out the individual and collective experiences of the group. At the beginning, the chairperson plays a major role in getting the ball rolling. However, the committee is most successful when the group soon takes the lead and the chairperson becomes one of the participants.

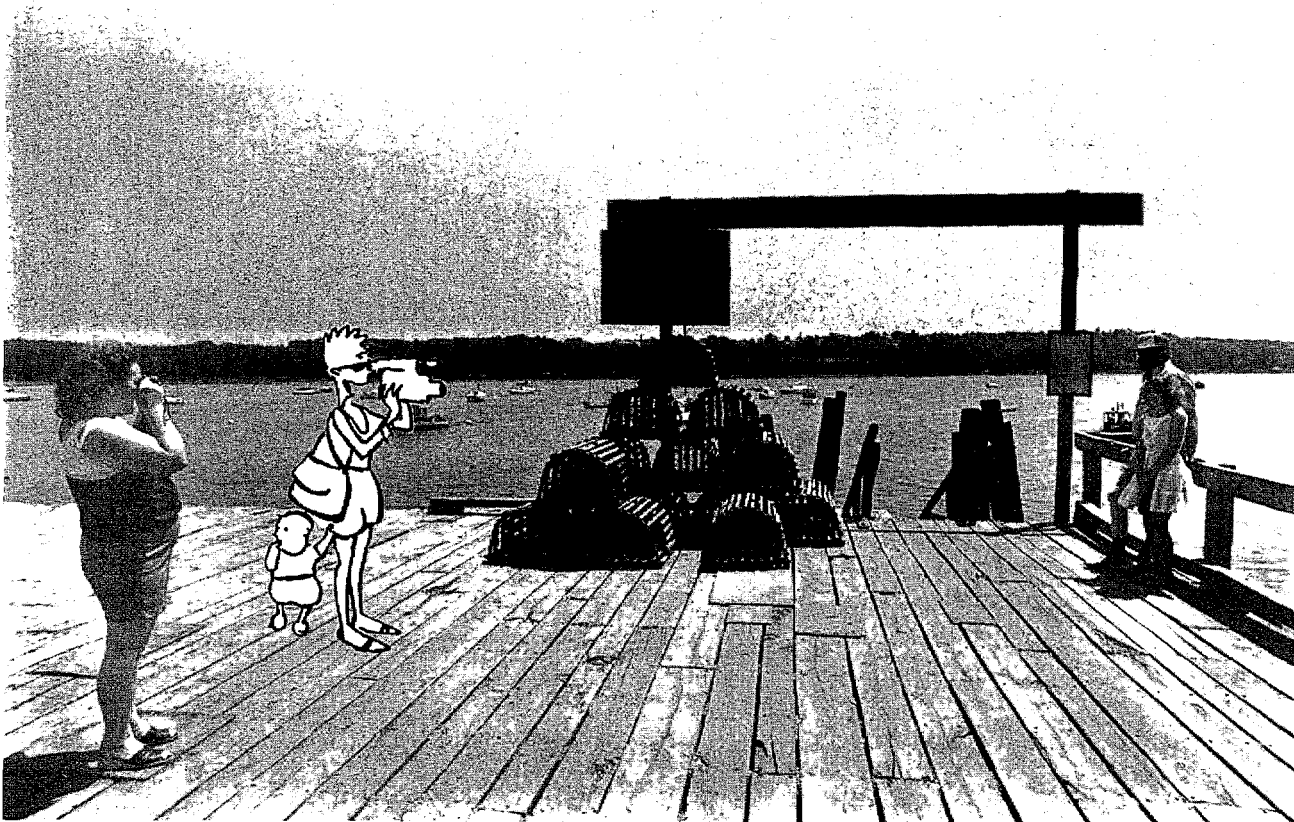
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- ☑ **Leadership should be a shared responsibility** if the group is to avoid becoming dependent on one or two people. Shared leadership is encouraged by asking the group to select people from amongst themselves to lead certain parts of the meeting such as the introduction or the discussion of strategies. Another approach is to set up a system of rotating chairpersons, but don't be too rigid about this. Sometimes one person moderating all the way through the process works best.

Don't forget to take stock as you go . . .

- ☑ It is important for several reasons to **keep a record of the key points of the discussion**. It shows that everyone's contribution is valued, and is a way of keeping track of progress made. It is also a way of noting questions that a group may wish to come back to later. The task of recording also forces a group to come to a consensus about the points they are making.
- ☑ It is best if the group can see the record of their discussion as it is being taken, as this allows the group to revise or correct on the spot. You can use flip-charts or sheets of newsprint to write down points for later discussion or conclusions. Detailed minutes or notes taken by a group member can supplement the visual record, but are not a substitute.

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- ☑ **The group should evaluate progress periodically.** It should review the original goals and see whether those goals are being accomplished or, if as a result of the discussion, they need to be reassessed. It is important also to check progress on each meeting's agenda and modify it as necessary, to evaluate the level of participation, and to identify and discuss any other problems that arise. Too often, evaluation comes only at the end, when it is too late to do anything about the problems that may have arisen. Ongoing evaluation is one of the most helpful things for developing group skills and building a group's cohesiveness and effectiveness.

DEFINING GOALS

How do you decide what you want to do? In other words, what are your goals? The latest buzz word in planning is "visioning." This is a way of arriving at goals. A vision fantasizes what your harbor could look like, ideally, in the not too distant future. Begin with the question: "If I were to recreate this harbor today, given what I know about current technology and uses, what would it look like?" Many towns have jumped on this bandwagon of "visioning." Whatever you decide to call it, it is important to identify goals clearly and fully. The proper choice of goals is half the battle. Beware of goals that are too general, hard to refute, and do not really say much. A goal should describe a desired outcome or the results to be achieved. It is sometimes easy to take goals for granted and concentrate on mere implementation. However, a large part of the ingenuity of planning is the attention brought to bear in choosing goals.

Visions or goals should not be pulled from the sky. There needs to be as many people as possible involved in the process. This is where a Herculean effort will pay off the most. We've all heard the sad stories of dusty plans left on shelves at the town office. That's because people

weren't involved, only planners. Don't make this mistake. Make friends with harbor users, and enemies of dreary plans.

Consider, as an example, the straight-forward way folks in Jonesport stated their goal and priority needs:

Major Goal:

to revitalize the economy in order that adequate employment will be available at good wage levels.

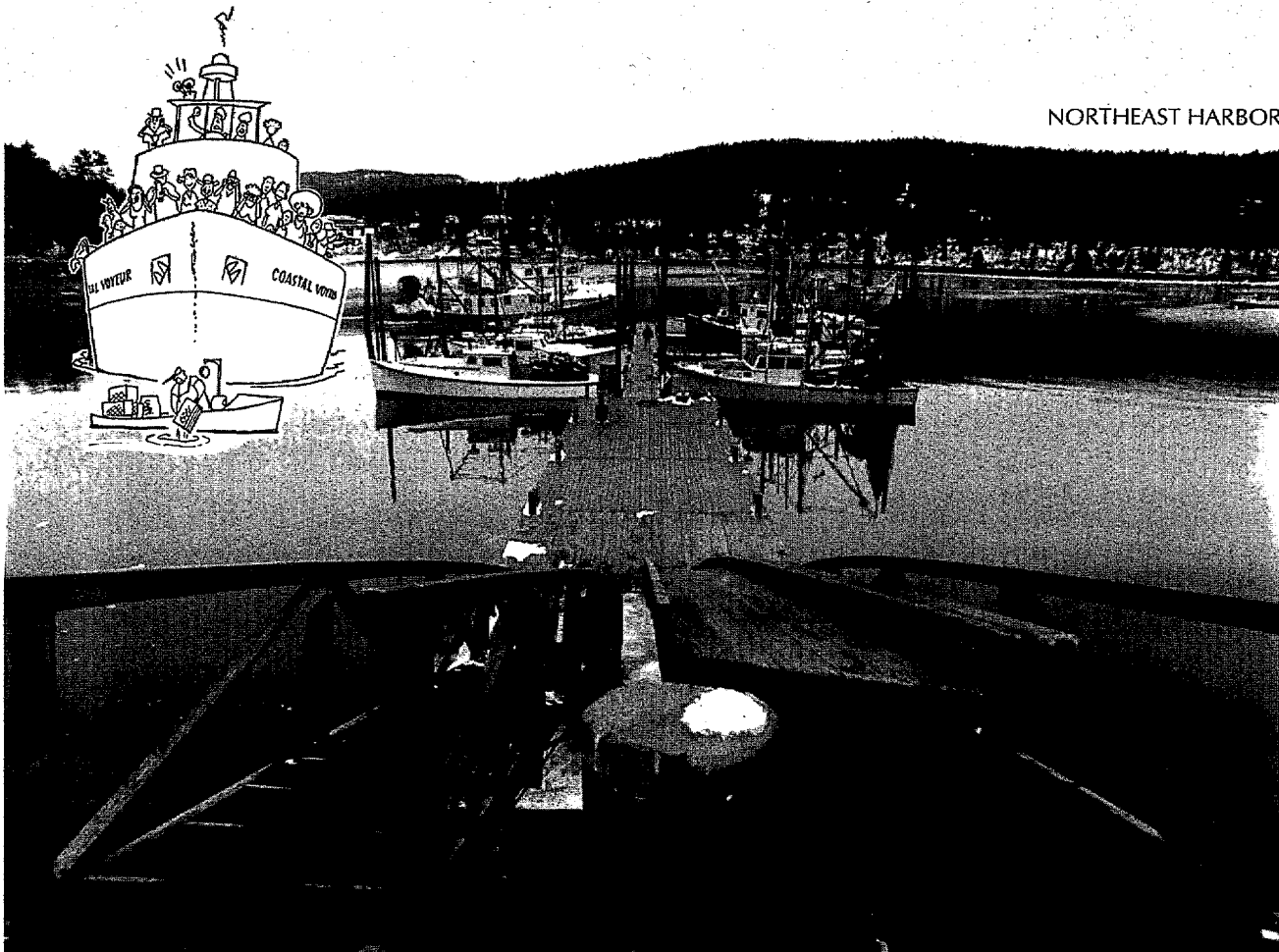
Priority Development Needs:

1. complete breakwater and harbor dredging
2. obtain sewers, protect town's spring
3. secure public access to the shore
4. improve downtown commercial area including sidewalks and off-street parking
5. reserve waterfront space for water dependent uses
6. protect property owners outside shoreland zone
7. construct an adequate municipal building
8. adopt a harbor ordinance and mooring plan

— From the Jonesport Waterfront Action Plan

INVOLVING THE PUBLIC

There are many ways to involve citizens in the planning process. Usually, you have some idea of what you want to do. Then you'll bounce it off other people. Maybe you and others have recently been appointed to a new Harbor Committee. Eventually, you'll organize a meeting to get other people in town involved. Those who attend the meetings will form the core of the working group that will address the issues in your harbor. Maybe this group will eventually become the town's official Harbor Committee, if you don't already have one. It is very important that the first meetings be organized for success. What follows are suggestions, possibilities, and a few principles that will help you to organize and conduct good meetings. This is where you get to enjoy the mess of small town democracy. It can be scary. Freedom always is. Maybe you'll take a bumpy ride. The only way to lose is not to try.



More Ideas for Getting the Public Involved		
Technique	Process	Results
Public Meeting	widely advertised, held in public space, reasonably good way to present information	often not successful in obtaining information or gaining widespread public involvement; can be confrontational
Small Workshop	focuses on specific topic; special persons with particular interest or expertise invited	good way to obtain detailed information and to review specific goals
Public Survey	telephone or mail questionnaire to sample of, or entire, community	not a good way to provide new information; difficult to obtain representative results; framing of questions key to quality of response - expertise may be needed
Personal Interview	identify, contact and interview key persons with expertise or interest in particular issue	good way to obtain in-depth information; can be taxing on committee resources
Events	dinners, cookouts, or parties used as occasions for presentations	good orientation to basic issues; difficult to convey details, can build support and involvement
Presentations	members of committee present information to community groups	good if some opportunity for interaction with group is possible; can obtain views of special interests
Bulletin Board	good for meeting agendas, and general basic concepts and information	details can't be covered; difficult to site in a location that many people will see
Local Student Involvement	have local students do "The Harbor in the Year 2010" plan; offer a course on critical issues	relies primarily on secondary transfer of information; good technique for generating interest
Mass Media	<ul style="list-style-type: none"> • develop mailing list of media outlets (radio, newspaper, TV); • develop relationship with member of the press; • prepare and distribute brief, objective, and timely news release; • write letters to the editor to clarify and explain issues and concerns; • make notices of meetings and agendas available 	widespread distribution of committee news possible; press may interpret events differently or misquote; details unlikely to be covered; press coverage sometimes erratic and unlikely to report on processes



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IDENTIFYING THE ISSUES AND CRUNCHING THE DATA

Ultimately, your purpose is to produce results. With a set of clear goals from the first few meetings, it's time now to collect the information you need to help in formulating options and choices. This is where you can get into trouble. **BEWARE:** there is an inherent tendency in this process to collect too much data.

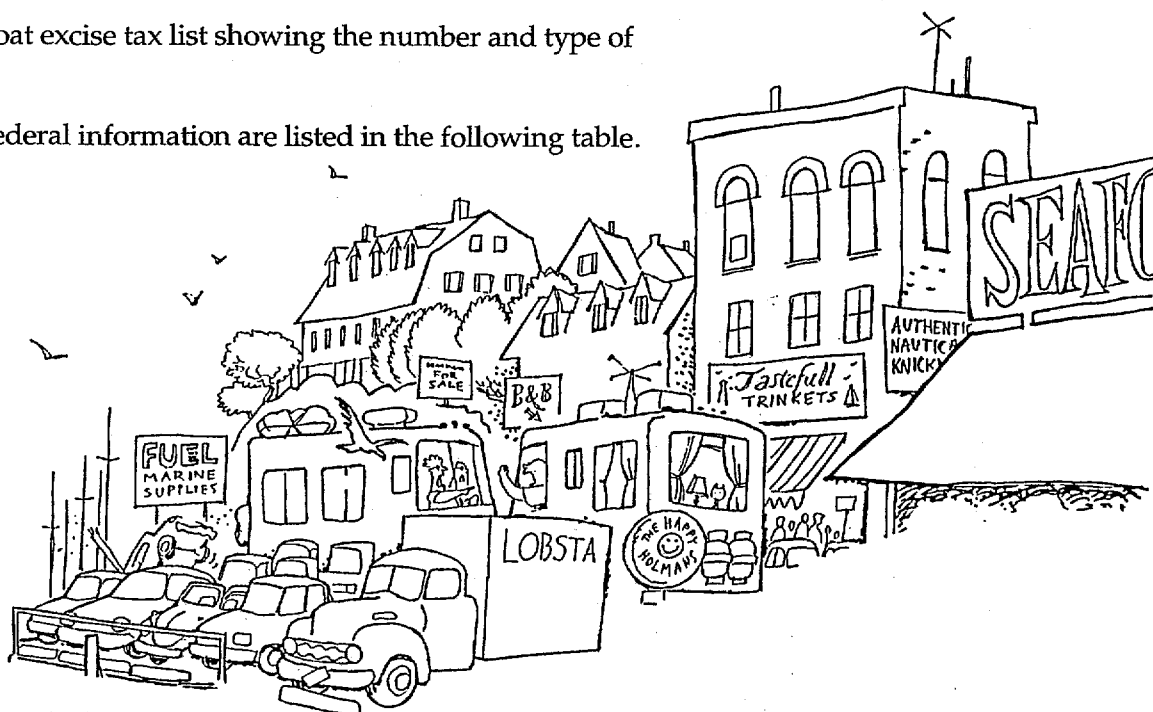
Planner-types are particularly prone to stumble around and get lost in the assessment of things. Remember that the point of all this is not to produce a report, but to accomplish something. That is why the information you collect must be fitted to the requirements for dealing with the issues at hand. Here's a suggestion: collect only the information that helps answer questions raised at the meetings. There are basically two kinds of information worth collecting: personal, pragmatic, "local knowledge" based on the direct experience of individuals involved, and the "processed", often more highly specialized information available from government agencies, such as technical studies and statistics. Your sources of local information are people like the harbormaster, fishermen, boaters, marina and boatyard owners.

Between 1982 and 1991, there was a 76% decline in the clam harvest in the State of Maine. Currently, approximately 30% of Maine's clam flats remain closed to shellfishing.

By following the suggestions we've made for involving citizens in the process, you will tap into an immense amount of local knowledge that can be put to immediate use. Other sources of local information are:

- local comprehensive plans;
- shoreland zoning ordinances and/or townwide zoning ordinances;
- tax maps, aerial photos, and associated records;
- records of local boards, committees, agencies, i.e., harbor master records, mooring and fee information, planning board reviews of major projects, etc.; and
- the town office's boat excise tax list showing the number and type of boats.

Sources of state and federal information are listed in the following table.



State and Federal Agency Information For Harbor Planning and Management		
Subject	Description	Source
baseline information on certain selected ports	historical information, basic characteristics, uses and facilities; mid 1970's data	The Fishing Ports of Maine and New England by James M. Acheson et al.
boat registration	boat registration by county, length, type	Dept. of Inland Fisheries and Wildlife: 287-2043
coastal marine environments	1976 maps display a number of coastal values, including salt marshes and tidal environments; scale is 1 inch equal to 2,000 feet	Maine Geological Survey; Augusta, Maine: 287-2801
coastal recreation areas	State Comprehensive Outdoor Recreation Plan (SCORP) which, among other things, inventories existing public and private recreation sites, and projects demand on facilities	Department of Conservation, Bureau of Recreation: 287-3821
coastal river estuaries	profiles available for 19 estuaries, includes information on physical and biological features, human activities and discharges	State Planning Office: 287-3261
coastal wetlands	aerial photo interpretation showing wetlands 1-3 acres or larger; scale is 1 inch equals 2,000 feet	U.S. Fish and Wildlife Service, National Wetlands Inventory; obtain maps from U.S. Geological Survey, 1-800-USA-MAPS
coastal wetlands	significant wildlife habitats including endangered species and important wildlife concentration areas	Department of Inland Fisheries and Wildlife; Augusta, Maine: 287-2871
commercial marine fishermen harvest data, health and safety of marine life and habitats	shellfish landings and value, commercial fishing licenses, results of marine water testing for shellfish resources	Department of Marine Resources and Regional Labs: 624-6550
economic trends	annual economic forecasts	State Planning Office: 287-3261
existing and potential areas suitable for water dependent uses	suitable "water dependent uses" defined as areas where land slope is less than 15% within 250 feet of the shore, and where water is at least 5 feet deep at low tide within 150 feet of the shore	State Planning Office: 287-3261
federal navigation and dredging projects	list of all dredging projects ever conducted; harbor navigation improvement studies; description of major harbors	U.S. Corps of Engineers Office; Augusta, Maine: 623-8367
general planning information	demographics, population growth, transportation statistics, economic development assistance, comprehensive planning	Southern Maine Planning Commission; Sanford: 324-2952 Greater Portland Council of Governments; Portland: 774-9891 Lincoln County Planning Office; Wiscasset: 882-6358 Mid-Coast Planning Commission; Rockland: 594-2299 Penobscot Valley Council of Governments; Bangor: 942-6389 Hancock County Planning Commission; Ellsworth: 667-7131 Washington County Planning Commission; Machias: 255-8686
harbor and offshore depths and features	bathymetry charts that show water depths	National Oceanic and Atmospheric Administration, charts available at most marine supply stores
legal affairs	zoning ordinances, code enforcement, liability	Maine Municipal Association: 623-8458

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State and Federal Agency Information For Harbor Planning and Management

Subject	Description	Source
marine industry information	<ul style="list-style-type: none"> national trends, boater demographics, sales data and projections fishing industry experience, contacts and goals "Working Waterfront" - newspaper about harbor issues aquaculture research and education agenda general information about marine education and research activities at the University of Maine 	<ul style="list-style-type: none"> National Marine Manufacturing Association:(312) 836-4747; and International Marina Institute: (401) 849-5885 Associated Fisheries of Maine: 989-6304 and Maine Lobstermen's Association: 563-5254 Island Institute, Rockland: 594-9209 Maine Aquaculture Innovation Center: 989-5810 Sea Grant Program; University of Maine, Orono: 581-1440
monthly vessel count	landings volume and value for major ports	National Marine Fisheries Service, Portland: 780-3320
port facilities, major piers, ferry services, cargo data for major ports	"Transportation to the Year 2000 - Strategy for Fish Piers, Shipping and Water Transportation" (1990) (may not be up to date - marine facilities survey conducted in 1985-1986)	Maine Department of Transportation, Bureau of Transportation Services: 287-2841
public access sites and facilities	maps locating known parks, launch areas and other publicly owned shorefront areas	State Planning Office: 287-3261
sales tax receipts	trends in taxable retail sales for towns and cities	Bureau of Taxation: 287-2336
soils	soils maps now available for most of the state; these are medium intensity maps, "accurate enough for planning purposes"	Natural Resource Conservation Service offices; Orono Office: 866-7241
sources of contamination of coastal waters	contamination sources include waste water discharges	Department of Environmental Protection, Land and Water Quality Bureau: 287-3901
state guide to dredging regulation and funding	<u>A Guide to the Regulatory and Funding Process for Coastal Dredging</u>	Dredging Coordinator, State Planning Office: 287-3261
submerged lands information	submerged land lease inventories and costs	Bureau of Public Lands: 287-3061
topography	20-foot elevations of shoreland areas usually provided at a scale of 1 inch equal to 1 mile; topography maps available at scale of 1 inch equal to 2,000 feet (7.5 minute quadrangle sheet)	U.S. Geological Survey maps are available at local sport shops and from Maine Geological Survey: 287-2801
Maine harbor plans and reports	Harbor plans from Scarborough, Cape Elizabeth, South Portland, Portland, Bangor-Brewer, Jonesport, and Eastport	Maine State Planning Office: 287-3261
waterway analyses and issues	vessel licenses, traffic volume by type of vessel, navigation issues	U.S. Coast Guard, regional stations in Boothbay Harbor, Eastport, Rockland, Southwest Harbor, So. Portland, West Jonesport
weather patterns	key weather features such as wave fetch and storm conditions	National Oceanic and Atmospheric Administration, National Climate Data Center, Asheville, NC.: (704) 271-4800

FORECASTING DEMAND

What are the major trends shaping the development of harbors? Besides time, luck and accidents, what factors are influencing the shape of your harbor? Earlier, we suggested you consider a vision of the ideal harbor. Now let's flip the coin and approach planning for the future from another direction by looking at past and current trends. Although, to some, this future prediction business may call forth images of technocrats atop tall towers crunching numbers, bean counting and reading tea leaves, the process of anticipating change can be simple, straight-forward and useful.

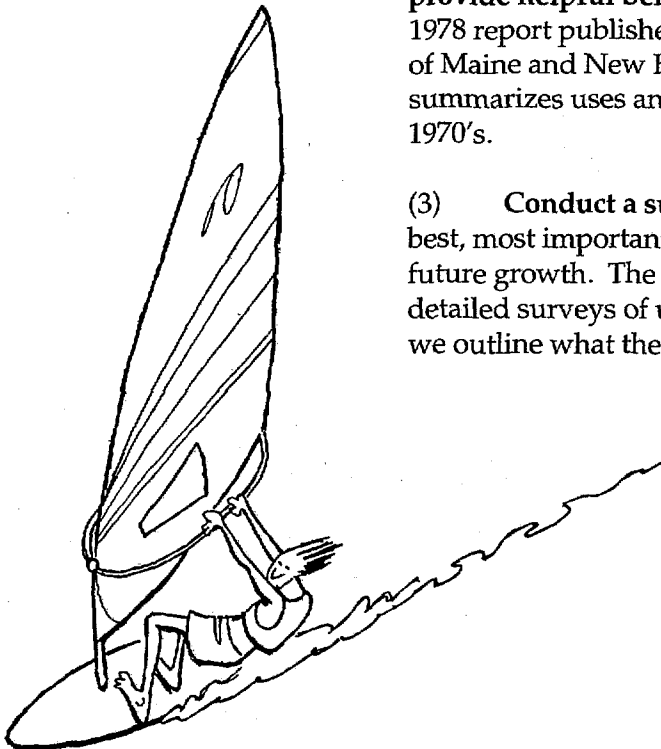
Here's how to do it, step by step:

The number of boats registered in the State that use Maine's coastal waters has nearly tripled from about 21,000 in 1970 to 56,000 in 1989.

(1) **Document harbor use over time.** For example, the Town of Freeport collected information about the numbers of boat registrations and excise tax collection over the years. These figures showed that boat registrations between 1987 and 1990 increased by 120%, and excise taxes collected increased by 37%. Information on fish landings can sometimes suggest trends in harbor use. The harbor master's records should also contain a year-by-year tally of mooring fees received. All of these statistics can be used to identify trends in the demand for the facilities in the harbor. A straight-line projection of past growth can sometimes be used to gain some sense of future growth. Take the average percent per year growth in, say, boat registrations and predict future boat registrations using the same growth rate.

(2) **Previous town plans, studies, or historical documents may also provide helpful benchmark information.** Of particular interest may be a 1978 report published by the Maine Sea Grant Program, "The Fishing Ports of Maine and New Hampshire" by James M. Acheson et al. This report summarizes uses and facilities in most of Maine's harbors as of the late 1970's.

(3) **Conduct a survey of users of harbor facilities.** This is probably the best, most important step that can be taken to obtain a good estimate of future growth. The Freeport Coastal Waters Commission conducted detailed surveys of use of the town's harbor users. On the following page, we outline what the survey contained and how it was conducted.



THE RIGHT TACK

A TOWN LANDING SURVEY *

By Land:

Survey vehicles and pedestrians arriving at the town landing.

Information to Collect

- number and type of vehicles
- residence of vehicle occupants - Maine vs. out-of-state
- destination:
 - lobster pound
 - boat yard
 - marina
 - town wharf
 - sightseeing
 - other
- time of arrival
- number and destination of pedestrians
- brief interviews to solicit comments, re: parking, walking opportunities, adequacy of facilities, etc.

Time of Survey

Survey conducted during the week from 6:30 - 12:30 and also on a weekend day. Survey could also be taken one day during the off season.

By Water:

Survey boat traffic.

Information to Collect

- Type and size of boat (average length)
- commercial user (lobstermen, clambers only) or pleasure boat
- number of passengers
- place of residence
- purpose of visit
- time of stay
- boats using floats: type and average stay
- foot traffic: number of dinghies in use
- brief interviews to determine adequacy of facilities, expectations for the future

Time of Survey

- weekday and weekend, all-day survey, 6:30 a.m. - 12:30 p.m.

By Users:

Survey owners of facilities currently located on the waterfront.

Information to Collect

- list of facilities for water dependent and non-water dependent uses
- size of facility, room for expansion, land and water use facilities
- number of service and other types of moorings
- size of piers and wharves
- support facilities including parking areas, boat launches, restrooms
- availability of public services, adequacy of road connections, sidewalks and other walkways

Trends to Identify

- future use expected for each facility
- conversion possibilities
- viability of available support services
- safety and overcrowding issues
- harbor management needs
- anecdotal assessments of conditions and trends for use of the harbor

* Survey procedures modeled after one conducted by the Freeport Coastal Waters Commission in 1990.

Maine's dry cargo port traffic has tripled since 1981.

(4) **Look at national, state and regional trends.** There are many trends at work that will affect the pressures your harbor experiences in the future. All of the information gathering from each step in this forecasting process should be pulled together and weighed to get a sense of what might happen. There are no "words of wisdom from the mountain" for deciding what's more important. In the end, your collective intuition and preferences should determine the future direction you layout in your plan. Instead of being totally subject to the tyranny of chance, with planning, you're only partly so.

In the box below, we provide a few key national and regional trends at work that could affect planning for your harbor. You may also wish to refer to the *Mooring Plan Handbook* (see Appendix C) and, in particular, Chapter 3 in that handbook on forecasting demand, which may provide you with additional insight.

WATERFRONT TRENDS

- Growth in ocean fish catch has come to an end. Expect continued reductions in the size of the traditional fishing fleet.
- U.S. seafood prices are climbing, thus expect more attempts at aquaculture and the need for associated fish and seaweed processing facilities.
- Continuing pressures to restrict auto use will encourage the use of alternative modes of transportation, including car and passenger ferries and more ocean cargo transport.
- Dwindling supplies of trees worldwide will accelerate Maine's export of forest products to international markets by sea.
- Declines in the marine mammal population (e.g., harbor porpoises) will intensify calls for more marine pollution control measures, including marine pump-out stations and restrictions on the use of chemicals in boat repair, maintenance and construction.
- The State's share of the national tourism pie is expected to expand. With it will come increased pressure for marinas, seasonal docking facilities and associated shoreside services; in particular parking lots, restaurants, lodging places, gas and supply services.
- Cruise boat and charter services will expand considerably creating greater demand for facilities to accommodate such activity.
- Opportunities will develop in shipbuilding, maintenance and overhaul as a result of federal government initiatives to keep shipbuilding competitive in the military and merchant sectors.
- Maine's relatively pristine coastal region is ideally suited to, and will continue to attract, research, education and development operations in the marine science and biotechnology fields.
- Although real estate pressures have generally declined, coastal real estate, particularly non-restricted waterfront properties, will continue to command a premium, particularly for adding residential and recreational uses.
- Explosive growth in recreational boating during the seventies and eighties, continuing into the nineties, will increase the call for additional boat launching facilities, mooring spaces and boat traffic management.
- Maine's status as an acknowledged center for sea kayaking will create demand for special facilities, wildlife protection zones, vessel lanes and additional coastal patrols.
- A revival of the soft-shell clam industry is likely in the near future and the lobster fishery will hold its own in terms of value of product. New waterfront business opportunities will emerge in value-added processing, handling, and niche markets.

THE PLAYERS AND THE RULES

Harbor management is a multi-faceted effort: many federal, state, and local authorities are involved. In fact, there are 28 state and 16 federal agencies that have some decision making or planning responsibility in the marine environment. In addition, all coastal communities have the authority to regulate use and develop harbor management plans. Below we describe the major players involved and their principal interests.

The U.S. Corps of Engineers is the principal federal agency involved with harbor development and requires communities to manage waterways so that they are accessible and open to all (we will have more to say about this later, in the discussion about mooring allocation). The Corps of Engineers also has jurisdiction over many projects located on intertidal or submerged land. In general, a developer must obtain a permit from the Corps to alter or place structures on these wetlands. Moorings, however, are covered by a "general permit" so that individuals need not apply to the Corps for permission to set a mooring. Rental moorings are not included under the general permit. Consequently, marina operators and others who plan to lease moorings must obtain a permit from the Corps.



The Bureau of Land and Water Quality Control in the Maine Department of Environmental Protection (DEP) and the **Bureau of Public Lands in the Department of Conservation** are the most active state agencies involved in harbor activities. The DEP has regulating authority over environmental issues under the Natural Resources Protection Act.

Most construction and maintenance activities in and around harbors will require a DEP permit. The Bureau of Public Lands has the authority to lease the state-owned submerged lands for erection of permanent structures and other activities such as the construction of wharves and marinas, dredging and filling. Officers of the **Department of Marine Resources, Bureau of Marine Patrol** also play a vital role in enforcing safety and conservation laws.

A Special Note About Dredging

Most of Maine's major harbors and rivers are Federal Navigation Projects; as such, they are maintained by the Army Corps. Obtaining federal, state, and local approvals for dredging projects - whether or not they are federally maintained areas - can be a long and complicated process. Communities with dredging needs are well advised to begin planning and involving appropriate state and federal agencies early in the process. (See "A Guide to the Regulatory and Funding Process for Coastal Dredging," available from the State Planning Office at 287-3261).

The U.S. Army Corps of Engineers is concerned primarily with navigation. In smaller harbors, the Corps is frequently called upon to provide such services as dredging channels or constructing breakwaters. Once it has done its work, the Corps' supervisory authority is limited to seeing that such channels are kept clear and its structures are adequately maintained. The State Planning Office is the lead state agency responsible for developing coherent policy and setting priorities for federal maintenance dredging projects. Talk with them first about where your town's harbor fits in with the State's priorities (call the Dredging Coordinator at 287-3261).

Principal Government Agencies and Regulations of Harbor and Related Activities

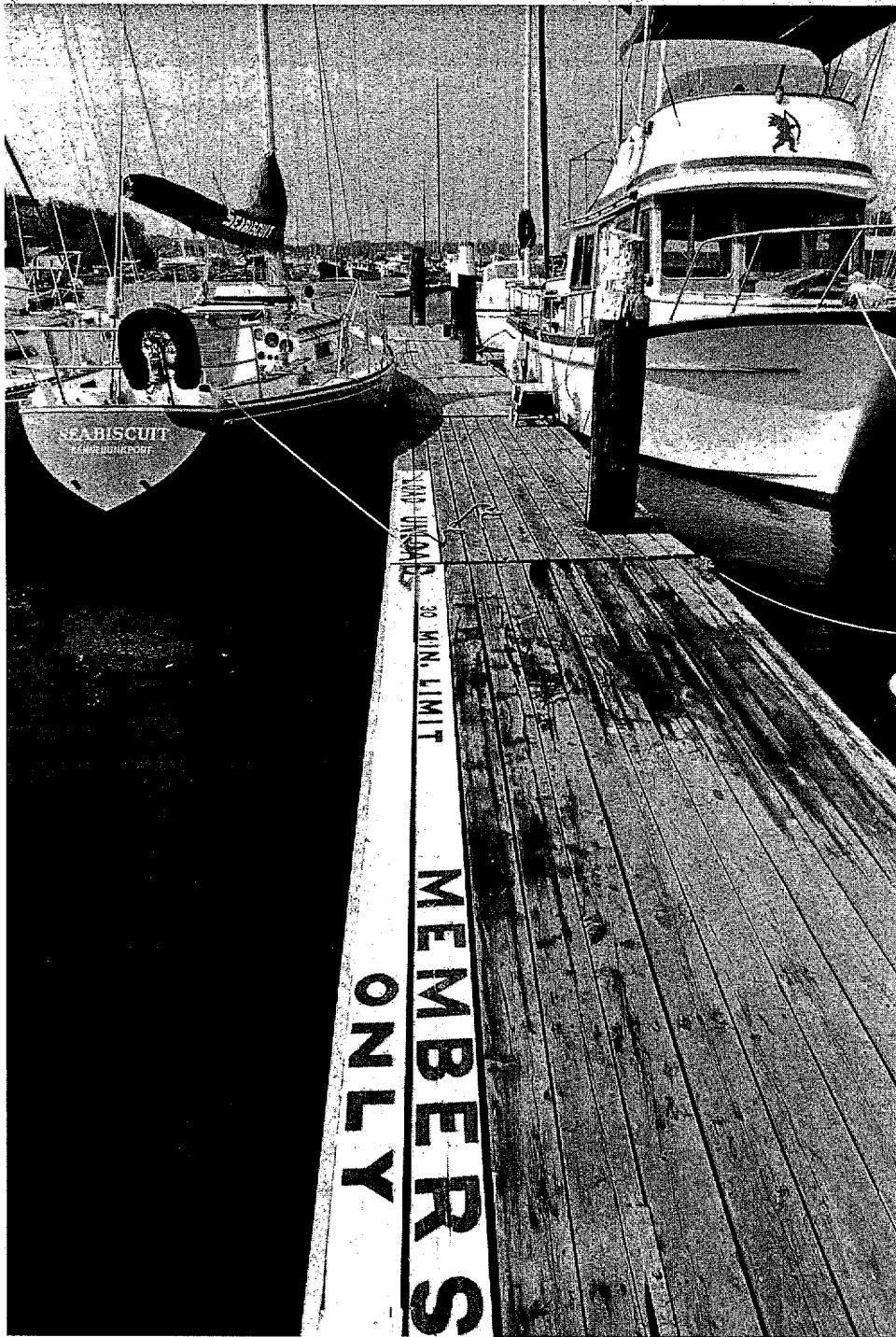
Government Agency	Town/City	ACOE	DECD	DEP	DIF&W	DMR	DOC	DOT	EPA	MGS	NOAA	SPO	USCG	USFWS
Permits/ Activities	building permits, floodplain permits, mooring permits	Sections 9 and 10 of Harbor Act and Section 404 of Clean Water Act, general and individual permits	economic develop- ment	wetland regulations, waste discharge licenses, site location permit by rule, shoreland zoning oversight	wildlife habitat protection, watercraft registration, anadromous fishing regula- tions, advises DEP on permit applications	aquaculture leases, marine habitat protection, advises DEP on permit applications	critical natural areas, plan- ning and zon- ing for un- organized towns and islands, public lands	commercial ports, ferries, planning and development	water and air quality, ocean dumping	field surveys, research, advises DEP on permit applications	scientific information about oceans and the atmosphere	planning, state policy development, floodplain management oversight	aids to navigation	endangered and threatened wildlife, habitat protection, research and planning
Aquaculture Projects	X	X		X		X			X		X		X	X
Coastal Planning	X						X	X				X		
Consistency with Coastal Zone Management Act												X		
Dredge Disposal	X	X		X	X	X			X	X		X		X
Endangered Species					X		X							X
Environmental Monitoring		X		X	X	X			X	X	X			X
Maintenance, Repair, and Replacement of Structure	X	X		X										
Mining Activities														
> 20 Acres	X	X		X			X							
< 20 Acres	X	X					X							
Moorings														
• Boats Under 65'	X													
• Boats Over 65'	X	X		X									X	
• Rental Moorings	X	X												
Port Development	X	X	X	X				X				X	X	
Recreation/Public Access	X	X			X		X					X	X	
Use Conflicts	X	X					X	X					X	
Water Quality Certification				X			X		X					
Waterfront Construction	X	X		X	X	X						X		X
Zoning Issues	X			X			X					X		

State Agencies

DEP - Dept. of Environmental Protection
 DECD - Dept. of Economic and Community Development
 DIF&W - Dept. of Inland Fisheries and Wildlife
 DMR - Dept. of Marine Resources
 DOC - Dept. of Conservation
 DOT - Dept. of Transportation
 MGS - Maine Geological Survey
 SPO - State Planning Office

Federal Agencies

ACOE - Army Corps of Engineers
 EPA - Environmental Protection Agency
 NOAA - National Oceanic and Atmospheric Administration
 USCG - U.S. Coast Guard
 USFWS - U.S. Forest and Wildlife Service



There are 125 marinas located in various coastal towns in Maine with several thousand slips available. The Portland-South Portland area alone contains 1,500 slips.

KENNEBUNKPORT

WORKING TOWARD CONSENSUS

After individuals in your group have achieved a certain sense of clarity about the issues and conditions affecting the harbor, the next step involves translating knowledge into action. At this point, if you haven't already done so, you'll need to identify the obstacles and discuss how to overcome them. Is it money? Is it lack of organization? Is it general public apathy? Whatever the obstacles, if they are described clearly, solutions are often discernible. At this step in the process, it will be good also to identify allies or potential allies in order to produce the results you want.

Sometimes a clearly written summary of key issues and points of agreement and disagreement is necessary. Circulating such a summary to a wider audience will sometimes break a log jam of disagreement. Decisions will be supported as long as concerns are expressed openly and respectfully, and people are given ample opportunity to be heard.

The ability to network with lots of people and to build consensus is the most basic skill for involving the public and arriving at meaningful decisions. Consensus-building involves getting competing interests to talk to one another and to redefine alternative courses of action until the result reflects something that most can support.

In 1950, there were 8,000 commercial fishing licenses issued; in 1974, 19,000 and in 1991, 14,000.

Scarborough Forecasts

In the five year period between 1981 and 1986, the Town of Scarborough saw a 68% increase in the use of its harbor. As growth continued, the Town sought to manage it. To get to the heart of the issues, the Harbor Plan Committee commissioned:

1. a dredging study to analyze the prospects of creating a 3-acre vessel anchorage off Ferry Beach;
2. a study of the town's clam resource, including steps to be taken to help improve it;
3. a projection of future commercial and recreational uses of the harbor;
4. a feasibility and market study addressing commercial fishing, recreational boating and other recreational uses;
5. a preliminary site design with cost estimates for the proposed facilities at the municipal boat launch and new parking areas; and
6. a town survey to gauge public opinion regarding harbor issues and priorities for improvements.

All of this information was analyzed and a comprehensive harbor plan was prepared for shoreside improvements, zoning modifications and land acquisitions for public access. As a result of the Committee's efforts, conflicts have been minimized, problems anticipated, and the Town's harbor saved as an asset for the area and its citizens.

THE RIGHT TACK

Consensus differs from "majority rule" in that each participant comes away feeling like a winner. To reach consensus, everybody does not have to agree on everything, but differences should be aired and resolved sufficiently so that there can be a unanimous decision to move forward.

When the majority rules, losers sometimes work to undermine the decision or may withdraw from future involvement altogether. Where participants have worked toward consensus, they are encouraged to remain involved because they can relate the group's decision to their own needs. In the end, however, someone must step forward and champion a resolution to the issues at hand. Working toward consensus should not become an excuse for wallowing in indecision and not exercising leadership. At some point, someone will need to take a stand and endure the turbulence of controversy over honest differences in order to make headway. Remember what Shakespeare said, "When the sea was calm, all ships alike, showed mastership in floating."

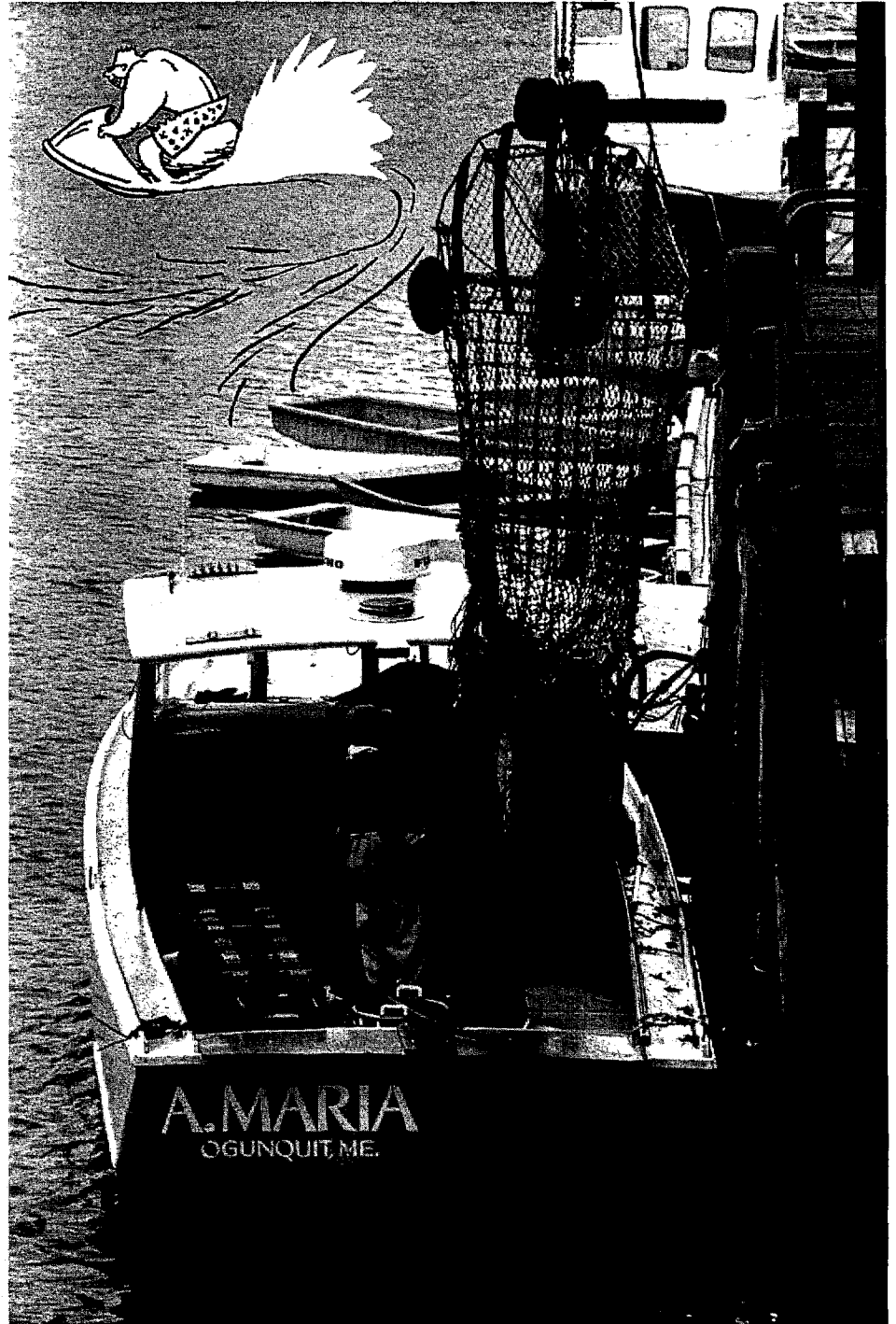
Bucksport's Experience

The Town of Bucksport has a very active citizenry and town officials hold many townwide and neighborhood meetings to review plans and development schemes. People's opinions are sought, discussed and respected. As a result, projects in Bucksport receive considerable public review before being implemented.

A decade ago, the Town of Bucksport began a downtown revitalization program that included a waterfront redevelopment component. For years, the waterfront along the downtown shore had been used as a dumping ground and was in a serious state of decline. Numerous overboard discharge pipes exited the banks of the Penobscot River in this area. Erosion was also threatening to undermine buildings along Main Street. At the time, a half dozen boats were moored along the waterfront. Town officials recognized that revitalizing the downtown area without including the waterfront would compromise, and render incomplete, their larger scheme. Financial assistance was obtained from the Department of Economic and Community Development's Waterfront Action Grant Program as well as the Community Development Block Grant (CDBG) Program.

A waterfront committee was established early on to develop a plan for making waterfront improvements. Important products of the Committee's work were a vision of a revitalized waterfront, a timetable and a sequence for critical actions, and the identification of possible funding sources for the desired improvements. The group also conducted an inventory of the waterfront that detailed conditions, ownership, sources of pollution, natural features, current use, access, etc. Armed with a body of information, it was clear that the greatest need was to stabilize the banks and eliminate the overboard discharges as an immediate first step. Subsequently, they removed rotting pilings, arranged acquisitions and property easements, reconstructed and enlarged a new town float, added long- and short-term parking areas, and constructed a landscaped walkway. All this was done primarily to promote public access and to enhance an underutilized resource.

While there are few fishing concerns in Bucksport, recreational boaters have grown tenfold since the Committee began its work. Their planning effort revealed the need (and desire) for a small marina along the downtown waterfront to serve the blossoming fleet. A spin-off marina feasibility study has shown a healthy demand for such a facility. There are ongoing efforts by the Committee to acquire selected shorefront parcels to complete the waterfront walkway and to provide enough land to attract a marina operation.



Maine's existing marine business and industry supports about 25,000 jobs or about 4% of the total state work force.

OGUNQUIT

IMPLEMENTATION TOOLS: HOW TO MAKE IT HAPPEN

MAKING IT HAPPEN

There are three principal ways to put harbor planning recommendations into effect:

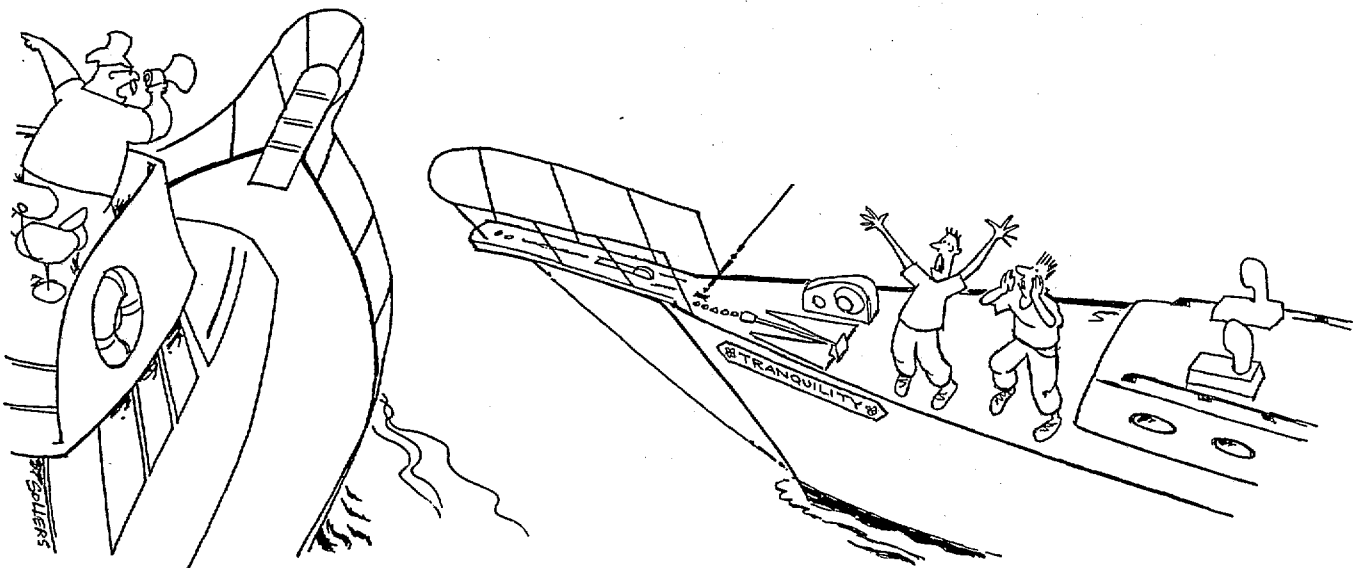
- (1) Ordinances;
- (2) Capital Improvements Program (CIP); and
- (3) Promoting Private Investment.

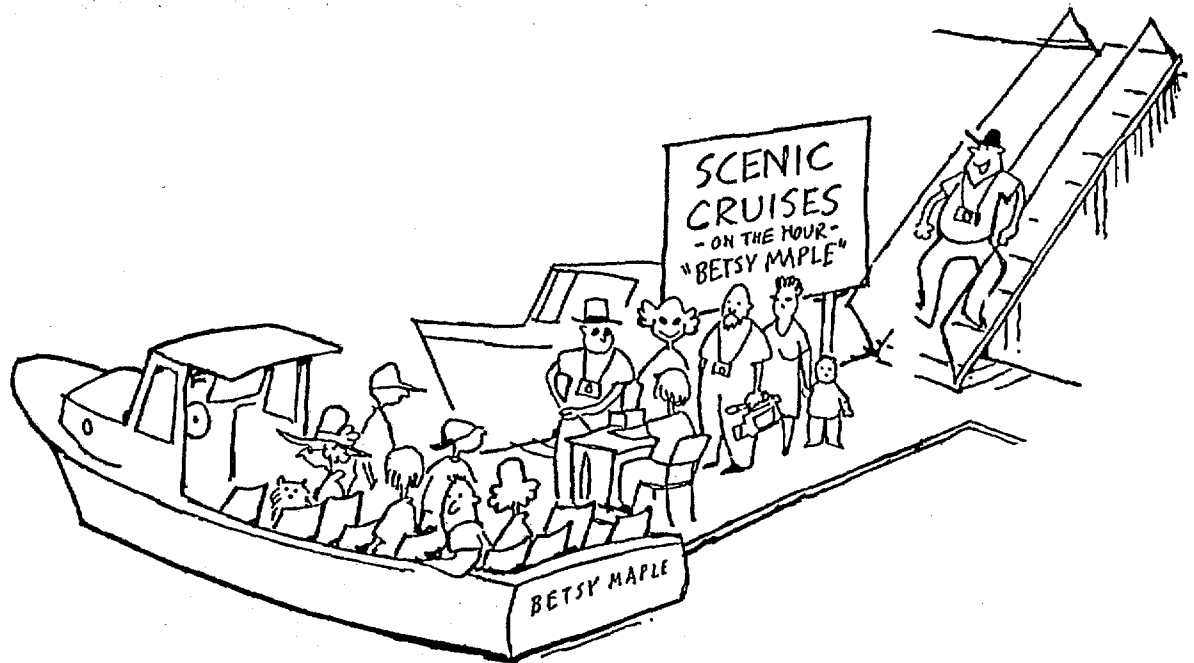
Ordinances are the legal embodiment of the community's plan for its waterfront and harbor. They can be fashioned to give priority to water dependent uses or provide opportunities for other commercial or residential development.

A Capital Improvements Program (CIP) is the community's list of public improvements planned for the waterfront and is keyed to a budget. It demonstrates a real interest and financial commitment to the harbor on the part of a city or town, and can be a catalyst for private investment.

Once a community has laid the groundwork for harbor development through its CIP and ordinances, promoting private investment is often the next step in making its vision of the harbor a reality. Conversely, private investment may spur town leaders and citizens to look more closely at how the waterfront is developing and prompt changes to the community's ordinances and capital improvement planning.

The State of Maine exercises stewardship responsibilities for all lands and waters within 3 miles of its coast. This area encompasses 3.5 million acres, roughly equivalent to 18% of the State's total land area. These waters are home to at least 1,600 different types of bottom-dwelling organisms, about 100 types of birds, 73 different types of fish, and 26 different kinds of whales, porpoises, and seals.





PROJECT BASICS

1. **Look to see if it's been done before.**
Don't reinvent the wheel. Learning from other communities experiences will give you a tremendous start in getting your project off the ground. Contact the State Planning Office, neighboring harbor committees or the Regional Planning Commissions who may be able to help you find examples you can model.
2. **Organize for Success.**
The kind of organization that you choose to administer a given project has a significant impact on the options for funding its development. In addition to town government, consider public-private partnerships or forming a local, private non-profit development corporation to oversee the project.
3. **Look to Multiple Sources of Funding.**
Financing any project typically will require more than one funding source. Match the financing mechanism to the type of project. For example, tax increment financing is one type of financing mechanism that requires projects to generate tax revenue. These tax revenues are then used to service a municipal bond for infrastructure improvements such as a town pier. Many projects have been financed by marketing different features of the project to separate financiers in order to piece together necessary funds. Other funding options include: loans and equity investments, grants, donations and other gifts, municipal bonds, local government assessments and revenues. Offering incentives such as infrastructure improvements, zoning concessions ("contract zoning"), tax abatements, or land and buildings can help make a project happen.
4. **Leverage Your Resources.**
Leveraging is when money from one source is used to generate money from other sources. This mechanism underlies many public-private partnerships and is an essential strategy for communities seeking to make the most of limited local resources.
5. **Consider a Public-Private Partnership.**
Any activity undertaken by government and business that serves the interests of both can be considered a partnership. Such a relationship requires a carefully prepared plan that accounts for the relative perspectives of each partner - opportunity, risk, commitment. A local development corporation can be founded to stimulate harbor development and to act as the community's agent in a public-private partnership.

THE RIGHT TACK

ORDINANCES

Local ordinances may be necessary to regulate land and water uses. Yes, this is the "Z" word. There are many sources of information on designing shoreland and waterfront zoning ordinances as well as harbor ordinances. Waterfront zoning deals with the landside issues and is usually incorporated as a district in townwide zoning or shoreland zoning ordinances.

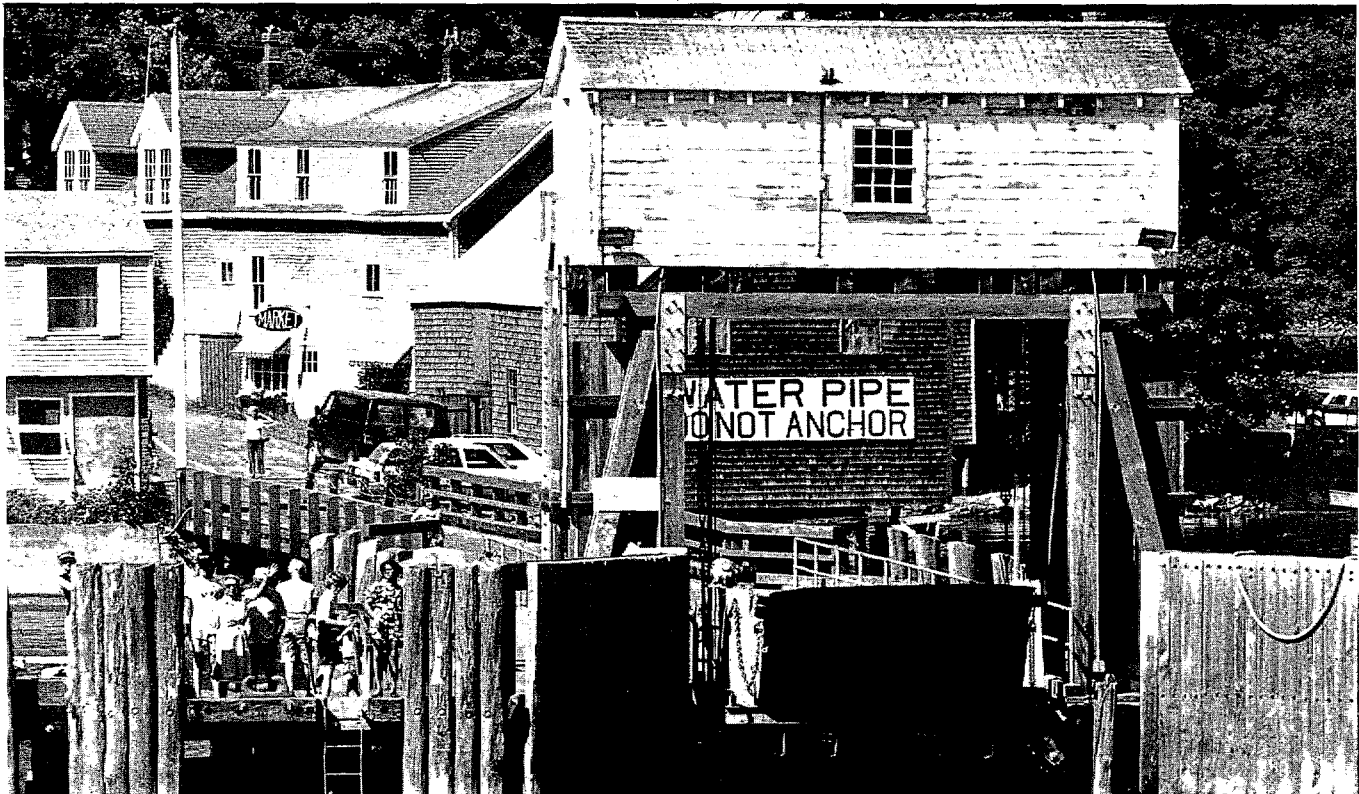
WATER DEPENDENT USES

A key consideration in waterfront zoning is whether a community wants to have specific provisions for water dependent uses. Water dependent uses are activities that require facilities with direct access to the water, such as commercial fish piers, port facilities, and marinas. Support services for marine businesses also need to be located on or near the waterfront.

Other facilities and services such as condominiums and restaurants do not require a waterfront location, but can command a premium price if located on the water. Consequently, many non-water dependent users are able to pay more for a waterfront location than those associated with the marine industries, forcing water-dependent uses out of the harbor. The issue regarding water dependency is quite simple – if communities wish to maintain a working waterfront and healthy marine resource industries, they must make a conscious effort to favor water dependent uses in shoreline areas.

Maine's coastal communities consist of 12% of the land in the State, 58% of the population, and 65% of the State's jobs. Many residential structures now compete for land that traditionally provided access for fishermen, shipbuilders and marine operators.

NORTH HAVEN



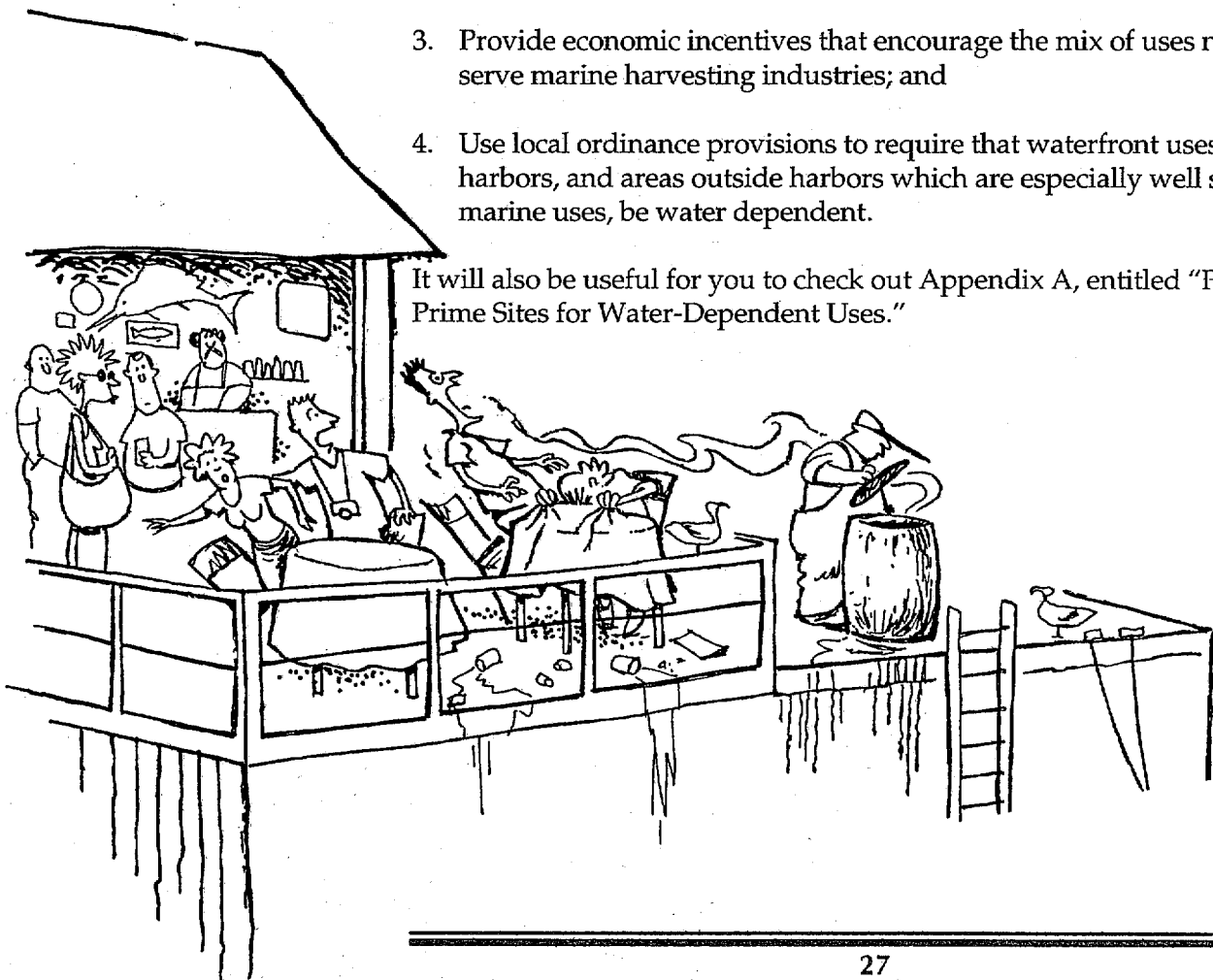
The need to favor water dependent uses extends beyond the harbor. There are many individual sites along the Maine coast that are suitable for water dependent uses, but they are vulnerable to development that could be located elsewhere. Local communities should recognize that water dependent uses can be squeezed out of "mixed use" shoreland zones. Care should be taken to craft "mixed use" ordinance language so that other uses are considered secondary to the water dependent uses.

Conflicts may even arise among water dependent uses. For example, a recreational marina may compete with the fishing fleet for space. State guidelines require that preference be given to commercial uses.

Here's how to approach this issue:

1. Analyze local needs and identify sites suitable for water dependent uses. (The State Planning Office has a statewide map of sites suitable for water dependent uses. This map can serve as a useful starting point for local strategies. Call the Office and ask for the Water Dependent Uses maps.)
2. Provide the public facilities that are needed to encourage water dependent uses, e.g. commercial fishing piers, boat launch and storage areas, parking, etc.
3. Provide economic incentives that encourage the mix of uses needed to serve marine harvesting industries; and
4. Use local ordinance provisions to require that waterfront uses in harbors, and areas outside harbors which are especially well suited to marine uses, be water dependent.

It will also be useful for you to check out Appendix A, entitled "Protecting Prime Sites for Water-Dependent Uses."

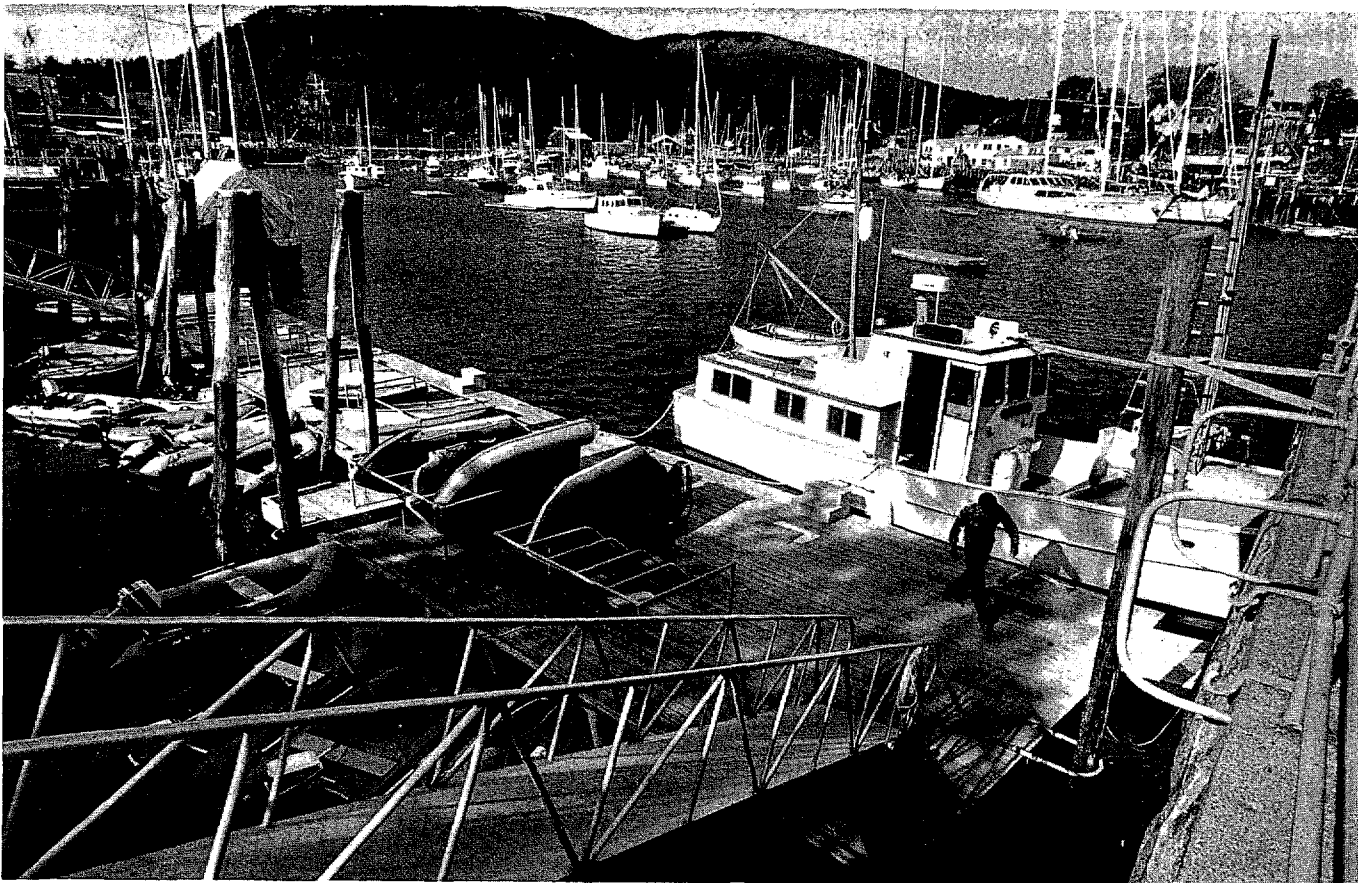


HARBOR ORDINANCES

Harbor ordinances specify how the harbor and town-owned waterfront facilities will be used. Harbor ordinances also outline powers of the harbor master and related administrative procedures. Specifically, harbor ordinances will contain an outline of duties of the harbor master and the harbor committee. Will the harbor master be empowered to make arrests or will he or she be more like a code enforcement officer? A harbor master empowered to make arrests will require more training and equipment than one who serves primarily as a code enforcement officer. An ordinance should also contain a process for appealing decisions made by a harbor master.

Another major area covered in a harbor ordinance is the establishment of boundaries and areas where regulations apply. Regulations such as speed limits, mooring area rules, town dock rules, abandonment of vessel restrictions, transient vessel anchorage provisions, etc. Areas that should be defined are: harbor areas, channels, mooring areas and anchorage areas. Standards for mooring tackle and a process for inspecting the adequacy and safety of such equipment are also important. The final section of a harbor ordinance usually specifies fees for permits, and penalties for those who don't comply with the rules. For additional information on this topic, see Appendix B, entitled "Notes on Developing a Harbor Ordinance."

CAMDEN



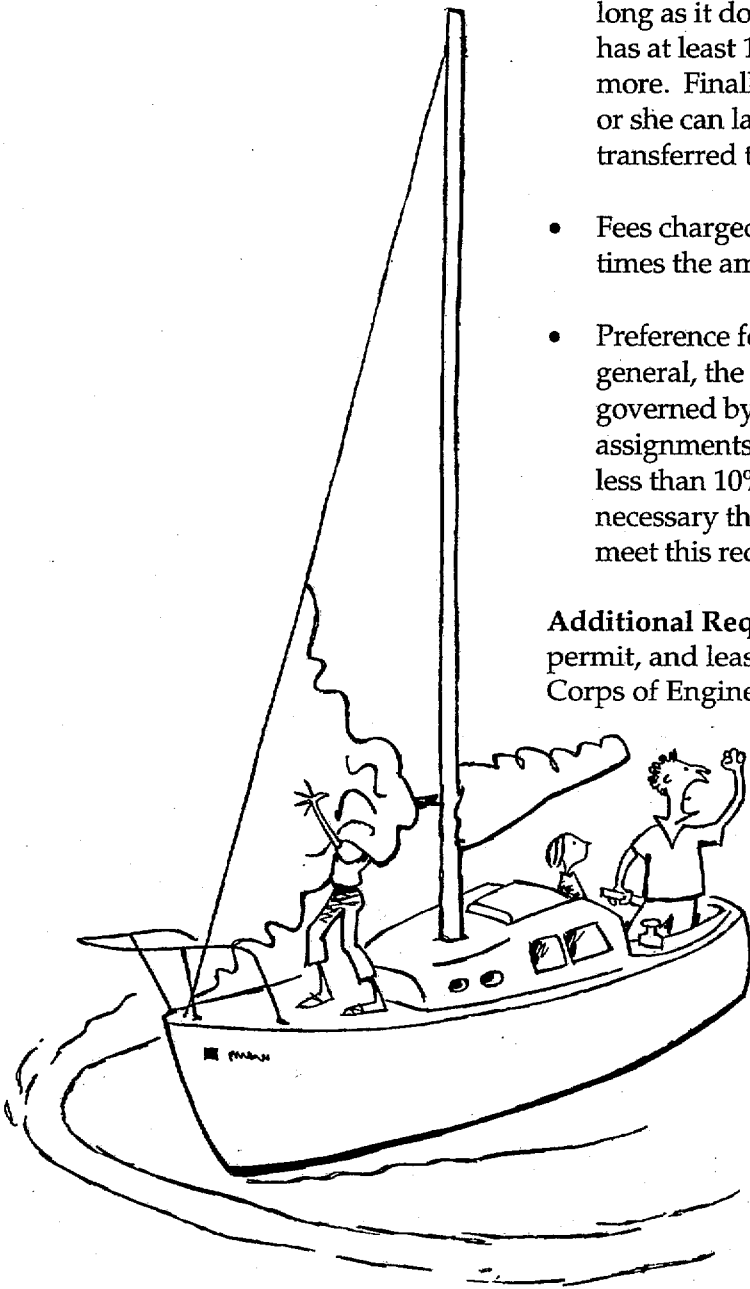
According to the Department of Economic and Community Development, there were 11,000 moorings statewide in 1989. In 1991, it was estimated by the Southern Maine Regional Planning Commission that 1,600 persons were on waiting lists for moorings and slips in York County.

REGULATING MOORINGS

The first and most frequent issue that surfaces in harbors is the regulation of moorings. Because, for the most part, moorings are exempt from state and federal permitting procedures, local authorities control use and allocation. However, there are policies enacted by the State Legislature (Title 38 MRSA, Chapter 1) which guide local harbor management decisions. The principal limitation on local authority is that it cannot conflict with or contradict the letter or intent of state or federal law. The State law also requires towns to assign moorings according to the following criteria:

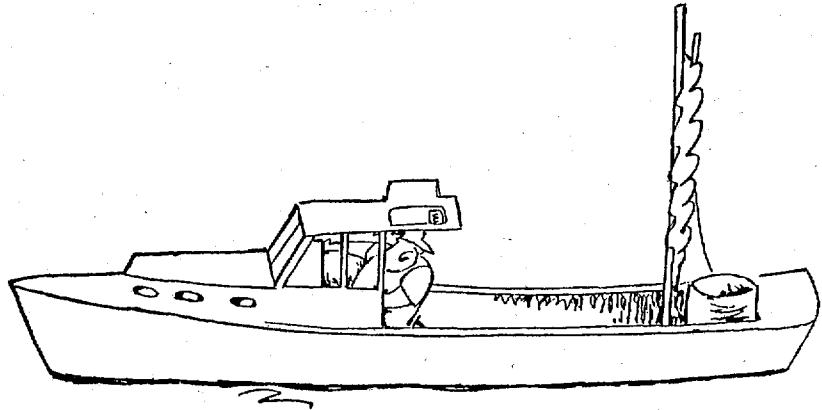
- A shoreside owner is entitled to one mooring fronting his property as long as it doesn't interfere with navigation, and as long as the owner has at least 100 feet of frontage and a lot that is 20,000 square feet or more. Finally, a shorefront property owner must own a boat before he or she can lay claim to a mooring privilege. Moorings cannot be transferred to someone else.
- Fees charged for nonresident moorings cannot be any more than 5 times the amount charged of residents.
- Preference for mooring assignments can be granted to residents. In general, the order of preference for the assignment of moorings is governed by whether or not the town has a waiting list for mooring assignments. If there is a waiting list, the town must see to it that no less than 10% of those who have moorings are nonresident. It is not necessary that a person lose a current mooring assignment in order to meet this requirement.

Additional Requirements: vessels over 65 feet long require a DEP permit, and leased or rented moorings require permits from the Army Corps of Engineers.



THE RIGHT TACK

Some harbor projects, if they involve federal funds, can change how a town allocates moorings. If, for example, the U.S. Army Corps of Engineers is called in to undertake a dredging project, a community will be required to open its harbor to everyone on equal terms. Conflicts with the Army Corps have arisen in towns where harbor moorings are allocated to residents on a preferential basis. If you want to minimize potential conflicts with the Corps, follow the guidelines for allocating moorings in the box below.



Maine has 138 coastal communities, 17 state agencies and 6 federal agencies that are engaged and have jurisdiction in the marine environment.

Allocating Moorings When Federal Agencies are Involved

If your harbor has room for additional moorings, you must assign a mooring to any boat owner who applies for one unless you have a valid reason to deny it. An applicant's place of residence cannot be a basis for denial. If your harbor does not have room for additional moorings, you must place the applicant's name on a waiting list.

When spaces become available, they must be assigned to persons on the waiting list. If there are less than 10% nonresident moorings in your harbor, and there are nonresidents on your waiting list, you must assign any available moorings to the nonresidents on your list until you reach the 10% level. This applies to both commercial and pleasure boaters. To comply with Federal requirements, once you have achieved the level of 10% nonresidents, you must assign moorings to persons on your waiting list in a nondiscriminatory fashion. You cannot refuse a mooring to a nonresident just because your harbor has 10% or more of its moorings already in use by nonresidents.

For a more detailed discussion of these legal requirements, see *A Legal Guide for Harbormasters and Coastal Officials* available from the University of Maine Cooperative Extension. Also, you can refer to the *Mooring Plan Handbook* which is included as Appendix C in this volume.

CAPITAL IMPROVEMENTS PROGRAM (CIP)

When is Expertise Needed?

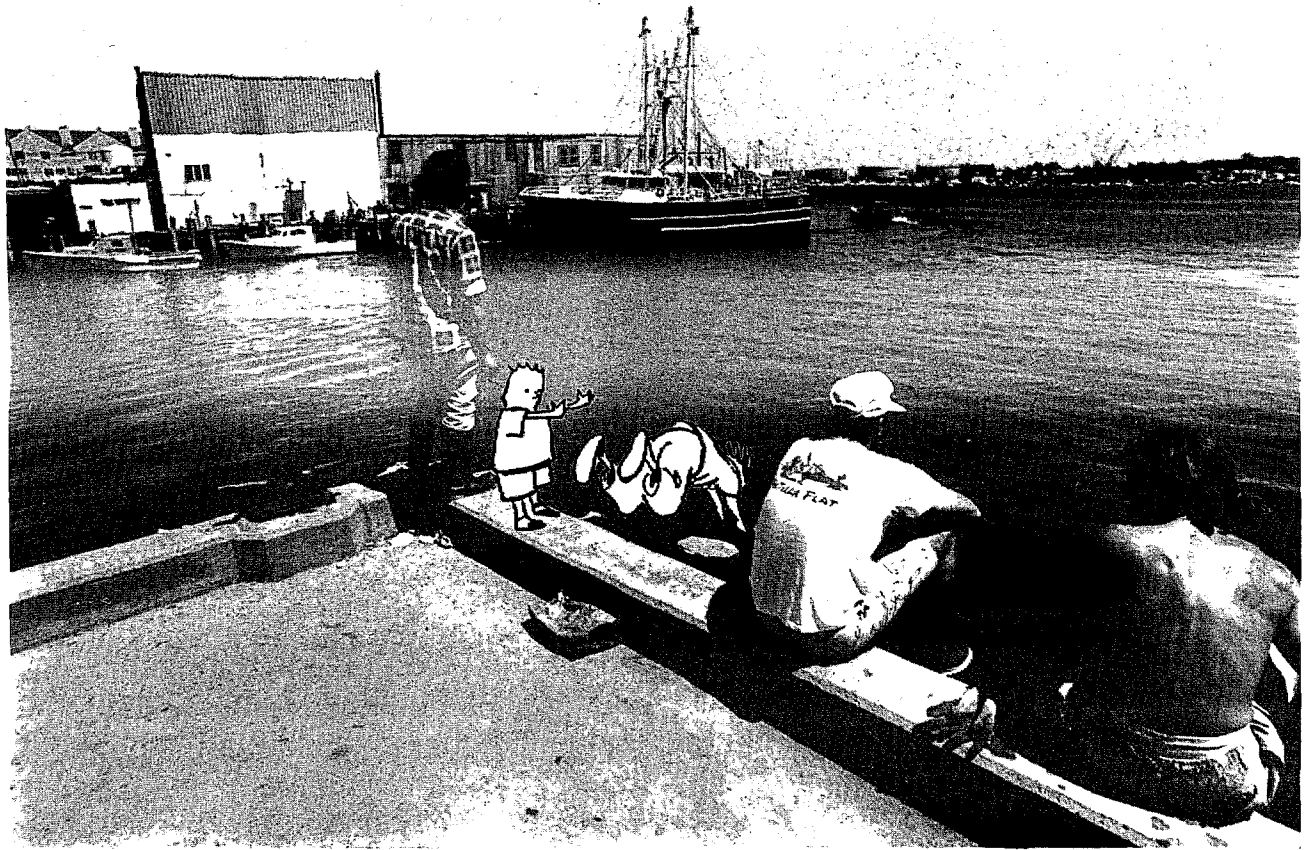
- X Don't hire an expert if you don't know what you want to accomplish.
- X Don't hire an expert to take sides with you, or preach to the converted.
- X Don't hire an expert to "solve the problem."
- X Don't hire an expert to "educate" others in town.
- X Don't hire an expert to "do a report" for you.
- ✓ Do hire an expert to collect specific technical information, do detailed engineering, address essential resource management issues, write involved grant proposals, conduct a valid and representative telephone survey of public opinion, do a detailed site plan, prepare a permitting strategy and coordinate the permitting process.

Contact the Maine Coastal Program staff at the Maine State Planning Office (287-3261) for a listing of planning consultants working in Maine.

A Capital Improvement Program (CIP) is a fiscal tool that budgets major capital improvements over a 5-10 year period and tracks the community's incurred debt. The CIP identifies the facilities or improvements needed to accommodate the changes you anticipate or want to have happen in the harbor. Communities identify improvements such as expanding existing parking lots and rehabilitating old docks or wharves. A CIP usually includes detailed costs, engineering and architectural plans, or other studies. You'll probably need an expert for this kind of effort. Also, the Greater Portland Council of Governments publishes a very helpful document called "Developing a Capital Improvement Program" (1991).

The chart on the following page lists some of the major grants that may be available, as well as other possible avenues to implement your harbor plan.

PORTLAND



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Public Financing Opportunities for Harbor Development Projects

Loan/Grant Program	Administering Agency/Contact	Scope of the Program	Who Can Apply and Other Requirements
Economic Development Administration programs Public Works and Development Facilities (Title 1)	Eastern Maine Development Corporation, Regional Economic Development Agencies, Federal Office: 1-800-339-6389	<ul style="list-style-type: none"> grants provided to distressed communities to attract industry, generate jobs, encourage business expansion; area (Labor Market Area) unemployment rate has to exceed state average 	local government, special purpose unit of government, public or private non-profit 40% local match required
Small Business Administration programs (7A) <ul style="list-style-type: none"> small loans preferred lenders pollution control 	Small Business Administration Augusta Office: 622-8378	<ul style="list-style-type: none"> loan guarantee or loans of \$50,000 or less for fixed assets; real estate; or working capital for retail, service, wholesale, manufacturing or construction business required 1st or 2nd mortgage on business assets 	<ul style="list-style-type: none"> businesses apply directly negotiated interest rate usually less than market rates Small Business Administration guarantees loans from local banks
<ul style="list-style-type: none"> Microloan Program 		<ul style="list-style-type: none"> loans from \$5,000 - \$25,000 for fixed assets or working capital; up to six-year term, fixed market rates 	<ul style="list-style-type: none"> businesses apply directly must be unable to obtain credit elsewhere personal guarantees required
<ul style="list-style-type: none"> Tree Planting Program 	Maine Forest Service: 1-800-367-0223 or 287-2791	<ul style="list-style-type: none"> only for purchase and planting of trees on state, local or small business properties 50% match requirement 	<ul style="list-style-type: none"> local governments, small businesses with local governments
Farmers Home Administration program <ul style="list-style-type: none"> business/industrial loan guarantees community facilities 	Farmers Home Administration, Bangor Office: 990-9120	<ul style="list-style-type: none"> 80% loan guarantees to support financing "improvements in rural life", for fixed assets, real estate, working capital direct government funds or loan guarantees to improve, develop or finance essential community facilities priority given to areas of high employment program only available in areas with less than 50,000 population favorable provisions for facilities serving low income groups 	local government, special purpose unit of government, nonprofit agencies
Finance Authority of Maine <ul style="list-style-type: none"> small business loans working capital loans 	Finance Authority of Maine, Augusta Office: 623-3263	<ul style="list-style-type: none"> 90% guarantee up to \$1,000,000 for most purposes <u>except</u> construction financing and housing businesses must have 50 or fewer employees and sales of 5 million or less 	<ul style="list-style-type: none"> businesses apply directly security interest on available assets required from borrower
<ul style="list-style-type: none"> Maine Job Start 		<ul style="list-style-type: none"> loans, 2% below prime, for fixed assets and working capital \$10,000 maximum exposure; 4-5 year term and maximum net worth of recipient \$25,000; gross household income of less than 80% of state median 	<ul style="list-style-type: none"> local small businesses review and approval of application by Washington-Hancock Community Action Agency

Public Financing Opportunities for Harbor Development Projects			
Loan/Grant Program	Administering Agency/Contact	Scope of the Program	Who Can Apply and Other Requirements
Finance Authority of Maine <ul style="list-style-type: none"> Smart-E Bond 	Finance Authority of Maine Augusta Office: 623-3263	<ul style="list-style-type: none"> loans for fixed assets and associated soft costs, from \$250,000 to \$7 million financing restricted to manufacturing facilities, solid waste disposal facility and nonprofit corporations 	<ul style="list-style-type: none"> taxable and tax exempt market rates First security interest in financed assets required
<ul style="list-style-type: none"> linked investment for commercial enterprise 		<ul style="list-style-type: none"> one year renewable loans at 2% below CD rate for real estate, fixed assets, working capital limit of \$200,000 for firms with less than 20 employees must be manufacturer and/or have 70% sales out of state 	<ul style="list-style-type: none"> local businesses security interest in financed assets required
<ul style="list-style-type: none"> economic recovery loans 		<ul style="list-style-type: none"> direct loans at prime +4% for most normal business uses borrower must have exhausted all available sources 	<ul style="list-style-type: none"> local businesses security interest in financed assets required
Housing and Urban Development (Community Development Block Grant) programs: <ul style="list-style-type: none"> Development Fund Interim ("gap") financing 	Maine Department of Economic and Community Development: 287-8484	<ul style="list-style-type: none"> grant used to provide loan to a business for creation of jobs or housing units must benefit low to moderate income residents (51% of total benefit) maximum \$100,000 cannot be more than 40% of total project cost 	<ul style="list-style-type: none"> local government requires subordinated mortgage lien on financed assets flexible interest rate dependent on project need approval by legislative body required
<ul style="list-style-type: none"> Community Revitalization 		Maine Department of Economic and Community Development: 287-8484	<ul style="list-style-type: none"> grants to fund town projects, e.g., public facilities, utilities, housing rehabilitation, historic preservation, special economic development, etc. must benefit low to moderate income residents (51% of total benefit) maximum grant of \$400,000 requires 20% local match
Dept. of Interior programs: <ul style="list-style-type: none"> Land and Water Conservation Fund 	Department of Conservation: 287-2524	<ul style="list-style-type: none"> grants provided for acquisition, development of outdoor recreation facilities/space first priorities are water access and land acquisition 50% match required 	<ul style="list-style-type: none"> local government or school district
Boat Facilities Program	Maine Bureau of Parks and Recreation: 287-4952	<ul style="list-style-type: none"> funding for construction of boat launching facilities, land acquisition 	<ul style="list-style-type: none"> local governments
Urban and Community Forestry Assistance Program (formerly America the Beautiful)	Maine Forest Service: 1-800-367-0223 or 287-2791	<ul style="list-style-type: none"> program and project development for environmental education 	<ul style="list-style-type: none"> State, county or local government, non-profits

THE RIGHT TACK

Public Financing Opportunities for Harbor Development Projects			
Loan/Grant Program	Administering Agency/Contact	Scope of the Program	Who Can Apply and Other Requirements
Regional Economic Development Agencies: Revolving Loan Fund	Eastern Maine Development Corporation: 942-3689 Northern Kennebec Development Commission: 873-0711 Androscoggin Valley Council of Governments: 783-9186	<ul style="list-style-type: none"> any \$10,000 - \$1 million business assets can be financed, loans done in conjunction with local banks limited to 50% of financed assets limited to businesses in agencies' respective regions 	<ul style="list-style-type: none"> local businesses rates slightly lower than market rates
Department of Economic and Community Development programs: <ul style="list-style-type: none"> state tax increment financing 	Department of Economic and Community Development: 287-2656	<ul style="list-style-type: none"> special district established by town to promote business development 25% of new state tax revenue (sales tax or income tax) generated in the district returned to municipality for a maximum of 10 years returned state tax revenues can be used to finance the development or to help pay for roads, sewer, etc. as necessary for the development to occur can include retail or industrial activity state approval required 	<ul style="list-style-type: none"> local units of government
<ul style="list-style-type: none"> local tax increment financing 	Department of Economic and Community Development: 287-2656	<ul style="list-style-type: none"> similar to State Tax Incremental Financing (see above) except towns devote part of the increased property taxes received to help finance infrastructure for new development state approval required 	local units of governments
<ul style="list-style-type: none"> Waterfront Action Grants 	Maine State Planning Office (287-3261)	specific harbor planning and management activities	local units of government
<ul style="list-style-type: none"> boat pump-out grant program 		75% of grant goes for boat pump-out facilities	towns, cities and marina owners
Maine Department of Transportation programs: <ul style="list-style-type: none"> Intermodal Surface Transportation Efficiency Act 	Maine Department of Transportation: 287-3131	<ul style="list-style-type: none"> broadens application of federal highway programs to include "multi-modal facilities" and improvements such as tree planting, landscaping, bike paths, scenic easements, historic sites, sign removal, etc. 	Local and State governmental agencies; Maine Department of Transportation administers program directly with advice from Regional Transportation Advisory Committees
Inland Fisheries and Wildlife: <ul style="list-style-type: none"> public access development funds 	Inland Fisheries and Wildlife: 287-4471	<ul style="list-style-type: none"> funds for small boat access sites priorities for prime fishery habitat areas 	local units of government

There are 20 ferries operating from Maine's harbors, 65 cruise ships visit yearly, and more than 65 other types of boat cruises operate from Maine harbors. Excursions and charters also operate along the coast of Maine and 11 companies now ferry tourists and researchers to sites offshore in search of humpback and fin whales.

PROMOTING PRIVATE INVESTMENT

Private investment in harbor and waterfront facilities can be encouraged in a variety of ways. Certain public improvements or zoning designations can make it attractive to developers to put in services or other types of facilities that will complement existing harbor activities. An active harbor committee with a good community-supported plan for development is a rarity these days. Private developers will be eager to work with you. Contact a representative of one of the various regional economic development organizations for help.

Eastport's Accomplishments

The Town of Eastport has a very effective harbor planning and expansion program underway. Ten years ago, Eastport was described as "a place of hangers-on." Eastport is now the State's second largest general cargo port. Now Eastport's problem is how to manage and build on its waterfront successes. The purpose of the Town's 1991 Comprehensive Harbor Waterfront Plan is to "guide how Eastport's waterfront will be used in the future."

The Project Oversight Committee sought simple and direct solutions to issues. Many of the solutions focused on techniques for stimulating private investment in a way that would have the least possible impact on the Eastport taxpayer. Here's a few of the things they decided to do:

1. strengthen the harbor master's role;
2. continue efforts to relocate the cargo facility out of the downtown area to Estes Head;
3. continue with improvements to the Town's fish pier;
4. redirect recreational boating to the north end of the breakwater;
5. create a small boat basin along the inner section of Broad Cove;
6. continue with efforts to improve water quality, particularly in conjunction with recreational boating;
7. support aquaculture by building a boat ramp and renovating the town dock.

Many of these improvements are being made possible through a combination of public and private investments, and by the Town's supportive zoning and harbor management policies.

MAINE'S COASTAL POLICIES

In 1986, the State of Maine enacted into law nine coastal policies which are to guide the conduct of activities in coastal areas. All port and harbor management should recognize these directives.

1. **Port and harbor development.** Promote the maintenance, development and revitalization of the State's ports and harbors for fishing, transportation and recreation.
2. **Marine resource management.** Manage the marine environment and its related resources to preserve and improve the ecological integrity and diversity of marine communities and habitats, to expand our understanding of the productivity of the Gulf of Maine and coastal waters, and to enhance the economic value of the State's renewable marine resources.
3. **Shoreline management and access.** Support shoreline management that gives preference to water dependent uses over other uses, that promotes public access to the shoreline, and that considers the cumulative effects of development on coastal resources.
4. **Hazard area development.** Discourage growth and new development in coastal areas where, because of coastal storms, flooding, landslides or sea level rise, it is hazardous to human health and safety.
5. **State and local cooperative management.** Encourage and support cooperative state and municipal management of coastal resources.
6. **Scenic and natural areas protection.** Protect and manage critical habitat and natural areas of state and national significance and maintain the scenic beauty and character of the coast even in areas where development occurs.
7. **Recreation and tourism.** Expand the opportunities for outdoor recreation and encourage appropriate coastal tourist activities and development.
8. **Water quality.** Restore and maintain the quality of our fresh, marine and estuarine waters to allow for the broadest possible diversity of public and private uses.
9. **Air quality.** Restore and maintain coastal air quality to protect the health of citizens and visitors and to protect enjoyment of the natural beauty and maritime characteristics of the Maine coast.



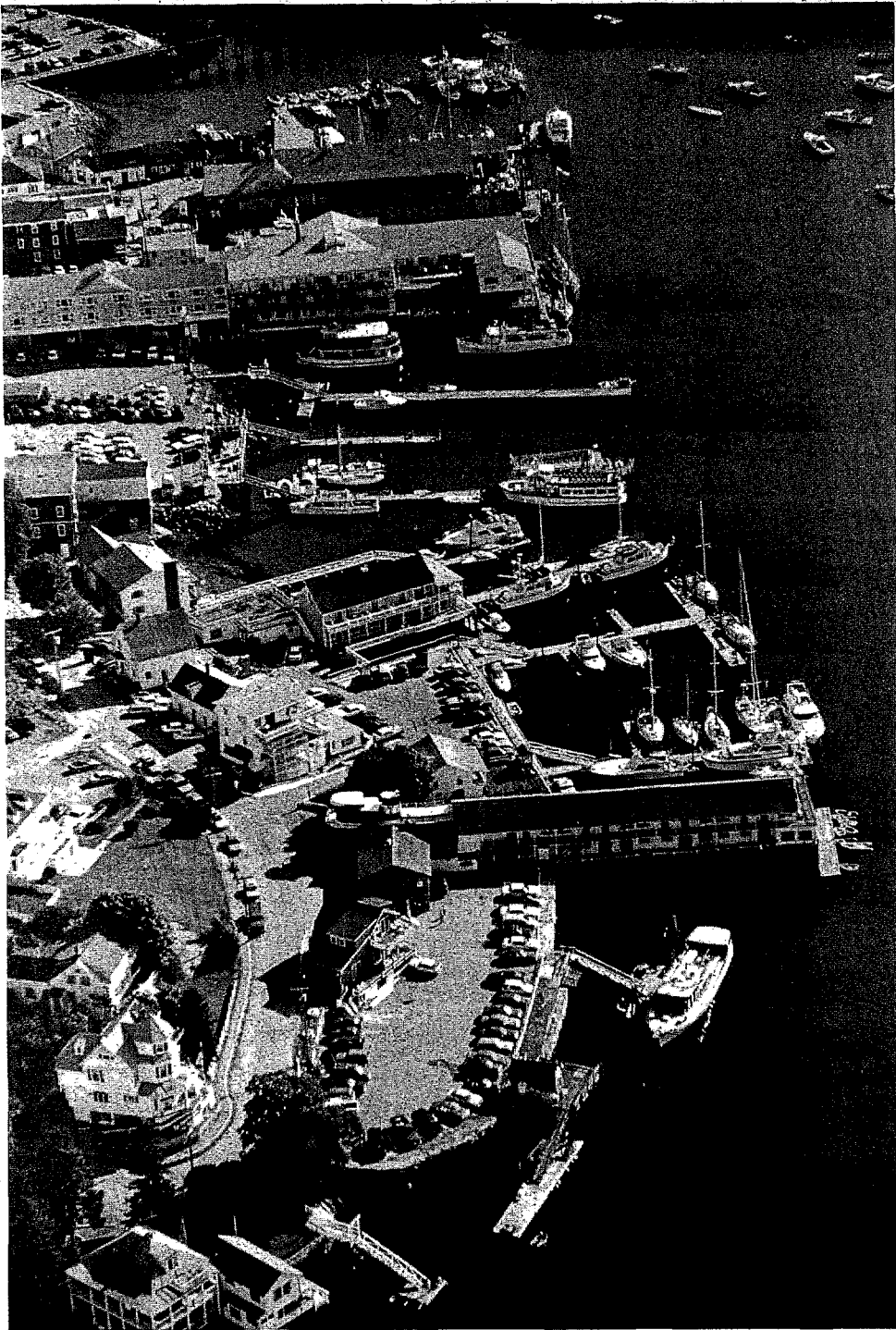
CHARACTERISTICS OF MAINE'S MAJOR HARBORS *								
Region Characteristics of Harbor and Location	Protection from Winds		Interest, Beauty and Attractiveness		Facilities		Working Harbor # of Commercial Fishing Vessels	Other Features, Comments
	Hurricane Hole	Well Protected	Very Attractive	Pleasant	Water (W) Groceries (G) Fuel (F)	Boat Yard /Launch Area		
Southern Coast: short on harbors and close to population centers, consists of a series of shallow bays and occasionally rocky headlands, many beaches								
KITTERY Back Channel	X				W,F	BY/L	84	full of moorings, little anchoring room
YORK York Harbor	X			X	W,G,F	BY		no anchoring, crowded harbor, tricky to enter
KENNEBUNKPORT Kennebunkport	X				W,G,F	BY	45	crowded harbor, several marinas, shallow mooring areas
CAPE PORPOISE HBR Cape Porpoise Harbor		X			W,G,F			working harbor, all moorings are private
BIDDEFORD POOL The Pool		X		X	W,G,F		28	no anchoring, tiny harbor, bird watchers' paradise
Casco Bay: hundreds of islands, great estuaries and sounds, beginning of rocky promontories, bay itself approximately 20 miles wide, Portland metro a dominant feature								
PORTLAND			X		W,G,F	BY/L	146	ferry terminal, new marina facilities, commercial activity, several marinas
YARMOUTH Royal River	X				W,F	BY/L	36	some moorings, 340 slips available
STATE-OWNED Jewell Island		X	X					no moorings, anchoring only, small harbor, great views and walking trails
SO. FREEPORT Harraseeket River		X	X		W,G,F	BY/L	47	narrow harbor entrance, no anchoring, busy place
HARPSWELL Long Cove Snow Island Ors Cove	X	X X		X	W,F	BY	332	unmarked ledges, difficult entrance good anchoring, uncrowded, idyllic ample room to anchor, easy to enter
PHIPPSBURG Cape Small Harbor Sebasco Harbor The Basin	X X	 X		X X	 W,F	 	123	difficult to enter, mostly anchoring, some moorings working harbor, some moorings, mostly anchoring anchoring only, idyllic setting
Midcoast and the Rivers: many rivers, large islands, several major peninsulas, rich history								
WISCASSET				X	W,G,F	BY/L		many facilities including town pier, historic village
RICHMOND Richmond		X			W,G	L	6	some moorings, town float
SWAN ISLAND Swan Island		X	X					state wildlife refuge, visitors must come through Richmond
BATH				X	W,G,F	BY/L	39	historic city, many attractions, hard current on an ebb tide
SOUTHPORT Cozy Harbor Maddock Cove Love Cove		X X X		X	W,G,F W,G,F	BY	33	anchoring available, crowded major yard tricky to enter, cable area
FIVE ISLANDS				X	W,G,F	BY		attractive, well protected
GEORGETOWN Riggs Cove Robinhood Cove	 X	X			W,G,F	BY	45	excellent boat supply, 40 slips, 70 moorings anchoring only
DARMISCOVE ISLAND			X					historic site
BOOTHBAY HARBOR Oak Cove		X X			W,G,F	BY	44	large, easy to enter, public landing anchoring only
BOOTHBAY Hodgdon Cove Sawyer Island Cross R. and Oven Mouth Little River Pleasant Cove	X 	X X X		X	 W,F	BY/L	101	anchoring only anchoring only anchoring only, wonderful entrance difficult to enter, working harbor, anchoring anchoring only, easy to enter
SO. BRISTOL Seal Cove	X			X			62	anchoring only, many seals, difficult to enter, strong current

THE RIGHT TACK

CHARACTERISTICS OF MAINE'S MAJOR HARBORS *								
Region Characteristics of Harbor and Location	Protection from Winds		Interest, Beauty and Attractiveness		Facilities		Working Harbor # of Commercial Fishing Vessels	Other Features, Comments
	Hurricane Hole	Well Protected	Very Attractive	Pleasant	Water (W) Groceries (G) Fuel (F)	Boat Yard /Launch Area		
BRISTOL Witch Island		X					88	excellent anchorage, sanctuary of ME Audubon private moorings only private moorings, dangerous entrance, good anchorage town float landing w/launching ramp, limited room working harbor, few moorings, no anchorage
Poorhouse Cove	X							
Eastern Branch	X							
Round Pond		X			F	BY		
New Harbor		X			W,G,F			
PEMAQUID HARBOR				X				short walk to the beach, historic site
MONHEGAN			X		W,G,F		9	many facilities, open to ocean swells, poor anchoring conditions
BREMEN Hog Island		X		X			45	no anchoring, some moorings available
CUSHING Hornbarn Cove Pleasant Point Gut	X X							private moorings, anchoring only working harbor, some moorings, mostly anchoring
TENANTS HARBOR				X	W,G,F	BY/L		attractive working harbor
HIGH ISLAND HARBOR				X				large quarry area
ROCKLAND					W,G,F	BY/L		many attractions
ROCKPORT			X		W,G,F	BY/L		small, but beautiful harbor
FRIENDSHIP Harbor Island		X		X		L		limited, poor anchoring conditions
ST. GEORGE Allen Is. and Georges Hbr		X		X				private island, visiting not encouraged, but allowed
THOMASTON		X			W,G,F	BY		town launching ramp and floats
Penobscot Bay: many traditional fishing villages and tourist spots, best cruising grounds, many islands and protected harbors								
MATINICUS			X		G,F		25	working harbor
PORT CLYDE				X	W,G,F	BY		working harbor, ferry terminal to Monhegan
ST. GEORGE Long Cove		X		X		BY		no moorings, anchoring only
CAMDEN		X	X		W,G,F	BY/L		crowded, but a jewel of Penobscot Bay
NORTH HAVEN Pulpit Harbor Perry Creek	X X		X X		W,G,F W,G	BY BY		good facilities no moorings, anchoring only private moorings, anchorage
VINALHAVEN Winter Harbor Seal Bay Carvers Harbor Hurricane Island Long Cove	X X X X	X X X X		X X X X	W,G,F W	BY		anchorage anchorage working harbor, limited anchorage school location private moorings, anchorage
ISLESBORO Sabbathday Harbor Cradle Cove		X		X	W,F	BY	21	private moorings, anchorage
SEARSPORT HARBOR				X	W,G		15	exposed to ocean, historic port
STOCKTON SPRINGS Stockton Harbor		X				BY/L	23	land at launching ramp or beach
BELFAST					W,F,G	BY/L		good facilities, city landing
CASTINE Smith Cove Holbrook Island Harbor		X X	X	X	W,G,F	BY	3	current makes difficult anchoring anchor only anchorage, conservation area
CAPE ROSIER Horseshoe Cove Orcutt Harbor	X				W			mooring floats and stakes, anchor only in channel anchor in midchannel
BROOKSVILLE Bucks Hbr/Lem's Cove	X			X	W,G,F	BY	23	moorings and anchorage available
Mount Desert: great topographic relief and sailing area, Jericho Bay, Blue Hill and Frenchman Bay mostly wide, open, and deep								
DEER ISLE Northwest Harbor Burnt Cove Webb Cove (inner) Southeast Harbor Inner Harbor	X	X X X X			G F		123	anchorage anchorage anchorage anchor in basin anchorage
STONINGTON			X		W,G,F	BY	140	working harbor
SEDGWICK/BROOKLIN Benjamin River	X				G	BY	13/29	moorings, anchorage, town dock

CHARACTERISTICS OF MAINE'S MAJOR HARBORS *								
Region Characteristics of Harbor and Location	Protection from Winds		Interest, Beauty and Attractiveness		Facilities		Working Harbor # of Commercial Fishing Vessels	Other Features, Comments
	Hurricane Hole	Well Protected	Very Attractive	Pleasant	Water (W) Groceries (G) Fuel (F)	Boat Yard /Launch Area		
SWAN'S ISLAND Buckle Harbor Burnt Coat Harbor		X X		X X	W,F	BY	49	anchorage moorings, anchoring, land at dinghy float or wharf
FRENCHBORO Frenchboro (Long Island)		X	X		W,F		6	moorings, anchorage
BLUE HILL Blue Hill Harbor	X		X		W,F,G	BY	27	moorings, anchorage, crowded
TREMONT Somes Cove Sawyer Cove Bass Harbor (inner)		X X X		X	W,F	BY	42	anchorage anchorage moorings, slips and anchorage, Swan's Island Ferry
SOUTHWEST HARBOR				X	W,G,F	BY/L	31	many boat builders, Coast Guard
GREAT CRANBERRY				X	W,G,F	BY	13	plenty of anchorage
LITTLE CRANBERRY				X	G,F	BY		some moorings available
NORTHEAST HARBOR		X	X		W,G,F	BY	35	town dock, floats, moorings
SOMESVILLE Somes Harbor		X		X	G			anchorage
BAR HARBOR		X		X	W,G,F	BY/L	33	crowded and busy, popular cruise ship destination
Down East: coves are all working harbors, wildlife is abundant, islands are uninhabited, dense fog, strong currents, and high tides								
SORRENTO Back Cove		X			W,G		10	working harbor, anchorage, beautiful setting
GOULDSBORO Bunkers Harbor Corea		X X		X	W,F F		75	anchorage anchorage
WINTER HARBOR Inner Harbor		X			W,G,F		27	no anchorage
BEALS/JONESPORT Mud Hole (Great Wass Island)	X		X				150	anchorage
ADDISON Eastern Harbor		X		X	W,G,F	BY	124	anchorage
JONESPORT Cows Yard and Head Hbr Bunker Cove Shorey Cove	X	X X		X	G,F	BY	138	town marina anchorage anchorage anchorage
MACHIAsPORT Moose Snare Cove	X						123	anchorage
Passamaquoddy Bay: foggy, strong currents, huge tides, U.S. and Canadian waters								
CUTLER North Head	X	X	X	X	W,G,F		45	anchorage
EASTPORT	X			X	W,G,F	BY	59	commercial port, many facilities
PERRY Sipp Bay		X					23	anchorage
LUBEC Federal Harbor	X			X	G		82	anchorage

* Sources: A Cruising Guide to the Maine Coast, Hank and Jan Taft, Camden, Maine, 1991; Maine State Recreation Plan, 1988; and Maine Dept. of Inland Fisheries and Wildlife, Boat Registrations, 1991.



BOOTHBAY HARBOR

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- Coastal Right-of-Way Rediscovery Program
- Liability
- Planning and Implementing Public Shoreline Access
- How to Conduct an Inventory of Scenic Areas

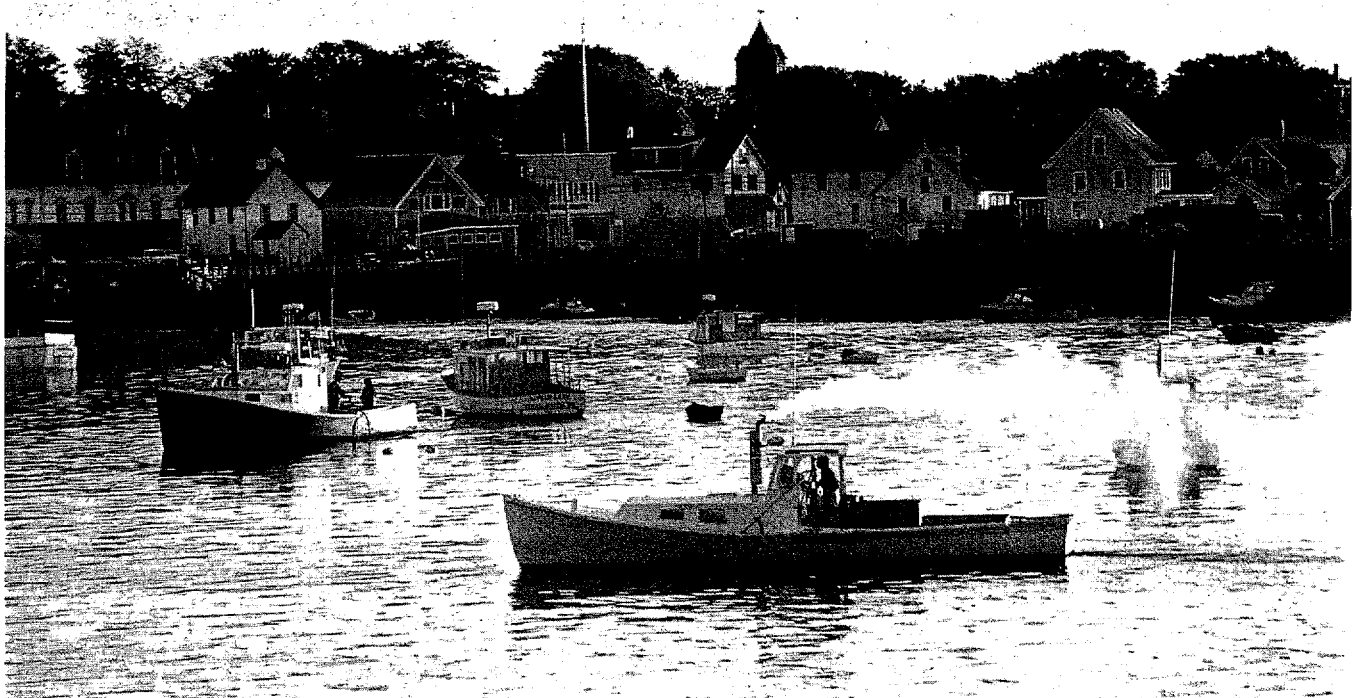
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VINALHAVEN



APPENDIX A:

PROTECTING PRIME SITES FOR WATER DEPENDENT USES

INTRODUCTION

Maine's coastline is over 3,500 miles long, yet only about 10 percent has sufficiently deep and sheltered water to provide necessary operational areas for Maine's marine industries. Of the approximately 175 miles that are suitable for working waterfront activities, more than half are already occupied by a variety of residential, commercial, and industrial uses. Moreover, during the past 10 years, growth pressures and rising real estate values have provided incentives for the conversion of vacant properties and structures and boatyards that supported maritime industries to housing, professional offices, and other types of land use activities that do not require a waterfront location.

Many coastal communities are concerned about the loss of traditional "water dependent" activities along their waterfronts and conflicts arising between new waterfront development, such as apartments or restaurants and marine industries. For instance, the noises and smells associated with commercial fishing activities are often not welcomed by owners of adjacent residential properties. Additional pressures are created as commercial fishermen and increasing numbers of recreational boaters are forced to compete for limited moorings and docking space in busy harbors.

Strong local support for protecting traditional waterfront activities led to enactment of Maine's Coastal Policies in 1986 by the Legislature. The nine Coastal Policies, listed on page 36, cover a wide range of topics affecting the use and management of coastal resources. Under this law, State and municipal actions affecting coastal areas - regulation, funding and planning - are required to be consistent with the Coastal Policies. Two of the Coastal Policies are particularly relevant to the protection of water dependent uses:

Policy #1 - To promote the maintenance, development, and revitalization of the state's ports and harbors for fishing, transportation, and recreation.

Policy #3 - Support shoreline management that gives preference to water dependent uses over other uses; that promotes public access to the shoreline; and that considers the cumulative effect of development on coastal resources.

To help communities implement these policies, the Legislature also amended the Shoreland Zoning statute to encourage municipalities to establish districts, under local zoning ordinances, that give preference to water dependent uses.

In 1989, Maine's communities began developing comprehensive plans and implementation programs under the Comprehensive Planning and Land Use Regulation Act of 1988. Coastal cities and towns are required to ensure that local plans and implementation programs are consistent with the Coastal Policies and ten state goals specified by the Act. One of these goals, echoing the concerns addressed by the Coastal Policies, directs municipalities to "protect the state's marine resources industry, ports, and harbors from incompatible development and to promote access to the shore for commercial fishermen and the public."

As a first step, to assist communities interested in protecting water dependent uses, the State Planning Office (SPO) has prepared maps that show existing and prime water dependent use sites in all coastal

cities and towns. The following discussion explains how these maps were prepared and provides suggestions for using the maps as local plans and implementation programs are developed. Development of these water dependent use maps is part of a more comprehensive effort by SPO to help communities improve local management of coastal resources.

WHAT IS A WATER DEPENDENT USE?

A water dependent use is one that must have direct access to the water in order to function. Other uses, such as restaurants, professional offices, and condominiums, may be enhanced by a waterfront location, but do not require one. Maine law defines functional water dependent uses as:

...those uses that require for their primary purpose, location on submerged lands or that require direct access to, or location in, coastal waters and which therefore cannot be located away from these waters. Those uses include, but are not limited to, commercial and recreational fishing and boating facilities, finfish and shellfish processing, storage, and retail and wholesale marketing facilities, waterfront dock and port facilities, shipyards and boat building facilities, marinas, navigation aides, basins and channels, industrial uses dependent upon water-borne transportation or requiring large volumes of cooling or processing water that cannot reasonably be located or operated at an inland site and uses which primarily provide general public access to marine or tidal waters (38 MRSA 436 [1-D]).

As communities initiate harbor and waterfront planning activities, defining what is meant by the term "water dependent use" will be important. Communities may choose to adopt the state definition above or develop one that is more tailored to reflect local needs and circumstances. In some instances, it may be necessary to distinguish "water dependent uses" from "water related uses." A water related use is one which is not intrinsically dependent on a waterfront location but whose operation benefits economically from a shoreline location. Examples are marine electronics sales and repair establishments, marine refrigeration and plumbing establishments, and boat rigging establishments. Generally, definitions that list specific uses instead of using broad open-ended descriptions will be easier to interpret and administer. It also may be necessary to define key terms such as marinas, marine-related offices or restaurants which may have broad interpretations unless they can be delineated.

THE MAPPING PROJECT

The goal of this mapping project is to identify coastal areas that are particularly suitable for water dependent uses. Suitable sites, characterized by special physical features described below, are important natural resources along Maine's coastline. **THE SITES DESIGNATED ON THE MAPS DO NOT HAVE FIXED BOUNDARIES, BUT ARE MEANT TO HIGHLIGHT GENERAL AREAS THAT ARE SUITED FOR WATER DEPENDENT ACTIVITIES.** Consequently, communities are encouraged to supplement these maps with more detailed inventories and assessments that meet local needs. Suggestions for additional data collection efforts are outlined below. For the purposes of this project, areas ideally suited to support water dependent uses include those meeting the following three criteria:

- 1) Land Slope: less than 15% slope within 250 feet of the shore;
- 2) Water Depth: at least 5 feet within 150 feet of the shore at mean low water; and,
- 3) Protection: generally sheltered from excessive wind and seas year round.

Each of the three criteria was mapped separately, then the sites that overlapped were designated as potentially prime sites. Existing water dependent use sites (not necessarily "prime" sites) were also mapped to serve as a point of reference. A draft map was sent to town and city officials so that the prime sites could be verified. After incorporating local comments, the final site selections were made.

The actual mapping process consisted of the following steps:

- To identify suitable land slopes, areas within the 40 foot contour line on United States Geological Survey topographic quadrangles (1:2400) were shaded. The 40 foot contour was determined using the formula for slope (rise/run); thus, a 15% slope means no greater than a 37.5 foot incline over a distance of 250 feet.
- To identify areas with suitable water depth, the line 150 feet from the shore was marked on National Oceanographic and Atmospheric Administration (NOAA) nautical charts. Then, if the 150 foot line was at, or greater than, the six-foot depth contour line, the area was shaded as an acceptable depth.
- To identify areas suitably protected, the NOAA charts and local knowledge of the coastline were used. This aspect of the mapping process relied most heavily on local review.

AVAILABILITY AND DESCRIPTION OF MAPS

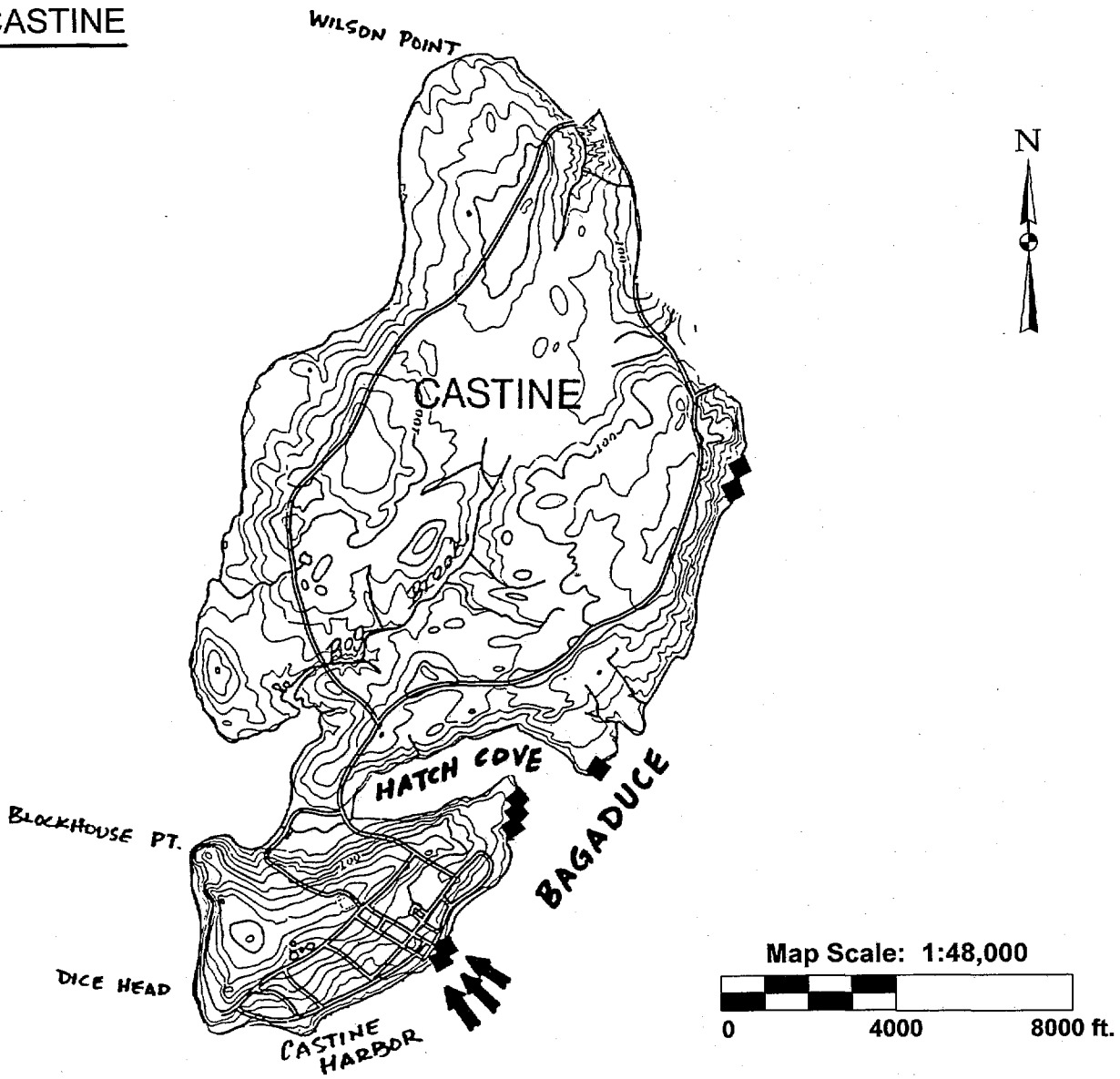
Two types of maps are available to each coastal municipality. These maps include a single copy of a large scale (1:12,000) blue-line map and several copies of a small scale (1:48,000) map. Figure 1 is an example of a small map.

The maps identify those sites that are considered particularly "prime" for water dependent uses with small square symbols. In addition, the maps identify existing water dependent uses with arrows.

The large map, which offers more detail, can be used at public meetings or during planning sessions. The smaller one is inexpensive to reproduce and can be handed out at meetings or to the general public.

Water Dependent Use Mapping Initiative
Maine State Planning Office

CASTINE



The sites designated on this map do not have fixed boundaries but are meant to highlight areas which are prime for water-dependent uses. The information may not be exact and should be field checked. For additional information contact your local town officials or the Department of Economic and Community Development.

LEGEND
◆ PRIME SITE FOR WATER DEPENDENT USE
➔ EXISTING WATER DEPENDENT USE

FIGURE 1

USING THE WATER DEPENDENT USE MAPS

The most important information provided by these maps is the location of prime water dependent use sites using the three natural conditions described above. Clearly, however, these criteria are not the only factors that determine suitable locations for water dependent activities. Indeed, as noted above, many existing water dependent use sites are not identified as "prime" sites for this project, but are important sites.

The maps are intended to serve as a starting point for local boards or committees concerned about waterfront and harbor management issues. For example, under Maine's Comprehensive Planning law, coastal communities are required to set local policies and develop implementation strategies aimed at the protection of water dependent uses. It is anticipated that these maps will be helpful as communities begin to identify those areas where water dependent use activities should be encouraged. Similarly, the maps should be helpful for coastal cities and towns undertaking more detailed harbor and waterfront management plans. In other cases, communities updating or amending local shoreland zoning ordinances may be able to use the maps to identify appropriate locations for special districts that protect water dependent uses.

In each of these cases, however, communities will need to collect and analyze other types of information. Other factors that should be considered include the following:

Existing and Surrounding Land Uses. Adding existing waterfront land use patterns (e.g. residential, recreational, commercial) to the water dependent use maps will help communities further define the most appropriate areas to reserve for water dependent activities. Communities are likely to be most concerned about protecting waterfront areas that presently support water dependent uses, whether or not they are mapped as "prime" sites. Additionally, vacant or underutilized properties adjacent to prime water dependent use sites pose valuable opportunities. Conversely, waterfront land that is already used for or is near an incompatible use, such as a residential development, will be less desirable to reserve for water dependent uses.

Overland Transportation. Identifying existing or planned roads and rail lines that connect a waterfront area with regional or national transportation systems may also be important factors. Some water dependent uses, such as cargo handling facilities, are dependent on overland transportation to the site and need particularly good roads. Railroads may be required or desirable for some types of water dependent uses.

Availability of Public Services and Utilities. Some water dependent uses may require municipal services such as sewerage systems, water supply and distribution systems, and solid waste collection and disposal systems. The availability of parking areas may also be important for certain water dependent businesses and industries. Additionally, the existence of a town-owned wharf or boat launching facility can serve as a focal point for water dependent activities.

Environmental Impacts. Some sites may be on or near wetlands, important aquifers, wildlife and shellfish habitat, or other environmentally sensitive areas. Federal, State, and local environmental regulations and other development constraints may limit the suitability of some sites for intensive commercial or recreational activity.

Access to the Open Sea. Some sites may be cut off from the open sea by ledges or tidal flats.

MANAGEMENT OPTIONS

Protecting water dependent uses is usually only one of several waterfront and harbor issues facing coastal communities. Other concerns often include managing limited docking and mooring space, ensuring adequate public water access sites and facilities, and coping with insufficient parking and related traffic problems during the summer months.

Too often, crisis situations and unexpected circumstances, such as the sale of a prime waterfront lot, require local officials to act without guidance from a community plan or a set of policies. Ideally, concerns and problems related to waterfront and harbor areas should be identified and addressed as part of an overall shoreline management plan or a community's comprehensive plan. Goals and policies determined by a broad-based planning process can guide future decisions related to zoning, land acquisitions, and capital improvements. An outline of the basic steps involved in the waterfront/harbor planning process is presented in the first section of this book.

A variety of both regulatory and non-regulatory implementation techniques can be used by communities to manage waterfront areas and protect water dependent uses. A successful strategy is likely to incorporate more than one technique. For example, a municipality may choose to establish zoning requirements that favor water dependent uses as well as acquire land for the development of a dock and parking area that can be used by local fishermen. Several important techniques are described briefly below; however, local officials are encouraged to review more detailed information and examples presented in *Coastal Management Techniques: A Handbook for Local Officials* and obtain planning assistance from your regional planning council or the State Planning Office (SPO). Additionally, a new publication, *Managing the Shoreline for Water Dependent Uses: A Handbook of Legal Tools*, prepared by the Marine Law Institute at the University of Maine School of Law for the Maine Coastal Program, contains valuable information on legal issues and techniques related to the protection of water dependent uses. Copies of both handbooks are available from SPO.

REGULATORY TECHNIQUES

Zoning is a common tool used by municipalities to regulate land use. Communities can adopt zoning ordinances containing districts which favor or require water dependent uses. These districts can range from strict Water Dependent Use Districts to ones which allow a mixture of uses. However, it is important to keep in mind that Maine law requires that each municipal zoning ordinance be based on a comprehensive plan. Thus, communities interested in waterfront zoning should first be sure that local planning goals and policies support such an initiative.

As a community begins designing a Water Dependent Use District, the answers to the questions listed on page 52 can help municipal planning committees determine appropriate types of uses given local concerns and conditions. Often, communities find that more than one Water Dependent Use District is needed to accommodate different sections and characteristics of the waterfront or shoreline, as well as incompatible water dependent activities.

Strict Water Dependent Use Districts

Communities should consider adoption of strict Water Dependent Use Districts for areas containing vital traditional commercial fishing businesses and industries. The noises, smells and general intensity of these industries make their coexistence in close proximity with certain other land uses very difficult. Once certain non-water dependent uses, such as offices and condominiums, are established near

fishery operations, there may be pressure brought to limit marine industry activities, and eventually to convert the sites to other non-water dependent uses.

Additionally, communities may wish to control the types and/or sizes of water dependent uses allowed in a Water Dependent Use District. For instance, permitted uses could be restricted to specific types, such as commercial fishing and related activities (e.g. ice, bait and fuel vendors, retail and wholesale marketing facilities, etc.). This type of limitation may be appropriate where berthing of commercial fishing vessels is threatened by encroaching marina operations designed for recreational use. Alternatively, commercial fishing could be favored by limiting the size of other types of water dependent activities. For example, marinas could have limitations on the maximum number of slips they offer for recreational boats. However, it is important to ensure that all uses which are necessary to the proper functioning of a working waterfront are included in a Water Dependent Use District. Some water related uses, such as ice making, are necessary for fish processing and transportation.

The Department of Environmental Protection has prepared optional ordinance language for a Maritime District as part of the 1989 revision of the Model Municipal Shoreland Zoning Ordinance. The "model" Maritime District, developed by an advisory committee that included representatives of marine industries, should be a useful guide for communities considering the establishment of such a district.

Mixed Use Districts

Some communities may determine that allowing mixed uses in Water Dependent Use Districts is appropriate. In some cases, the expenses associated with operating marine businesses and industries can be offset by leasing or selling portions of buildings or land areas to non-water dependent uses. Allowing mixed uses can also contribute to year-round economic activity in a waterfront area. However, taking the time to identify appropriate non-water dependent uses that should be permitted or allowed as a conditional use in the District is important. For example, certain types of professional offices, stores, or restaurants may be more compatible with marine businesses than residential complexes, particularly when they offer services to or otherwise enhance a water dependent use.

Districts that permit non-water dependent uses can be limited so as to favor water dependent uses in several ways:

- require fixed percentages of land area or building floor space to be devoted to water dependent uses (or marine related uses);
- allow non-water dependent uses only on the upper floors (e.g., second or third floor) of buildings in the District;
- limit building size and height (allow larger buildings for water dependent uses); and
- establish maximum permitted lot coverages (allow greater lot coverage for water dependent uses), setback requirements, and specified building orientations.

Establishing these types of requirements is likely to affect possible uses of waterfront properties in the District, as well as visual quality and the availability of public access to the water. As specific zoning requirements are developed, however, communities should take care to ensure that restrictions established to control non-water dependent uses do not inadvertently hinder the operations of maritime business and industries.

QUESTIONS TO GUIDE THE DESIGN OF WATER DEPENDENT USE DISTRICTS

Purpose of the District

- **What is the community vision for the land area to be encompassed by the district?**
This vision should be expressed in a general policy statement which describes the uses and activities which the community wishes to promote, preserve, and protect. This policy should also articulate the community's desired pattern of physical development for the area.

Permitted and Conditional Uses

Note:

Permitted Uses are those uses allowed in a district provided that standard requirements, which apply to all uses, are met. These requirements typically include minimum lot size requirements, building setbacks or yard requirements, and maximum lot coverage ratios.

Conditional Uses are those uses which may be appropriate in a district if specific conditions are met beyond the standard requirements for that district. These conditions must be in the form of specific standards defining the type, size limitation, and other characteristics for the use. These conditions must be clear and quantifiable in order to withstand legal scrutiny (see questions on performance standards below).

- **What uses in the proposed district are important to the community to retain and encourage?**
These uses should be permitted uses in the district. In the case of Water Dependent Use District, these will be at least a large percentage of those uses described in Maine's definition of water dependent uses noted at the beginning of this appendix.
- **Are there specific non-water dependent uses needed by the water dependent uses in order for them to function?**
Examples are ice making for fishing operations, boat riggers and sailmakers for marina operations, marinas, and marine offices related to actual water dependent activities. These supporting uses (water-related uses) may be permitted or conditional uses. Designation as a "conditional use" can ensure that water-related uses will not interfere with the water dependent uses in the district. To accomplish this, the ordinance should include conditions which may take the form of maximum area per lot devoted to use, prohibition from first floor occupancy, etc.
- **What non-water dependent uses can be safely accommodated along with the water dependent uses without displacing them or detracting from their efficient operation?**
Communities should give careful thought to allowing non-water dependent uses in the proposed district. These uses may be limited to specific types of retail stores, offices, or industries that are highly valued by the community and/or fulfill a special need. Similar to the water related uses, these uses may be designated as permitted or conditional uses. However, to ensure that these uses do not displace water dependent uses, their designation as conditional uses with clearly defined standards is strongly recommended.

Prohibited Uses

- **What non-water dependent uses threaten to displace water dependent uses?**
 These uses should not be permitted in the proposed district unless they are adequately controlled. Certain non-water dependent uses, such as residential development, may be incompatible with commercial water dependent uses under any conditions.
- **What existing uses will be made non-conforming by the proposed new district?**
 Since non-conforming status ("grandfathered") is usually severely restrictive, consideration should be given to the effect this will have on existing businesses' expansion plans and operations. This is particularly important if certain water dependent uses, such as fish rendering plants or marinas, are assigned non-conforming status. It is very possible that restrictions imposed on expansion may force such uses out of business. As a new Water Dependent Use District is developed, a community may want to ensure that all existing water dependent uses are considered to be conforming uses.

Multiple Districts

- **Are there conflicts between different types of water dependent uses?**
 Conflicts between commercial fishermen and recreational boaters may be resolved by designating different sections of the waterfront for each use.
- **Are there sections of the waterfront that have different existing use patterns?**
 Waterfronts are complex and often will require two or more zoning districts to ensure adequate regulation.

Performance Standards and Dimensional Requirements

- **What spaces within the district cannot be fully utilized by water dependent uses and could be devoted to some other uses without conflict?**
 In some cases, second or third floors in structures are not important to the operation of water dependent uses.
- **What spaces within the proposed district should remain open for...**
 - ...efficient operation of water dependent use activities?** Large areas are often needed for boat and equipment storage. Maximum lot cover ratios and building setback requirements can ensure adequate open space. Also, consideration should be given to the noise, smell and other operational characteristics of water dependent uses.
 - ...safety?** Spacing between buildings is necessary for emergency and fire access.
 - ...visual corridors and aesthetics?** Many people value the view of the water from the streets and sites near the harbor.
- **What sizes and heights of structures should be allowed in the proposed district?**
 Communities may wish to limit the size of new buildings to the approximate size of existing buildings in the harbor area. However, some water dependent uses which the community may wish to encourage or retain might require larger buildings. In these cases, maximum building sizes for water dependent uses and non-water dependent uses can be different.

THE RIGHT TACK

What size lot is adequate to accommodate the allowed buildings and uses, including their parking and open spaces, etc.?

Communities may wish to establish a minimum lot size permitted in the district. While this approach may limit flexibility in terms of using the site, it has the advantage of preventing the creation of inappropriately small lots which may require variances from other dimensional requirements of the district in order to be utilized.

NON-REGULATORY TECHNIQUES

Acquisition

As growth pressures have increased, waterfront land values have also risen. While the acquisition of prime waterfront property can be expensive, it is one of the most effective ways for a community to control waterfront development.

The traditional method of acquiring land is to purchase and retain all legal rights (fee simple). A number of towns in Maine have purchased fishing piers or boat storage areas to help promote water dependent activities. Waterfront land owned by a city or town can be leased with restrictions on the types of uses permitted. In Boothbay Harbor, for instance, the town purchased a fishing pier on the harbor's eastern side. It is now leased to marine businesses and has preserved access for traditional commercial fishing activities. Communities can also buy land and resell the property with restrictive covenants on its use. Alternatively, a municipality may acquire a "less than fee interest" in a waterfront parcel at less than the full market price, such as an easement for public access.

In some communities, land trusts may be helpful in protecting waterfront property. Land trusts are private non-profit organizations that can acquire or accept gifts of property, conservation easements, or other interests in real property to enable public use or benefit from the land, including the preservation of public access points for water dependent uses. Land trusts can also assume responsibility for managing property owned by someone else. For example, the Town of Harpswell acquired two acres of land at Mackerel Cove, an area traditionally used as a park in the summer and for boat storage in the winter. To ensure the continuation of this tradition, the Town placed covenants on the land and asked the local land trust to manage the property. The Maine Coast Heritage Trust, a statewide non-profit organization located in Brunswick and Northeast Harbor, provides assistance for local land trusts.

Several grant programs, administered by State agencies, provide financial assistance for land and easement acquisitions. Information about these programs is presented in the table on pages 32-34.

Public Improvements

Communities can also encourage water dependent uses by providing needed public infrastructure, such as piers, docks, or parking facilities. Some water dependent uses also require public sewerage, water, and road systems to support their operations. Municipal funds may also be used to pay for harbor dredging projects. For example, the Town of Scarborough acquired a vacant parcel of land adjacent to the town landing, is developing parking facilities for commercial and recreational users and is providing other site improvements. Partial funding for the project was provided through Maine's Coastal Program. Whether and how a community provides and maintains these facilities and services can impact the viability of water dependent uses.

APPENDIX B:

NOTES ON DEVELOPING A HARBOR ORDINANCE

The following notes are intended to outline the major provisions that should be included in a local harbor ordinance. When drafting a local harbor ordinance, it is important to keep in mind that it must be consistent with the state Harbor Masters Law, Title 38, Chapter 1. For a detailed discussion of Maine law governing harbor management rights and duties of municipalities and harbor masters, local officials are encouraged to obtain a copy of *Harbor Management: A Legal Guide for Harbor Masters and Coastal Officials*, from the University of Maine, Cooperative Extension Service, UMO, Libby Hall, Room 110, Orono, Maine 04469 (there is a \$5.00 fee for the handbook).

In addition to the substantive areas discussed below, a local harbor ordinance should also include sections on:

- the title of the ordinance;
- authority for the ordinance;
- purposes of the ordinance;
- effective date of the ordinance;
- conflicts with other ordinances;
- applicability of the ordinance; and
- validity and severability (i.e. if any section of the ordinance is declared invalid by the courts, other sections or provisions of the ordinance remain valid).

As with land use ordinances, municipal attorneys can provide valuable assistance in drafting local harbor ordinances to ensure that all appropriate sections and language are included.

The following eleven notes describe the major provisions which should be included in any harbor ordinance. Each section begins with a brief description of the provision and is followed by examples (in bold) from ordinances adopted by coastal communities in Maine. Copies of these and other local harbor ordinances can be obtained from Maine Coastal Program staff at the State Planning Office (tel: 287-3261).

TWO TYPES OF HARBOR ORDINANCES

What type of harbor management program does the community want? There are two main types of harbor ordinances; ones that empower the harbor master to make arrests and carry a gun, and ones that are more like zoning ordinances enforced by a code officer.

If the harbor master is to make arrests (and presumably be armed), it should be stated in the ordinance (see excerpts from Kittery and Rockport below). Conversely, if he or she is to act as a "code officer" it should be so stated (see excerpt from Cumberland below).

Most Maine harbor masters are the code officer type. A harbor management program which includes an arrest-empowered harbor master will require more extensive resources in terms of equipment, mandatory harbor master police training, and salaries.

THE RIGHT TACK

Kittery:

The Harbor Master shall be empowered to make arrests for offenses under the provisions of the regulations as other peace officers are authorized to do.

Cumberland:

The Harbor Master shall not make arrests or carry a weapon.

Rockport:

The Harbor Master may arrest and deliver to the police authorities on shore any person committing an assault upon them or another person acting under their authority.

HARBOR COMMITTEES

If a harbor committee exists, the ordinance should contain a section that describes the duties of the committee (see examples below), the membership of the committee (i.e., how many members, how they are appointed and length of term, interests that should be represented on the committee, etc.), and how the committee will operate (i.e., how the chair is selected, who calls meetings, etc.).

The following are some *suggested* guidelines to consider when establishing a local harbor committee.

- a) Harbor committee members should be appointed by elected officials.
- b) There should be no more than seven members and if more or less, it should be an odd number.
- c) Harbor committee members should represent a broad spectrum of the community. There should be no more than two members of each of the following categories: commercial fishermen; commercial boating; recreational boating; non-boating interests (i.e., business on the water, waterfront property owners).
- d) Terms should be limited to one 2-3 year period with one renewal. A member absent from the committee one term or more should be required to be reappointed.
- e) All meetings should be open and announced to the public.
- f) Harbor masters should attend all meetings and be a non-voting advisor.

Mount Desert:

The duties and responsibility of the Harbor Committee shall be to oversee the harbors and report to the Board of Selectmen as follows:

- a) To advise as to the custody, care and management of the harbors and their facilities.
- b) To recommend policy for municipal harbors.
- c) To recommend rules and regulations for use of the harbors.
- d) To make recommendations on the construction of piers, wharves, breakwaters, marine railways, or bulkheads, within the harbor waters.

- e) To propose fees and harbor operational budgets.
- f) To develop short and long-range harbor plans.
- g) To review the qualifications of persons seeking employment as Harbor Master or Deputy Harbor Master.

York:

The Board of Selectman shall appoint a Harbors Board, being a board of Town residents, to serve without compensation, and to include five regular members who serve staggered terms of three years and two alternate members who each serve a term of one year. The duties and responsibilities of the Harbors Board shall be:

- 1) To oversee and plan the general operation of the Harbors and Tidal Waters of the Town.
- 2) To hear appeals from decisions of the Harbor Master in accordance with the procedure established in Section III, Paragraph R of this ordinance.
- 3) To advise the Harbor Master in the implementation of the provisions of this ordinance, including mooring space assignments.
- 4) To annually submit a budget request to the Selectmen, through the Town Manager, and to administer the budget as approved.
- 5) To adopt written policies and procedures to facilitate administration of the Ordinance.
- 6) To make recommendations to the Board of Selectmen, through the Town Manager, for the enhancement of harbor facilities for the long-range benefit of users and the town.
- 7) To make recommendations, as needed, to the Board of Selectmen, through the Town Manager, for the revision and updating of this Ordinance.
- 8) To hold public informational meetings, as necessary, to assure adequate public participation in deliberations and recommendations of the Board.
- 9) To report periodically to the Town Manager on the activities of the Board.

POWERS AND DUTIES OF THE HARBOR MASTER

Harbor ordinances should state clearly what the harbor master is empowered and required to do. Examples include:

Belfast:

The duties and responsibilities of the Harbor Master are prescribed by the Title 38 M.R.S.A. In addition, the Harbor Master, acting under the orders of the City Council, shall have full authority in their interpretation and enforcement of all regulations affecting Belfast Harbor and waters adjacent to the shoreline of the City of Belfast to the fullest extent permitted by law.

THE RIGHT TACK

The Harbor Master shall be overseer of the City's moorings, floats, docks, ramps, breakwater, channel and adjacent municipal property and ensure that their proper maintenance shall be provided for.

The Harbor Master shall regularly attend the Harbor Advisory Committee's meetings and inform the Committee of his activities as well as provide such available information as may be requested by the Committee for the execution of its duties.

Yarmouth:

204.1 The Harbor Master or his deputy (if any), when duly appointed and qualified under the provisions of this ordinance, shall have power and authority to do and perform all of the duties of a Harbor Master, as provided in the Statutes of the State of Maine and acts additional thereto and amendatory thereof, and shall enforce and carry out such rules and regulations as may from time to time be made by the town Council for the regulation and management of those areas designated in Section 102 of Article I of this ordinance, and the use of public wharves, docks, piers and floats in the Town of Yarmouth.

204.2 The Harbor Master has jurisdiction over the entry of all vessels into those areas designated in said Section 102 of Article I of this ordinance. No vessel shall be brought into the municipality of Yarmouth for the purpose of wrecking or scrapping without the permission of the Harbor Master.

204.3 The Harbor Master shall enforce within his jurisdiction safety rules based on the guidelines established by the Coast Guard, Coast Guard Auxiliary, Power Squadron and other recognized authorities.

204.4 The Harbor Master shall have jurisdiction over all moorings in the Town of Yarmouth.

204.5 The Harbor Master shall maintain and post a current mooring list and mooring waiting list for Yarmouth Harbor and any other areas within the Town of Yarmouth for which there has been established a mooring plan. A mooring plan, for the purposes of this ordinance, shall be a system established or approved by the Harbor Master designating the locations of moorings and/or anchorage of vessels.

204.6 In areas for which there has been a plan established, the mooring and anchoring of boats, the manner thereof, the locus thereof, shall be under the supervision, direction and control of the Harbor Master.

APPEALS FROM HARBOR MASTER DECISIONS

There needs to be a way to appeal decisions made by a harbor master. This appeal process should be specified in the ordinance.

Appeals are generally taken to a harbor committee appointed by the Selectmen (Council). Appeals can also be taken to the Selectmen or directly to Superior Court.

Mt. Desert:

8.2.1 Any and all persons aggrieved directly or indirectly by a decision, order, rule or act, or the failure to act of the Harbor Master may appeal said decision, order, rule, act, or failure

to act. Such appeal must be in writing directed to the Board of Selectmen and filed within 10 days of said decision, order, rule, act, or the failure to act. The appeal must state with specificity the decision, order, rule, act, or failure to act and state the reasons for appeal. The Board of Selectmen, upon hearing the appeal, may affirm or modify or set aside the decision, order, rule, act, or failure to act only if such is not supported by any facts or is clearly contrary to the intent and specific provisions of this ordinance.

8.2.2 An appeal from the decision of the Board of Selectmen may be taken by the aggrieved party or parties to Maine Superior Court in accordance with Maine Rules of Civil Procedure 80B.

Cumberland:

- 1) Any and all persons aggrieved directly or indirectly by an action or failure to act of the Harbor Master may appeal such action or failure to act to the Coastal Waters Commission. In deciding any appeal, the Commission shall hear and approve, approve with modifications or conditions, or disapprove the action or failure to act from which the appeal is made.
- 2) Such appeals shall be made by application in writing to the Coastal Waters Commission within five calendar days of the action or failure to act from which the appeal is taken. The application must state with specificity the action or failure to act from which the appeal is taken and the reason for the appeal. The appeal shall be considered by the Coastal Waters Commission at its next regular meeting.
- 3) Any action or failure to act by the Harbor Master concerning the location of moorings or boats, as a result of which location there is immediate danger to lives or property, shall not be stayed pending appeal.
- 4) An appeal may be taken by any party from any order, relief or denial by the Coastal Waters Commission under section 1 above, within thirty days after the decision is rendered, to the Superior Court in accordance with Rule 80B of the Maine Rules of Civil Procedure.

ESTABLISHMENT OF BOUNDARIES AND AREAS

Local harbor ordinances can be adopted by communities to regulate activities on or near the water. The area covered by the harbor ordinance can extend up to three miles off-shore. The harbor ordinance should specify the areas to be covered by the various provisions of the ordinance. Areas which should be defined are: harbor areas, channels, mooring areas, and anchorage areas. Mapping of these areas is also a good idea. A mooring plan would certainly show all use boundaries.

Harbor boundaries should be defined.

Bucksport:

The harbor shall include that area of water to high tide lying within the following boundaries: beginning at the northerly end of the Bucksport-Verona bridge, thence along the bridge to the Bucksport-Verona line, thence generally westerly along the town line to a point due south of the Champion Paper Company, thence due north to the shore, thence along the shore to the beginning.

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Channels should be defined.

Belfast:

2.2 Channel: for the purpose of this Ordinance, the channel limits shall be designated as a fairway three hundred feet wide, more or less, at its starting point, 1000 feet west of Steel's Ledge and extending in a northwesterly direction to a point adjacent to the canning factory wharf at which point its width has diminished to two hundred feet, more or less. These ranges shall constitute the southwesterly side of the channel.

Mooring areas should be defined.

St. George:

Designated moorage areas shall be established to protect the moorage privileges of individuals. Existing moorings in these areas shall be considered grandfathered.

13(a) Port Clyde - mooring area limits (as defined by Loran C): Can #1 - west side coordinates - 12826.4 / 25879.9 then northerly to the public landing 12824.0 / 25879.9 Can #1 - east side coordinates 12824.0 / 25879.9 then northerly to the public landing 12824.0 / 256879.9

Anchorage areas should be defined.

Hampden:

The anchoring of boats will not be allowed within the limits of the entrance channel or the mooring area. All boats shall be anchored down river from the entrance channel to the boat launch ramps, keeping a minimum distance of 100 feet from the down river edge of the entrance channel, and not more than 200 feet from the shoreline. The lower limit of the anchorage area shall be 100 feet down river from the Turtle Head.

MOORING TACKLE STANDARDS AND INSPECTIONS

Vessels need to be protected from other vessels dragging or coming lose and hitting them. Harbor ordinance provisions can help ensure vessel safety by requiring mooring tackle to be adequate. Communities have handled this in two ways; specifying minimum tackle standards in the ordinance, or delegating general approval authority for mooring tackle to the harbor master. Whichever method is used, inspections of tackle should be required on a periodic basis. The ordinance should specify how the inspection is to be conducted and by whom. Some examples:

St. George:

All moorings set after enactment of this Ordinance shall be considered new moorings and be inspected and approved by the Harbor Master.

Wells:

All moorings shall be inspected at least once each year by the Harbor Master and, at his direction, the boat, vessel or flotation owner or its agent shall make repairs necessary for the safety of the craft and others.

All moorings shall conform to the specifications as set forth by the Harbor Master, but in no event shall a mooring block be less than 800 pounds for boats of 20 to 29 feet in length... and not less than 1,000 pounds for boats 30 to 40 feet in length.

Mt. Desert:

The following shall be the minimum specifications for all moorings in all harbors except as otherwise provided:

Boat Length	Mushroom	Rock Size	Bottom Chain	Top Chain	Nylon Size
0-20 feet	75	500	1/2"	1/2"	1/2"
21-30	200	1,000	5/8"	1/2"	5/8"
30-40	n/a	2,800	3/4"	1/2"	3/4"
40-50	n/a	3,400	7/8"	5/8"	1"

HARBOR USE REGULATIONS

This section(s) will contain the body of the rules which pertain to harbor use, such as:

- Speed limits on vessels;
- reckless operation;
- channel rules which will keep it free from obstructions;
- mooring area rules;
- transient vessel anchorage rules;
- town dock rules;
- abandonment of vessel restrictions;
- removal of illegal vessels;
- debris and refuse;
- flammable substances;
- drug and alcohol use;
- water skiing, surfing, swimming, etc.;
- tampering and unauthorized boarding; and
- noise

MOORING ASSIGNMENT PRIORITIES

As the harbor becomes more crowded, the way moorings are allocated will become more and more important. The State Harbor Masters Law 38 M.R.S.A. ch. 1 sec. 7A is quite specific in requiring a minimum level of mooring allocation to nonresidents. Beyond that, there are several methods by which allocation of moorings can be handled. Most Maine communities currently have policies which favor residents over nonresidents. This type of policy is not recommended for a number of reasons, including its conflict with Army Corps of Engineers requirement for harbors to be open to all on equal terms (this is important if dredging is ever to be done).

Other mooring allocation priority systems include those based on user groups (i.e., commercial fishermen over pleasure boaters) and first-come-first-serve assignment.

Following are some examples:

Belfast (note that sections d. and e. are not consistent with Maine law):

8.3 Priority for enjoying the privilege of maintaining a mooring in Belfast Harbor shall be in accordance with the following priority guidelines:

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- a. Riparian owners;
- b. Vessel owners who are commercial fishermen;
- c. Vessel owners who have other approved commercial use;
- d. Resident pleasure vessel owners;
- e. Non-resident pleasure vessel owners.

Rockport:

Within the space available, requests for a particular location or area of the harbor will be treated in accordance with the following priority guidelines:

1. Resident shorefront owners requests for location immediately adjacent to frontage;
2. Commercial vessel owners;
3. Pleasure vessel owners;
4. Commercial operators with rental moorings;
5. Vessel owners with multiple locations.

WAITING LIST MANAGEMENT

Those harbor masters who have long waiting lists know what a problem these lists can be. The goal should be to keep the list as short as possible. This can be accomplished several ways, such as:

- annual renewal of the list;
- fees to be on the waiting list;
- requirement that vessel owner not already have a mooring in the harbor (or any harbor); and
- requirement that the applicant have a boat.

Annual renewal of the list and a small fee to cover administration of the list would work well together.

The Portland Harbor Rules prohibit current mooring holders from getting on the waiting list. This was done to prevent the rounds of musical moorings that occurred in the form of chain reactions of mooring relocations when one mooring spot opened up. The requirements for being on the waiting list, whatever they may be, should be spelled out in the ordinance.

FEES AND PENALTIES

Fees for moorings and other harbor uses should be high enough to support the harbor management program. User fees, as opposed to property tax revenues, more directly place the cost of harbor management on those who benefit from it. Mooring fees in Maine harbors currently vary from \$0 to several hundred dollars.

Budgets for harbor management programs vary even more greatly. Again, some communities have \$0 budgets, while others like Mt. Desert (Northeast Harbor) have an annual budget over \$200,000. More typical is Southwest Harbor's budget of \$46,000 which supports a full-time harbor master, a part-time assistant harbor master, and expenses to run a boat and an office.

Penalties for violation of the ordinance should be high enough to discourage violations. Some of the older ordinances have fines of \$5 to \$10. These fines may not be adequate to encourage compliance with the law even if they are assessed on a daily basis.

DEFINITIONS

The following is a compilation of definitions from various ordinances along the coast of Maine. All important terms should be defined in local harbor ordinances.

- Anchor - Shall mean any appliance used by a craft for anchoring purposes and which appliance is carried aboard such craft when under way.
- Shall mean to secure a vessel to the bottom within a body of water by dropping an anchor(s) or other ground tackle; which is carried aboard a vessel when underway as regular equipment.
- Basin - Shall mean a naturally or artificially enclosed or nearly enclosed body of water where small craft may lie (anchor).
- Berth - The place where a ship lies when at a wharf or pier.
- Breakwater - A permanent, solid structure of rock, stone or granite (or combinations thereof) extending from the shoreline into the waters for the principal purpose of breaking and reducing the force of waves.
- Bulkhead - A permanent solid structure or wall built along the shore to retain and protect the upland from waves and sea erosion.
- Channels - Areas of the harbor kept open for navigation or other purposes by rule or regulation of the Town of (___), the Department of Army or other regulatory or legislative body.
- Commercial Year-round Fisherman - A fisherman whose primary source of income involves engaging in the trade or occupation of fishing.
- Commercial Mooring - A mooring assigned to a commercial enterprise involved in sales, service, storage, construction, repair or operation of vessels for hire rather than to specific vessels, which may be used by a suitable sized vessel with the permission of such commercial enterprise to which the mooring is assigned.
- Commercial Vessel - Any boat registered as commercial by the State of Maine.
- Shall mean any vessel whose primary use is fishing.
- Dinghy - A dinghy shall mean an unpowered punt, skiff, tender or the like.
- Any craft under twelve feet in length.
- Emergency - Shall mean a state of imminent or proximate danger to life or property in which time is of the essence.

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Harbor Master -

Shall mean the Harbor Master and Deputy Harbor Master annually appointed by the Selectmen. The Harbor Master and Deputy Harbor Master shall (not) be invested with police powers.

Marina -

A shorefront facility providing one or more of the following services to the public: boat berthing, boat launching, boat storage, boat repair and servicing, sale of fuel and lubricants for marine use, sale of marine supplies, sale and/or servicing of marine equipment and accessories, including boat trailers.

A marina is a dock or basin providing secured moorings for motorboats and yachts and often offering supply repair and other facilities; a dock or basin providing dockage, supplies and services such as storage and repairs to small crafts.

A business establishment having frontage on navigable water and, as its principal use, providing for hire offshore moorings or docking facilities for boats, and which may also provide accessory services such as boat and related sales, boat repair and construction, indoor and outdoor storage of boats and marine equipment, boat and tackle shops and marine fuel services facilities.

Mooring -

A mooring is a permanent, adequate means of securing a boat to the bottom in a moorage. This may be through a buoy or float.

Shall mean any appliance used by a craft for anchoring purposes and which appliance is not carried aboard such craft when under way as regular equipment.

The term "mooring" shall include all means of securing a vessel to a particular location, other than temporarily by anchor for a period of less than two weeks, or by attaching her to the shores (including an outhaul) or to a wharf, float, dock or pier, and shall include year-round and seasonal moorings.

Nonresident -

For the purpose of this ordinance, a nonresident is a person who resides in (town) less than 180 days in a calendar year or does not own real property in (town).

Obstruction -

A mooring, a vessel, floats and any object which impedes navigation is defined as an obstruction.

Permanent -

Structures (including moorings) which remain in or over the water for seven months or more in any period of twelve consecutive months.

Qualified Mooring Inspector -

The term "qualified mooring inspector" shall mean a person, including a skin diver, who satisfies the harbor master that he is qualified to inspect mooring tackle as to condition and size.

Qualification shall be judged by past experience in installing and inspecting moorings, familiarity with mooring tackle, including the size and kind of mooring tackle needed for the safe mooring of given sizes of vessels, and familiarity with the mooring regulations of the Harbor Commission.

Resident -

For the purposes of this ordinance, a resident shall mean any person who owns real property within the Town of (___) and/or resides in Town of (___) more than 180 days in a calendar year.

A person who resides in the Town of (___) for a period of six months or more.

Riparian Owner -

Shall mean an owner of a parcel of land located in the Town of (___) which borders upon the harbor as described in this ordinance.

Shall and May -

'Shall' is mandatory; 'May' is permissive.

Temporary -

Structures which remain in or over the water for less than seven months in any period of twelve consecutive months.

Vessel -

Vessels shall include boats of all sizes propelled by sail, machinery or hand, plus scows, dredges, shellfish cars and craft of any kind.

APPENDIX C:

MOORING PLAN HANDBOOK

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CHAPTER 1 – INTRODUCTION

THE MOORING PLAN: STABILIZING CHANGE

When people talk about harbors, they inevitably discuss change. The 1980's were a time of strengthened state laws and local ordinances, increased numbers of people using the water and stronger efforts to manage coastal areas. Harbor masters have been assigning moorings for years; it has only been recently that anyone talked about the need for mooring plans.

Unfortunately, change can be threatening. How often have we heard people yearn for "the good old days?" But what were the good old days? Were they times of orderliness and harmony?

For many years, boat owners simply moored where they wanted, with minimal or no supervision. As long as everyone had room, harbor administration proceeded with few problems. Indeed, the nature of the job has been exemplified by the longevity of many harbor masters, who often spent years on the job for little or no compensation.

Today, harbor masters are on the front lines battling major issues such as water quality, shoreside development, and commercial/recreational conflicts, which include accommodating increased use of a fixed amount of space – the harbor. It is their responsibility to keep the harbor functioning (which, as many people know, is not the same as keeping everyone happy).

How does a mooring plan help a harbor master do his or her difficult job? It is an attempt to re-establish those fundamental qualities from the good old days – orderliness and harmony.

It has often been observed that harbor planning is merely the "wet side" application of standard land use planning. Under this analogy, the harbor ordinance is the maritime cousin of the community's land use code. And the mooring plan? This is the site plan for the water, a blueprint that organizes space in an efficient, equitable and manageable manner.

The mooring plan is the basic implementation tool governing how water areas will be used by boats when they are "parked." It establishes the capacity of an area, the density of moorings and the clustering of various boat sizes. It allocates space more efficiently.

The purpose of this primer is to provide the reader with the tools to:

- consider alternatives to single point moorings as a way of using harbor space more efficiently;
- forecast the number of boats which will use the harbor; and
- determine appropriate linkages between use of the water and the adjacent coastline.

THE LEGAL CLIMATE

Harbor regulation involves the interests of federal and state authorities, as well as municipalities. The fundamental federal concern is to keep waters open to commerce, but neither the U.S. Coast Guard nor the U.S. Army Corps of Engineers regulates local government mooring plans. The state's interest in intertidal and submerged lands arises from outright ownership of certain lands and public trust obligations for others. But, like the federal government, the state does not directly regulate most moorings, although the state law (Title 38 MRSA) establishes general mooring policies that local

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communities must follow. (Appendix I, p. 97, contains an excerpt from the Harbor Master Authority Study by the Bureau of Public Lands, Department of Conservation. The excerpt explains management responsibilities regarding moorings).

With private, individual moorings free from most state and federal controls, actual mooring management responsibility rests with local governments and their harbor masters. Since 1954, municipalities have had the specific legislative authority to regulate certain aspects of harbor management, including the appointment of a harbor master who is responsible for assigning mooring privileges. In addition, Maine's constitution, as amended in 1971, grants Maine's municipalities the authority to adopt regulations on virtually anything occurring within its jurisdiction. This authority is commonly referred to as "home rule."

At the federal level, the U.S. Army Corps of Engineers wants moorings equitably available to all. The Corps' reasoning is that navigability for all U.S. residents is in the public interest. Currently, Maine law requires that priority be given to non-residents if the current number of non-resident moorings is not more than 20 percent (10% for recreational non-resident and 10% for commercial non-resident). However, this should be considered a minimum requirement for non-resident moorings. Both the Maine Civil Rights Act and the Equal Protection Clause of the U.S. Constitution question the legality of allocating moorings based on residency. The Corps requires nonexclusionary mooring allocation policies if federal money will be used for local dredging or breakwater projects.

For the latest overview of harbor regulation, an excellent resource manual for harbor masters is *Harbor Management: A Legal Guide for Harbor Masters and Coastal Officials* (University of Maine Cooperative Extension Service). Existing state laws are contained in Title 38 MRSA.

PLANNING FOR MOORINGS

Ideally, a mooring plan is developed in conjunction with an overall harbor planning process. Proper planning for moorings requires involvement by major user groups, the local neighborhood and key municipal officials, as well as thoughtful consideration of location considerations, boating demand forecasts and mooring techniques. Figure I outlines the planning process as described in this primer.

Figure I: PLANNING CHECKLIST FOR MOORINGS

FORM PLANNING GROUP

- Harbor Master
- Town Planner
- Selectman/Councilor
- Commercial boat representation
- Recreational boat representation
- Neighborhood representation

GATHER BASELINE DATA

- Identify local coastal characteristics
- Identify ideal mooring specifications
- Existing mooring areas
- Mapping

FORECAST DEMAND

- Review past studies
- Surveys
- Estimate ownership/population ratios
- Interview knowledgeable harbor users

MOORING LAYOUT ALTERNATIVES

- Single Point
- Second Moorings
- Two or More Anchors
- Mooring Floats
- Mooring Chains
- Marinas

MOORING STANDARDS

- Tackle
- Chain
- Rope
- Block
- Anchors

SHORESIDE LINKAGE

- Parking
- Public Recommendations
- Neighborhood Compatibility

CHAPTER 2 – GATHERING THE BASELINE DATA

IDENTIFY LOCAL COASTAL CHARACTERISTICS

The Maine coast from Cape Elizabeth eastward to Eastport abounds with rocky coves, inlets and rivers which are used to moor small vessels. From Cape Elizabeth westward to New Hampshire, the coast is less rocky, with mooring areas more prevalent in the mouths of sandy rivers. Both sections of the coast have their advantages and disadvantages as far as moorings are concerned.

If a mooring “lets go” in one of the rivers of southwestern Maine, the chances are good that the boat will end up on a sandy beach or bar and not be badly damaged. However, in this area, there are often problems with currents and sand bars which move and shoal haphazardly. It is not unusual for former mooring areas to be dry at high tide today. Further east, the rocks and ledges provide better protection with more stable bottoms, but the rocks are much less forgiving than the sand if a vessel breaks loose.

The bottom in the area of eastern Maine’s ledges can be variable. Some places have soft mud deposits. Others may have sand and gravel bottoms, or bottoms characterized as just plain rock. When the bottom is soft mud, moorings can be secured with either a heavy mooring block (which uses its own weight to remain in place) or a specialized mooring anchor such as a mushroom (see Figure X). Where the bottom is sand and gravel, a heavy block is appropriate. The block is also good for ledge bottom. In a few instances, a heavy chain is stretched across a cove or inlet from shore to shore. This chain is fastened securely to rock with eye bolts. Usually, several moorings are attached to the bottom chain at appropriately spaced intervals. Although not common in Maine, it is also possible to drive a pile or cluster of piles in either sand or mud to serve as a mooring anchor. However, a heavy block of stone or concrete is certainly the most common method of anchoring a mooring to the bottom along the coast of Maine.

CONSIDER MOORING AREA SPECIFICATIONS

If specifications were to be written for the ideal mooring area in the manner that architects and engineers design buildings or bridges, the following material would be included:

1. Mooring areas should be accessible from both land and sea. Since people need a small boat (i.e., tender or dinghy) to get out to a larger moored craft, there must be a dock or other suitable facility to store, launch and/or retrieve a small boat. In some areas, there is only a beach. In a few locations, there may be a boathouse. In most cases, a floating dock serves the purpose. Of course, a mooring area must also be accessible to open water. However, in some areas used for moorings, the existing channel to open water is not always in an all-tide waterway. Deeper draft vessels cannot enter or leave the mooring area during the lower stages of the tide. The location of moorings in these areas is not recommended, but it does occur.
2. Mooring areas must have appropriate water depths. At low tide, the water should be deep enough so that boats do not run aground. Yet the water depth should not be so deep that excessive amounts of mooring chain are needed. In general, the more exposed the mooring location, the deeper the water must be to prevent problems with breaking waves.

Boats lying at single mooring anchors or blocks swing about the single mooring point in a circle, with a radius equal to the horizontal projection of the mooring chain and pennant plus the overall length of the boat (see Figure II – Figure II uses a mooring chain length of twice the high water depth and a pennant length of 2½ times the height of the bow of the boat above the water surface. These are commonly used minimums, but are not necessarily appropriate for every location.)

It is obvious that the deeper the water, the larger the circle described by the particular boat. Consequently, a mooring area of relatively uniform depth can be more easily laid out to prevent interference between adjoining boats than one with widely varying depths.

3. Mooring areas should be protected from adverse winds and waves. In general, waves which cause problems in mooring areas are generated by the wind. Wind generated waves increase in size as the open areas across the water (i.e., fetch) increase. The greater the fetch, the bigger the waves and the larger the mooring problem. During the summer, Maine's fair weather breezes come out of the southwest and normally are not strong enough to develop large waves. The most severe storms are the infrequent tropical storms or hurricanes that travel up the coast during the fall months. More often, the state will experience a "northeaster" which, in the winter, can include a blizzard along with high winds. Also during the winter, fair weather may occur as far as sunny skies are concerned, but there may be very strong winds from the northwesterly quadrant of the compass for days at a time.

For areas which are used only for summer moorings, it has become common practice to attempt to locate moorings that are protected, as a minimum, from the north and east. For areas which are to be used year-round, there must also be limited exposure to the northwesterly quadrant as well. Mooring areas with protection from winds out of the north (90 degrees east to 90 degrees west) may provide little protection during some hurricanes, but for the most part, do provide hurricane protection for storms that pass east of the Maine coast.

As boating activity increases each year, more and more inhospitable areas are used for moorings. Pleasure boats are often placed on exposed moorings. During the warm summer months, they do not have many problems. However, commercial boats used year around must be moored in protected areas.

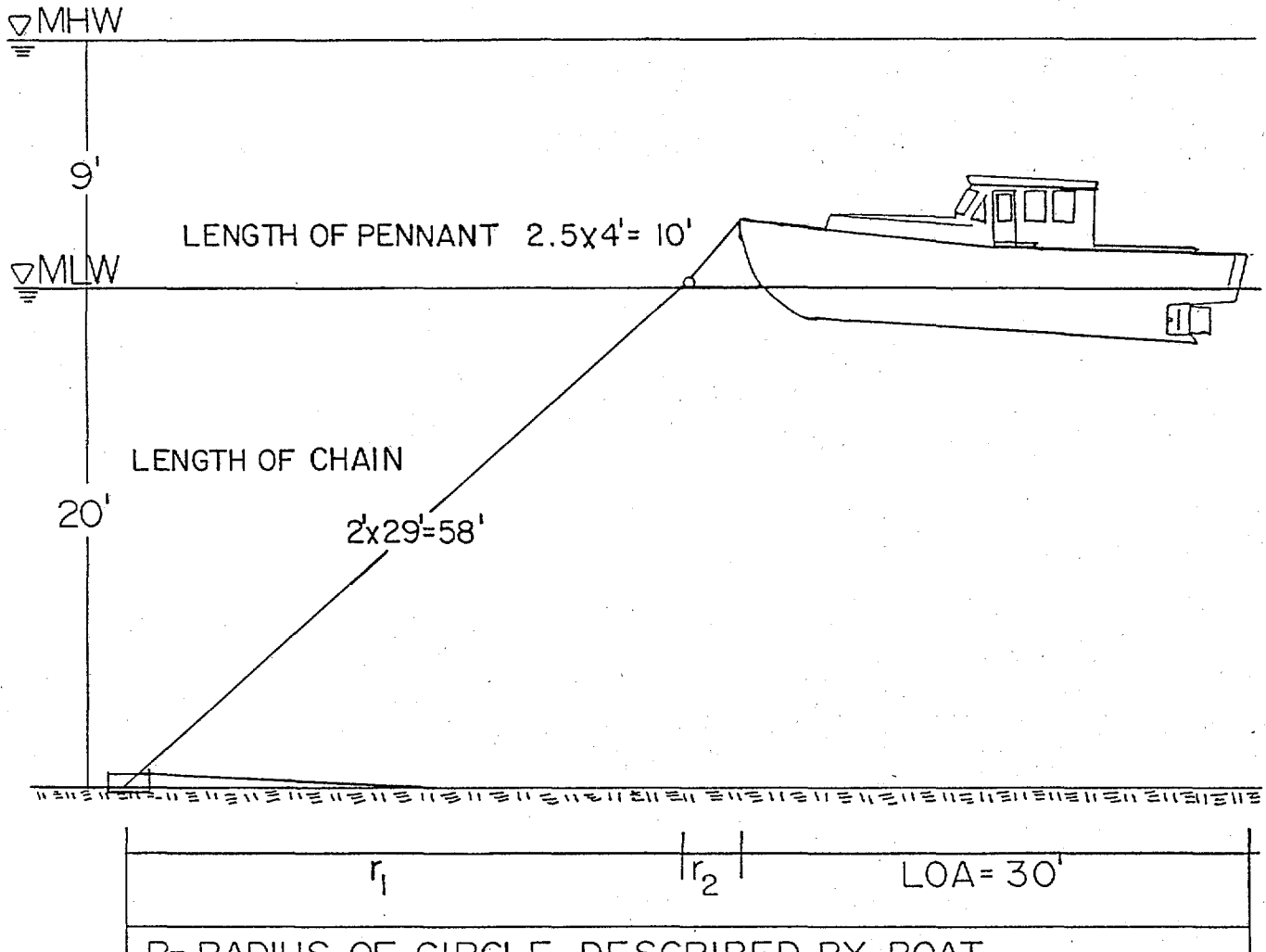
CONSIDER IMPROVING EXISTING MOORING AREAS

Communities have tried to improve mooring areas in many ways, such as by building breakwaters or dredging. There are examples of successful use of each technique in Maine, but neither is always successful because of the potential for siltation and the formation of sand bars. Examples are York Harbor in York and Scarborough Harbor, off Pine Point in Scarborough. Each of these areas are plagued with siltation and growth of sand bars. To the east in Eastport, the steel sheet pile breakwater has been successful. Ocean-going vessels can be serviced on its outer face while smaller craft tie to its inner face, protected from all types of weather.

Breakwaters and dredging are also expensive and must comply with strict environmental regulations. In general, they should be undertaken only if there are no other alternatives for mooring area improvement.

FIGURE II: SINGLE POINT MOORING

BOAT DESCRIBES A CIRCLE WITH
A 360° CHANGE IN THE WIND



R= RADIUS OF CIRCLE DESCRIBED BY BOAT
LENGTH OF CHAIN (58') + LENGTH OF PENNANT (10')
= 68'

AT LOW TIDE $r_1 = \sqrt{58^2 - 20^2} = 54.4'$

AND $r_2 = \sqrt{10^2 - 4^2} = 9.2$

$R = r_1 + r_2 + LOA = 54.4 + 9.2 + 30 = 93.6$

MAPPING

I. Scale

With growth in harbor use, it is becoming necessary to prepare maps of mooring areas with specific mooring locations identified. As a minimum, these maps should be at a scale of one inch equal to 200 feet. In some crowded areas, they may be as large as one inch equal to 50 feet. In most cases, however, a scale of one inch equal to 100 feet is suitable.

II. Sources of Mapping Information

A. U.S. Army Corps of Engineers Condition surveys

In many areas, the U.S. Army Corps of Engineers has prepared condition surveys of local waters. If a mooring area is to be mapped, an Army engineer condition survey is an excellent place to begin. These maps are usually done using mean low water as a datum and will be most helpful in determining water depths and approximate lengths for mooring chains. Then, when mooring scope requirements are set, it is possible to determine mooring areas required for various sizes and types of vessels.

Condition surveys are available from the Corps' office in Waltham, MA.

B. Depth Finders

When Army engineer condition surveys are not available, a small boat with an electronic depth measuring instrument can be used to determine approximate water depths. However, the accurate plotting of the location of numerous soundings, as would be required for mooring areas, would be difficult with this technique.

III. Locating Existing Moorings

A. Aerial Photography

If large numbers of vessels are presently moored in an area to be mapped, aerial photos in conjunction with an Army condition survey can be an excellent means of locating all existing moorings. In general, such photography should be undertaken at high tide with little or no wind.

B. Electronic Survey Instruments

Where fewer boats are to be located, electronic survey instruments can be used effectively by placing the instrument at a known location and determining an angle and distance to mooring locations.

Electronic survey instruments with electronic distance measuring capability (EDMs or Total Station) send an electronic signal out to a reflector which must be held at the point to be located (in this case, the mooring). By precisely measuring the time for the signal to travel to the reflector and return, the instrument is able to measure very precisely. Distances up to two thousand feet can be measured with an accuracy of plus or minus a fraction of an inch. In practice, the instrument is set up on the municipal pier or some other point that has a clear view of the harbor. Then the reflector is carried from mooring to mooring in a small boat. Once the reflector is at a point that is to be located, the operators of the system communicate by radio and a reading is taken to locate it. Readings can be stated as angle and distance. With a total station, it is possible to compute coordinates which can be tied into a grid of the harbor.

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C. Loran C

Another method of locating moorings is Loran C, but it must be used with caution. Islands and other land masses produce erroneous readings. The interference from land masses is the reason why the federal government does not publish a Loran C net for any of the inshore coastal waters. It is possible in some areas, however, to project the appropriate grid into an anchorage and get excellent results. With care, Loran C can be used to locate moorings, but there are no guarantees on the accuracy and all readings must be rechecked. The Carvers Harbor master on Vinalhaven uses this technique.

DEVELOPING THE MOORING GRID

A map of a harbor with all of the existing moorings plotted on it is a very useful tool for the harbor master because it clearly shows where boats are located and where any obvious spaces for new moorings exist. However, to maximize the mooring capacity of a harbor, it is necessary to locate moorings in an organized manner which accommodates the spatial needs of each vessel (but does not permit inequitable distribution of the available area).

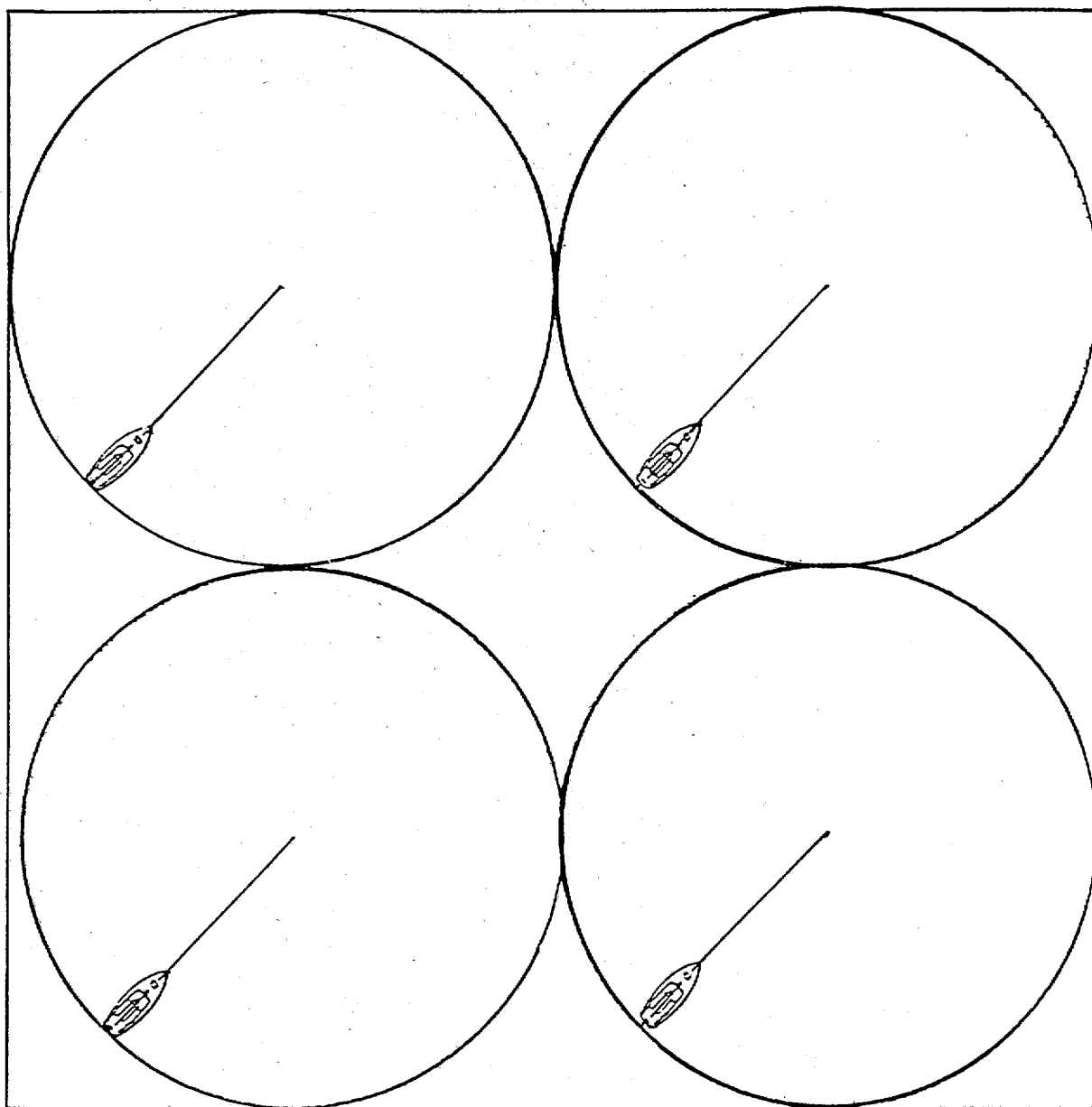
Because boats come in all shapes and sizes, it is impossible to establish a simple set of criteria which will satisfy the mooring needs of all boats. However, it is possible to group boats by size and category and establish a pattern for harbor usage which organizes the available space as efficiently as possible. Such grouping of boats might segregate boats into the following categories:

1. Boats under 20 feet in length;
2. Power boats 20-30 feet long;
3. Sailboats 20-30 feet long;
4. Power boats 30-40 feet long;
5. Sailboats 30-40 feet long;
6. Power boats over 40 feet long; and
7. Sailboats over 40 feet long.

Depending upon the depth and mooring criteria, it is possible to establish a grid for the layout of moorings for the various boat categories. For example, the moorings for the 30 foot boats in Figure III with non-overlapping circles of influence can be located on a grid with moorings placed 2 times the 93.6 foot radius or about 187 feet apart each way. If the same boats are to be moored with overlapping circles of influence, the grid might be as small as 93.6 feet on center each way, but to allow for maneuverings, that grid might be enlarged to 100 or 110 feet on center.

By setting categories, it is possible to determine a mooring grid plan for relatively efficient harbor usage depending upon boat size, water depth, etc. Based upon the above conditions moorings for boats 20 to 30 feet in length would be set in a grid 100 feet apart and larger boats could be set in a somewhat larger grid. However, if there are extreme changes in harbor depth from one area to another, the grid pattern must be enlarged accordingly to allow for the longer length of mooring chains. Mooring grids are useful tools, but they are not the ultimate answer to mooring problems.

FIGURE III



FOUR 30' BOATS MOORED WITH NON
OVERLAPPING CIRCLES OF INFLUENCE 93.6 RADIUS
4 BOATS PER 3.2 ACRES

LOW TIDE ——— 20'
TIDAL RANGE ——— 9'
HEIGHT OF BOAT
AT BOW ——— 4'

GRAPHIC SCALE 1" = 60'



CHAPTER 3 – FORECASTING DEMAND

Forecasting boating demand is important for determining how many vessels may use the harbor in the future. By forecasting, towns can determine how much new mooring space may be needed, or, if the harbor is experiencing full use, if they need to develop alternative strategies for boating access.

Assessing future boating demand is an inexact science. Unless you have the luxury of both time and money to survey boat use over several seasons or to determine your harbor's market share of local boating demand, it is difficult to pinpoint exact growth rates. There are many variables, including:

- Boats using mooring areas generally are not less than 16-feet long, so demand calculations must focus on properly sized boats (marinas generally service boats at least 20-feet long).
- The amount of demand varies according to the number of boating facilities in the community and in neighboring communities.
- In river areas, you must forecast demand from two or more bordering communities to fully understand local boating use on the shared water resource.
- Boating demand is related to such general factors as weather conditions and the strength of the economy, each of which can upset growth trends.
- Boating demand is also affected by local demographic and socioeconomic characteristics. In general, the higher the local income level, the more apt people are to purchase a pleasure boat.

Variables aside, there are several methodologies for capturing the essence of the demand picture for the purposes of general harbor planning. It is best to make a judgment by combining several of the forecasting methods. They include estimates from state or regional studies, conducting surveys of national population/boating ratio formulas, and collecting anecdotal reports from people familiar with the harbor. Below is a summary of demand measuring techniques and explanations of their advantages and disadvantages.

1. Refer to past studies of demand in the state or region.

Advantage: An existing body of data is always better than having no data at all.

Disadvantage: The data may be outdated; or the harbors from which the data was generated may not be the same type of harbor as yours; or the figures are the compilation of local averages, in which case your harbor may be higher or lower.

Examples of regional or state studies:

- 1991 Boat Users Survey. Bureau of Parks and Recreation, Maine Department of Conservation. September 1991.
- Southern Maine Regional Berthing Study: An Analysis of Boating Facility Supply and Demand Along the York County Coast. Southern Maine Regional Planning Commission. June, 1991.

2. Survey private and public marinas and mooring areas to determine historic and projected growth.

Advantage: Provides accurate assessment of the experience of existing facilities over time (or of the planned growth of proposed facilities).

Disadvantage: Does not take into account transient use of public landings.

Example of survey: Table I shows a 1988 survey of facilities in Saco.

TABLE I: PAST, PRESENT AND PROJECTED USE OF BOATING FACILITIES RIVERWIDE

SACO FACILITY	1983	1988	1990	1993
Saco Yacht Club	102	89	99	129
Riverside Anchorage	122	122	122	122
Norwoods	22	22	38	38
Camp Ellis Pier ¹	40	85	85	85
Saco Island Marina ²	-	-	157	157
TOTALS	286	318	501	531

NUMBER AND PERCENTAGE CHANGES:

83-88: + 32 boats, +11.2% total, +2.2% annual

88-90: + 183 boats, +57.5% total, +28.7% annual

88-93: + 213 boats, +67% total, +13.4% annual

(Source: City of Saco, Saco River Public Access Study, 1988)

3. Develop formulas such as boat registration per population and compare with national figures.

Advantage: If no other data exists, it is possible to estimate a general trend picture.

Disadvantage: Refers to local boat ownership, without determining exact use of local coastal facilities.

Example: The National Marine Manufacturers Association (NMMA) estimates that the current ratio of population and boat registration is approximately 24 people per boat, which will remain steady through the year 2000. NMMA figures estimate the ratio for boats 16 feet and over at 62 people/boat. Maine's figures (total boats) are 10 people per boat and 28 people/boat (16 feet and over). Assuming that each national and state ratio also remain steady, projected ownership of local boats most likely to demand moorings can be calculated. Table II is an example of such a calculation.

¹ At maximum use under current condition

² Proposed facility

Table II: BOATING GROWTH IN ANYTOWN, MAINE

Year	Popul- ation	# Of Boats 16' And Over	Ratio Of People/Boat	Annual %
1985	10,000	400	25	
2000	15,000	600	25	4.5%

(Source: National Marine Manufacturers Association, *A Long-Term View of Boating Recreation Demand*, 1985; and Boating Registration Statistics, 1985)

4. Rely on the actual experience of the local harbor master and Bureau of Marine Patrol.

Advantage: Helps overcome gaps left by the other methods and takes into account the many variables involved in demand: current availability of ramp, marina and mooring facilities; availability of parking; availability of shoreside services; ease of access from both seaward and landward; the volume and nature of traffic in the channel; and the existence of superior facilities in nearby communities.

Disadvantage: Information is anecdotal and may be subjective.

Determining commercial fishing vessel demand is a simpler process because the industry is no longer in a high-growth era. In general, all of Maine's traditional fisheries experienced rapid expansion during the late 1970s, in response to the establishment of the 200 mile limit. Many vessels were added to fleets at that time. Current projections by the Maine State Planning Office estimate that overall employment in the industry will decline from a figure of 7,000 in 1985 to 6,000 in 1995, a drop of 14 percent.

While large ports, such as Portland, may require a more sophisticated analysis, the state information can be applied to local harbors. Here is how the Town of Scarborough correlated fisheries employment and vessel number:

The overall state data suggests the number of Scarborough lobster fishermen will maintain its current cycle. If there are 60 people working on lobster boats today (two people per 20 full-time boats and one person per 20 part-time boats), a 14 percent decline by 1995 would leave 52 lobster fishermen, roughly the same amount who fished out of Scarborough Harbor in the late 1970s.

However, over the next several years the average size of a lobster boat fishing out of Scarborough is expected to increase. Currently ranging from 24 to 36 feet, more vessels are expected to be 30 feet and over, reflecting a trend of more traps, longer trips and fishing in deeper water to remain competitive in the industry.

(Town of Scarborough: "Comprehensive Harbor Plan for the Town of Scarborough," 1987)

Information on recreational and commercial boating registration is available at local town offices or at the State Department of Inland Fisheries and Wildlife. In addition, many recreational boaters document their vessels with the U.S. Coast Guard for insurance and finance reasons. Harbor masters should require information on documentation on mooring application forms because they become the only local method of tracking documented vessels.

CHAPTER 4 – MOORING LAYOUT ALTERNATIVES

SINGLE POINT MOORINGS

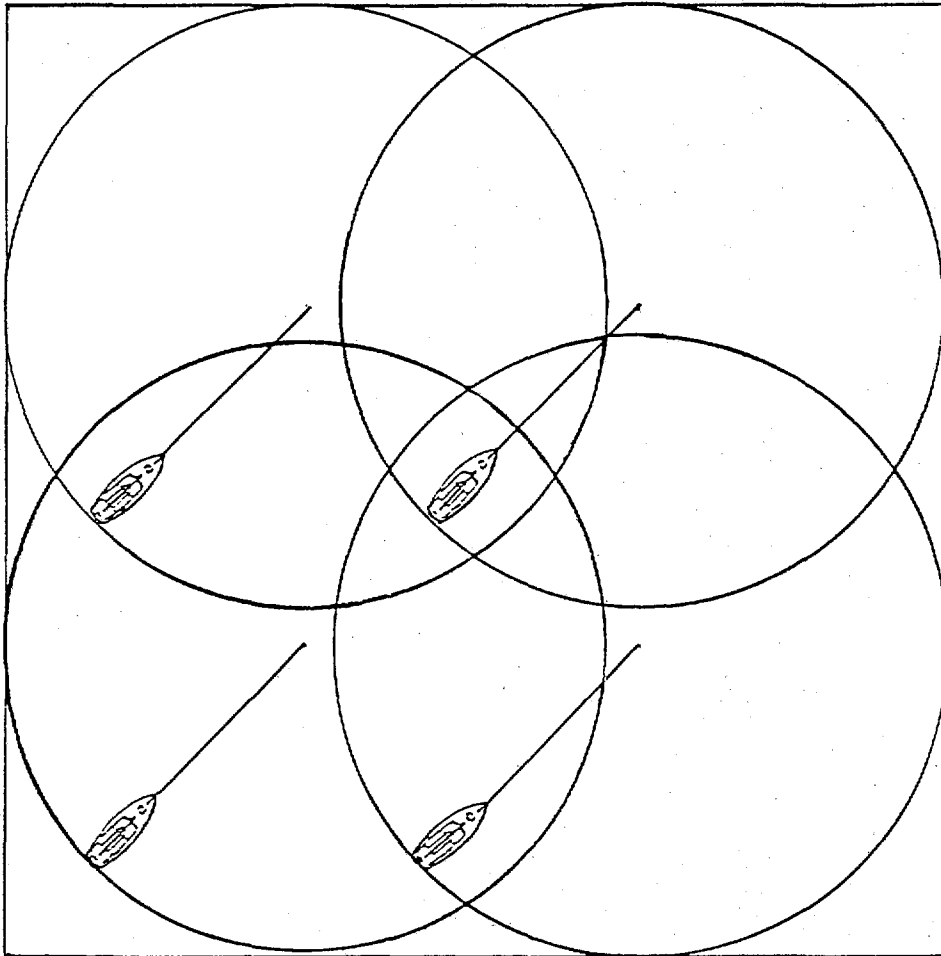
Single point moorings, where boats swing about an anchor or mooring block, are the most common type of mooring in Maine. Space has not been much of a problem in the past; typically a lobster boat has been allowed to swing in a circle ("circle of influence") that varies from about 200 feet across to 240 feet in diameter, depending upon the length of the boat and the depth of the water. This type of mooring has the advantage that unless there is a very strong current, the bow of the boat faces into the wind and presents the least exposure to storm winds and waves.

In the past, single point moorings have been laid out in a harbor so that the circle of influence described by one boat does not infringe upon the circle of influence of another boat (see Figure III).

As mooring areas become more crowded, the circles of influence overlap each other as boats are moored closer to each other. In many instances, this crowding together with overlapping circles is acceptable as long as all of the boats at the moorings behave in the same manner (see Figure IV).

Problems occur, however, when different types of boats are moored near each other; e.g., when a 30-foot lobster boat is moored next to a 30-foot, deep-keeled sailboat, which in turn is moored next to a 45-foot sport fishing boat (which may be moored next to an 18-foot outboard, etc.). Different types of boats do not react to wind and current in the same manner. Consequently, mooring locations must be assigned by the type of boat, as well as its size. A yacht club with a fleet of similarly designed sailboats can moor boats much more efficiently than a mixed use public mooring area that includes everything from outboards and small centerboard cat boats to commercial trawlers and deep draft sailing yachts (see Figures V and VI for sample mooring radii and overlapping moorings for three types of boats grouped to provide maximum usage).

FIGURE IV



FOUR 30' BOATS MOORED WITH OVER-
LAPPING CIRCLES OF INFLUENCE AT 93.6' RADIUS
4 BOATS PER 1.94 ACRES

LOW TIDE ——— 20'
TIDAL RANGE ——— 9'
HEIGHT OF BOAT
AT BOW ——— 4'

GRAPHIC SCALE 1" = 60'

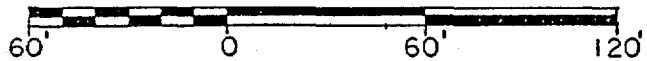
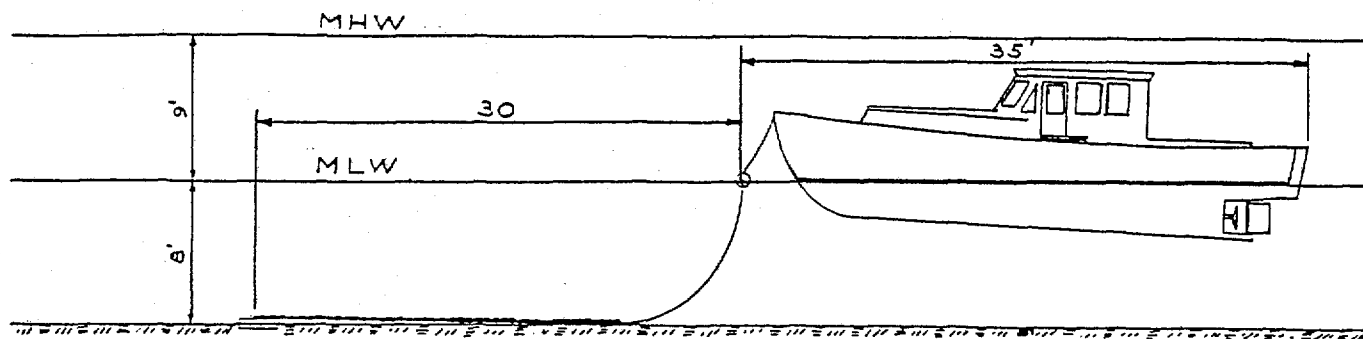
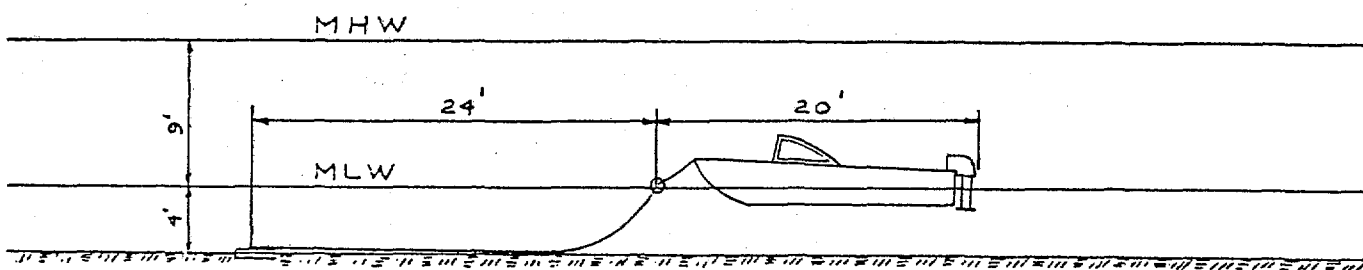


FIGURE V

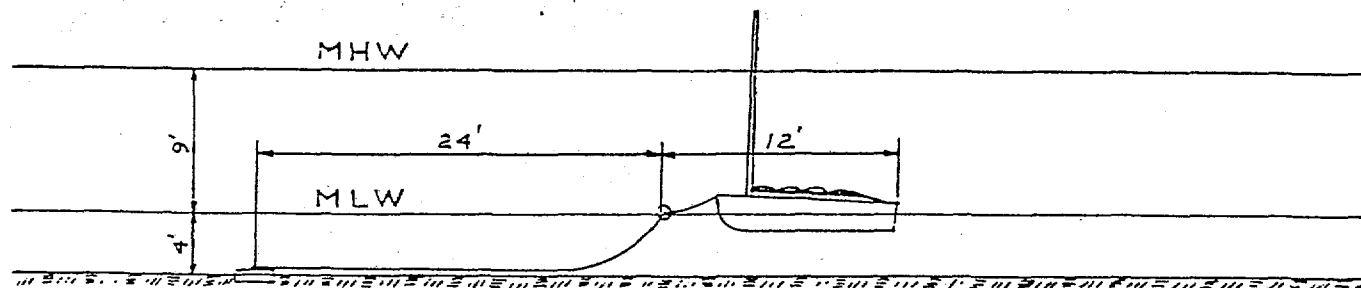
SHALLOW HARBOR WITH MINIMUM RADII



△ TYPICAL POWER BOAT ————— 65' RADIUS

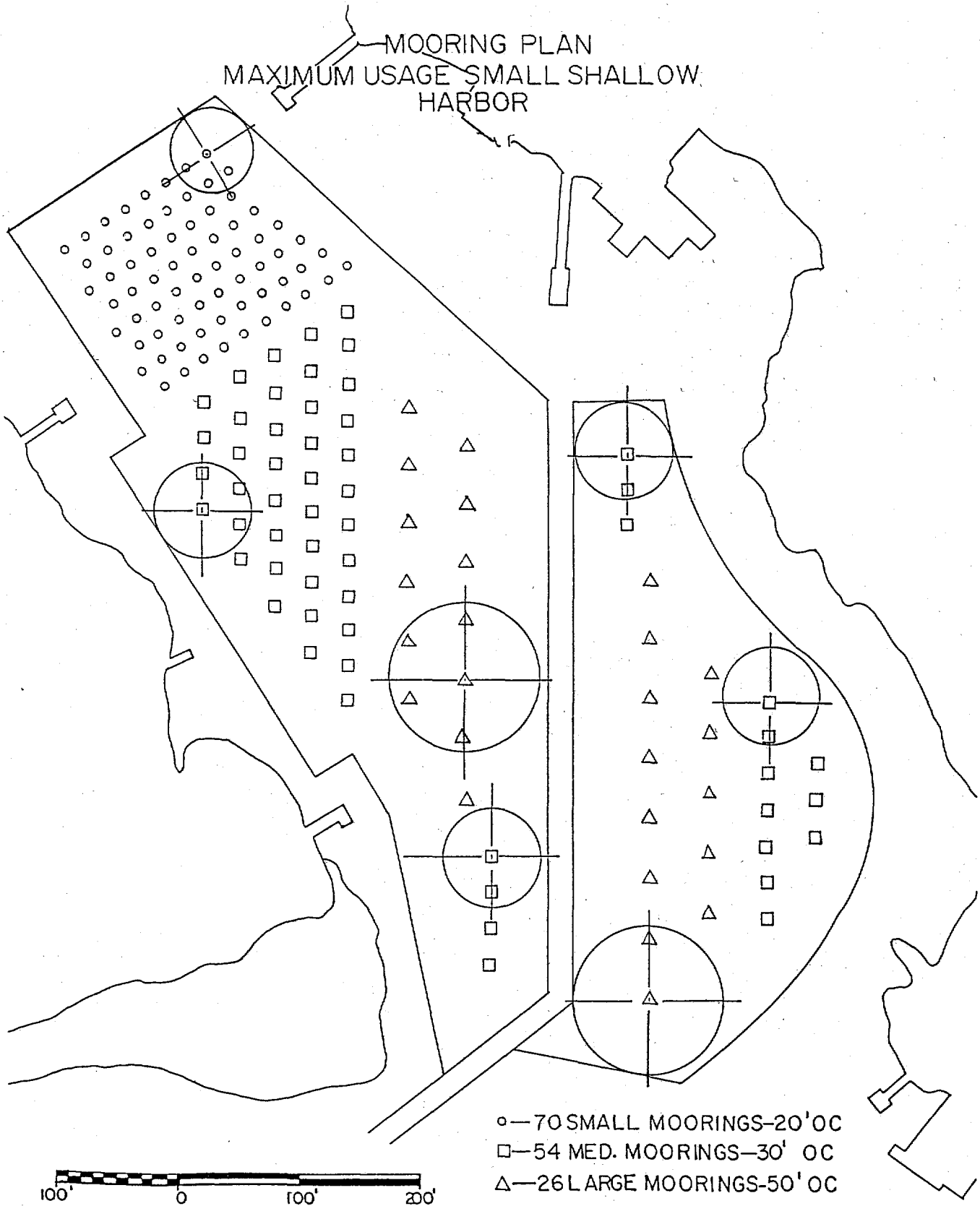


□ TYPICAL OUTBOARD MOTOR BOAT ————— 44' RADIUS



○ TYPICAL SMALL SAILBOAT ————— 36' RADIUS

FIGURE VI



SECOND MOORINGS

In narrow constrained areas, it is possible to set a second mooring so that the boat is held fore and aft. The boat no longer swings in a circle and takes much less mooring space. However, since storm winds do not always come from the same direction, this type of mooring is not practical if there is any possibility that large waves can build and strike the side of the moored vessel. Frequently, such moorings are set in narrow rivers with considerable wind protection provided by the river banks. For the most part, this is not a practical mooring for the Maine coast and cannot be recommended except in very specialized locations.

TWO OR MORE ANCHORS

In an effort to reduce mooring space requirements, some communities in southern New England are now requiring moorings with two or more anchors or mooring blocks. In its simplest form, there are two mooring blocks with a heavy chain from each block which meet at a swivel that can be reached at low tide; a lighter chain is connected to the swivel and leads to the mooring buoy (in some instances, heavy nylon rope is used in place of the upper chain – see Figure VII). The resulting area of influence is an ellipse of less area than the circle of influence described by a single point mooring (see Figure VIII).

The size of the ellipse will vary depending upon the length of boat, depth of water, tide, distance between blocks, and scope. The spacing may be set at twice the water depth, or greater. In the following example, using the same boat, same depth of water, same tidal range and same pennant as in the single point calculations above, the mooring area can be reduced to 40 percent of that required for the single point mooring. Here, the blocks are placed apart almost $2\frac{1}{2}$ times the water depth and the heavy chains are twice the water depth. The light chain is twice the tidal range (this provides the same scope as the single point mooring when the boat is held by one mooring block and in a position parallel to the line described by the two blocks on the bottom). Under these conditions, the boat theoretically occupies an area which is in the form of an ellipse about 120 feet along its primary axis and 110 feet along its secondary axis. In actual practice, single point mooring circles of influence and ellipses described by boats on two-point moorings are slightly smaller than the calculations indicate. This is because the chains sag and form a catenary curve instead of straight lines. However, this is an appropriate safety allowance and should not be deducted from the area allowed for each boat.

A slightly more complex mooring can be constructed with three blocks or anchors set 120 degrees apart. With additional chain and block(s), the moorings are, of course, more expensive, but in selected areas, may be very appropriate.

Because there are so many variables, it is not practical to come up with an all-inclusive formula for all conditions. However, if the following conditions are set, then the major and minor axis of the mooring area for a two-block system can be calculated using the following formula:

THE RIGHT TACK

Definitions:

H = Depth of water at high tide

T = Tidal range

h = Height of bow above water

LOA = Length over all of boat

CONDITIONS

1. Heavy mooring chains twice the high water depth (2H).
2. Mooring blocks set so that angle between heavy chains at the swivel is 90 degrees.
3. Light mooring chain (3.46) (Tidal range).
4. Pennant 2.3 times height of boat at the bow.

Major axis = $2.8H + 6.9T + 4.6h + 2(\text{LOA})$

Minor axis = $1.2H + 6.9T + 4.6h + 2(\text{LOA})$

(see Figure VIII for the ellipse.)

In this day and age of personal computers, a variety of variables can be evaluated for a particular mooring area. Once a set of standards has been agreed upon, mooring circles or a mooring grid can be plotted on a chart of the mooring area. For single point moorings, the grid would be in squares. For two point moorings, the grid would be rectangular.

At present, just being able to plot circles of influence for existing moorings may be enough to enable a harbor master to find room for additional boats. However, it probably will be necessary to either set lines for the layout of moorings or to set up a grid system of moorings if a harbor is to be fully utilized. Permanent marking of mooring lines or grids on shore is recommended, but it is understood that private ownership of tidal lands may prevent establishing such markers.

FIGURE VII

SINGLE MOORING WITH DUAL
MOORING BLOCKS

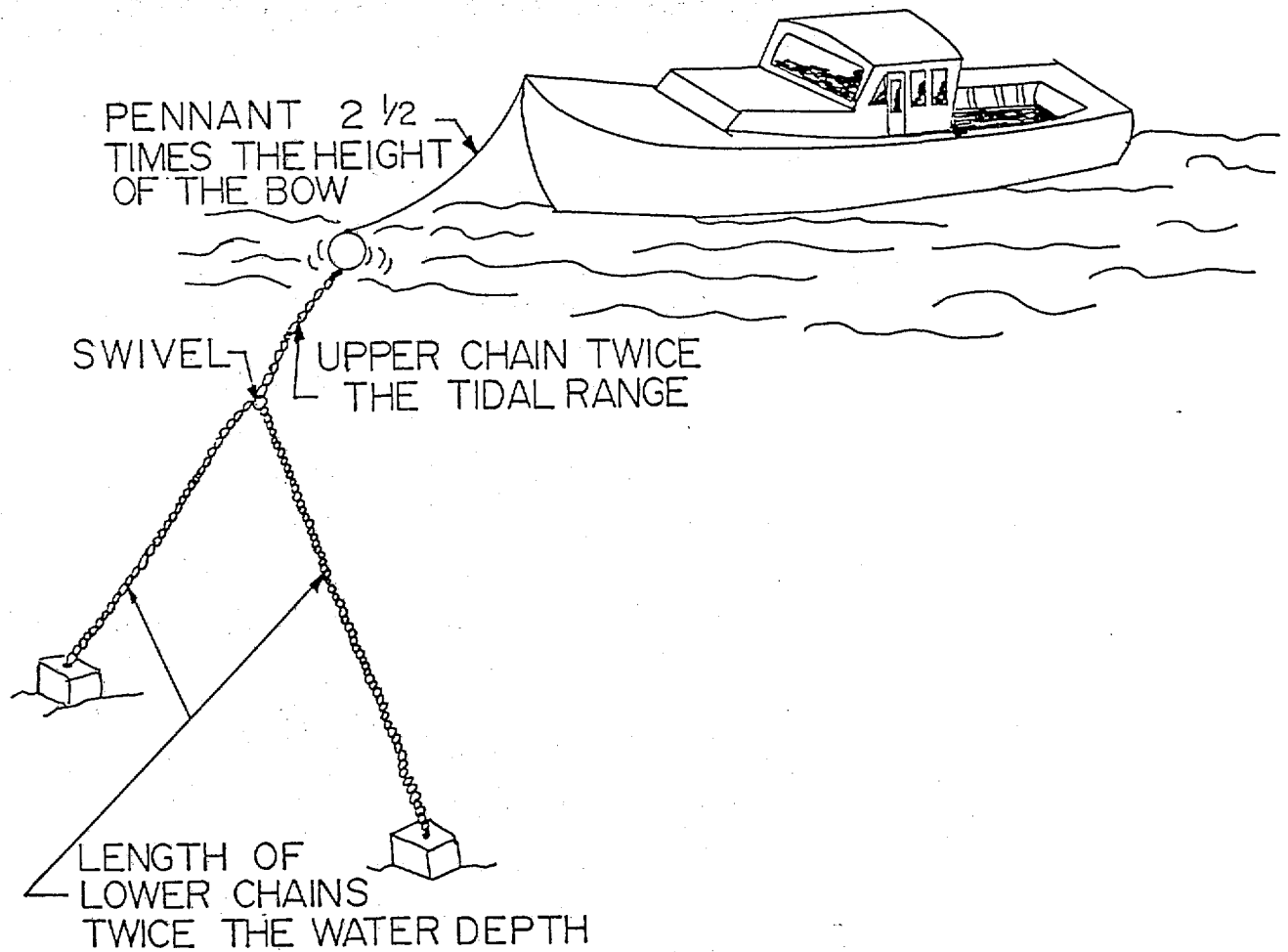
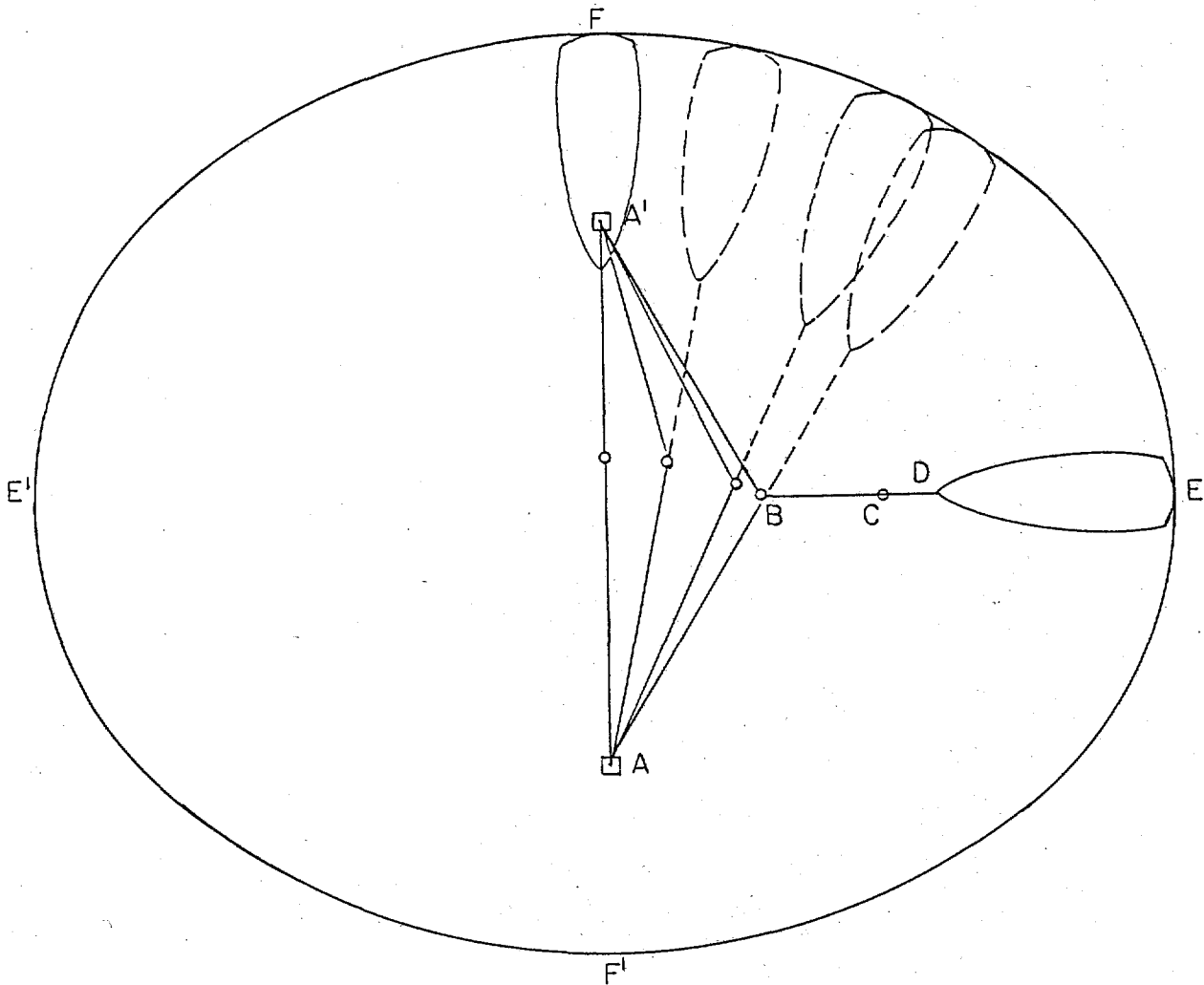


FIGURE VIII

ELLIPSE* DESCRIBED by STERN of BOAT on 2 POINT MOORING at LOW TIDE



$E'-E = \text{MAJOR AXIS} = 2.8H + 6.9T + 4.6h + 2LOA$

$F-F' = \text{MINOR AXIS} = 1.2H + 6.9T + 4.6h + 2LOA$

WHEN-

$H = \text{DEPTH OF WATER AT HIGH TIDE}$

$T = \text{TIDAL RANGE}$

$h = \text{HEIGHT OF BOW ABOVE WATER}$

$LOA = \text{LENGTH OVERALL OF BOAT}$

$AB = A'B = 2H = \text{LENGTH OF LOWER CHAINS}$

$BC = 3.46T = \text{HORIZONTAL PROJECTION OF UPPER CHAIN LENGTH}$

$CD = 2.3h = \text{HORIZONTAL PROJECTION OF PENNANT}$

$\angle ABA' = 90^\circ$

*NOTE — ELLIPSE WILL VARY IN SIZE AND SHAPE AS MOORING SCOPE TIDAL RANGE, DEPTH OF WATER, AND DISTANCE BETWEEN BLOCKS VARIES.

MOORING FLOATS

In very protected areas of Maine, communities use mooring floats (see Figure IX). Camden Harbor and the Royal River in Yarmouth are two examples. These floats are actually narrow floating docks which are long enough so that a boat can tie up to each side of the float. Each boat, as well as the float, ride on the mooring. The mooring must be heavy enough for both boats plus the float and can use one or more anchors or blocks (in Camden, the area is protected enough so that the floats are moored at both ends and do not swing). The two boat owners who use the mooring float are sometimes the owners of the float. At other locations, the community may own the float and lease it to the users. Mooring floats can also serve as useful storage areas for lobster bait or gear away from the general shoreside public. The floats also ease boarding to and debarkation from the vessel.

MOORING CHAINS (GROUND LINES)

When harbor bottom conditions are such that conventional moorings are not practical (e.g., steeply sloping rock bottom where mooring blocks are not stable and anchors cannot dig into the bottom), heavy chains have been stretched from shore to shore and lighter mooring chains have been attached at intervals along the heavy chain. Because there is no possibility of dragging this type of mooring, it is theoretically possible to set closer tolerances and place moorings closer to each other. This type of mooring system is not widespread in Maine. However, it has been reported that, in Europe, the system is used to increase mooring efficiency for boats up to 30 feet in length. The time may come when a submerged chain mooring system will be an appropriate alternative to increase the mooring capacity of a harbor. However, along with this system comes the responsibility of maintenance and replacement of the submerged chain as well as any liability if it should fail. Matinicus Harbor uses this system, which is described in part in a leading coastal cruising guide:

"You will notice that the lobster boats lie in orderly lines. Instead of each boat's having a mooring of its own, each is moored to a heavy nylon line running across the harbor from shore to shore. The ends are chain to resist chafe on the rocks. Each boat is attached to this line with a heavy nylon painter. Nylon has lots of stretch, every bit of which is needed in a heavy northeasterly. One fisherman observed, 'Don't they ride easy!' Useful and efficient as they are, an anchor fouled in one of these lines is as good as lost without a trip line."

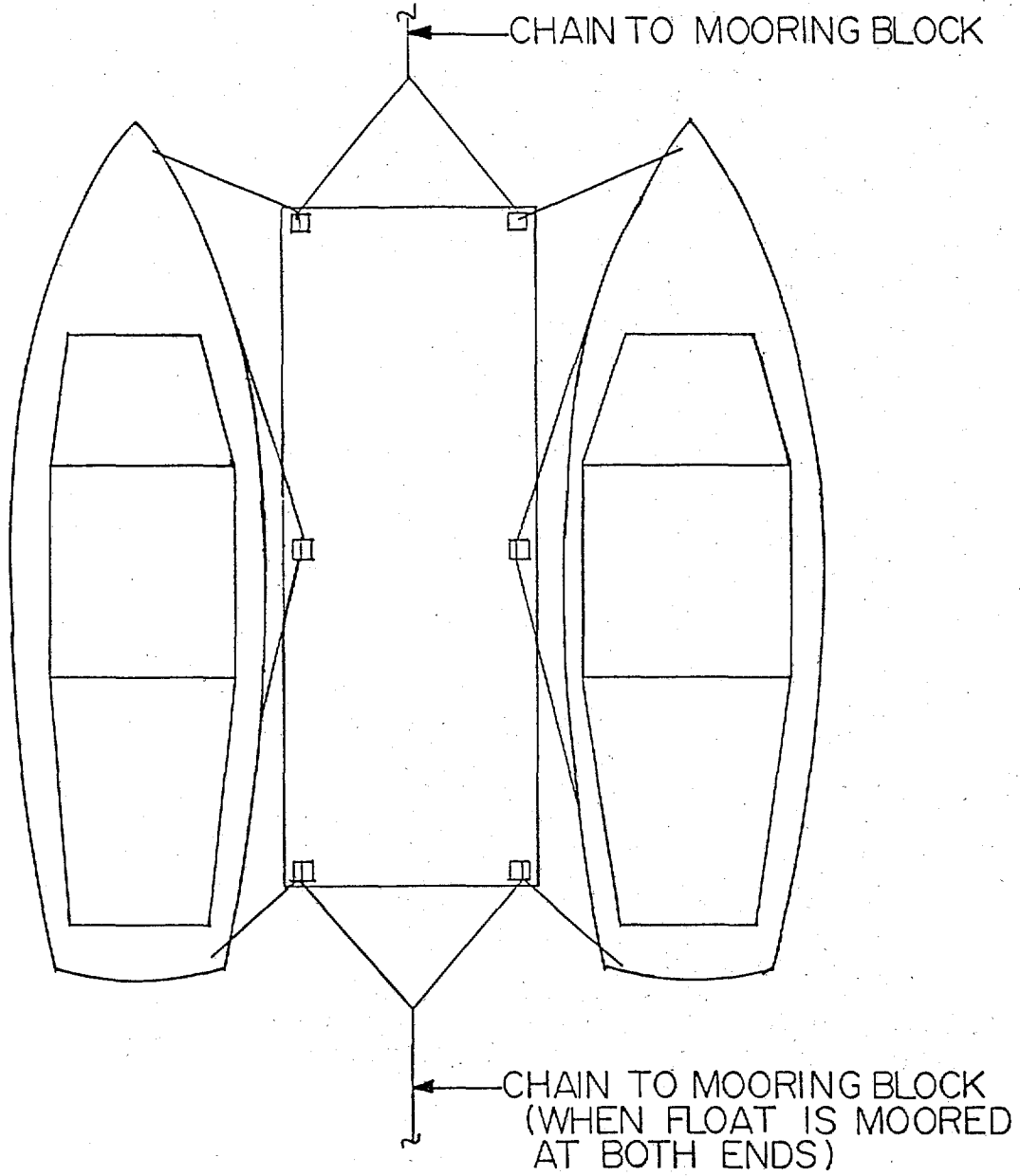
(From Duncan, Roger F. and Ware, John P., *A Cruising Guide to the New England Coast*; New York: Dodd, Mead & Co., 1987.)

FLOATING STAR DOCKS

Floating star docks with slips radiating from a single point have been used in some areas of the United States, such as the Great Lakes. The docks are relatively expensive and usually are anchored to the bottom with pilings. However, no matter which way a storm wind blows, more than one quarter of the boats will be nearly broadside to the storm and almost one half of the boats will have their aft quarter exposed to the storm. Exposure to such storm conditions cannot be recommended for use on the Maine Coast.

FIGURE IX

TYPICAL MOORING FLOAT AND BOATS



MARINAS/BOAT SLIPS

Marinas are, of course, the most expensive but the most efficient method for mooring large numbers of boats. A modern, well-designed marina can hold a hundred boats in the area required to moor three lobster boats on single point moorings. However, marinas must be in protected waters and, in Maine, the boats should lie in a generally northeast/southeast orientation. In at least one instance in Maine, two sailboats in adjoining slips with a northwest/southeast orientation have rolled sufficiently to lock their rigging together in a northeast storm. For many reasons, some people are not in favor of marina construction along the Maine coast. However, it cannot be disputed that they are in the most efficient method of storing large numbers of floating boats.

DRY BOAT STORAGE

As mooring space becomes more limited, fewer small boats will be left in the water but will be stored in the dry. This is most apparent today with the large number of boats stored on trailers. Not only are the numbers of boats on trailers increasing, but the average size of boats on trailers is increasing. Not too many years ago there were very few boats longer than 16 or 18 feet stored on trailers and now there are plenty of boats 22 feet, 24 feet and longer that are trailered. However, the towing vehicle capacity is a serious limiting factor on trailered boat size. This is emphasized by the large numbers of four cylinder automobile engines of today as compared with the more prevalent six and eight cylinder engines of just a few years ago. Because of the limitations of towing vehicles, it is not expected that major changes will take place in regard to the types of boats stored on trailers. But mooring space limitations will certainly ensure that larger numbers of smaller boats will be kept on trailers. This will place greater demands on launch facilities and will require more launch ramps and parking for vehicles with trailers.

Even though trailered boats are limited in size by automobile capacity, there is no such limitation on specialized boat handling equipment. Accordingly, it is expected that there will be more and more specialized fork lifts and travel lifts which will launch boats that are stored in the dry and then return these same boats to storage after short-term usage. The three and four boat high storage racks at South Portland and some inland lakes are an indication of what small boat "mooring areas" may be in the future. Who can tell. The day may come when all power boats under thirty feet in length are stored in the dry and sailboats may join them if an efficient method can be found to raise and lower masts.

CHAPTER 5 – MOORING STANDARDS

Loads placed upon moorings vary considerably depending upon the type of vessel at the mooring. For example, under a gale wind (30-40 MPH), a 25-foot open boat with no cabin will exert a pull of about 540 pounds on its mooring. Under the same conditions, a 25-foot cabin boat will exert a force of about 700 pounds. Boats which lay calmly with their bow into the wind exert less force on their moorings than those which constantly sail around their mooring. Consequently, it is as impossible to say that all boats of equal length require the same size mooring as it is to say that all men of the same height should wear the same shoe size.

A boat owner should have some confidence that, during storm conditions, other boats will not break loose from their moorings and damage his vessel. For this reason, it is advisable for a community to set some minimum standards. However, because mooring loads are so variable, such standards cannot be applied to all boats, nor can the community be held liable for damage inflicted if a minimum standard mooring fails. A parallel to this is state inspection of automobiles. The vehicle may pass inspection, but the state is not held liable if at a time following inspection, the car or truck is involved in an accident.

TACKLE DESIGN

The American Boat and Yacht Council recommends the following design loads as standards for mooring design:

Table III: GROUND TACKLE DESIGN LOAD

Length Of Boat	Beam	42-Knot Wind	60-Knot Wind
20'	7'	720 lbs	1,440 lbs
25'	8'	980 lbs	1,960 lbs
30'	9'	1,400 lbs	2,800 lbs
35'	10'	1,800 lbs	3,600 lbs
40'	11'	2,400 lbs	4,800 lbs

(Use length or beam, whichever produces the largest load value.)

CHAIN CHARACTERISTICS

It is recommended that all chain used for moorings be strong enough to resist the loads caused by a 60-knot wind. Chain comes in a variety of strengths, depending upon the type of link and alloy of steel used, but ordinary chain can be expected to have the following characteristics:

Table IV: CHAIN CHARACTERISTICS

Size	Lbs./Foot	Working Limit *
1/4"	11.75	1,325 lbs
5/16"	1.14	1,980 lbs
3/8"	111.64	2,750 lbs
1/2"	112.92	4,750 lbs
5/8"	114.43	7,250 lbs

* NOTE: Working limits are considerably below breaking strength of chain to allow for corrosion as well as safety factor. Several authorities recommend using 20% of the breaking strengths as the working limit.

ROPE

Twisted 3-strand nylon rope is recommended for any rope used on a mooring. It is not only rot resistant and does not deteriorate appreciably in salt water, but it has considerable capacity to stretch and act as a shock absorber under shock loads. Under day-to-day loading, nylon rope should not be stressed more than 11 percent of its breaking strength according to the cordage manufacturer's recommendations. However, to obtain the advantage of the stretch for shock loading, it should be stressed to 25 percent of its breaking strength (when stressed less than 25 percent, the rope does not stretch, failing to provide any shock loading advantage). Under ultimate loading, it should not be stressed to more than 50 percent of its breaking strength, simply because of the loss in strength at knots and splices.

Taking into consideration the characteristics of nylon rope, it is recommended that moorings be designed so that the loads produced by a 60-knot wind should not exceed 25 percent of the breaking strength of the rope. A table for the characteristics and strengths of 3 strand nylon rope is shown below:

Table V: CHARACTERISTICS AND STRENGTH

Twisted 3 Strand Nylon Rope

Dia. of Rope		Weight lbs./100 ft	Average Breaking test (lbs)	Breaking Test	
inches	Mms. *			11%	25%
3/8	9	3.5	3,700	410	925
7/16	10	5.0	5,000	550	1,250
1/2	12	6.5	6,400	700	1,600
9/16	14	8.3	8,000	880	2,000
5/8	16	10.5	10,400	1,140	2,600
3/4	18	14.5	14,200	1,560	3,550
7/8	22	20.0	10,000	2,200	5,000
1	25	26.0	25,000	2,750	6,250

* Closest metric rope size

MOORING BLOCK

The size and weight of the mooring block or anchor used to secure the mooring chain to the bottom is also a variable factor. By providing scope, the weight is not a direct lift but has a horizontal factor as well when the block drags across the bottom and digs into the harbor floor. The softer the bottom, the more the block digs in and the stronger the mooring. All anchors, of course, take advantage of this digging characteristic.

Scope is the ratio of the length of the mooring chain and/or rope to the vertical distance from the anchor or mooring block to its highest point. In Figure II, the mooring chain length is twice the vertical distance from the harbor floor to the mooring float at high water – a scope of 2:1. With a pennant $2\frac{1}{2}$ times the height of the bow of the boat, the total length of the chain plus the pennant is 68 feet, or 2.06 times the total distance from harbor floor to the bow of the boat. The scope for the entire mooring is 2.06:1.

Weight alone is the deciding factor when sizing the block because a mooring block does not have sharp edges designed to bite into the harbor floor. The material the block is made of is all important as can be seen from the comparison of the submerged weights of concrete, concrete and steel or granite listed below:

Table VI: MOORING BLOCK COMPARISON

	Air Weight	Weight in Sea Water
30 gallon container filled with concrete	601.60 lbs.	344.90 lbs.
30 gallon container filled with 90% concrete & 10% steel	747.84 lbs.	481.14 lbs.
55 gallon container filled with concrete	1,102.90 lbs.	623.30 lbs.
55 gallon container filled with 90% concrete & 10% steel	1,352.40 lbs.	881.80 lbs.
2,000 lb. concrete block	2,000 lbs.	1,147 lbs.
2,000 lb. granite block	2,000 lbs.	1,269 lbs.

When comparing the variety of blocks available for mooring, it is important to consider that the submerged weight of concrete is only 86 pounds per cubic foot, while the submerged weight of granite is 111 pounds per cubic foot.

Since, as discussed above, a boat does not pull directly up on a mooring block, but at an angle, the actual uplift on a mooring block is less than the tension on the mooring chain. The longer the chain, the less uplift on the block. With a chain at least twice the depth of the water, the direct uplift on the block is about one half the tension on the chain. Therefore, the mooring block theoretically must only weigh, when immersed in water, one half the force applied to it by the sloping mooring chain.

However, this sloping pull on the chain also produces a horizontal force on the mooring block as well. This force is about 87% of the tension in the chain. On a soft bottom, the mooring block sinks into the mud and when a strong horizontal pull is produced, it is necessary to displace the mud before the mooring will drag. The shape of the block and the characteristics of the bottom certainly have a bearing on the ability to resist this horizontal force so that no general rule of thumb can be set up to size the mooring block. Many harbor masters recommend flat thinner blocks rather than thick curved cubical shapes. Round objects, such as barrels filled with concrete, may roll on the bottom and are not thought to be as good as more rectangular objects.

RECOMMENDED STANDARDS

As stated previously, mooring standards cannot be all encompassing, but general guidelines for mooring construction are certainly appropriate. When a mooring block is to be used, it is suggested that it be granite instead of concrete, if at all possible. On a weight basis only, granite is close to 10 percent more effective than concrete and because of its greater density, it may sink into soft bottom sediments more readily and gain supplemental capacity from those sediments. In addition, the chain should be as long as possible and as heavy as practical. There should be a heavy swivel in the chain as low as possible, but high enough so that it can be inspected at low tide. All shackles should be at least one size larger than the chain, with pins securely lashed in place to prevent them from backing out. All rope should be good quality, three strand nylon with heavy galvanized thimbles in all eye splices where the rope joins the chain or other metal. Wherever ropes comes in contact with objects which tend to cause it to wear or braid, it should be protected with chafing gear. Frequently, rubber or plastic hose can be adapted to provide excellent chafe protection from bow blocks and whenever the rope rubs against the stem of the boat. The equipment standards below are appropriate for summer moorings for pleasure boats in protected harbors. Commercial boats which are used all year long or boats in exposed areas would do well to utilize heavier gear.

Table VII: MINIMUM MOORING STANDARDS

Boat	Chain	Pennant	Block *	Weight in Air	
				Concrete	Granite
20'	5/16"	1/2"	360 lbs.	570 lbs.	
25'	5/16"	9/16"	490 lbs.	955 lbs.	775 lbs.
30'	3/8"	5/8"	700 lbs.	1,220 lbs.	1,105 lbs.
35'	1/2"	3/4"	900 lbs.	1,570 lbs.	1,420 lbs.
40'	1/2"	7/8"	1,200 lbs.	2,100 lbs.	1,900 lbs.

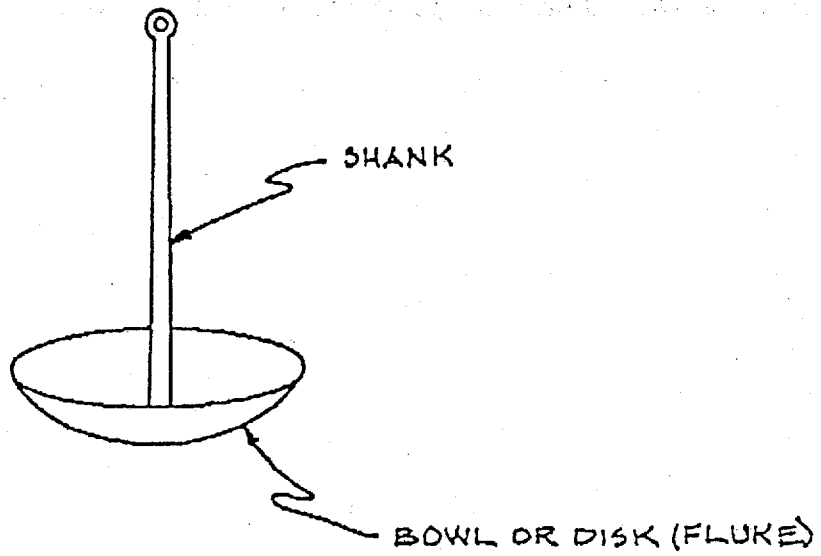
* Weight in Water

The above standards are minimums. An increase in weight beyond the minimum by 30% would be quite appropriate to provide some safety factor. The mooring owner is advised to increase sizes of the mooring components if his vessel is to be exposed to adverse conditions or if his boat places more than ordinary strain on its moorings.

In areas where there is soft sand, silt or mud, a mushroom anchor may be an appropriate alternative (see Figure X for a typical mushroom anchor). Once dug in, a mushroom anchor is said to be able to hold a force equal to ten times its weight. This is not at all true in gravel, hard sand, hard clay or any other ocean floor that does not permit a mushroom anchor to dig in; therefore, a mushroom anchor should not be substituted for a block if the bottom characteristics are not appropriate.

The Bruce anchor (see Figure XI) was developed for holding floating oil drilling rigs in place. Where used to anchor these rigs, four or more anchors are deployed so that the load on each anchor is unidirectional with little or no tendency to twist the anchor out of the ocean bottom. They are said to bury well into hard sand or gravel bottoms which are not suitable for mushroom anchors, and it is claimed by the manufacturer that they do not twist out of the bottom. These anchors are relatively expensive (over \$200 for a simple anchor for a 30 foot boat), so it is doubtful that many mooring systems with three or more Bruce anchors will be used along the Maine coast.

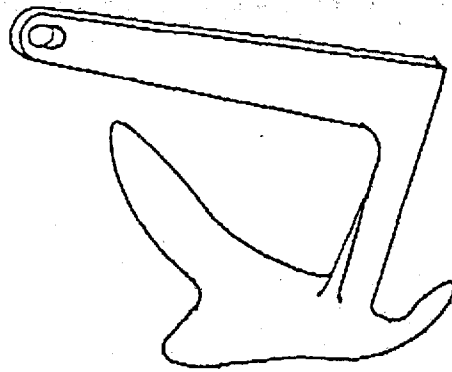
FIGURE X



TYPICAL MUSHROOM ANCHOR

N.F.S.

FIGURE XI



TYPICAL BRUCE ANCHOR

N.T.S.

CHAPTER 6 – SHORESIDE LINKAGE

Planning for moorings does not end at the water's edge. It is important to link the use of the water with the adjacent land use to ensure compatibility of uses while not overwhelming the land area's carrying capacity for servicing the mooring area.

At a minimum, harbor officials should address the following issues:

1. parking;
2. public accommodations; and
3. neighborhood compatibility.

PARKING

There is variation in parking standards around the country. Research by the International Marina Institute indicates that one car for every two recreational boats (0.5 spaces per boat) is a good rule of thumb nationally. But rules of thumb tend to be modified by local conditions (e.g., consideration of employee parking or accommodating other uses, such as restaurant). A typical range for communities appears to be 0.6 spaces to 0.75 spaces per boat.

There is also a range of choices for commercial boats, according to studies from around the country. Again, the numbers are modified by local conditions (e.g., the type of fleet). A lobster fleet may require just one space per boat, but draggers may need 1.3 - 2 spaces per boat because of crew sizes.

PUBLIC ACCOMMODATIONS

The best way to keep an area clean is to make it easy for people to keep it that way. Public restrooms, trash barrels, and boat pump-out facilities, as long as they are serviced and emptied regularly, will help communities limit the human impact of boating.

NEIGHBORHOOD COMPATIBILITY

If a mooring area is not embraced by the residents of the adjacent neighborhood, the chance to provide enjoyable public access for boating is diminished. Harbor officials must work closely with neighborhoods to resolve issues such as traffic impact, parking, trash pickup, hours of usage, impact on views, etc. The best way to handle this issue is to make neighborhood representatives part of the planning team and to design the mooring area and the adjacent shoreside access area to a scale appropriate to the neighborhood.

APPENDIX I**EXCERPT: HARBOR MASTER AUTHORITY STUDY
BUREAU OF PUBLIC LANDS, DEPARTMENT OF CONSERVATION**

2. Management Responsibility. Numerous governmental agencies, at the federal, state and local level, are involved in decisions regarding the use of submerged lands. On the federal level, the U.S. Army Corps of Engineers issues permits for certain projects located in either the intertidal or submerged lands. Moorings are covered under a general blanket permit and therefore do not require Army Corps approval on an individual basis. Rental moorings are not covered under the general permit and therefore do require a Corps permit. At the state level, the Department of Environmental Protection has responsibility in regard to environmental concerns and considers moorings for vessels less than 65 feet in length exempt from the Wetland, Alteration Permit process.

The Bureau of Public Lands has primary management responsibility on submerged lands for the state. The authority to lease submerged land for permanent structures is established in Title 12 § 558-A "Submerged Lands Act." Under this authority the Bureau may lease the "right to dredge, fill or erect permanent causeways, bridges, marinas, wharves, docks, pilings, moorings or other permanent structures on submerged and intertidal land owned by the State." "Permanent" means occupying submerged land owned by the State during 7 or more months during any one calendar year. In consideration of the DEP exempt status and municipal involvement and authority, the Bureau, through rulemaking, has established the same exempt classification as DEP, for vessels less than 65 feet in length. This exempt status at the State and federal level places actual management responsibilities for assigning mooring privileges at the local or municipal level.

APPENDIX II

SOURCES OF INFORMATION AND FURTHER ASSISTANCE

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International Marine Institute, 35 Steamboat Avenue, Wickford, Rhode Island, 02852.

National Marine Manufacturers Association, 401 North Michigan Avenue, Chicago, Illinois 60611 and 353 Lexington Avenue, New York, New York 10016.

U.S. Army Corps of Engineers, 42 Trapelo Road, Waltham, Massachusetts 02054.