Maine Coastal Program

Coastal Choices: Deciding Our Future

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Contents

Foreword 2
Introduction 3
Conserving Coastal Lands 5
Wildlife 7
Critical Areas Program 8
Public Access 9
Economic Growth 11
Growth Management 13
Cumulative Impacts of Growth 15
Marine Pollution 17
Working Waterfronts 18
Seafood Prices 20
Aquaculture 22
Ports and Harbors 24
Energy Development 26
Shoreline Hazards 28
Freshwater 29
Tourism 30
Photo Credits 31
Maine Coastal Program 32

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Foreword

In both its natural processes and its human culture, the coast of Maine is dynamic. It was sculpted by glaciers and continues to be shaped by wind and waves. It was home to prehistoric people over 5,000 years ago. It was a battleground in French and Indian wars, and a shipbuilding capital renowned throughout the world.

Today, Maine's coast continues to change. Once considered the country's northeastern frontier, it has become a vacationland that draws more than 5 million visitors each year. Residents of coastal Maine are finding more employment opportunities and a better standard of living. But they are concerned as well. Amidst all the change, they wonder if our state can retain the qualities that make it unique -- its traditional marine trades, quaint coastal villages, and clean bays and harbors.

The question rests with the people of Maine. We face hard choices on a wide range of coastal issues — from aquaculture and public access, to energy development and rising sea level. Before we can make wise decisions on these issues, we must understand the nature of the challenges that face us. This handbook offers a variety of viewpoints on some of the more compelling coastal issues. We hope that it will help show you how our coast is changing.

If Maine is to carry the best of its maritime heritage into the future, we must work together — learning about the issues, engaging in productive dialogue, and working cooperatively at all levels. We look forward to working with you.

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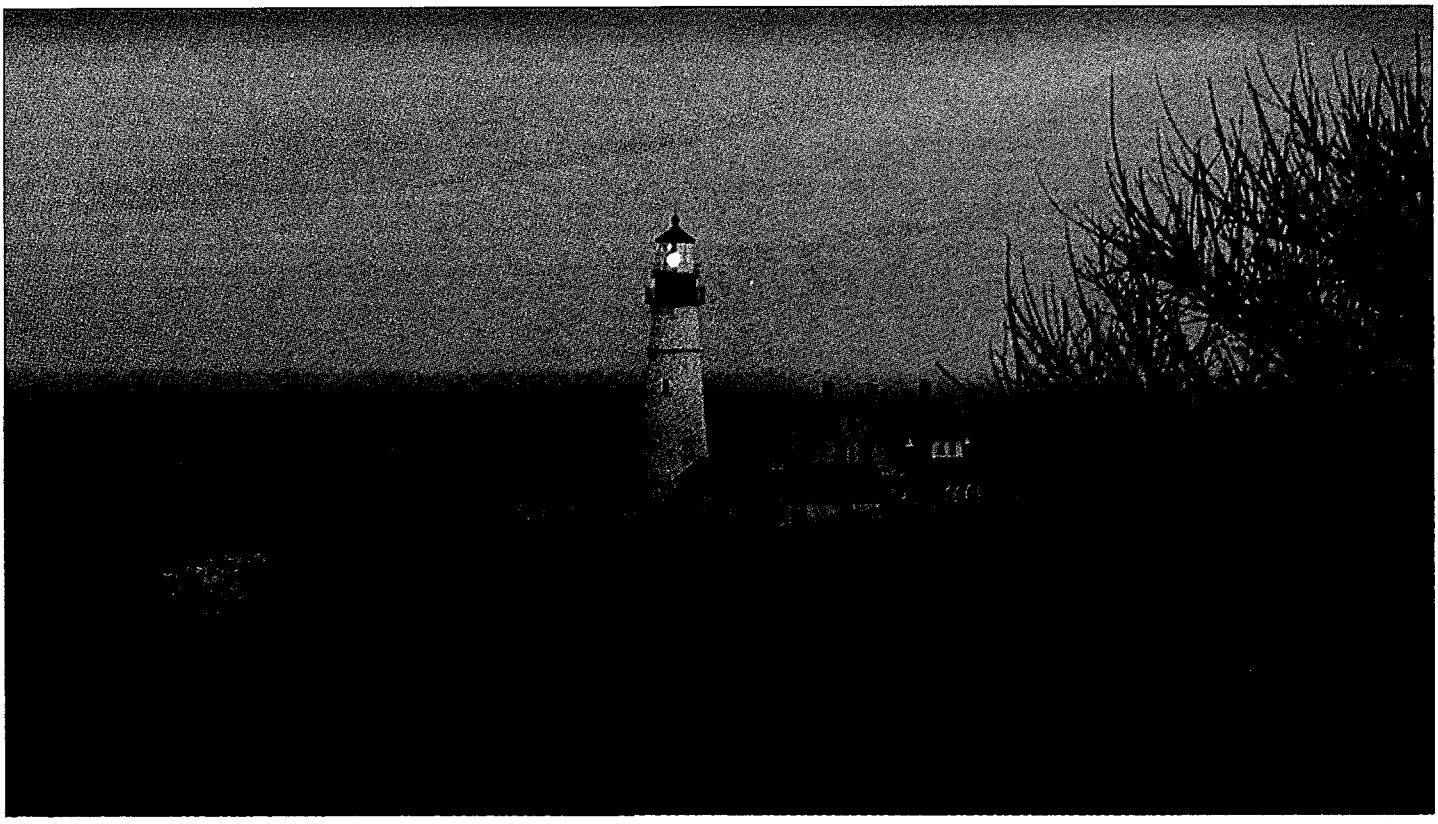
Introduction

by David Keeley, Director, Maine Coastal Program



Portland Head Light

The unique character of Maine's coast gives our state its identity. Maine is renowned for its rockbound peninsulas and 3,000 islands, dotted with lighthouses and lobster shacks. Over a century ago, Maine-built schooners carried granite, timber, and ice from our coast to ports all over the world. Along the coast, we take pride in our maritime heritage and feel a "sense of place"; we recognize that the coast's natural beauty and quality of life make Maine *different* from other states.

Rapid growth, though, is changing Maine's coast. While strengthening the state's economy and stimulating employment, it threatens some of the very qualities that make Maine different. The challenge before Maine today is to balance development of coastal resources with conservation of natural resources and traditional ways of life. If Maine fails in this effort, it will no longer be different. Its beaches, like New Jersey's, will be closed because of debris floating ashore; its shorefront homes, like those on Cape Cod, will tumble into the ocean. Maine's coast need not share the fate of its southern neighbors. It can choose — in its characteristic way — to *be* different.

Maine can develop differently — strengthening its economy *without* destroying its prime coastal resources. By carefully conserving our scenic areas and wildlife refuges, rejuvenating our ports and marine industries, and fostering growth that complements the natural landscape and enhances local communities, we will carry the best of Maine's past into the future.

The Coast and Its People

Maine's coastal area, which includes lands along tidal rivers, contains over 50 percent of the state's year-round population. In the past 10 years, population in the coastal area has increased 14 percent (roughly 3,100 people per year) and employment has increased 32 percent. Two-thirds of state residents now work in Maine's 144 coastal towns. Although it constitutes only 12 percent of Maine's land area, the coast is, and will continue to be, the state's economic and population center.

Southern Maine

Maine's southern coast, which extends from Kittery (at the New Hampshire border) to Freeport, is the most intensively developed portion of the state. This region has many of the state's 78 miles of sandy beaches, which are the most dynamic natural areas along the coast.

In terms of population and construction, York County is the fastest-growing county in Maine. Towns such as York, Wells, and Kennebunkport enacted temporary building moratoria in the early and mid-1980s so they could develop effective local land use controls. In the Town of York alone, $20 million worth of land was bought by developers in the last half of 1985, and real estate sales have increased by over 400 percent since 1985. Casco Bay, dotted with more than 140 islands, provides plentiful marine

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resources and outstanding recreational boating opportunities.

Maine's southern section has the state's highest employment and *per capita* income in Maine. During the 1950s, the region's work force was involved largely in agriculture, fishing, and traditional manufacturing (textiles, leather products, food processing, and metal products). Today, manufacturing firms have been rejuvenated or replaced by producers of electronics, instruments, plastics, and industrial machinery.

Service sector jobs now dominate in this region, constituting over 75 percent of total employment. The service sector along the southern coast includes both low-wage, low-skill jobs (often part-time) in retail trade and services, and well-paying, full-time employment in communications, business, education, and professional services.

Mid-coastal Maine

In mid-coastal Maine, from Brunswick to Belfast, thin peninsulas reach out between deep estuarine rivers. This area's indented coastline offers well-protected harbors that shelter fishing fleets. Aquaculture, or "sea farming," is an expanding industry along this region's tidal waters. The roughly 270 islands of Penobscot Bay provide essential nesting habitat to more than 26,000 pairs of seabirds, including rare species such as bald eagles and Leach's storm petrels.

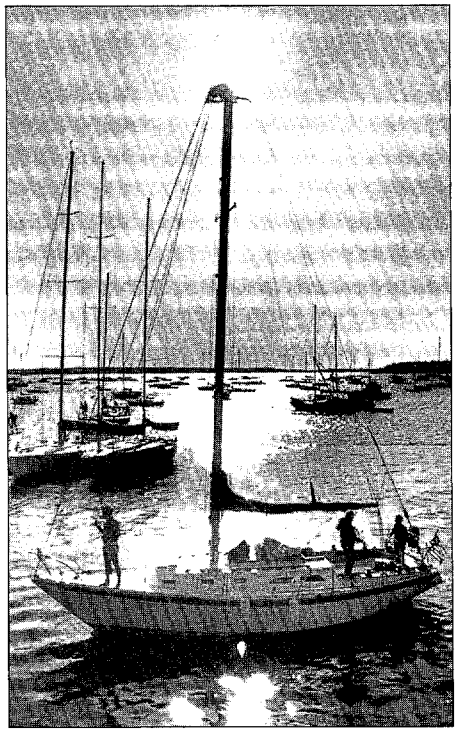
Employment in the mid-coastal region varies from family-owned businesses, often serving the summer visitors, to Bath Iron Works (BIW). With a work force of nearly 9,000, BIW is Maine's largest private employer. The mid-coastal region has other marine-related industries such as boatbuilding and repair, fishing, and food processing, but its fastest growing manufacturing industry may well be printing and publishing.

As along the southern coast, the service sector still provides most of the area's jobs. The mid-coast's growing popularity as a retirement area supports increasing health service and retail jobs.

Eastern Maine

The "downeast" region extends from Penobscot Bay to Calais (on the Canadian border). The term "downeast" was coined in the late 1800s when sailing schooners followed the prevailing southwesterly Gulf Stream winds that carried them down, eastward toward the Canadian border. Tidal changes, which reach over 25 feet near the Canadian border, are some of the greatest in the world. Coastal wetlands, rivers, and islands provide excellent year-round anchorages; and blueberry barrens and forestland offer seasonal employment opportunities. Over 4 million visitors come to Mount Desert Island each year.

Clammer



Falmouth Harbor

The region's attractive landscape and relatively slow-paced way of life attracts many retirees and summer residents. Real estate is in great demand. Prices for desirable properties in Blue Hill, for instance, have doubled in the past two years. Vance Gray, a Blue Hill realtor, notes that people "are not buying property so much as a way of life" *(Bangor Daily News*, 2/27/87). While this influx helps strengthen the region's economy, it leaves fewer places where the public may gain access to the shoreline. Public access is particularly important in this region because many clammers, wormers, and fishermen rely on access to water across undeveloped private property.

With the possible exception of Bangor, the economy of downeast Maine relies on traditional industries such as forest products, fishing, and agriculture. Efforts to stabilize fishing and fish-processing employment have met with moderate success. The agricultural sector, based largely on blueberry production, has benefitted from improved marketing, product quality, and production processes.

Again, the service sector provides most of the jobs in the downeast region, especially in retail trade and health services. This region is also attracting an influx of retirees and a growing number of tourists. □

Conserving Our Coastal Heritage

by Jay Espy, Associate Director, Maine Coast Heritage Trust

Maine is renowned for its beauty and cultural heritage, but much of its unique landscape is sensitive to even minor human disturbance. Maine's islands, for example, are home to some of the world's most threatened species, like the beachhead iris and Leach's storm petrel. Some scientists estimate that while coastal islands constitute only 5 percent of the world's total landmass, they harbor 55 percent of all endangered species.

Even coastal areas that are not innately fragile can be used unwisely and irrevocably damaged. Scenic vistas, working waterfronts, and prime recreational areas (or simply places where the public can reach the shore) are particularly vulnerable in Maine's present climate of rapid development. Once these settings are lost, there are no substitutes: without wharf space, fishermen cannot land their catch; without sufficient recreational areas open to the public, we will be denied access to Maine's beaches and rocky shore.

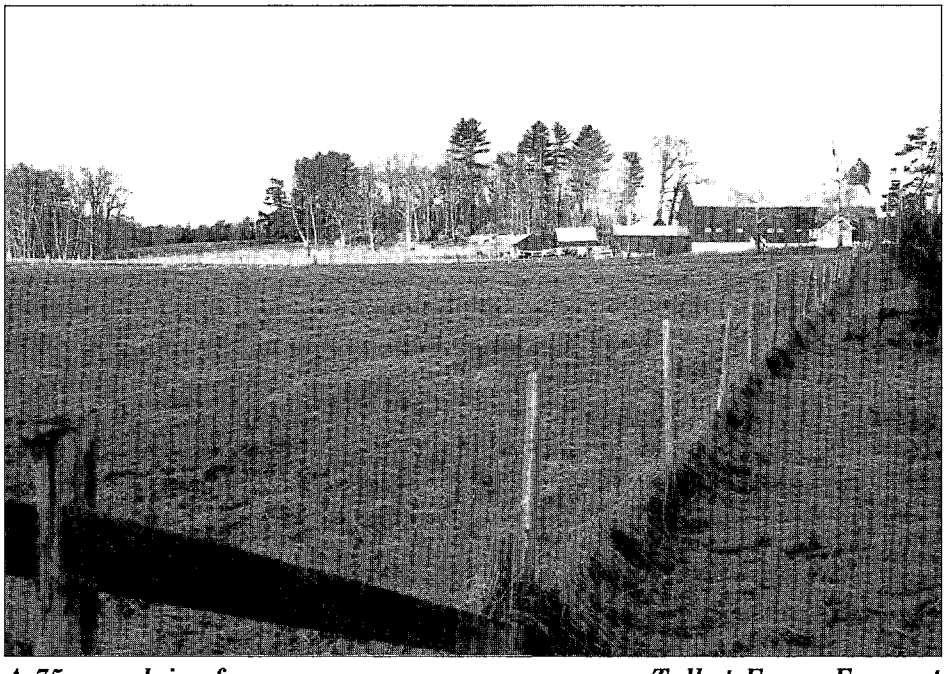
Maine's coastal land may be preserved through conservation easements, outright gifts, direct property purchases, and various leasing arrangements.

To conserve important land resources, hundreds of people in Maine are using conservation easements in which landowners voluntarily restrict future uses of their property. The restrictions are outlined in a legal document that is granted to a governmental agency (federal, state, or local) or to a conservation group. The easement is permanently incorporated into the property's chain of title so future owners are subject to the easement's limitations. The landowner may still control access to the land, though, and sell (or otherwise convey) the property. Since conservation restrictions often reduce property value, donors of qualified conservation easements may deduct the lost value from their federal income taxes as a charitable contribution. In many cases, the donor can receive estate and property tax benefits.

In 1979, the owner of Talbot farm, one of Freeport's oldest and most scenic saltwater farms, granted a conservation easement to the Freeport Conservation Trust. The 81-year-old owner could no longer operate the farm, but was deeply saddened to think it might be subdivided someday. The Trust established an easement that allowed continued farming and maintained the existing buildings, but prohibited future development. With the conservation easement in place, the owner sold the house and 75-acre dairy operation to a local farmer, assured that it would always remain an agricultural and scenic asset for town residents to enjoy.

Maine's coastal land may also be preserved through outright gifts, direct property purchases, and various leasing arrangements. Like conservation easements, these methods protect valued lands and -- often -- hold attractive tax incentives for landowners. Perhaps the most popular direct-purchase arrangement is the "bargain sale," in which a conservation group buys a property below its market value -- at a "bargain" price. Through this arrangement, both the landowner and conservation group benefit: the landowner receives a cash payment for the bargain price, plus a charitable tax deduction (equaling the difference between the property's fair market value and bargain price); and the conservation group purchases a property at a reduced price to preserve in its existing state.

In Maine, federal programs have helped to expand and buffer existing land holdings, including those in Acadia National Park, the Moosehorn and Rachel Carson National Wildlife Refuges, and the White Mountain National Forest. At the state level, the Department of Inland Fisheries and



A 75-acre dairy farm protected by conservation easement. ***Talbot Farm, Freeport***

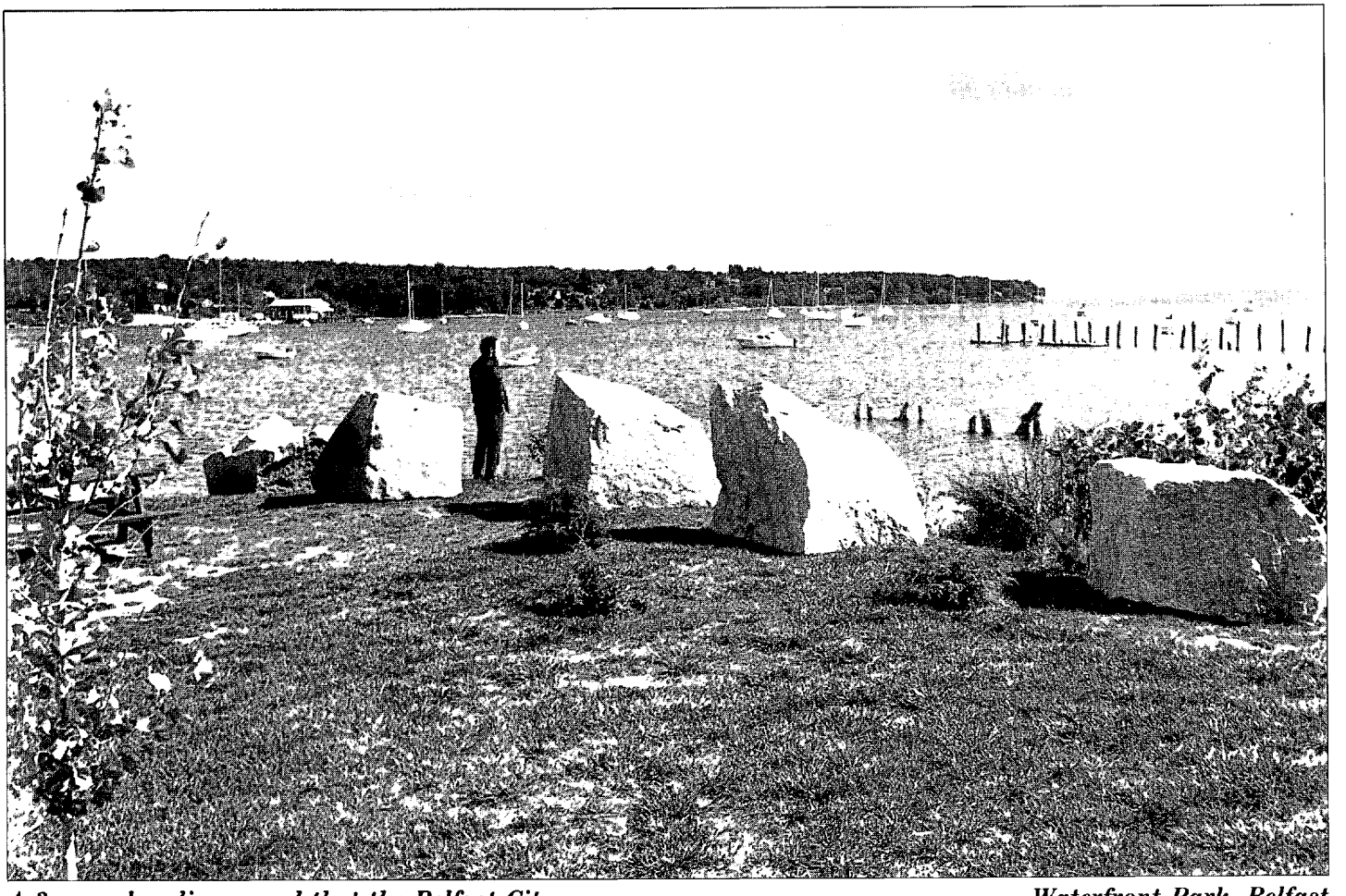
Wildlife, Bureau of Parks and Recreation, and Bureau of Public Lands all acquire land and easements for wildlife management, public parks, and coastal island management areas. In 1985, for example, The Nature Conservancy and the Department of Inland Fisheries and Wildlife jointly purchased Great Duck Island, successfully preserving a 250-acre island considered to be the most important seabird nesting site in the eastern United States. The Critical Areas Program, administered by the State Planning Office, is also active in identifying places of significant geologic, botanic, zoologic, or scenic importance that merit protection (see article, p. 8).

Towns and cities, often acting through their conservation commissions, have also succeeded in securing open space. Belfast, for example, established a waterfront park in 1987 after the city acquired a 3-acre shoreline parcel. The City Council entertained numerous development proposals for this valuable site, but decided it should be preserved for Belfast residents' recreation and water access. The City granted a conservation easement to Maine Coast Heritage Trust stipulating that no future development take place on this waterfront property.

Towns and cities, often acting through their conservation commissions, have also succeeded in securing open space.

As development pressures increase, local land trusts have growing influence over long-term land conservation. Maine presently has 50 nonprofit land trusts to help maintain, preserve, and enhance its open spaces, each of which can accept gifts of land and conservation easements.

The local groups are complemented by the work of other private organizations. The Nature Conservancy, for example, has an active program for acquiring habitat of rare and endangered species. Other national and statewide organizations that own conservation lands include National Audubon Society, Maine Audubon Society, and the New England Forestry Foundation. Maine Coast Heritage Trust works to facilitate gifts of land and easements to other conservation organizations. It offers advice to landowners, land trusts, municipalities, and other agencies interested in protecting Maine's coastal landscape. For information regarding local land trusts, please contact Maine Coast Heritage Trust at either of its two offices: P.O. Box 426, Northeast Harbor, Maine 04662, (276-5156); or P.O. Box 416, Topsham, Maine 04086, (729-7366). □



A 3-acre shoreline parcel that the Belfast City Council placed under a conservation easement.

Waterfront Park, Belfast

Will Wildlife Along Maine's Coast be a Part of Our Future?

by Alan Hutchinson, Maine Department of Inland Fisheries and Wildlife

Popham Beach (aerial view)

Picture a crystal clear day in early fall: you're sitting on a high bluff above a wide saltmarsh, watching a flock of shorebirds that have just arrived from their arctic breeding grounds. Eagles have nested in the tall pines near the marsh's far shore as long as people can remember, and shorebirds stop at this marsh each fall to rest, feed, and prepare for their journey to wintering grounds in South America. The eagles and shorebirds share the marsh with feeding herons in summer, and black ducks in winter.

Your gaze shifts from the shorebirds to a sand beach beyond the marsh, where plovers and least terns fly with their young. Your attention is suddenly drawn seaward by the rare sight of a finback whale, an endangered species, as it blows and then dives again. Searching the surface in case it should reappear, your gaze and thoughts turn to the islands scattered along the horizon. They're just dots from this distance, but you know that they are home to wildlife unlike any in the continental U.S. -- puffins, terns, petrels, guillemots, auks, and more.

As you scan the island-dotted horizon, a glint of sunshine tells you that several seals are sliding into the water from their basking ledges near the islands. Closer by, a movement along the marsh shore draws your eye to three white-tailed deer that are feeding at the marsh's edge.

Whether you gain your pleasure in wildlife from observing, studying, drawing, photographing, hunting, or fishing, its presence makes Maine unique. Wildlife makes a significant contribution to Maine's economy as well. Although wildlife is a major part of Maine's heritage and a vital element of life here today, we must ask whether we can keep this valuable heritage for our state's future. We can easily answer "yes," but wildlife conservation doesn't just happen. It takes commitment from all of us.

What is the challenge before us? Maine is losing its wildlife. Eleven species have died out in the past century, and habitat loss threatens many more.

What is the challenge before us? Maine is losing its wildlife. Eleven species have died out in the past century, and habitat loss threatens many more species today. The threat is greatest for those animals tied to special types of habitat, even if they need that setting only a few weeks of the year: lose that location and you lose the animals. The least terns' beach, puffins' island, seals' ledge, deer-wintering area, and heron rookery are all examples of specialized habitats. Fortunately, not all uses of these spots need to be excluded: we just need to be prudent in deciding where wildlife and new development can coexist.

The challenge, then, is to identify the significant settings and make a commitment to protect them so that wildlife and its inherent values will be part of our future. This effort will require comprehensive town planning, responsible land use decisions, land acquisitions for conservation, landowner cooperation, and state assistance. With these efforts, Maine's wildlife heritage can come into the future with us.

To find out more about current wildlife conservation efforts in Maine, contact the Wildlife Division of the Department of Inland Fisheries, Station 41, Augusta, Maine 04333 (289-2535) or the Wildlife Department at Maine Audubon Society, 118 U.S. Route One, Falmouth, Maine 04105 (781-2330). □

Maintaining Maine's Natural Diversity

by Hank Tyler, Manager, Maine Critical Areas Program

Documenting and conserving Maine's natural history along the coast presents a tremendous challenge because of the diverse range of wildlife habitat, geologic features, endangered species, and scenic vistas. Equidistant between the equator and North Pole, Maine's shore borders on the Gulf of Maine -- one of the five most productive water bodies in the world. The glaciated, rockbound coast is washed by cold, well-mixed waters which offer ideal feeding grounds for abundant fish and seabird species.

The coast also comprises a mosaic of common, rare, and endangered plant communities. Maine's cold coastal waters create a cool, moist environment ideal for subarctic plants and coastal peatlands (bogs and heaths). Farther south along the coast are plants that are at their northernmost range in Maine. Some species, like the inkberry that is found on Isle au Haut, occur at only one site in the state.

To identify and document the areas that feature this impressive range of botanic, zoologic, geologic, and scenic resources, the Maine Legislature created the Critical Areas Program in 1974. To date, about 600 Critical Areas have been officially recognized by the State Planning Office, roughly half of them along the coast.

The coast comprises a mosaic of common, rare, and endangered plants and wildlife species.

The Program works closely with public and private landowners to promote voluntary conservation of Critical Areas: it provides information on Critical Areas to conservation groups, land use planners, and businesses. While the majority of coastal Critical Areas are privately owned, a number are held by federal, state, and municipal governments, and by groups such as the Maine Audubon Society, The Nature Conservancy, and the National Audubon Society.

The Critical Areas Program has published numerous statewide inventory reports and educational brochures, as well as a land conservation booklet called "The Landowner's Options"; all of these publications are available to the public. For more information, contact the Critical Areas Program, State Planning Office, State House Station 38, Augusta, Maine, 04333 (289-3261). □

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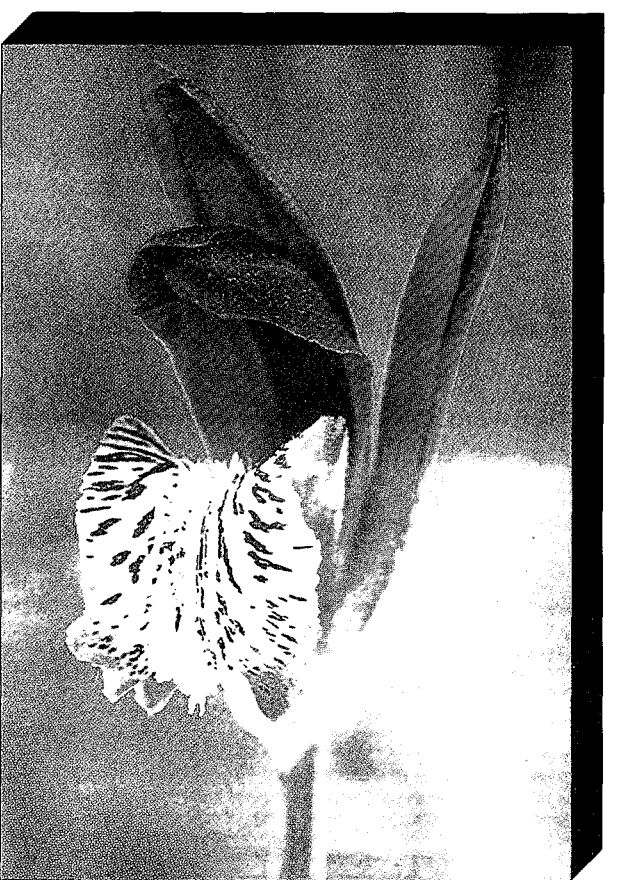
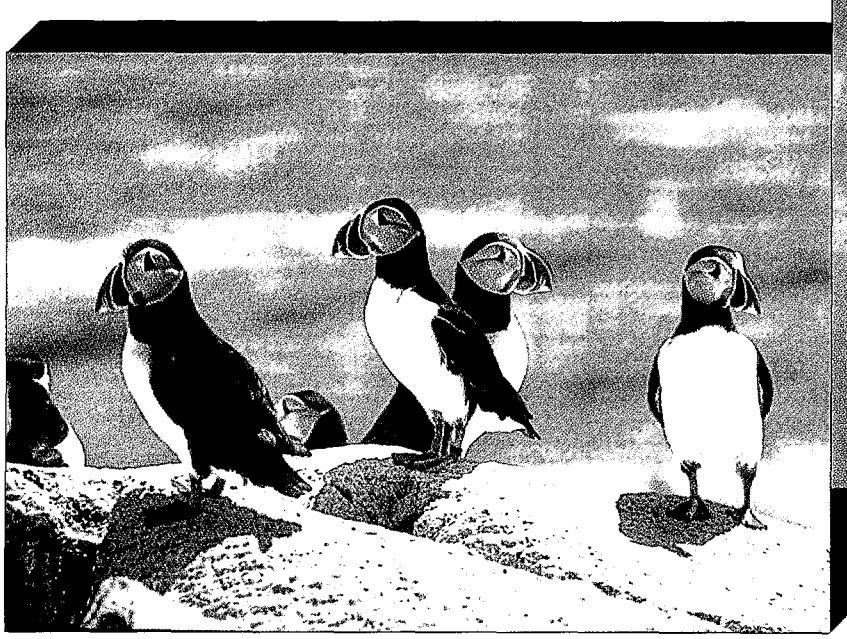


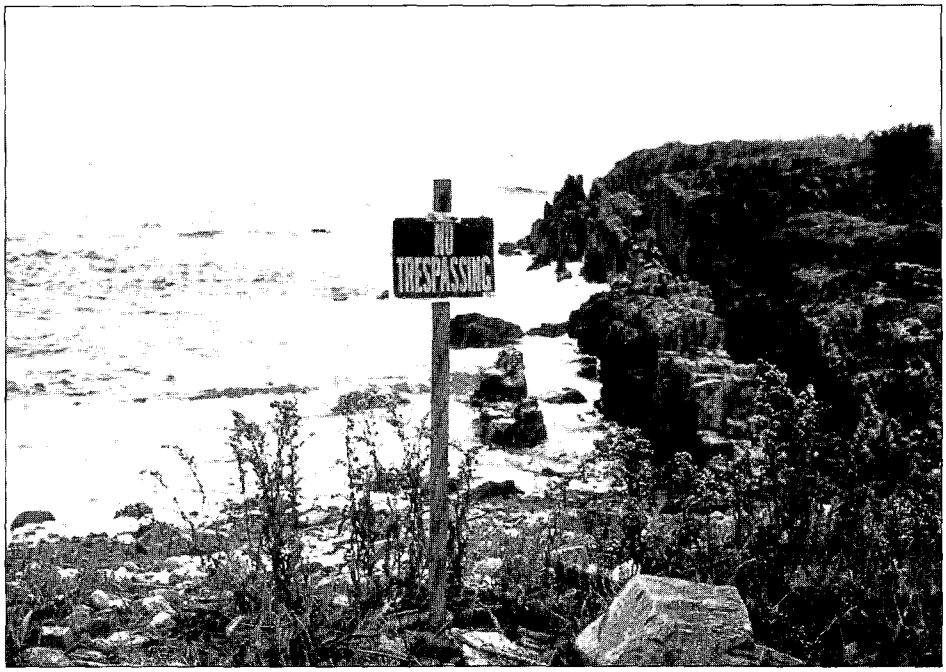
Arethusa (or Dragon's mouth) -- a rare flower



Puffins -- an endangered species

Public Access to Maine's Coast

by Karen A. Massey, Esq., and Mark Dawson, State Planning Office



York Shoreline

Coastal access is vital to Maine's economy and quality of life. Tourists are drawn -- in growing numbers -- to Maine's shore: Acadia National Park is the second most visited park in the country, and Maine's southern beaches draw people from across the country, as well as from Canada. Residents and visitors alike come to the coast for sunning, swimming, sailing, fishing, exploring, and solitude.

While our coast is arguably Maine's greatest natural resource, only 6.4 percent of the shoreline is held by the public. Half the state's population lives in towns that border on tidal waters, but many people in Maine now have trouble gaining access to the shore for recreation or activities like clamming, worming, and fishing.

Only 6.4 percent of Maine's shoreline is held by the public.

Several challenging public access issues now face Maine. Traditional, informal access to the sea is being lost as properties change hands and land is developed. Many clammers, wormers, and beach-goers are losing their customary rights-of-way to the water. Recreational and commercial boat operators are disputing rights to berthing and mooring spaces, and there are not enough boat launching and waterfront parking facilities to meet demand. Only 27 percent (about 20 miles) of Maine's beaches are publicly owned, and on summer days these public beaches are filled to capacity.

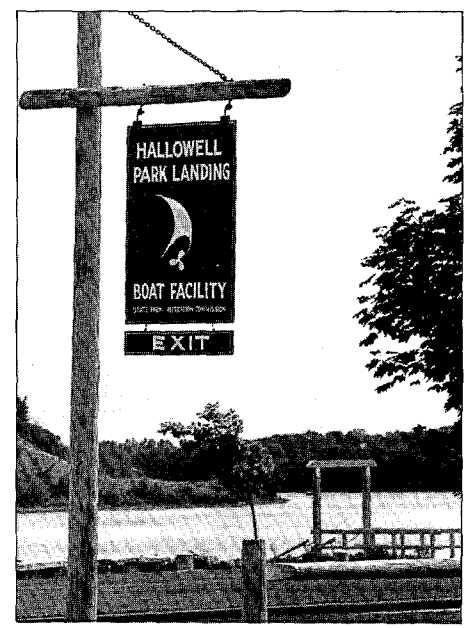
If much of Maine's coast is no longer accessible, and people are turned away from parks and boat launches, Maine's quality of life will diminish and the state will suffer economically. People working in Maine's fishing and lobstering industry and in other marine trades will be unable to continue the work their families have done for generations. Businesses will no longer be drawn to Maine because of its attractive natural environment.

While much more needs to be done to increase public access, some initial programs have already been created to address the issue.

Land and Water Conservation (LAWCON) Fund Program. Since 1965, 130 state and local projects along the coast have received nearly $2 million in federal matching funds to develop existing publicly owned property. Waterfront parks and/or boat launching facilities have been developed in Bangor, Hampden, Augusta, Gardiner, Hallowell, Bath, Belfast, and South Portland. About 10 to 15 percent of the funds have gone to land acquisition. LAWCON funding contributed to the purchase of Jewell Island and to the acquisition and park development at Reid and Popham Beaches.

Boat Facilities Program. Paid for through a marine fuel tax, this program has helped fund development of 193 public access sites, 50 of them on tidal waters. Despite this increase in coastal boat launches, 65 percent of local officials in coastal towns feel their communities need additional facilities for recreational boaters (according to a 1986 State Planning Office study). Numbers of boats have increased while informal access to private land has diminished.

Maine Coastal Program. This program, which began offering acquisition and development funds in 1985, has provided funding for 40 low-cost construction projects to enhance coastal access. These projects, for example, have included development of a waterfront park in Rockport; wharf rehabilitations in Waldoboro, Castine, and Freeport; and boat launching/parking facilities at Brooklin and Harrington.



Boat Facility, Hallowell

The Coastal Program has funded access surveys through regional planning agencies in Southern Maine, Cumberland County, and Penobscot Valley. These localized community surveys document current access points, take inventories of potential access sites (e.g., streets that dead-end at the shore or abandoned roads), and plan how future access points may be acquired and developed.

Private, Nonprofit Agencies. Private, nonprofit conservation agencies (e.g., Maine Coast Heritage Trust, The Nature Conservancy, and Maine Audubon Society) protect land, which is often privately owned, through conservation easements that protect scenic vistas and coastal views. Some of these properties permit limited public access. Maine Coast Heritage Trust has helped establish 50 local land trusts in Maine, which in turn protect 3,288 acres of land (see "Conserving Our Coastal Heritage" article).

Other Approaches

While these programs have produced significant results, much more should be done to enhance coastal access opportunities. There needs to be greater coordination among the many programs designed to expand the extent and quality of access sites.

In early 1988, the Maine Coastal Program (administered by the State Planning Office) developed an access strategy to coordinate access-related programs, initiate new programs to enhance public access opportunities, and help communities to prepare their own strategies and workplans for acquiring access sites.

There are a number of possible strategies that Maine might consider for acquiring public access lands. These concepts are being studied, but it is still uncertain which would be politically, legally, and socially feasible.

The State Legislature or local communities might enact measures that require developers who eliminate public access in one location to provide it in another. To receive a development permit, a developer may need to take specific measures to avoid adverse impacts to public access caused by the project. For example, when a developer plans to build on a coastal property that the public has used to reach the water, the developer may need to provide means for continued public access across the property (and perhaps post signs to this effect).

Development could also be regulated in a less site-specific manner by exaction measures. These measures might include regulations that call for all developers to provide public access opportunities for the community regardless of the size, location, or impact of their projects.

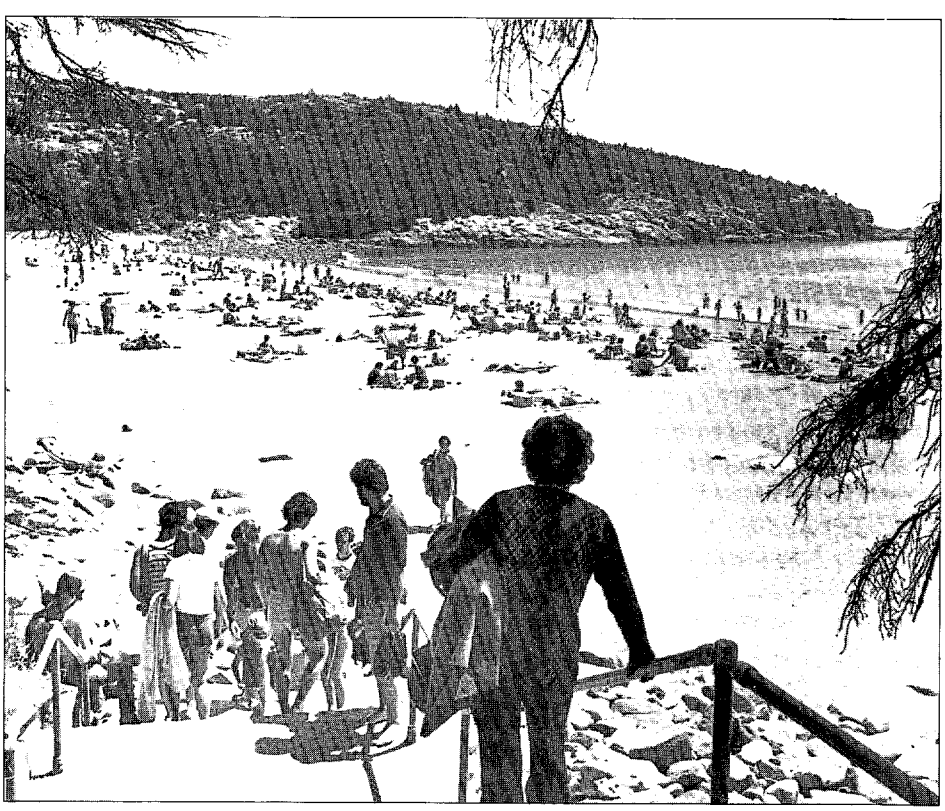
Another possible measure would involve state imposition of supplementary taxes to generate revenue for purchasing public lands. A real estate transfer tax could be collected locally, when properties change ownership, but the revenues would be paid to both the county and state.

The revenues from a real estate transfer tax could go into a fund, known as a land bank, that would then be used to buy and preserve land. Rapidly growing islands, like Nantucket (Massachusetts) and Block Island (Rhode Island), have successfully established land banks. Block Island, which imposes a 2 percent tax on most real estate transactions, accumulated $327,000 in its land bank during its first three months of operation.

In the meantime, municipalities should try to find unused public access sites that may exist, and investigate deeds, town documents, and court records to determine where legal rights-of-way may exist.

Local communities may also obtain technical assistance from the state to prepare and implement shoreline access plans. Coastal towns can work with private organizations (such as Maine Coast Heritage Trust) and state agencies to negotiate land donations or easements and to secure funds for purchasing important properties.

If you would like further information on public access issues, contact the State Planning Office, Station 38, Augusta, Maine 04333 (289-3261). □



Sand Beach, Acadia Nat'l. Park

Rising Numbers: Economic Growth Along the Coast

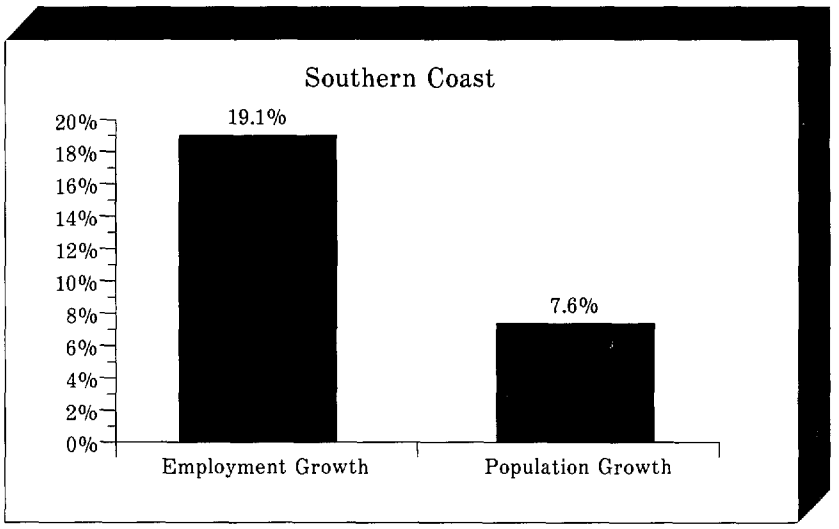
by Charles Colgan, State Economist, Maine State Planning Office

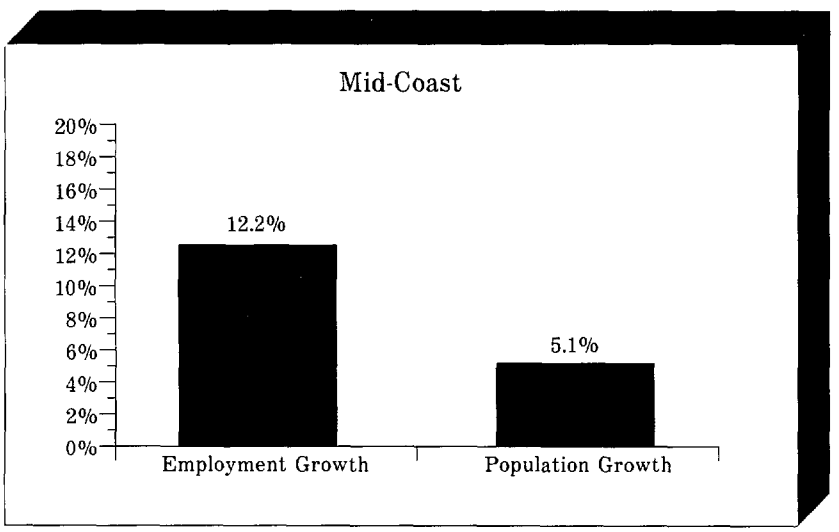
Two natural resources, the forest and coast, are the foundation of Maine's economy. Today, the coast is both the population and employment center of the state, and is -- in general -- the fastest-growing area of Maine (in population and employment). This unprecedented growth is creating concern about how the coastal economy will grow and how scarce and threatened coastal resources will withstand increasing pressures.

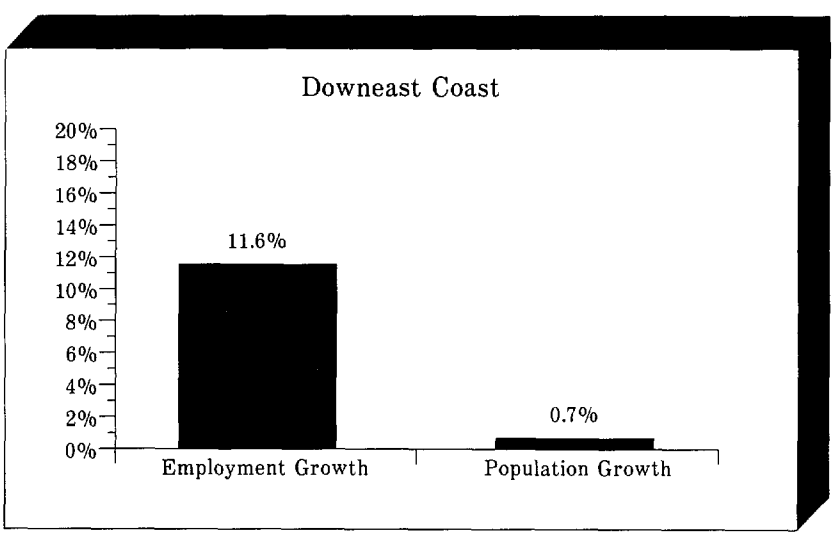
With 12 percent of the land, the coastal region has 58 percent of the population and 65 percent of Maine's jobs.

The coastal economic region, which comprises the coastal "labor market areas" chosen by the Department of Labor, is the population center of Maine; with 12 percent of the land, it has 58 percent of the population (1986). It also holds 65 percent of Maine's jobs. This figure is not surprising if you consider that Maine's major urban centers (i.e., Portland, Bangor, Augusta, and Biddeford/Saco) are all in the coastal area (which includes tidal waters). This high percentage demonstrates that the coastal economy comprises much more than fishing, shipbuilding, and tourism. These traditional coastal industries remain important, but they are only part of a diverse and rapidly growing economic region.

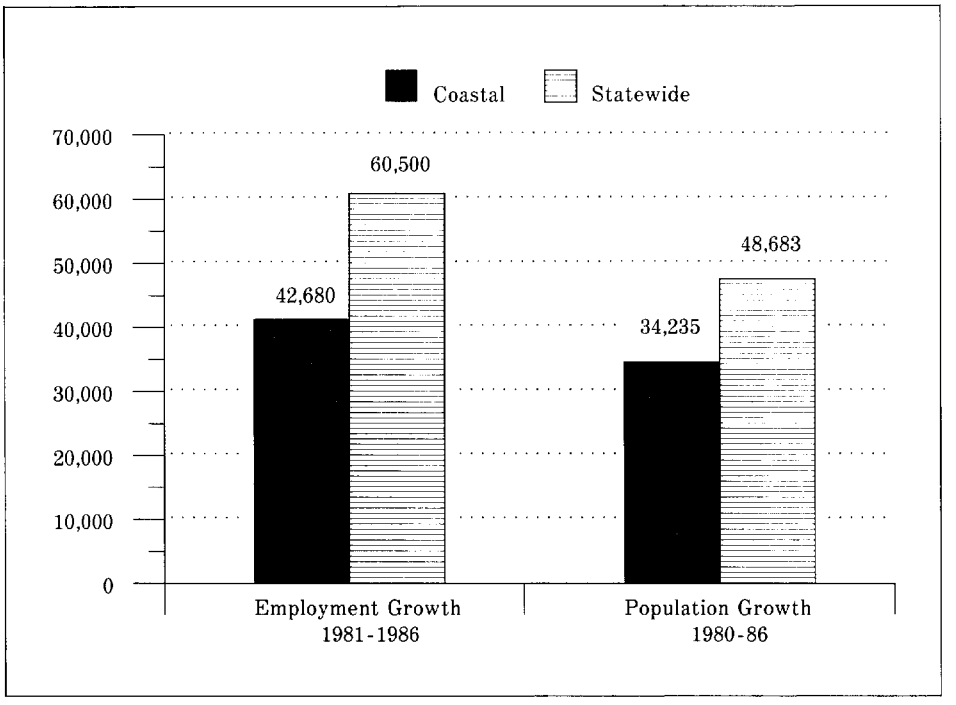
Maine's economic outlook has changed dramatically over the past decade: the state has shaken its image of a lagging economy to emerge, in the second half of the 1980s, as one of the fastest-growing states in the country. It is the coastal area that has led the state in this change. From 1980 to 1986, employment in Maine grew a total of 14.4 percent. Employment on the coast grew by 16 percent, whereas employment inland grew by less than 12 percent. During this period,







statewide employment grew more than three times faster than population growth, a pattern that was repeated along the coast (see chart).



Recent economic change along the coastal region has not been patterned in one steady progression of growth eastward; rather, significant growth in the southern areas has been mirrored by pockets of growth scattered down the coast in Lincoln County, the Rockland area, and Ellsworth/Mt. Desert Island. Growth rates in the major coastal cities has been steady, but it has been overshadowed by growth in outlying areas.

The coastal regions that have seen the largest population or employment increase share one common denominator: they tend to be regions that offer beautiful scenery or other amenities that have attracted both tourists and new residents. Much of the new employment here can be found in service sector work.

In general, Maine's economic growth has been driven almost exclusively by the trade and service sectors, rather than by manufacturing. Along the coast, trade and service employment grew by more than 23 percent and manufacturing declined by more than 10 percent. At a few points along the coast, however, manufacturing actually grew. Manufacturing employment increased by more than 10 percent in the Ellsworth region, and more than doubled in the Kittery/York region, with an increase of over 1,700 jobs.

The dominance of trade and service sector growth throughout the coast holds certain implications for the future of coastal resources. The heavy industrial facilities, like oil refineries and aluminum smelters, that were proposed for the coast in the 1960s and 1970s never materialized. Instead, the engine of coastal economic growth has been many small- and medium-sized projects (e.g., retail stores and malls, office buildings, restaurants, and condominiums). The growth that has occurred in the trade and service industries has produced, along many parts of the coast, a level of development that even the most ardent proponents of the 1960's megaprojects could barely have envisioned; and, for the most part, the growth has proceeded without the adverse environmental consequences that would have accompanied heavy industrial development.

Forecasts for economic growth in Maine consistently show that growth in trade and service industries will continue to lead Maine's economy through the next decade.

But the smaller scale growth carries its own consequences for Maine's coastal resources. This kind of development tends to be land-intensive. That is, retail stores, restaurants, malls, and office buildings -- the physical manifestations of trade and service growth -- need a greater amount of land per job created than do manufacturing industries, since the customers must be brought to the place of business instead of shipping a good to a customer.

Thus, roads, parking lots, buffer zones to enhance landscaping, and demand for scenic building to attract customers all place additional pressures on land and other coastal resources. The land right along the shoreline, which is most scarce and most fragile, is the land in greatest demand. The conflict over its use and management is apparent in the growing number of waterfront moratoria, such as Portland's, that restrict waterfronts to water-dependent uses. Competing demands for Maine's fragile coastal lands are bound to continue.

Forecasts for economic growth in Maine consistently show that growth in trade and service industries will continue to lead Maine's economy through the next decade. The pace of growth, though, may be slower than we have seen recently.

What makes the Maine coast unique -- its scenic character and productive resources -- are the foundations of the state's recent economic growth. And, ironically, it is these very foundations that are threatened by growth. The need to "balance growth and development" has almost become a cliché, but the need is real, and nowhere more so than along the coast. Only if we tend and care for our coastal resources will they continue to lead Maine's economy. □

Growth Management: The Real Estate Developer's Perspective*

by Gordon Hamlin, President, Maine Real Estate Development Association

For the first time in recent memory, Maine has surpassed national averages for low unemployment, and for growth in personal incomes and retail sales. According to the "Maine Business Indicator," published by the University of Southern Maine in 1981, "most of the expansion in Maine's employment and personal income would be impossible without major efforts by the state's construction industry." This statement remains true today.

Commercial and industrial development, largely caused by expanding Maine businesses, is bringing countless opportunities to Maine's work force. Last year, for the first time in Maine's history, the value of construction activity in Maine exceeded $1 billion. Measured by wage and salaried employment, development is the fourth largest provider of jobs in Maine, behind manufacturing, services, and retail trade. In 1986, direct employment in the construction industry exceeded 40,000 jobs. Coupled with spin-off jobs created by our industry, our association estimates that total real estate development-related employment amounts to 13 percent of all Maine employment.

We are not talking here about the minimum-wage service industry jobs that have become commonplace in Maine. We refer to jobs that pay good wages -- such as plumbers, carpenters, architects, engineers, and other crafts and professional jobs. Development has also helped create permanent and well-paying jobs in areas such as apartment management, sewage treatment operation, and road and bridge maintenance.

Development contributes to job growth in more intangible, but equally important, ways. A study by the University of Southern Maine has determined that the $1 billion-plus in construction contracts generates over $2 billion worth of economic activity. Expanding businesses in Maine need new and efficient commercial and industrial facilities. We provide them. The expanding tourist industry needs new and better facilities. We provide them. Developers are not creating demand but seeking to meet the state's needs.

In June of 1987, the Maine Real Estate Development Association formed a Growth Management Task Force comprised of real estate developers, home builders, municipal officials, planners, bankers, and others in the real estate industry. Our goal was to determine how to balance the demands of a growing economy with the need to preserve Maine's unique natural resources. We researched and reviewed the state's current land use regulations and planning initiatives. At the same time, we reviewed land use and planning statutes in other states. We came to two conclusions: one, that planning is essential to achieve sound land use management and sustain economic prosperity; and two, that we need greater clarity and predictability in our present regulatory system.

Building Construction

Planning is essential to achieve sound land use management and sustain economic prosperity.

It would be presumptuous of us to suggest that we have all the answers to address these concerns. But we have studied some areas that do need attention.

All too often land use decisions in Maine's towns are made at the wrong end of the process. We consistently make major land use decisions in the regulatory process during the site review stage, after a developer has walked in with an application establishing how, when, and where land will be used. Instead, we should identify consistent and compatible land uses early in the planning stage. We react rather than plan for the future. This kind of *ad hoc* regulation makes it difficult to protect the environment.

We believe that the most effective way to deal with the cumulative impact of growth is in the planning stage. By engaging in comprehensive planning, communities can determine their needs and the capacity of their land and public facilities; then, they can establish appropriate land uses and direct growth through planning

*The following are excerpts of testimony given to the Legislative Study Commission on Land Conservation and Economic Development.

rather than by *ad hoc* regulatory decision-making (which can produce uncoordinated and incompatible developments).

We would like to see all towns engage in comprehensive planning. Local comprehensive planning that accommodates important environmental concerns and identifies appropriate areas for development is the best way to achieve the twin goals of economic growth and environmental conservation.

The present regulatory system is unclear and, consequently, unpredictable. This unpredictability creates apprehension among landowners and entire communities. We need a set of clear ground rules that everyone can understand -- developers and communities alike. Our association's members are more than willing to play by the rules; just make those rules fair, clear, predictable, and consistently applied.

Local comprehensive planning that accommodates important environmental concerns and identifies appropriate areas for development is the best way to achieve both economic growth and environmental conservation.

Lack of planning can produce a shortage of key public facilities and services such as schools, adequate sewer and water facilities, road systems, and fire protection. As developers, we realize our responsibility to help pay for increased demand on the infrastructure and we would like to see a consistently applied and predictable system for imposing impact fees. Impact fees should be determined and levied on a square-foot or per-dwelling-unit basis for new development, but only by communities that have established their specific infrastructure needs and costs through planning.

Lack of planning for growth has prompted many communities in southern Maine to enact growth control ordinances or building moratoria. These measures carry their own adverse regional impacts. For instance, a moratorium in one town may shift growth to another town and play havoc with a neighboring town's responsible planning efforts. Moratoria should not be enacted until their regional impacts have been evaluated.

Growth Management Meeting

A lack of planning has contributed, in part, to a shortage of affordable family housing in southern and midcoastal Maine. In York County, for example, a family at the median income level can afford a house selling for under $74,800. With the average York County home costing in excess of $82,000 last year, many families cannot purchase a home.

Builders and real estate developers in our association are finding it increasingly difficult and even impossible to produce moderately priced housing. When they try to construct affordable housing, developers often find themselves confronted with large-lot and single-family specifications, and building codes and standards that greatly increase costs of housing. Rising land values in southern and central Maine further contribute to these costs.

Many builders and real estate developers want to produce affordable housing for Maine people. But we cannot do so without state and municipal help. Towns should be required, in the course of forming comprehensive plans, to address the issue of affordable housing. They should decide where within their municipality they would like appropriate economic development. And they should also be required to identify critical environmental areas, open space, and farmlands, and their appropriate uses.

All this planning will require funds, technical assistance to cities and towns, and state-level review. But growth is not a "special interest" issue. We believe that this issue affects every community in Maine and every single Maine citizen. If we begin a planning initiative now, we have the opportunity of sustaining a healthy economy, quality job creation for Maine citizens, an ample supply of affordable housing, and protection of our natural resources. We need a strong partnership between the state and municipalities and between developers and environmentalists to achieve this. □

Cumulative Impacts of Coastal Growth

by Josie Quintrell, Maine Department of Economic and Community Development

Myth or Reality?

Oceanside is changing. Across from the village store, whre the old post office used to stand, is a new Texaco station with a car-washing business. The Murphy's house along Main Street has been razed and a mini-mall built in its place, including a Burger King, a video store, and a discount shoe outlet. The Jenkins Farm was sold and subdivided; there are forty cape houses there called "Birchgrove Woods." Not long afterwards, eight townhouses called "Seabreeze Acres" were constructed along the water. On the inland side of town, they built a shopping center: now Oceanside has a Shop 'n Save, a Wellby's, and a laundromat. The number of "Land for Sale" signs indicates that there's more to come.

Like other towns in Maine, Oceanside's landfill is nearing capacity. The same is true for the town's sewer system, and Oceanside residents near the shore are complaining about saltwater in their wells.

Perhaps the major concern in town is the lost open space. There was a vocal debate in Oceanside last fall over the new "Birchgrove Woods" development. Deer used to gather there to graze during winter, and the local conservation club was worried that the animals might not find another spot around here in which to feed.

It's hard, though, to think about these changes when you live here day to day. It just seems like a new home here, and a new Cumberland Farms store there -- nothing major. It's only when someone from away -- who hasn't been here in a while -- returns and comments on how different Oceanside is that one starts thinking.

"Oceanside" is obviously a mythical town, but the growth it is experiencing is far from fictitious: towns from Kittery to Eastport have experienced many of the same changes in recent years. The change happens incrementally, but the cumulative effect of numerous projects threatens the natural resources and special character of many coastal lands. New building projects are reviewed for their impact on groundwater, soil erosion, traffic, wildlife habitat, and scenic areas. But the review process never looks at the combined effect that the 20, 50, or more projects approved in a year may have on the town's resources. One 20-acre subdivision project may not pose "unreasonable harm to wildlife" (the standard required by the subdivision law), as wildlife may migrate to adjacent undeveloped land. But if a mini-mall is built next door, and a 40-acre housing unit is constructed across the way, will the local wildlife still survive?

It is difficult to establish precise thresholds for how much development an area's natural resources can sustain before being irreparably harmed.

It is difficult to establish precise thresholds for how much development an area's natural resources can sustain before being irreparably harmed: current understanding of natural resources is simply inadequate. But without scientifically documented thresholds, regulators do not know when permitting construction of an additional project may seriously threaten the environment. Moreover, established thresholds can pose an unfair burden to landowners if they are denied use of their property because previous owners degraded communal resources to the point where one more project would endanger natural resources.

Crescent Surf Beach, in Kennebunk, illustrates the problem of managing cumulative impacts on a case-by-case basis. The beach has long been recognized as a unique natural resource; it is one of Maine's few double barrier-spit beaches and two threatened species nest there, least terns and piping plovers. It is also one of the few undeveloped stretches of beach that remains in southern Maine.

The incremental transformation of the beach started in the early 1980s when two houses were constructed. In issuing the permits for these residences, the State Board of Environmental Protection determined that the project would pose only minimal harm to the nesting bird populations; as a precaution, it set restrictions on beach use during the nesting season to protect the endangered birds. Indeed, these two homes did not harm the beach or the bird colonies. Since then, however, three more houses have been constructed along the beach. Slowly, the beach is being transformed from a natural area into a residential neighborhood. Each individual home poses little harm, but

McDonald's Construction

-- together -- they threaten the integrity of the beach system by encroaching on nesting habitat and interfering with the dynamics of the dune system.

What can be done to prevent this kind of incremental damage? To explore this question, the State Planning Office, through a grant from the Federal Office of Ocean and Coastal Resource Management, undertook a major policy study. The study examined development's effect on natural resources in nine York County towns, as well as the effectiveness of state and local laws to manage cumulative impacts. The report concluded "... that the negative cumulative effects are caused by haphazard growth. These can be minimized by planning, which anticipates growth and appropriately sites land uses to avoid harmful impacts." Only through planning and growth management can towns mitigate incremental damage.

The first step in managing cumulative impacts involves developing a comprehensive plan. In this process, towns inventory their natural and cultural resources, identify community goals and policies, and develop plans for implementing their goals. By reviewing resources in a comprehensive manner, towns can develop management strategies to alleviate the incremental effects of development. Comprehensive plans provide the foundation for regulatory or non-regulatory strategies.

Various tools can be used to implement the community's plans. Subdivision and site plan review ordinances allow communities to review industrial and commercial developments and multi-family homes for their impact on local resources. The scope of these ordinances should be broad enough to allow the town to review the combined effect of ordinances. Zoning ordinances allow towns to guide and shape their future growth. Specific zoning restrictions that help minimize the cumulative effect of development include the following:

- **Density restrictions,** which establish limits on the number of units allowed on an acre of land. Such restrictions can provide protection for sensitive resources such as groundwater aquifers and wildlife habitat.
- **Setbacks from Critical Resources** require development to be located a certain distance from resources in order to buffer the resource from the effects of development.
- **Resource Protection Zones** establish use restrictions in critical resource areas.
- **Overlay Zones** establish standards for particular resources. Such zones overlay additional standards for specific resources.

Non-regulatory tools such as restrictive easements and acquisition of land can help towns to preserve natural, open spaces for their communities (see "Conserving Our Coastal Heritage" article). These tools should be combined with local regulation to form a comprehensive management strategy.

Using these tools, Maine's coastal communities can have the benefits of economic growth without jeopardizing their natural resources. Towns will have to make hard choices, though, in finding a satisfactory balance. With deliberate planning and protection of local resources, communities won't be taken by surprise when the slow, incremental impact of change becomes evident. □

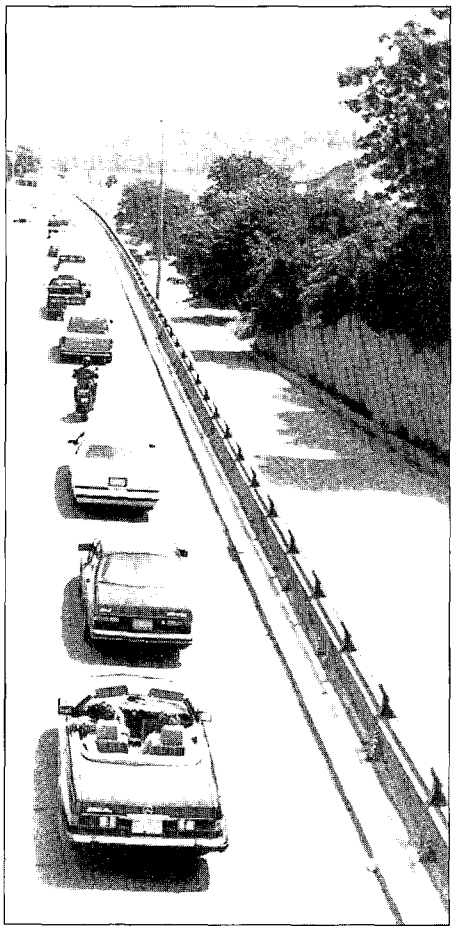
A Look at Growth along the Mid-coast

by Crispin Connery, Woolwich Town Selectman

Clearly, Woolwich and other mid-coastal towns are facing the same growth problems that we read about in the southern part of Maine. The rural flavor of our community is taking on suburban patterns. Along Route 1, strip development is occurring without much thought to assimilating open space. For example, Woolwich lost a natural buffer of large pine trees that bordered the industrial park. What are the costs of fragmenting our open spaces, wildlife areas, and wetlands?

The socio-economic make-up of our community is changing. There is a lot of talk about fixed income and retired people not being able to afford the increased housing and property taxes costs, and young people being forced to settle away from the region in which they grew up. People are starting to see that the incremental costs of growth go beyond increased municipal services.

And you don't have to be a Woolwich resident to know that the Carlton Bridge traffic is unbearable in summer. During the tourist season, the county now has to hire a traffic control officer to cool down tempers on hot, summer days.



Carlton Bridge Traffic, Bath

Judging from what is happening to the south, all this is just the start of what is in store for Woolwich and the mid-coast.

The Marine Environment: How Pristine Is It?

by Anne C. Johnson, Marine Program Director, Maine Audubon Society

Does seafood contamination make choosing a fillet at your local seafood market a game of Russian roulette? Will the proliferation of shorefront homes and condominiums contaminate your favorite beach with sewage bacteria? Is the health of Maine's coastal ecosystem declining irreversibly? Some of these risks to public and environmental health may be exaggerated, but pollutants are rapidly accumulating in Maine's marine environment: it is critical that we study the sources, fates, and effects of these contaminants.

Maine's marine waters are tainted by several classes of pollutants: trace metals, hydrocarbons, artificial compounds (such as PCBs), and sewage. While oil spills and other accidents are commonly thought to be the primary pollution source, the great majority of contaminants enter the ocean daily. This low-level pollution from sources such as sewage treatment plants, industrial discharge, and agricultural or urban runoff is not dispersed and diluted throughout the ocean; rather, the contaminants accumulate in bottom sediments near where they entered the sea. Concentrations of polycyclic aromatic hydrocarbons (PAHs, a potential carcinogen) in Casco and Penobscot Bays equal those found in heavily industrialized areas such as Massachusetts Bay and Long Island Sound.

What impact does this pollution have? Bacteria from sewage adversely affects 25 percent of Maine's productive shellfish flats, including much of Casco Bay. Until recently, shorefront homeowners whose lots lacked adequate soils for an in-ground septic system were permitted to discharge sewage into the ocean, after treating it with a sand filter and chlorinator. While these "overboard discharge" systems are no longer permitted, more than 3,000 existing overboard discharges along the coast are "grandfathered" (exempt from the new regulation). The Department of Environmental Protection (DEP) estimates that up to 80 percent of these systems may not function adequately. And many waterfront cottages and homes still use illegal "straight pipes," 10 years after they were banned, to discharge raw sewage into the ocean. Malfunctioning municipal sewage-treatment plants also contribute to the problem. Other types of chemical pollution contribute to public health risks: for example, fish in the Androscoggin River are contaminated with dioxin from paper mill effluent, while shellfish in Boothbay Harbor contain high levels of lead.

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At this time, though, marine pollution poses greater risks to Maine's environmental health than to public health. Humans, being at the top of the food pyramid, are often the last to feel the effects of pollution. In the meantime, pollution is affecting the complex web of flora and fauna beneath us in the food chain. Chlorine, a biocide used to kill sewage bacteria, has been implicated in the decline of Maine's smelt, alewife, salmon, and other anadromous fisheries. Research on bottom-dwelling organisms in Penobscot Bay indicates that hydrocarbons, which have accumulated on the ocean floor, are disrupting that critical habitat. Flounder in Casco Bay have a high incidence of liver tumors. Saltmarsh plants in the Saco River demonstrate elevated levels of chromium, a chemical discharged from tanneries and other industries. These are only a few of the nearly invisible but insidious signs that Maine's harbors and bays are at risk.

While Maine has made progress in reducing pollution, particularly with the ban on new overboard discharges, we must do more to protect our coastal waters and deeper, offshore waters in the Gulf of Maine. In 1986, the DEP began a pilot program to monitor marine sediments and fish tissues for contamination. If fully funded, this program will comprehensively survey the type and extent of pollutants' threat to Maine's marine environment. Further studies are also needed to determine how pollutants will affect environmental and public health.

Along with new research, federal, state, and municipal agencies must adopt a pollution-prevention program that will reassess permits for point discharges (such as industrial outfalls and sewage treatment plants) and begin a program for reducing pollution from non-point sources (such as urban and agricultural runoff). The state and federal government should provide technical assistance to towns, helping them incorporate pollution-protection measures into comprehensive plans. Towns can then ensure that runoff from parking lots and other impervious surfaces is collected in settling ponds, rather than directly discharged into coastal waters. Comprehensive plans allow towns to determine the cumulative impact of numerous activities, instead of reviewing just one project at a time. The city of Saco, for example, passed an ordinance in 1987 that requires industrial dischargers to submit a waste-minimization review before they hook up to the municipal sewage-treatment plant. This review, when conducted at a large metal-plating facility, reduced chromium discharged from the plant by 98 percent.

It will take planning and cooperation among all levels of government if we are to successfully reduce the pollution of Maine's coastal waters. □

Working Waterfronts: An Economic and Cultural Resource

by David Keeley, Director, Maine Coastal Program

Nearly every day, you can read in a coastal newspaper about shoreline development in Maine, and how it's affecting coastal communities. In Tremont, the change comes when a group proposes to convert a fish processing facility into housing units. In Rockland, a fish rendering plant is closed, and in Portland, condominiums are built on a fishing wharf. These changes make it clear that our waterfronts cannot accommodate all the interests that want to use them. So who stays and who goes?

In many cases, the conflict is between new waterfront development, such as housing, offices, or stores, and traditional marine industries like fish piers, lobster pounds, commercial wharves, marinas, and cargo handling facilities. These traditional marine trades are known as "water-dependent" because they must be situated on appropriate shorefront lands to operate. Even though Maine has over 3,500 miles of coastline, less than 10 percent of it has sufficiently deep and sheltered water to provide for good working harbors. The commercial fishermen who traditionally have been based in these harbors now have trouble coexisting alongside newer users of the waterfront. Tenants of harborside housing don't care for the noise, smell, and early morning hours of the traditional trades, and commercial fishermen and recreational boaters now vie for the same limited moorings and berthing spaces.

These conflicts in harbor use have grown out of coastal development and, in many instances, redevelopment that dates back to the 1960s when federal and state efforts to clean up our water resources began. Prior to that time, many of Maine's waterfront areas had deteriorated and failed to attract new businesses. Coastal towns often disposed of wastes directly in their harbors so people shunned coastal waters. Many communities, such as Lubec, Rockland, and Bath, even constructed their downtowns with "their backs to the waterfront."

Even though Maine has over 3,500 miles of coastline, less than 10 percent of it has sufficiently deep and sheltered water to provide for good working harbors.

Today, however, Maine's harbors are experiencing a revival, and communities are spending considerable sums to capitalize on their waterfront. Eastport, for example, purchased and razed several derelict buildings along its main street, which borders the harbor, to clear views to the water. Belfast has also revitalized its waterfront and successfully conserved a parcel of waterfront land as a town park.

These towns have begun to recognize that marine activities provide the fabric that binds their communities together. The mystique of Maine hinges on the vision of independent lobstermen, small fishing villages, and spruce-rimmed harbors, dotted with boats at anchor. Villages such as York, Perkins Cove in Ogunquit, Winter Harbor, and Cutler typify the attraction of Maine's working harbors. Our state's traditional marine trades lure visitors who drive great distances to spend time enjoying a quaint harbor or watching the fishing fleet return at sunset, flanked by a clamoring flock of gulls.

These working waterfront areas contribute to Maine's economy and culture, as well as to its aesthetic appeal. Since Maine's ports and harbors were the first areas in the state to be developed, they have helped define who we are and what we have become. In the 1800s and early 1900s, the economic well-being of the Maine coast relied on a thriving and prosperous marine trade. As the state developed, however, and the use of trains, trucks, and planes displaced boats, our waterfronts fell into disrepair. Today, though, nearly 22,000 people work in marine-based jobs. This total represents $492 million in wages annually.

Firms that are engaged in marine-based activities include boat builders and repair yards (most significantly, Bath Iron Works); marine suppliers, naval architects and surveyors; boat cruises, rentals, and charters; dockage and moorage; fish-processors; and fish wholesale/retail firms. The most significant element of the marine industry is shipbuilding (see pie chart) which

Lobstering

EMPLOYMENT AND EARNINGS IN MAINE 'S MARINE INDUSTRY (1986)

Industry	*Employment*	*Earnings (000)@*	*Earnings/wkr*
Fishing*	6,627	$97,315	$14,685
Fish Processing	1,810	$31,729	$17,530
Ship Building#	9,000	$303,818	$33,758
Boat Building & Repair	810	°	°
Water Transport#	1,782	$26,659	$14,960
Fish Wholesale	1,090	$23,065	$21,160
Fish Retail	430	$4,818	$11,206
Boat Dealers	260	$4,794	$18,438
Total Marine	21,809	$492,198	$24,631
% of Total Employment	3.6%	4.7%	

* Best Estimate Available
° Included in Shipbuilding
\# SPO estimate
@ Estimated by SPO except Fishing and Shipbuilding.

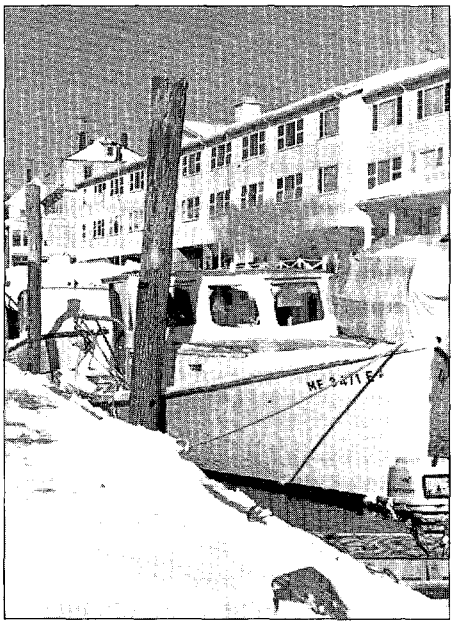
Maine State Planning Office. February 5, 1988.

includes nearly 9,000 jobs at BIW -- the state's largest private employer. Fishing and fish products are also important contributors. For example, the landed value of finfish and shellfish is in excess of $100 million, and seafood processing contributes an additional $80 million.

As competition for shoreline space increases during the 1980s, and non-marine operations begin displacing marine businesses, public pressure to address this issue grows at both local and state levels. Towns along the coast have begun to realize that, if left to private-market forces, the marine industry -- as we know it -- will not survive. Up against new businesses with fewer needs for space and capital, the traditional industries simply can't compete. So towns have begun to review their local comprehensive plans and land use ordinances to address competing uses along the waterfront. Portland, Vinalhaven, and Tremont, for instance, have called a temporary halt to development around their harbors to give themselves time to reassess their ordinances.

If left to private market-forces, the marine industry -- as we know it -- will not survive.

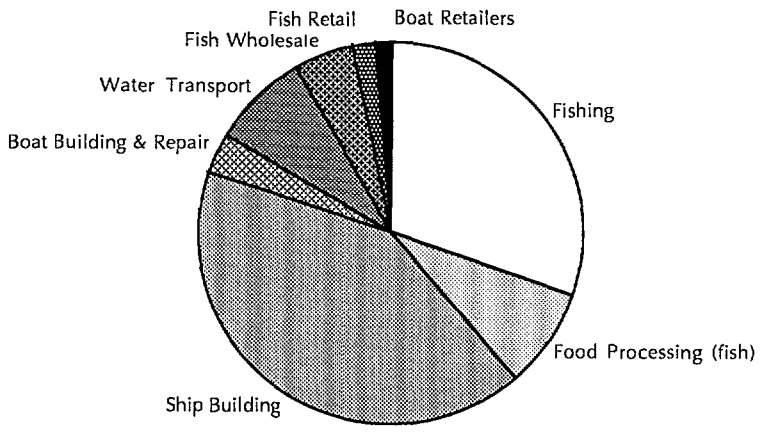
In 1986, a watershed year for working waterfronts, the public began to express interest in how Maine's harbors are being developed. In more than 75 public meetings (hosted by the Maine Coastal Program), residents along the coast agreed that the state should protect and promote marine-related activities. So the Maine legislature enacted a policy to guide state and local regulatory, planning, and financial decisions that affect port and harbor areas. The state then prepared guidelines for state agencies to follow in revising their regulatory and funding programs to promote these working waterfront areas.



Boothbay Harbor

The 1986 legislation is only a first step towards striking a balance among competing waterfront uses. With so few miles along Maine's shore suitable for marine trades, communities must decide what their priorities are before further development decides for them. The marine industry, local officials and others interested in charting the course of the community must come together to decide what type of development they want along their shoreline, and to develop a program that implements this vision. Only through thoughtful and timely action will Maine's marine businesses remain a vital part of our harbors. □

MAINE'S MARINE INDUSTRY



EMPLOYMENT IN MAINE'S MARINE-RELATED INDUSTRY 1986

The Price of Seafood: Is It Really High?

by Robert Beaudoin, Maine Department of Marine Resources

Seafood has become a key ingredient in America's new emphasis on healthy eating. Low in fat, high in protein and minerals, seafood is recommended by physicians as a part of our regular diet. Consumers who have commonly purchased haddock at a retail fish department, though, will find the price now equals that of a good steak. What has caused this price increase over recent years?

In 1975, seafood consumption nationwide averaged 12.5 pounds per person annually. In 1986, this figure had risen to 14.8 pounds, with projected estimates of over 20.0 pounds per person by the year 2000. This increased demand, especially for high-quality species such as haddock, has produced changes in methods of seafood harvesting, processing, transporting, and merchandising.

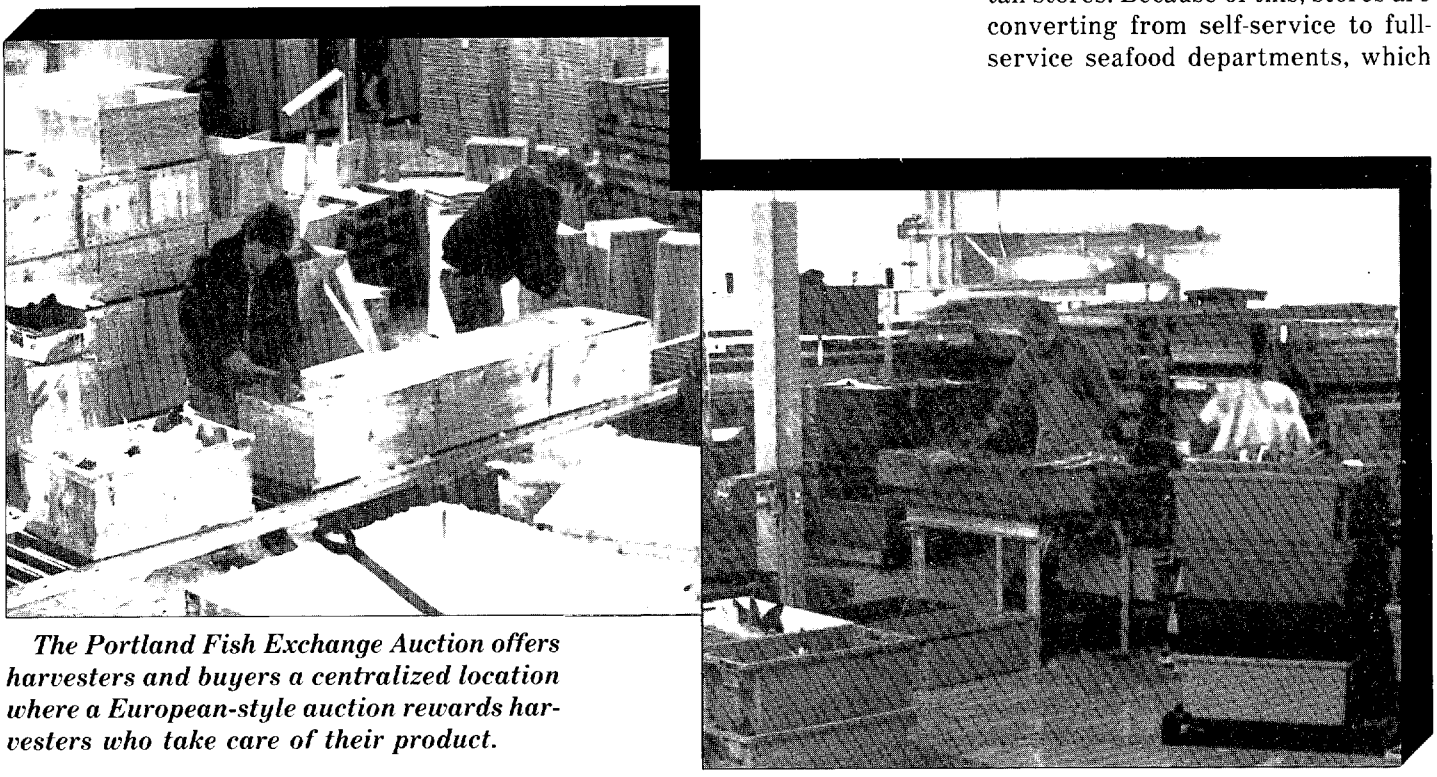
Most commercial fishermen now take longer (3- to 5-day) fishing trips than the day trips they often took in the past. They use larger boats to cover greater distances, with more efficient equipment and larger crews. Many maintain the fish at near-freezing conditions so the catches stay fresh longer, and bring better prices. To do this, the fishermen must use crushed ice to preserve their entire catch. This load of ice adds weight to the boat, which in turn requires more fuel. Fish are no longer just gutted and dumped in a storage area. To maintain quality, fishermen gut and wash their catch, then pack them with ice in boxes, or shelve them with ice in pens. Both methods reduce bruising and increase quality. At dockside, the fish are removed, separated by species and size, and re-iced for transit to a processor. This new system costs more because of increased handling.

Seafood buyers will pay these higher prices because their customers demand high-quality seafood, and improved-quality seafood offers the buyer a longer shelf life (which, in turn, means increased profits). The Portland Fish Exchange Auction now provides the high-quality seafood that buyers seek. It offers harvesters and buyers a centralized location where a European-style auction (with prices based on quality) rewards the harvester who takes care of his product, and provides buyers with top-quality products.

Processing plants have changed in the last decade to improve temperature and sanitation in maintaining the fish. After being filleted, the seafood products are washed, candled (examined for freshness), trimmed, and packed for shipment. Greater amounts of processing — required for products like boneless, well-trimmed fillets — further increase costs.

Transportation of seafood has also changed. Numerous improvements in air freight and trucking help maintain quality. Refrigerated trucks, as well as increased use of ice, help preserve seafood moving from processor to distributor, and later to retail outlets. Proper handling and storage, as well as transportation and sanitation, are all crucial if the consumer is to receive fresh, high-quality seafood.

Today's consumers like to see attractive seafood presentations in retail stores. Because of this, stores are converting from self-service to full-service seafood departments, which



The Portland Fish Exchange Auction offers harvesters and buyers a centralized location where a European-style auction rewards harvesters who take care of their product.

Portland Fish Exchange

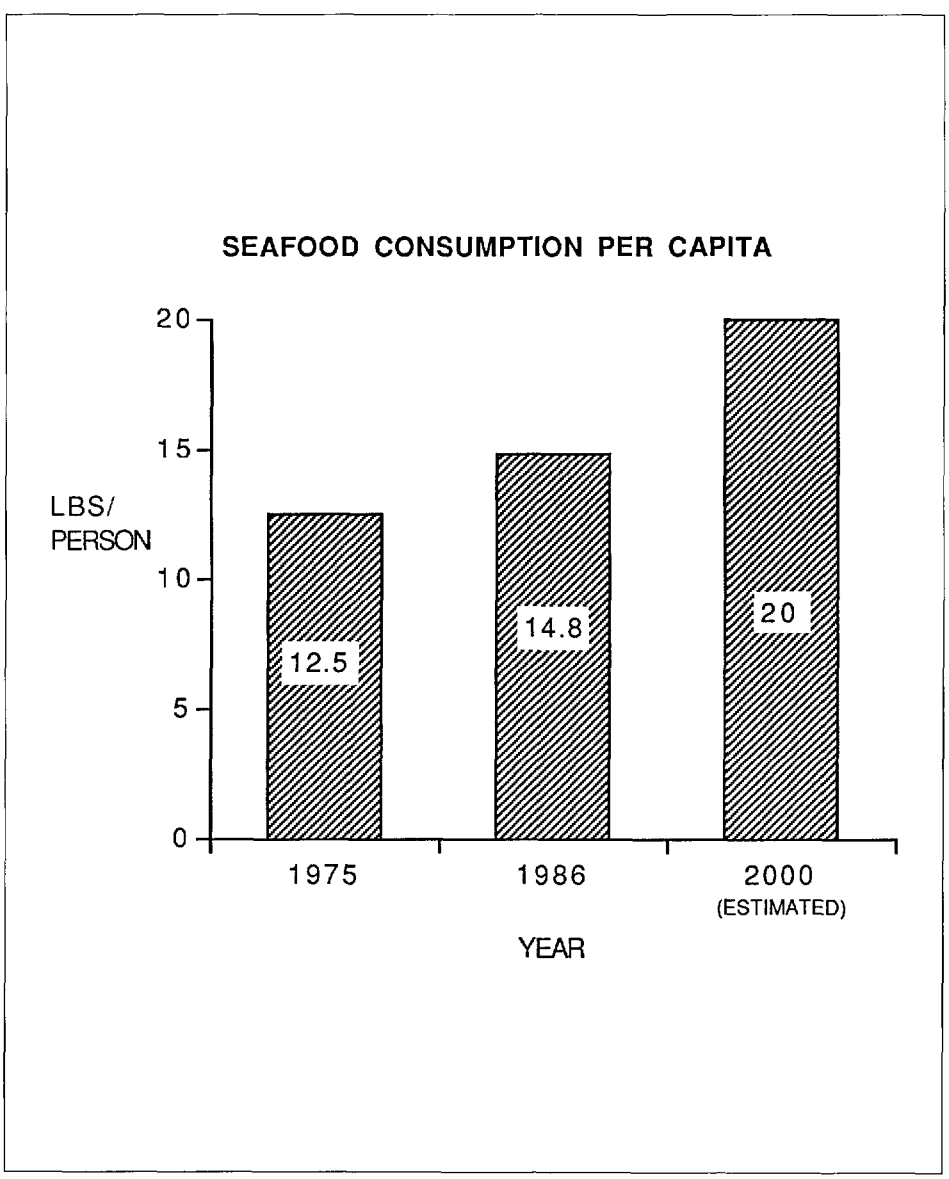
Full-service Seafood Display

means a walk-in cooler, ice machine, and display case. Estimated costs for this equipment are around $60,000. To maintain a full-service case, two full-time and four part-time employees are required. Needless to say, seafood sales increase, but so do costs of operation. The Department of Marine Resources' Marketing Division now helps train seafood buyers and retail-store personnel to properly handle, store, and merchandise seafood. The Department also runs a "Certified Fresh Maine Fish" program that has helped open new markets and give Maine seafood added recognition. The two-part program assures seafood buyers and consumers that products are of good quality.

Seafood prices also respond to the level of demand for particular species. Five years ago, haddock fillets cost an average of $3.29 per pound. Now, they average $6.39 per pound. Consumers receive a better product today, and demand this improvement because they know more about seafood. However, there are still less well-known species that serve as excellent alternatives to haddock and flounder, the most popular (and hence most expensive) species. The Department of Marine Resources is encouraging consumption of hake, cusk, pollock, wolffish, mackerel and whiting. Because these species are less in demand, they are more reasonably priced.

Foreign competition, which is growing, helps meet consumer demand and keep prices down. As prices increase, lesser-known species become more attractive to the consumer. Through in-store sampling, cooking videos, recipes, and special ads, consumers will try, and come to like, many lesser-known species. This trend, in turn, should remove pressure from species in high demand and slow the rise in seafood prices.

For more information on the "Certified Fresh Maine Fish" or other fish-marketing programs, contact the Department of Marine Resources, Station 29, Augusta, Maine 04333 (289-2291). □



Aquaculture: A Boost for Maine's Fisheries

by William Mook, President, Maine Aquaculture Association

Next time you eat at a restaurant, look closely at the menu. Which entrees are not grown on a farm? If you answer "seafood," you are probably right -- but perhaps not for long. While farm-raised products will never replace wild-grown seafood, the culture of aquatic species (or aquaculture) is becoming important to seafood production. Between 1975 and 1984, levels of farm-raised seafood rose from about 3 percent to 12 percent of total U.S. fish and shellfish production (according to the National Marine Fisheries Service).

Meanwhile, seafood consumption in the U.S. has risen more than 25 percent in the last five years. Most wild fisheries cannot sustain more intense harvesting, so over half of seafood eaten in the U.S. now is imported. Excluding petroleum products, seafood imports account for about 28 percent of our annual trade deficit (according to the American Fishery Society/Northeast Division newsletter, November 1987). As demand for seafood increases further, aquaculture offers an alternative to imports.

THE AQUACULTURAL "FARMYARD"

Many aquatic species around the world are now raised on farms, including abalone, shrimp, prawns, scallops, clams, oysters, mussels, striped bass, salmon, trout, and catfish. Instead of barns, pastures, and feedlots, the aquaculturist's "farmyard" consists of tanks, ponds, or protected coastal waters.

Aquacultural techniques and equipment are extremely varied. Mussel bottom-culture, practiced in Holland and Maine, is aquaculture at its simplest. Mussel farmers gather seed from crowded intertidal beds, and spread them out thinly on leased areas of the sea floor. After one or two growing seasons, the mussels are harvested with special drags towed behind boats. This type of bottom culture (also used with clams and oysters) works well given a consistent supply of seed, and a harvest large enough to offset planting costs and losses due to predation. Ducks, crabs, starfish, and predatory snails readily consume young shellfish.

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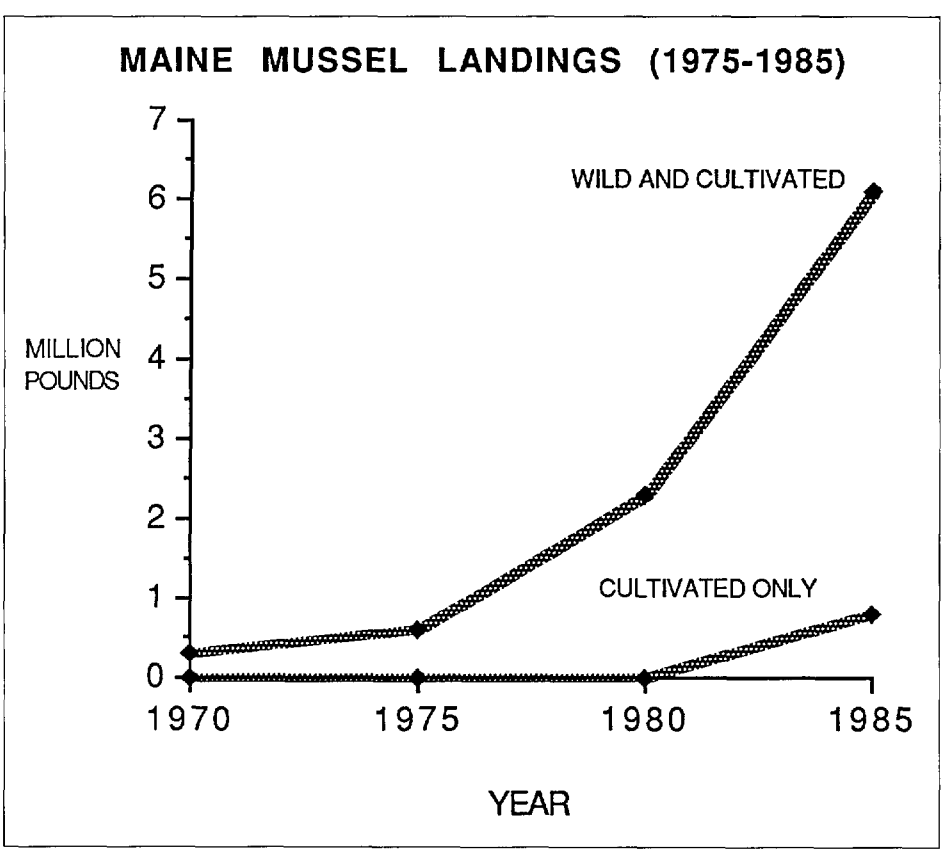
The survival, growth, and quality of shellfish may be enhanced by suspending the crop in water (away from the bottom) for all or part of its growing season. Oyster and clam farmers use trays covered with plastic screening, which protect juveniles -- and sometime even adults -- from predators. Some Maine mussels are grown to market size on ropes suspended from the surface. While this technique is more labor-intensive than bottom culture, rope-cultured mussels are free of grit and pearls.

The technique of rearing salmon and trout in floating pens is used successfully worldwide for a variety of finfish. The pens have sides, bottoms, and tops made of netting that keeps fish from escaping and predators (birds, other fish, or seals) from eating the harvest. Unlike shellfish, which eat naturally occurring microscopic plants (called phytoplankton), farm-raised finfish must be fed formulated pellets made from less expensive fish or fish by-products.

All sea farmers must start new crops each year. If natural sources of young shellfish or finfish are insufficient or unreliable, sea farmers turn to hatcheries. The water quality (e.g., temperature, salinity, oxygen, food) can be carefully monitored and controlled, thereby promoting rapid growth through the early, most vulnerable life stages. By exerting some control over growing conditions, the sea farmer — like his counterpart on



land – strives to increase crop survival, enhance product quality, and keep product supply predictable.

AQUACULTURE IN MAINE

Maine's numerous estuaries and sheltered coves, with their strong tidal flow of clean, plankton-rich water, provide an ideal setting for aquaculture. Commercial aquaculture began here during the early 1970s with a few small oyster, mussel, coho salmon, and rainbow trout operations. In 1973, Maine enacted an aquaculture lease statute that gives individuals or companies exclusive rights to their crops; the statute permits leases for aquaculture where proposed sea farming activities do not interfere unreasonably with navigation, adjacent landowners' access to water, or existing fishing and recreational activities on-site.

Many of the pioneering aquaculture ventures in Maine, begun in the early 1970s, were under-capitalized or too labor-intensive; others had insufficient seed stock or poor sites. During its first decade, Maine's aquaculture industry grew very slowly.

The 1980s have brought a promising change, however. From 1982 to 1986, mussel farming burgeoned with the adoption of bottom-culture techniques. Mussels -- a minor fisheries product less than 20 years ago -- in 1985 were second only to lobsters in pounds of shellfish landed per year. Over 6 million pounds were harvested in 1985 (see chart). Estimates by industry experts predict landings to grow annually by about 10 percent well into the 1990s, with future harvests reaching an annual value of about $100 million. Commercial harvesting of wild mussels occurs primarily between Casco Bay and Machias Bay. Within this large region, there are many protected areas suitable for mussel culture.

This year's salmon harvest (including farm-raised rainbow trout called "salmon trout"), raised mainly in the Eastport area, is expected to exceed 1 million pounds, with a "landed" value between 4 and 5 million dollars. The 400 acres of salmon leases, both granted and pending, could potentially yield annual harvests with an estimated value up to 180 million dollars (compared to the current landed value of lobsters, 46 million dollars per year, from a fishery that covers most of Maine's 3,500-mile coastline). Good salmon farming sites in Maine are limited, though, because they require deep water, and relatively warm water temperatures in winter.

In the mid-coastal area, several small farms are now raising quahogs and American oysters in the warmer upper reaches of bays and estuaries, or in human-made salt ponds. European (or belon) oysters are also being cultivated commercially in Maine but so far there has been no large-scale marketing effort for belon oysters. While the domestic market for belon oysters remains small, a vigorous market has recently sprung up in Holland and Belgium.

By exerting some control over growing conditions, the sea farmer strives to increase crop survival and enhance product quality.

PROBLEMS AND OPPORTUNITIES

Many people remain skeptical about aquaculture and question its effect on navigation and recreational boating. Shorefront landowners object to aquaculture on aesthetic grounds, saying that salmon pens or oyster trays on the water ruin views and lower property values. It is uncertain whether or not there is legal precedent to support this claim.

Opponents also claim that fish farms pollute. Feces and unused feed can accumulate beneath the fish pens, possibly lowering oxygen levels and harming marine bottom fauna. These charges stem from problems experienced in Norwegian fjords where waters below the pens tend to be naturally stagnant. Maine, especially downeast, has characteristically strong tidal currents that prevent feces from building up under salmon pens. Aquaculturists require clean water so it is in their own best interests not to pollute "source" water.

The possible environmental effects of antibiotics (used in fish feeds) also cause concern among environmentalists. Salmon farmers respond that the antibiotics they use are carefully regulated by the U.S. Food and Drug Administration, and are used only to control or prevent disease – not enhance growth.

Aquaculture has also prompted the fear that much of Maine's coastal waters will become privately controlled by large aquaculture companies, limiting public recreational and other commercial uses. This scenario is highly unlikely. Of the more than 2,000 square miles of coastal waters under state jurisdiction, about 1.8 square miles (less than 0.1 percent) are leased or pending a lease. Under the current lease law, no single company may lease more than 150 acres. Also, the lease only provides its holder with the right to grow and harvest a specific crop: many other uses of the site are still possible.

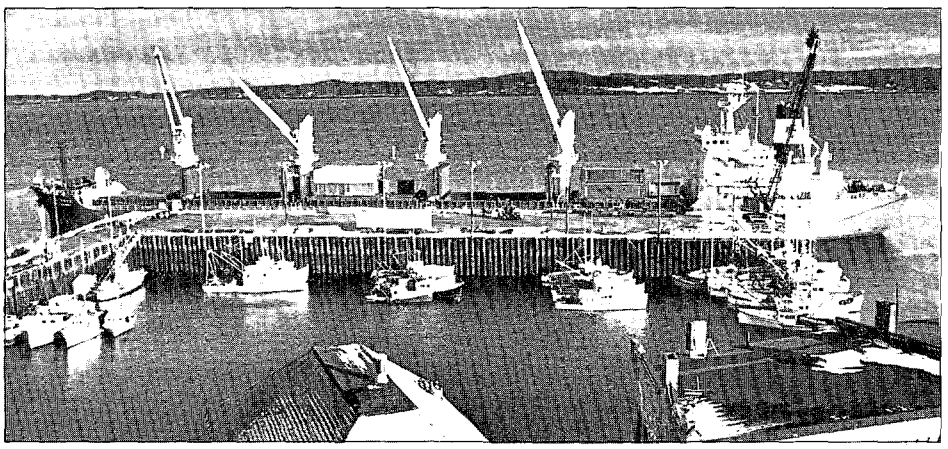
Some "traditional" fishermen feel aquaculture threatens their way of life. Wild-mussel fishermen, for example, believe that aquaculturists deprive them of future harvests by dragging up seed beds and transferring them to leased areas. Mussel farmers respond that they are taking mussels which, if not thinned or transplanted, would be killed during winter, become stunted by overcrowding, or filled with pearls, making them unfit for sale.

In addition to outright opposition, aquaculture lives in a confusing regulatory and legal climate: sea farming is not exactly fishing, but neither is it agriculture. Multiple permits are required for some types of sea farming because of overlapping state and federal jurisdiction; this duplication can make the process of starting or expanding a sea farm long, complicated, and expensive. Hopefully, as aquaculture becomes a more established industry, these roadblocks will be overcome. □

Ports and Harbors Along the Maine Coast

by Robert D. Elder, Director, Ports and Marine Transportation Division, Maine Department of Transportation

During the past 10 years, the amount of dry cargo going through Maine's ports has doubled to nearly three-quarters of a million short tons (one short ton equals 2,000 pounds), due largely to new port construction. In Portland, Searsport, Winterport, Bucksport, and Eastport, cargo facilities handle forest products, steel, fertilizer, tapioca, coal, agricultural products, and over 8 million tons of petroleum annually.



Eastport Cargo Terminal

New visitors to these ports are large (200- to 700-foot) passenger cruise ships from ports such as Boston, New York, St. John, Halifax, and Quebec. Collectively, Maine ports hosted over 60 such cruise ship calls (each carrying 75 to 725 passengers) during the summer of 1987, with Bar Harbor being the most popular port-of-call.

The demand for all types of marine facilities is growing, especially in southern and mid-coastal Maine where increasing population and heightened use have strained available facilities. New sites for berthing and anchoring boats are particularly needed in southern Maine, and comprehensive harbor and waterfront plans must be developed in mid-coastal and eastern regions.

In some places, efforts to revitalize waterfronts have already begun. Over the past decade, state agencies and coastal municipalities have constructed seven new fish piers to land and process Maine's growing catch. Portland's Fish Exchange, the first of its kind in the nation, has dramatically improved the quality of fish available to consumers: higher quality, in turn, has meant improved prices for fishermen.

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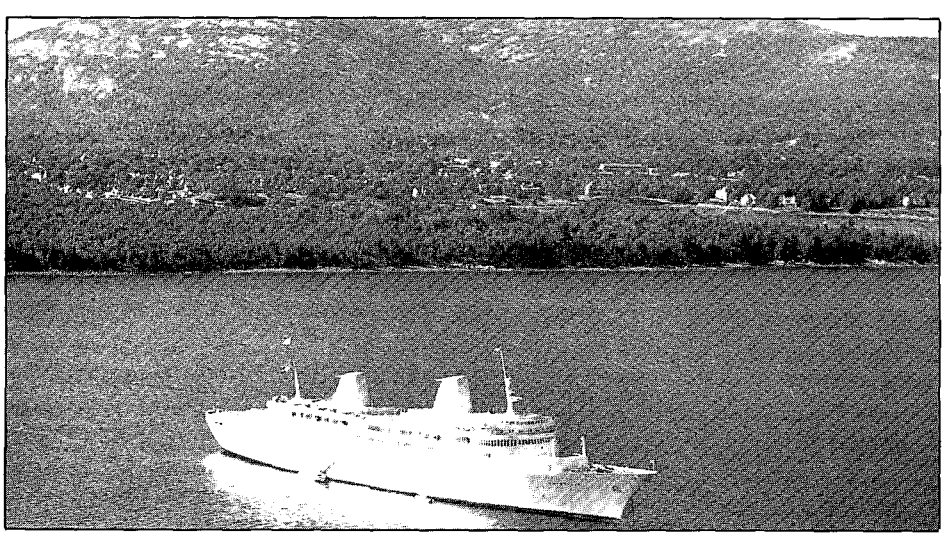
Maine's ports are also home to international ferries, two public ferry systems, and at least 10 other private ferries that serve islands on a regular basis. Over 60 boat cruises, excursions, and charters also operate along the coast. Most of these operations have grown (in numbers of passengers and/or vehicles carried) by over 25 percent in the past five years.



Cruise Ship, Bar Harbor

Outside the fishing industry, over 500 firms pursue marine-related activities in Maine's ports: boatbuilding; boat-repair and storage firms; marine sales, supplies, and rentals; and cruise, charter, and excursion services. The largest shipbuilder, Bath Iron Works, is the state's largest private employer with nearly 9,000 year-round jobs (and a substantial backlog of work). An average-sized fish processor, by comparison, employs roughly 25 to 30 persons.

Our ports and harbors are an essential part of the state's economy. Despite cyclical forces within the marine-based industries, the overall growth trend is strong. The traffic of high-value dry cargo such as forest-products exports is expanding in Maine, due to the decline in the dollar; national and regional seafood consumption is increasing due to greater health-consciousness, and all forms of recreational boating continue to grow in popularity.

Despite these promising growth trends, marine-related industries are quickly becoming jeopardized by escalating real-estate prices along the shore: marine-dependent businesses, like cargo shipping and fishing, are being priced out of their home ports. Communities like Portland and Yarmouth have passed moratoria limiting development that is not water-dependent.

Other towns are considering similar actions.

Smaller ports in southern Maine are encountering great demand for summer moorings and slips. These communities will need to protect existing anchorages, and improve their navigational infrastructure. Downeast, more detailed mooring and harbor plans, greater harbormaster enforcement, and new facilities are needed to make the most of existing waterfront space.

If the shipping and fishing industries are to maintain growth, with increasing competition for their shoreline space, state government will need to continue supporting marine construction of municipal service piers and infrastructural improvements like cargo facilities, dredging in ports, and navigational improvements. As our ports become more competitive and efficient, they draw increased business to both Maine's maritime trades and inland industries. Productive cargo terminals will allow businesses throughout Maine to save costs in exporting their products to new foreign markets. We can benefit greatly by improving our ports and harbors, but we must act now; for each year we wait, it becomes more difficult to accomplish these goals. □

Harbor Management

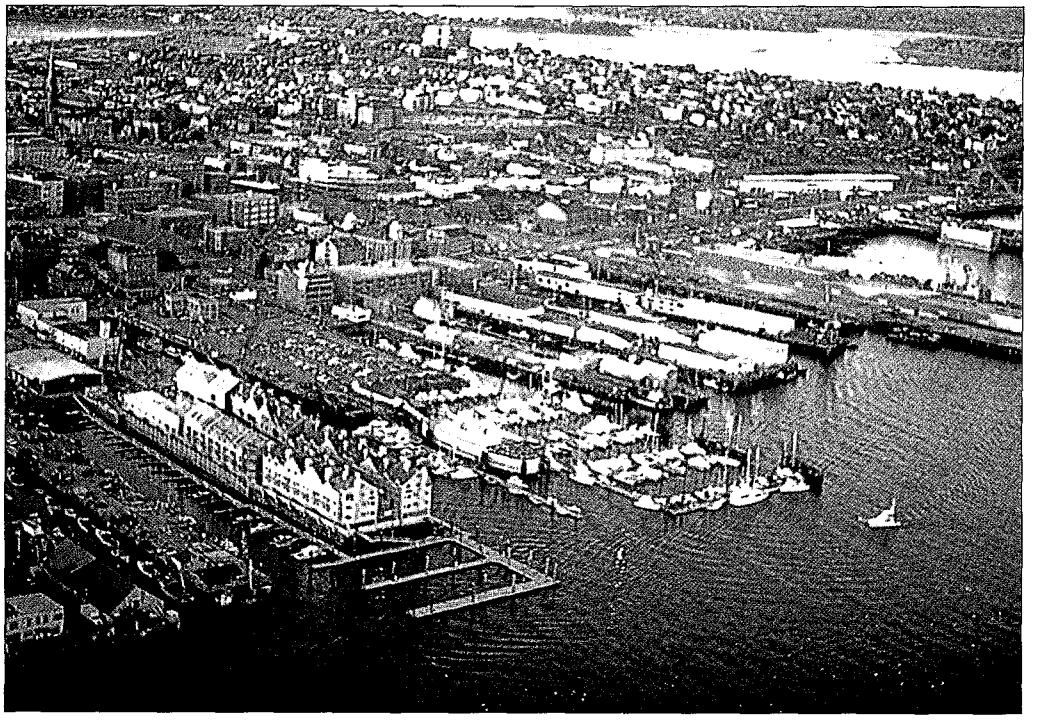
by Alfred W. Trefry III, President, Maine Harbor Masters Association

While some of Maine's smaller harbors are still devoted exclusively to fishing vessels or cruising boats, many Maine harbors are now juggling a variety of diversified uses. Northeast Harbor on Mt. Desert Island, for example, is a yacht basin during summer, and an anchorage for large draggers in winter.

Portland Harbor is a good example of a waterfront that combines commercial shipping, cruise ships, fishing vessels, oil terminals, drydocks and other ship-repair facilities, and pleasure boats. Portland now has close to 1,000 moorings, only 300 less than Boston Harbor. Some of these boats hail from other towns such as York where there is a two-year waiting list for moorings. Roughly another thousand boats are housed in marinas, and 600 to 1,200 more marina berths are planned. The pleasure boats vary from small day-sailers to large speedboats that can go 45 to 60 mph in commercial shipping lanes.

Ocean-going ships, tug boats, and island ferries (which traverse the channel 18 hours a day) must vie with smaller craft to use limited space. To make matters worse, many of the small-boat operators have little boating experience and do not know "rules of the road." Managing these diverse harbor-traffic patterns will require new regulations: already, the ones from 1982 and 1983 are obsolete.

In the future, the port hopes to attract more cruise ships and bulk cargo business. The International Ferry Terminal and some oil terminals are being reconstructed, and there is even mention of the dry cargo piers being rebuilt. The Portland Fish Pier, which replaced six derelict piers, is doing more business each year. To manage this new growth, and accommodate the diverse uses of the port, the Harbor Commission will need more funding and staff assistance. More comprehensive regulations will also be required to help apportion the available shore and deep-water anchorages to accommodate many different uses.



Portland (aerial view)

Energy Development Along the Coast

by Betsy Elder and Katrina Van Dusen, Maine State Planning Office

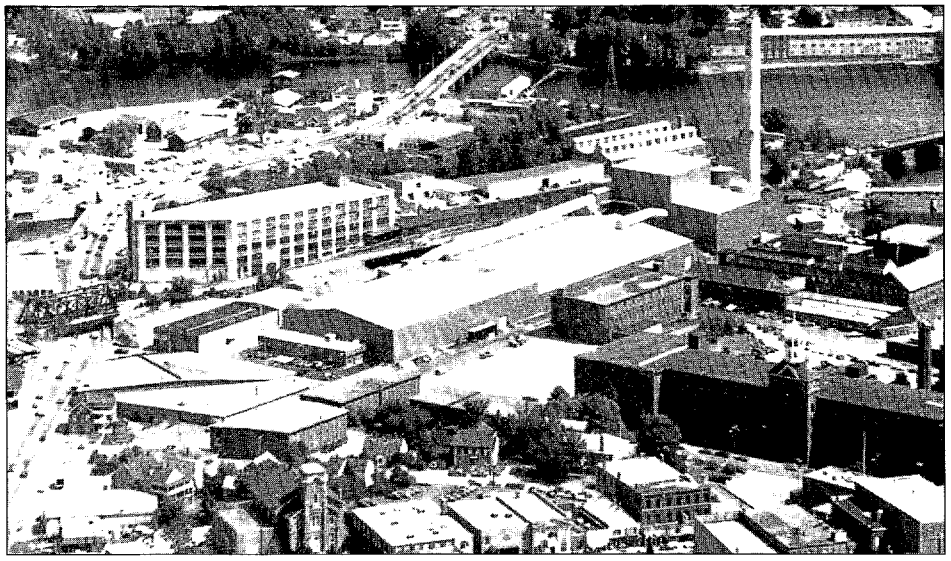
Past Energy Proposals

The coast is considered a natural setting for energy development because it offers easy access to ocean-going tankers carrying fuels and to water for cooling. Since the 1950s, several places along Maine's coast have been chosen as potential sites for energy facilities. Major oil refineries were proposed for Machiasport, Sanford, and Eastport, but were never built. Plans for a 1,000-megawatt (MW) nuclear plant and aluminum smelter in Trenton, near the entrance to Acadia National Park, were also abandoned. Central Maine Power Company planned two 800-MW nuclear units for Sears Island (in the mid-coast) during the 1960s, and subsequently planned a 600-MW coal plant for the same site, but neither plant was built. Coal and nuclear power plants were constructed in Wiscasset, though, and a coal plant built in Yarmouth. Energy proposals for plants using fossil fuels may become less common as the current trend is toward constructing thermal power plants that burn municipal wastes or biomass (wood wastes from timbering or wood chips).

Thermal Power Plants

Thermal power plants, in addition to burning biomass and municipal wastes, may generate electricity from combustion of gas, oil, ethanol, alcohol fuels, coal, or peat. Boilers of thermal plants can also be fueled by nuclear power and cogeneration (harnessing excess or "waste heat" to generate electricity). Large thermal facilities have been developed in Jonesboro (powered by biomass) and Bucksport (fueled by a combination of coal, wood, oil, and sludge).

Maine's coastal communities, faced with the prospect of overflowing landfills, are now beginning to favor burning municipal solid waste. New waste-to-energy incinerators are starting up in Portland, Biddeford/Saco, and Orrington. Collectively, these plants have the installed capacity to generate approximately 2,000 MW.



MERC Incinerator, Biddeford

Tidal Power along Maine's Coast

People in Maine have long been interested in the potential of tidal power. Studies done by the U.S. Army Corps of Engineers indicate that the Cobscook Bay region in eastern Maine could provide 200 MW of tidal power. It hasn't been developed yet, though, because its cost is still too high relative to other alternatives. While tidal power remains feasible and intriguing, it does not seem an economical choice for Maine at present.

Nova Scotia has proposed a major tidal power project, however, that is creating concern in the U.S. because of its potential impact on the entire Gulf of Maine. The Bay of Fundy, with tides that range from 33 to 45 vertical feet, could potentially generate 13,000 MW. In 1982, large-scale tidal power production was proposed for Minas Basin on Cobequid Bay in Nova Scotia. This Bay of Fundy tidal power project would involve construction of a 4,028-MW plant to produce an estimated 12.6 billion kilowatt hours (KWh) of electricity annually, 90 percent of which could be marketed to the United States.

Beyond the estimated construction costs of $22 billion (in 1982 dollars), reservations about the project center on how it might affect tides (and hence the shoreline) along the whole Gulf of Maine. Increased tidal fluctuations from the Minas Basin Project could cause saltwater intrusion of groundwater systems along the coast, lowering drinking-water quality for about one-quarter of Maine's coastal communities. The change in tides might also cause the shoreline to retreat. Up to 4,200 acres of coastal property and terrestrial habitat might be lost as increased wave action and storm surge would erode beaches and harbors.

Hydropower

Maine already has some hydropower plants along the coast. Facilities in Saco and Brunswick/Topsham -- and smaller facilities in Camden, Damariscotta, and Yarmouth -- collectively provide about 20 MW of electricity annually. The State Planning Office estimates that coastal sites could provide about 11 MW of additional hydropower from about 40 existing dams. Currently, however, the cost of developing these sites still outweighs the potential returns. Hydropower development is handicapped by the economic climate, reflected in low oil prices and rates from utilities, with-

drawal of tax incentives, higher development costs, and lack of available insurance.

Offshore Oil and Gas

The U.S. Department of the Interior (Interior) has decided to lease the outer continental shelf off Maine's coast for oil and gas exploration. The area being considered for exploration is largely under Georges Bank, located 150 to 300 miles from Maine. Interior's plans have generated controversy in New England because offshore drilling could threaten the valuable fish population of Georges Bank.

Although all of Interior's plans to lease acreage on Georges Bank have been challenged in court, a sale was held in December 1979. From July 1981 until September 1982, oil companies drilled eight exploratory wells on the shelf, but found no oil or gas. Interior now plans another Georges Bank lease sale (Sale 96), tentatively scheduled for February 1989. Texaco Canada is currently seeking permission from the Canadian government to drill on the easternmost portion of Georges Bank. Canada has owned rights to the eastern side of the Bank since a 1984 World Court decision resolved a long-standing boundary dispute between the U.S. and Canada.

Because the Bank's fish population is such a valuable natural resource, Maine's support for offshore oil and gas exploration has been tempered by concern for existing fisheries. The Georges Bank ecosystem is an important spawning and nursery area for many fish species that later enter our coastal waters: in fact, the richness of Georges Bank helps to make the Gulf of Maine one of the world's five most productive water bodies.

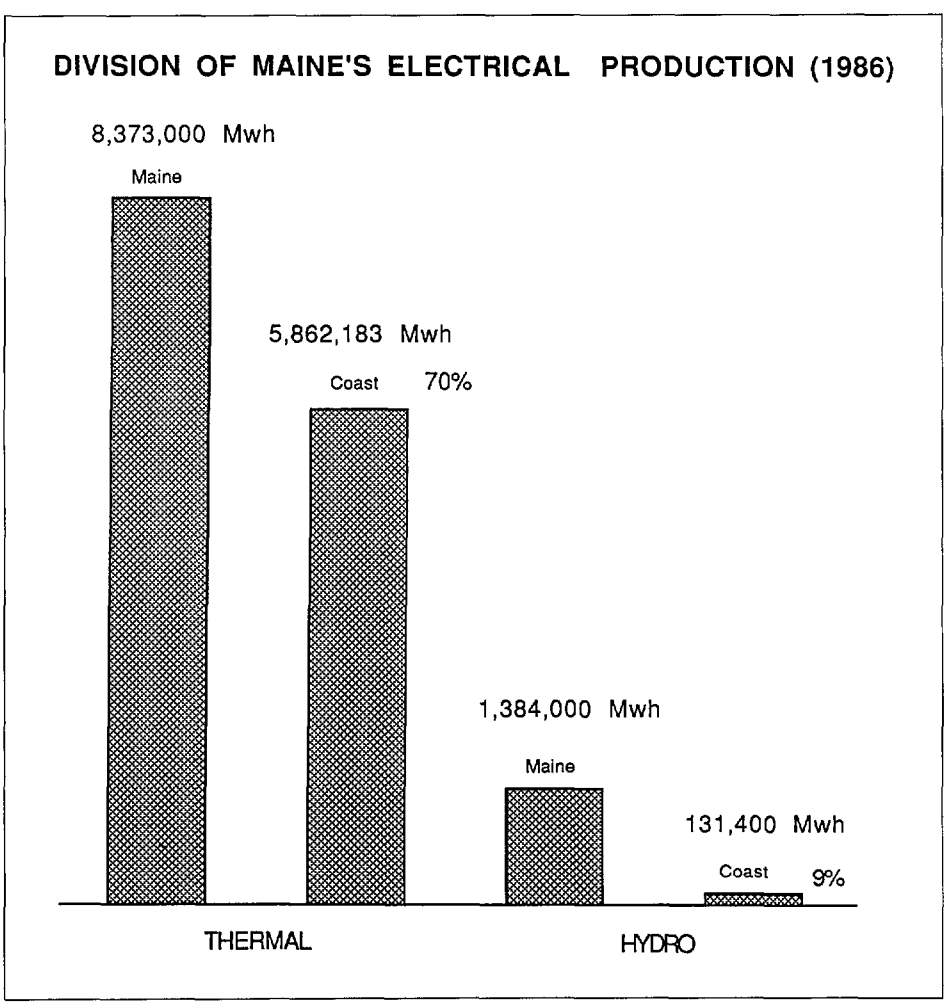
The risks to Maine of offshore drilling would not necessarily be counterbalanced by benefits: Maine would enjoy few, if any, direct energy returns from oil or gas discovered along the Atlantic's outer continental shelf. □

Electrical Generation: how much do we produce, how much do we need?

Electricity is usually expressed in units called megawatt hours (MWh) or kilowatt hours (KWh), indicating million watts per hour or thousand watts per hour, respectively. Based on use in year-round homes, Central Maine Power's "typical customer" used 600 KWh/month in 1987.

Demand for electricity fluctuates from day to day and during different times of the day. Peak loads occur during periods of high demand for electricity, such as when the temperature falls below zero and a large number of households are watching TV, cooking dinner in the microwave, and taking hot showers. So a generating plant with 500 MW of peak-load capacity could provide for approximately 120,000, or one-quarter, of the households in Maine. By contrast, 500 MW of base-load capacity could provide electricity for 547,000 households during a period of low demand. The actual peak-load capacity necessary to service all 430,000 households in Maine is 1,800 MW.

For more information, contact the Energy Extension Agent in your area (Presque Isle, Bangor, Augusta, Portland, or Lewiston/Auburn). Their telephone numbers are available from the Office of Energy Resources in Augusta (289-3811).



Shoreline Hazards

by Joseph T. Kelley and Stephen M. Dickson, Maine Department of Conservation, Maine Geological Survey

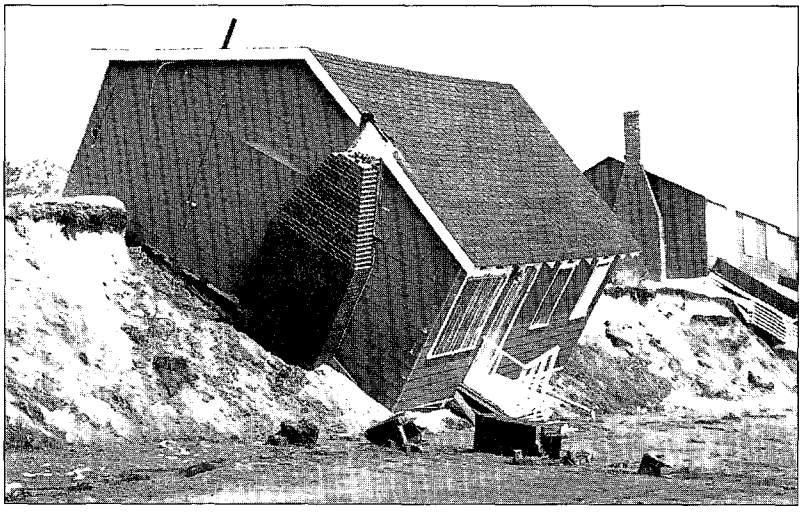
While Maine is renowned for its rocky coast, much of Maine's shoreline is marked by beaches, saltmarshes, and mudflats — collectively known as its "soft" coast. The fragile structure of this soft coast is undermined by erosion. In dramatic events like the winter storms of 1978 (which caused roughly $47 million in damage to southern Maine beach properties), we see how quickly land is eaten away. But usually, erosion moves the shoreline landward more gradually.

Even this gradual erosion, though, is powered by storm waves. Scientists have not measured the force of Maine's storm waves, but stories tell of waves that threw football-sized rocks 50 to 100 feet up the shore (occasionally landing them in people's living rooms).

Erosion is hastened by a quieter, less dramatic process: the gradual rise of sea level. Since the last Ice Age over 9,000 years ago, Maine's sea level has risen about 200 feet due to the melting of glaciers and slow warming of ocean water.

When the sea level was 200 feet lower, the shoreline was many miles seaward of where it presently lies. What are now islands, were the peaks of hills in a previous landscape.

Eroding Bluffs, Brunswick (Lots above bluff are being developed)



Popham Beach

Currently, sea level is rising from 1 to 3 millimeters per year, or 6 to 18 inches per century. While this rise sounds insignificant, even a small increase can erode large portions of Maine's soft coast. While rocky headlands will change little, Maine's beaches, wetlands, and bluffs may retreat hundreds of feet inland over the next 100 years.

Based on global warming trends (that might cause part of the polar ice caps to melt), the U.S. Environmental Protection Agency and the National Academy of Sciences predict that sea level may rise 3 to 5 feet over the next century. If this rise actually occurs, parts of Maine's shoreline could retreat thousands of feet.

Obviously, even a slight rise in sea level will cause extensive damage to human constructions along our coast. Most early settlements were located along Maine's rocky points near natural, deep harbors, but more recent development has been less thoughtfully planned. Many private houses built along Maine's southern beaches have been damaged or destroyed by storm waves.

Some communities have attempted to build structures that will protect their properties. Massive seawalls composed of desk-sized blocks of rock appear protective, but are easily disrupted by large storms. Furthermore, they lead to rapid loss of beach sand.

Seawalls and other forms of shoreline armor are prohibited along the Maine coast because of the damage they cause to the beach in front of them and to properties on their edges. The "edge problem" has, in other states, led to the loss of whole beaches. Maine also prohibits construction of immovable high-rise buildings in beach areas threatened by rising sea level, and it requires severely damaged buildings to be moved from the beach.

The primary missing link in Maine's coastal legislation involves eroding bluffs. In some areas, the eroded bluff sediment is sand that forms nearby beaches. In other places, mud from the eroded bluff is critically needed by salt marshes and nearby clam flats. In either case, there is no practical way to halt bluff erosion, and construction is more safely sited back from the eroding edge.

To protect people's lives and property along the coast, and to minimize our impact on shoreline ecosystems, it is essential that we keep structures a safe distance from the present coast. As sea level rises and the shoreline migrates, that distance should be maintained. The best way to deal with shoreline change is to "buy out" property that is presently threatened and to prevent unsound development in the future. □

Freshwater: The Coast's "Other" Water Resource

by Peter Garrett, BCI Geonetics

Freshwater . . . none of us can do without it, yet who among us does not take it for granted? But some Maine towns have learned otherwise.

In 1984, about a dozen households in the coastal village of Friendship lost their wells to gasoline that had leaked from a store's buried tanks. Now they have to content themselves with water from a public supply well, located in a nearby wetland. Unfortunately, though, that water contains more sodium than the state's drinking water limit.

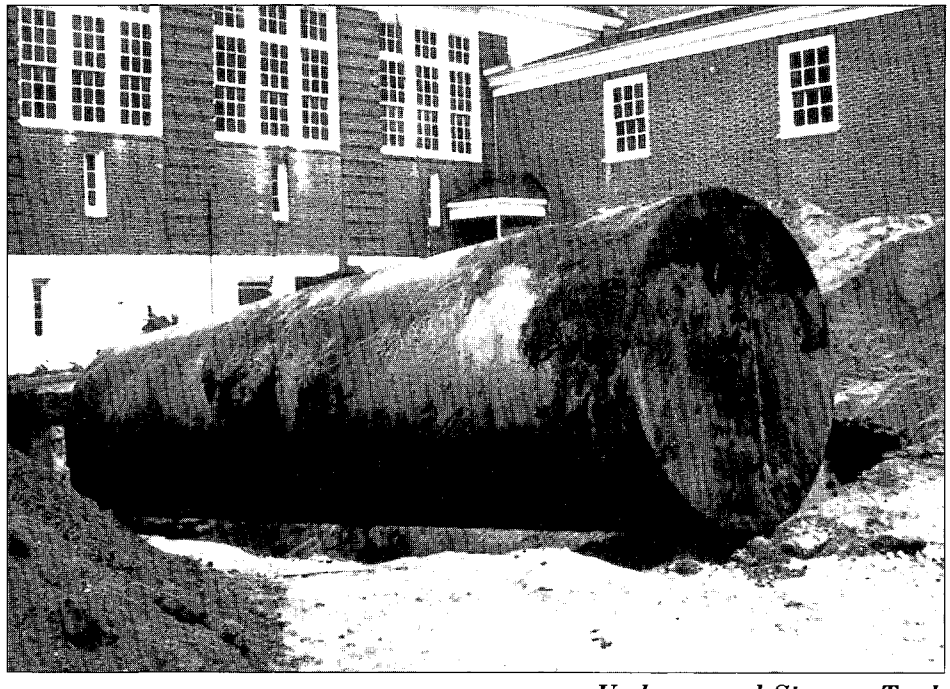
In Rockland, the water utility disputes with residents around an inland lake for the right to extract some lakewater for townspeople. And many households in delightful, down-at-the-water's edge settings have drilled wells within 200 feet of the shore. Such wells, if pumped too hard or if affected by other wells on nearby lots, can draw saltwater instead of fresh.

Despite these potential problems, Maine is fortunate to have plentiful supplies of high-quality water along much of its coast. In York and Cumberland Counties, most freshwater comes from Lake Sebago and the Saco River, reservoirs so vast that their water could conceivably be exported to Boston, even after meeting Maine's foreseeable needs.

Other municipal supplies often come from screened (slotted) wells that are located in sand and gravel aquifers. Residential wells are most often deeper, drilled into bedrock (where they draw water from fractures in the rock).

Topping the list of groundwater problems in the coastal area is radon, a radioactive gas common in bedrock groundwater along the mid-coast, where granite predominates. Radon can be filtered, but not avoided. Then there is iron, which is a rusty nuisance but no health threat. Finally, there are human-made chemicals: gasoline and heating oil (both from underground storage tanks), salt from sand/salt piles, and solvents from garages, boat-builders, or other light industry. And we cannot forget our poorly located or poorly functioning septic systems.

Contamination of groundwater from such chemicals can be avoided — if secure containment and vigilance is practiced by users and local officials. Leakage of only a few gallons of chemicals can cause the loss of a well, especially a bedrock well. Fortunately, though, Maine's known contamination problems have not been extensive: only rarely do they exceed a few acres in size.



Underground Storage Tank

Threats to freshwater quality in lakes and ponds come from development in the watershed. More development means more runoff of stormwater into streams and, eventually, lakes. Not only does this stormwater erode topsoil, it carries small amounts of phosphorus into lakes where it causes unsightly algal blooms. Such blooms render lakes less welcome to residents and visitors alike. The blooms also make treatment of drinking water more expensive.

How can we prevent the degradation of freshwater in our local environment? Here are some suggestions.

1) Join other concerned citizens: your local conservation commission or planning board would be a good place to start.

2) Search for potential threats to water quality. Even if no current threats exist, it is a good idea to monitor water quality regularly. Never take the quality of your local freshwater for granted.

3) Get technical assistance for the problems you perceive. The Regional Planning Commissions, Department of Environmental Protection and University's Cooperative Extension Offices are good sources, and so are some private consultants. The State Planning Office (and the organizations listed above) have a ten-step planning process for groundwater protection that is available to interested citizens.

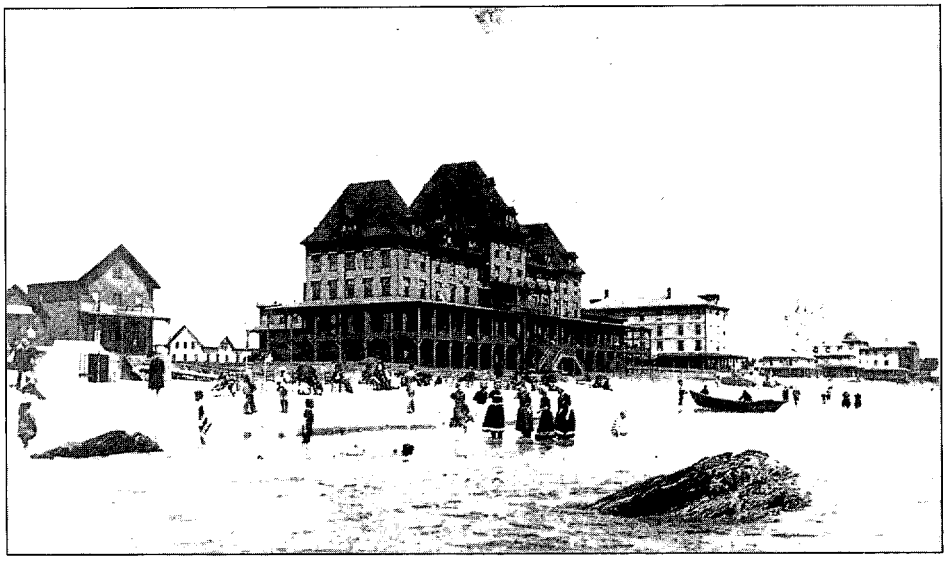
4) Make a plan, and go public with it. Get your ideas included in your town's comprehensive plan.

5) Put the plan into action. □

The Mystique of Maine: Tourism in "Vacationland"

by Peter Bachelder, Maine Publicity Bureau, and Flis Schauffler, Maine Coastal Program

Maine was a "vacationland" long before car license-plates began advertising the state's potential for recreation. As early as 1850, coastal towns such as Boothbay Harbor, Bar Harbor, and Old Orchard Beach were becoming fashionable places for summer visitors. While many of the early tourists (called "Rusticators") arrived by steamship or train from New York and Pennsylvania, some came from the north as well. A railroad line from Montreal to Portland brought an influx of Canadians to Old Orchard Beach by the 1860s.



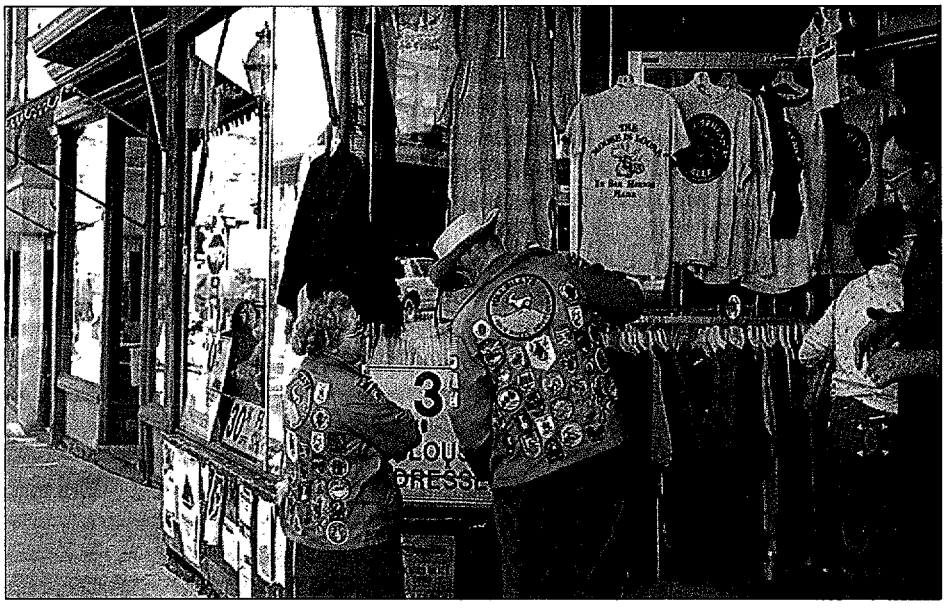
Old Orchard Beach (circa 1900)

Most of these early Rusticators were wealthy people who could afford to come for extended visits. Some brought steamer trunks and stayed in large coastal hotels that offered all the amenities of home. Others were lured by the grandeur of the state's lakes and forests, with their bountiful fishing and hunting possibilities. In the Moosehead and Rangeley Lakes regions, visitors were drawn to "sporting camps" where they stayed in individual cabins and ate three meals a day in a central lodge. By the 1890s, Maine Central Railroad (which carried many of the summer visitors) had opened a ticket office in New York City and was promoting Maine as a frontier vacationland, using full-page ads in New York papers.

After World War I, some of the major hotels began to lose business. The Rusticators were more interested in touring Europe — seeing where the war had been fought — and the visitors who began coming by automobile were seeking less formal vacations. This new breed of tourist ushered in the age of the "tourist camp," which featured housekeeping cabins or a tenting area, and often all-in-one facilities, with a small restaurant or lunch counter, gas pumps, and even a repair shop. These new "motorists" marked the decline of an era when tourists generally stayed in one place for the length of their visit. Maine's growing highway system was opening the way for them to explore -- at their leisure -- different vacation horizons.

Today, tourists are even more mobile and their vacations tend to be planned minimally, if at all. Annually, the Maine Publicity Bureau receives only 135,000 inquiries about Maine's vacation possibilities, whereas 6 million people show up. Most tourists take fairly short vacations of a week or two, and numerous weekend trips (particularly since the advent of three-day weekends). The weekend trips are particularly popular among visitors from neighboring states and Mainers who travel within the state. (When outside of the region where they live and work, even Maine residents are considered tourists.) When looking for lodging and food, many visitors no longer seek a formal environment. By some estimates, tourists now "eat out" one out of every two meals, often at fast-food establishments.

Another trend in tourism is toward "shopping vacations." Over the past five years, interest in buying at outlets has reached fever pitch in parts of southern Maine. Along a 2-mile stretch of Route 1 in Kittery, there are now 70 to 80 outlet-type stores. In-



Bar Harbor

cluding store purchases, lodging, food, transportation and recreation, tourists spent more than 1.5 billion dollars in Maine during 1986 (69 percent of which was spent along the coast).

For many native Mainers, the roads and beaches of southern Maine seem busy in summer, but our standard is different from that of the visitors (most of whom come from southern New England, New Jersey, Pennsylvania, and Metropolitan New York). Their concept of open space is unlike ours; many tourists are accustomed to crowds and would be uneasy if things were too quiet.

We ought to look ahead at least 10 or 20 years, not just to the next season.

Still, there is justifiable concern in towns where traffic congestion from visitors strongly affects the local community. Tourism ties directly into the present dialogue over how much development is appropriate and how it may best be managed. By enacting a Master Plan for Tourism, Maine could benefit from development without losing its reputation for being a slower-paced place where there is still room in which to find solitude and open space.

Pemaquid Point

Those of us who work in the tourism industry have a responsibility to be aware of the impact our work can have on a community. It would be easy for us to publish a pocket-sized pamphlet about, say, an offshore island — telling about all the attractions and the various ways to get there. This kind of brochure could have a terribly strong impact on the island community and we need to consider that — there's a difference between providing information when it is asked for and actively promoting places. At the Publicity Bureau, we respond to requests for information; we don't direct people to one place or another.

The tourist industry needs to consider its long-term goals: we walk a fine line between inevitable progress and the need to preserve the values that make Maine unique. We ought to look ahead at least 10 or 20 years, not just to the next season. And we need to know what Mainers have on their minds. If people have constructive ideas for how to plan ahead, they should become involved -- now -- to provide for everyone's best interests in Maine's future. □

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The Maine Coastal Program

In 1972, faced with burgeoning development along the nation's shores, the U.S. Congress enacted the Coastal Zone Management Act, which became the foundation for states' coastal programs. Unlike all other federal environmental legislation, the Act provides for a partnership among federal, state, and local government in cooperatively managing the nation's coastal resources.

Congress also took an unprecedented step by writing into the law a provision that requires all federal activities in the coastal area to be consistent with the approved state program: no longer could the federal government perform or support activities that violated state laws. If a state has a federally approved program, the federal government cannot dredge, construct breakwaters or federal housing, or conduct other activities that violate state laws.

In 1978, Maine implemented its coastal management program, relying on 11 existing environmental and land use statutes (that pertain to air and water pollution, siting of large projects, construction in wetlands and along beaches, shoreland zoning, solid waste sites, and marine resources).

The Maine Coastal Program (MCP) works in two distinct areas — regulation, and planning and policy development.

Regulation

At the state level, three state agencies implement the MCP through regulations: the Department of Marine Resources (DMR) oversees fisheries management; the Department of Conservation (DOC), through the Land Use Regulation Commission, regulates land use activities in the state's unorganized territories: and

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vironmental laws, and informs Maine citizens so they can better comply with state and local statutes. The MCP continues to work with the Legislature, state agencies, municipalities, and others to strengthen implementation of these laws. In 1986, the Coastal Program developed a legislative initiative to improve state and local decisions affecting coastal resources. The initiative, which was supported by Legislators, the public, and local governments, was enacted into law and now provides a framework for coastal decision-making.

nning and Policy Development

he MCP supports local and state ncies working on coastal issues l has funded more than 500 local nning projects along Maine's coast. the local level, for example, the P has helped towns prepare comhensive plans, regional shoreliness studies, and groundwater-use ategies. At the state level, the P has funded coastal wildlife dies, helped licensing and permitg of state laws, and analyzed ine's fish-pier needs. The Program also sought to develop public poli; on how coastal resources are used r example, where new cargo ports uld be located, how Maine aquacule should be developed, and how te and local decisions affecting the coast should be made.

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