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MARKET AND FINANCIAL FEASIBILITY ANALYSIS FOR A PROPOSED AQUARIUM IN BANGOR, MAINE

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INTRODUCTION AND EXECUTIVE SUMMARY

Economics Research Associates and Cambridge Seven Associates were retained by the City of Bangor to evaluate the market and financial feasibility of the proposed development of an aquarium in the Bangor Waterworks Building. Financial assistance for preparation of this document was provided by a grant from Maine's Coastal Program, through funding provided by the U.S. Department of Commerce, Office of Ocean and Coastal Resource Management, under the Coastal Zone Management Act of 1972, as amended.

Resident and Visitor Markets

Resident and visitor markets were evaluated to determine the potential market support for an aquarium in Bangor. The Bangor market area was evaluated and divided into primary, secondary, and tertiary markets for the purpose of analysis. The residents of these three market areas represent potential visitors to an aquarium in Bangor. The visitor market was profiled based on statistics available from the Maine State Development Office. In 1985, 1.1 million travelers visited the Downeast/Acadia Region. Tourism to this region is highly seasonal. Sightseeing and cultural events are the most popular activities of visitors to this region.

Comparable Attractions

Economics Research Associates interviewed personnel at five existing aquariums and one proposed aquarium comparable to that being considered in Bangor to determine their program content, operational information, and market characteristics. This information provides a basis from which attendance and financial projections for the Bangor Aquarium may be made.

With the exception of the Skidaway Island, Georgia facility, all the aquariums are located in New England or the Atlantic Maritime Provinces of Canada. Visitation levels range from lows of 23,000 at the Huntsman

Aquarium-Museum and 58,000 at the Shippagan Marine Centre (both facilities are located in remote areas and are oriented primarily toward research), to highs of 100,000 at the Maine Aquarium in Saco and the Skidaway Island facility, and 200,000 at the Fisheries Aquarium at Woods Hole, Massachusetts (these facilities are located in areas of heavy tourist traffic).

The Huntsman Aquarium-Museum and the Shippagan Marine Centre are open to visitors only during the summer months, while research is conducted year-round. The Skidaway Island facility and the Woods Hole Aquarium do not charge admission. The Maine Aquarium in Saco, Maine charges an adult admission price of $5.00 and offers memberships for $40.00 (family) or $25.00 (individual).

The smallest facility surveyed is the Huntsman Aquarium-Museum (10,000 square feet), and the largest is the Shippagan Marine Centre (38,000 square feet). The Skidaway Island facility has the most extensive grounds (680 acres), and the Woods Hole Aquarium has the least (2 acres). The Skidaway Island facility and the Woods Hole Aquarium have the shortest estimated average length of stay of visitors (.5 to .75 hours). Both of these facilities have small display areas and collections.

Proposed Program for the Bangor Aquarium

The Bangor Waterworks building complex provides a special opportunity for a mixed-use development focused on the Penobscot River and the creation of a unique River Center. The man-made embayment, designed to contain the Penobscot's diverted waters and operate the turbines in the Waterworks, is conceived as the central element of the complex and the location of the primary aquatic exhibits. Major naturalistic exhibits concentrating on the river system from its source at Moosehead Lake to the sea would display river otters, beavers, harbor seals, cormorants, a Penobscot Bay tank, and a rocky shore tide pool exhibit.

The environment of the Penobscot River and these active outdoor exhibits serve as the focus for the aquarium and for the retail and food services. The exhibits will provide a delightful setting featuring diving birds and harbor seals, rushing river water, and salmon fishermen.

The roof of the viewing galleries and Penobscot Bay tank would be covered by a deck for public access, thereby providing overlooks to the river and places for above-water close-up viewing of mammals and birds.

Attendance Projections and Pro Forma Development for the Bangor Aquarium

Based on a review of successful smaller and/or seasonal aquariums in North America, existing tourism in the region and other related factors, and the proposed program, Economics Research Associates outlined attendance projections, facility sizing, and preliminary operating budget for the Bangor Aquarium.

We estimate an average visitation of 112,000 persons. This estimate is within the range of comparable aquariums' market penetration ranges. A stable year pro forma for the facility indicates a slight surplus in operating revenue.

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Section II

RESIDENT AND VISITOR MARKETS

Resident and visitor markets were evaluated to determine the potential market support for an aquarium in Bangor.

RESIDENT MARKET

The Bangor market area was evaluated and divided into primary, secondary, and tertiary market segments for analysis. The primary market area encompasses persons residing within 25 miles of the proposed site. The secondary market area encompasses persons residing between 25 and 50 miles of the proposed site. The secondary market area includes Waterville and Bar Harbor on the coast. The tertiary market area encompasses persons residing between 50 and 100 miles of the proposed site. The tertiary market area includes Lewiston-Auburn, Augusta, and Brunswick.

Population

According to the 1980 U.S. Census, 119,416 persons resided in the primary market area, 161,460 in the secondary market area, and 426,840 in the tertiary market area. Population growth between 1980 and 1991 is projected to be limited. The greatest growth is projected in the secondary market (3.4 percent between 1980 and 1986 and 2.3 percent between 1986 and 1991). Population figures are shown in Table II-1.

Households

In 1980 there were 40,214 households in the primary market area, 56,990 in the secondary market area, and 150,174 in the tertiary market area. Between 1980 and 1991, growth in the number of households is projected to be moderate, with the greatest growth occurring in the secondary market (7.1 percent growth between 1980 and 1986 and 4.5 percent between 1986 and 1991). Data on households is shown in Table II-2.

Table II-1

POPULATION

	1980 Census	1986 Estimate	1991 Projection	Percent Change 1980-1986	Percent Change 1986-1991
Primary Market Area (0- 25 miles)	119,416	121,024	121,887	1.3 %	0.7 %
Secondary Market Area (25- 50 miles)	161,460	166,930	170,790	3.4	2.3
Tertiary Market Area (50-100 miles)	426,840	441,439	451,298	3.4	2.2
Total Market Area (0-100 miles)	707,716	729,393	743,975	3.1	2.0

Source: U.S. Census, Urban Decision Systems, and Economics Research Associates.

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Table II-2

HOUSEHOLDS

	1980 Census	1986 Estimate	1991 Projection	Percent Change 1980-1986	Percent Change 1986-1991
Primary Market Area (0- 25 miles)	40,214	42,123	43,291	4.7 %	2.8 %
Secondary Market Area (25- 50 miles)	56,990	61,054	63,805	7.1	4.5
Tertiary Market Area (50-100 miles)	150,174	160,703	167,767	7.0	4.4
Total Market Area (0-100 miles)	247,378	263,880	274,863	6.7	4.2

Source: U.S. Census, Urban Decision Systems, and Economics Research Associates.

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Average household size is decreasing in the market area; from 2.76 persons in 1980 to an estimated 2.67 persons in 1986, to a projected 2.61 persons in 1991. The greatest decrease is in the tertiary market; decreasing 3.3 percent between 1980 and 1986 and 2.2 percent between 1986 and 1991. Household size is shown in Table II-3.

Age

The distribution of the population by age in the Bangor market area is projected to shift toward the older between 1980 and 1991. School age children (6 to 17 years of age) and young adults (18 to 24 years of age) are projected to decline as a percentage of the total population. The greatest increase is in the 35 to 44 years of age cohort. Age group distribution is shown in Table II-4.

The median age of the population is projected to increase in the primary, secondary and tertiary markets between 1980 and 1991. The greatest increase is in the primary market area where the median age is projected to increase from 28.1 years of age in 1980 to 31.5 years of age in 1991. Data on median age is shown in Table II-5.

Income

In 1980, median household income was higher in the primary market area than in the secondary or tertiary market areas, and is projected to remain higher through 1991. Median household income is shown in Table II-6.

In 1980 per capita income was higher in the primary market area than in the secondary market area, but lower than in the tertiary market area. This relative position is projected to continue through 1991. Per capita income is shown in Table II-7.

VISITOR MARKET

The following data on state and regional tourist activity is derived from the Maine Tourism Study; 1984-1985, prepared for the Maine State Development Office and published in October of 1985.

Table II-3

AVERAGE HOUSEHOLD SIZE

	1980 Census	1986 Estimate	1991 Projection	Percent Change 1980-1986	Percent Change 1986-1991
Primary Market Area (0- 25 miles)	2.77	2.69	2.64	(2.9%)	(1.9%)
Secondary Market Area (25- 50 miles)	2.74	2.65	2.60	(3.3)	(1.9)
Tertiary Market Area (50-100 miles)	2.76	2.67	2.61	(3.3)	(2.2)
Total Market Area (0-100 miles)	2.76	2.67	2.61	(3.3)	(2.2)

Source: U.S. Census, Urban Decision Systems, and Economics Research Associates.

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Table II-4

AGE GROUP DISTRIBUTION
TOTAL MARKET AREA
(0-100 miles)

	1980 Census	1986 Estimate	1991 Projection
0- 5 years	8.4 %	8.9 %	8.6 %
6-17 years	20.2	18.1	18.0
18-24 years	12.8	11.1	9.7
25-34 years	15.5	17.0	16.7
35-44 years	10.9	13.3	15.0
45-54 years	10.0	9.5	10.5
55-64 years	9.6	8.9	7.9
65+ years	12.6	13.2	13.6

Source: U.S. Census, Urban Decision Systems, and Economics Research Associates.

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Table II-5

MEDIAN AGE

	1980 Census	1986 Estimate	1991 Projection
Primary Market Area 0- 25 miles	28.1 years	30.1 years	31.5 years
Secondary Market Area 25- 50 miles	31.3 years	32.7 years	33.9 years
Tertiary Market Area 50-100 miles	30.8 years	32.4 years	33.6 years

Source: U.S. Census, Urban Decision Systems, and Economics Research Associates.

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Table II-6

MEDIAN HOUSEHOLD INCOME

	1980 Census	1986 Estimate	1991 Projection
Primary Market Area (0- 25 miles)	$13,702	$19,089	$24,937
Secondary Market Area (25- 50 miles)	$12,338	$17,087	$22,894
Tertiary Market Area (50-100 miles)	$13,524	$18,710	$24,816

Source: U.S. Census, Urban Decision Systems, and Economics Research Associates.

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Table II-7

PER CAPITA INCOME

	1980 Census	1986 Estimate	1991 Projection
Primary Market Area (0- 25 miles)	$ 5,567	$ 8,644	$11,507
Secondary Market Area (25- 50 miles)	$ 5,210	$ 7,962	$10,508
Tertiary Market Area (50-100 miles)	$ 5,633	$ 8,834	$11,779

Source: U.S. Census, Urban Decision Systems, and Economics Research Associates.

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State of Maine Tourism Characteristics

Tourism activity is very important to the State of Maine and is the State's largest employer. During a one-year period ending in July of 1985 (the most recent period for which comprehensive data is available), Maine received 6.3 million visitors (quantified as person-trips) from the U.S., Canada, and abroad. Massachusetts, New York, and New Hampshire residents account for one-half of the total non-resident person-trips to Maine. Residents of Maine took an additional 5.1 million person-trips during the same period.

Tourism increases in the summer months, with one half of non-resident tourism occurring in June, July and August. The fall foliage season (September through November) accounts for one-quarter of yearly non-resident tourism. One-third of resident person-trips occur in the summer, with the remainder being spread evenly over the year.

Shopping is the major tourism activity for non-residents, followed by sightseeing. For residents, shopping and sightseeing are equally important activities.

Downeast/Acadia Region Tourism Characteristics

The Downeast/Acadia Tourist Region is the second largest region, economically, of the state's eight tourism regions. The region capitalizes on its coastal location and population center in Bangor. During a one-year period ending July 1985, the Downeast/Acadia Region received 1.1 million visitors. Massachusetts, New York and Atlantic Maritimes' residents accounted for 40 percent of total non-resident person-trips to the region. Nearly 60 percent of non-resident person-trips to the Downeast/Acadia Region occurred during the peak summer season. An additional 24 percent of non-resident person-trips occurred during the fall foliage season. For Maine residents, 35 percent of person-trips to the Downeast/Acadia Region occurred during the summer season, with the balance of person-trips distributed equally through the remainder of the year.

Forty-one percent of resident and non-resident visitors to the Downeast/Acadia Region stayed in rental lodging (hotel, motel, or resort), and 14 percent stayed in campgrounds.

Rental Lodging: Hotels/Motels/Resorts

There are approximately 193 hotel, motel or resort facilities in the Downeast/Acadia Region, with 5,216 rooms. Within the region, 46 percent of the facilities are located in or near Bar Harbor (89 facilities), while 23 percent are located in or near Bangor (45 facilities). However, the Bar Harbor and Bangor areas each have about one-third of the available rooms in the region (1,951 rooms and 2,207 rooms, respectively). Fifty-five percent of the rental lodging facilities in the region are motel-type facilities and 20 percent are resort cottages.

The average length of stay in rental lodging in the Downeast/Acadia Region was 3.1 nights, as compared with 4.3 nights statewide. The average number of persons per party staying in rental lodging in the region was 2.2 persons, compared with 2.5 persons statewide.

Rental lodging occupancy rates for the region are higher than for the state as a whole (59 percent versus 56 percent in 1985). Occupancy statistics display strong seasonality:

OCCUPANCY BY MONTH
1985

January	25%
February	27%
March	29%
April	32%
May	32%
June	41%
July	70%
August	78%
September	63%
October	53%
November	36%
December	25%
Annual Average	56%

The monthly regional data shown in the previous table indicate the average occupancy rates for those facilities being open for each month. In the Downeast/Acadia Region, where 33 percent of the facilities are open year-round, the highest occupancy rate for 1985, 78 percent, is seen in August; and the low of 25 percent is in December and January.

Campgrounds

There are approximately 39 campgrounds with 3,621 campsites located in the Downeast/Acadia Region. Within the region, 72 percent of the campgrounds are located in or near Ellsworth or Bangor (14 campgrounds each). Bar Harbor has over half of the available campsites in the region, followed by Ellsworth and Bangor, with slightly less than one-quarter each.

The average length of stay in a campground in the Downeast/Acadia Region was 3.1 nights, compared with 3.7 nights statewide. The average number of persons per camping party in the region was 3.1 persons, compared with 3.4 persons statewide.

Average occupancy rates for campgrounds in the Downeast/Acadia Region are lower than for the state (40 percent versus 43 percent in 1985). Occupancy is highest during the months of July and August (up to 70 percent), but falls to less than 10 percent in the off season. Nearly all the camprounds are closed from November through April.

Traveler Characteristics

There is a difference between the resident traveler and non-resident traveler in the Downeast/Acadia Region. The typical resident traveler is married, middle-aged, educated and in the low- to medium-income category. On the other hand, the typical non-resident traveler may be either married or unmarried, less educated, and in the middle-income range.

Resident and non-resident travelers participate in similar activities when vacationing in the Downeast/Acadia Region. Sightseeing/ cultural events are most popular with resident travelers, with 28 percent

participating; shopping and camping/picnicking are tied for second. Sightseeing/cultural events are also popular with non-resident travelers, with 44 percent participating. However, shopping is a close second (42 percent).

Acadia National Park

Acadia National Park on Mount Desert Island is one of the most popular attractions in Maine. Acadia was the first National Park established east of the Mississippi. Although one of the smaller National Parks, Acadia is reportedly among the ten most frequently visited areas in the National Park Service. Ninety percent of the Park's visitors come from the New England, mid-Atlantic, South Atlantic, and North Central states.

The park estimates that in 1986 4.1 million people visited the park. To obtain this estimate the park relies on a count of traffic passing over the Trenton Bridge from the mainland to Mount Desert Island. An estimation of the ratio of visitors to tourists is applied to this traffic count. This ratio was developed following a visual survey of vehicles crossing the bridge in 1977. This methodology does not take into account the increased development of Mount Desert Island since 1977 or the other possible destinations for tourists to the Island and may result in double counting of individual visitors. Table II-8 presents the park's estimate of visitation to Acadia National Park.

SUMMARY

The Bangor market area was evaluated and divided into primary, secondary, and tertiary markets for the purpose of analysis. The residents of these three market areas represent potential visitors to an aquarium in Bangor. The visitor market was profiled based on statistics available from the Maine State Development Office. In 1985, 1.1 million travelers visited the Downeast/Acadia Region. Tourism to this region is highly seasonal. Sightseeing and cultural events are the most popular activities of visitors to this region.

Table II-8

VISITATION AT ACADIA NATIONAL PARK

Year	Total Visitation	Percent Change
1977	3,181,269	
1978	3,130,126	(1.61%)
1979	2,883,279	(7.89%)
1980	3,273,095	13.52%
1981	3,402,973	3.97%
1982	3,754,230	10.32%
1983	4,270,663	13.76%
1984	3,918,387	(8.25%)
1985	3,928,594	0.26%
1986	4,112,078	4.67%
Average, 1977-1981	3,174,148	
Average, 1982-1986	3,996,790	25.92%

Source: Acadia Naional Park and Economics Research Associates.

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Section III

COMPARABLE ATTRACTIONS

Economics Research Associates interviewed personnel at five existing aquariums and one proposed aquarium comparable to that being considered in Bangor to determine their program content, operational information, and market characteristics. This information provides a basis from which attendance and financial projections for the Bangor Aquarium may be made.

Huntsman Aquarium-Museum; St. Andrews, New Brunswick

The Huntsman Aquarium-Museum is part of the Huntsman Marine Laboratory, a non-profit, education and research organization. The laboratory's goal is to develop an integrated and successful center for the pursuit of research and teaching in the marine sciences. The Huntsman Marine Laboratory was founded in 1969 on a 20-acre site provided by the Canadian Federal government through the Department of Fisheries and Oceans. An additional 50 acres were provided by the New Brunswick provincial government. The Huntsman Marine Laboratory is located on the shore of the St. Croix estuary and its confluence with Passamaquoddy Bay in the Quoddy region of the Bay of Fundy. The Huntsman Marine Laboratory is located in a 10,000 square foot facility in addition to several residential structures.

All of the animals exhibited at the aquarium were collected from the beaches and waters of the Quoddy region. The collection includes Atlantic salmon, lobster, crabs, clams, mussels, limpets, sea urchins, sea cucumbers, and sand dollars. Approximately half of the exhibits are dry displays. A touch pool was completed in 1986. A slide show titled "Quoddy Seas and Shores" was developed in 1986 also, as part of the interpretive program aimed at students in grades 7 through 12.

The Huntsman Marine Laboratory is host to students and researchers year-round, while the aquarium-museum is open from Victoria Day (mid-May) to the end of October. The aquarium-museum is open from 10 a.m. to 6 p.m.

Admission price for adults is C$3.00, for students age 6 to 18 is C$2.00, and for seniors is C$2.00. Children age 5 years and under are admitted free. The group admission price is C$2.00 for adults and C$1.50 for students. The aquarium-museum currently does not offer memberships.

In fiscal year 1986-1987, 23,000 persons visited the aquarium-museum in addition to 1,525 students in groups. Most visitation occurs in July and August, with most student groups visiting in late May and early June. Aquarium management estimates that 20 percent of total visitation is from the local area and the remainder are tourists from Canada and the northeast United States. The majority of student groups are from Maine. The average length of stay for visitors is one to one and one-half hours.

Shippagan Marine Centre; Shippagan, New Brunswick

The Shippagan Marine Centre opened in 1982 and is owned and operated by the New Brunswick Department of Fisheries. The Provincial Treasury supplied C$550,000 of the C$700,000 operating cost of the Centre in 1986. (The balance of the revenue was from admissions.) The Marine Centre is housed in a 38,800 square foot facility on an eight acre site in Shippagan. Shippagan is located on the northwest peninsula of New Brunswick on the Gulf of St. Lawrence.

The Marine Centre collection includes over 3,000 specimens representing 90 different species of fresh and salt water fish, crustaceans and marine mammals. The Centre houses 21 large tanks and nine small, holding 91,000 litres (24,000 gallons) of salt water; 50,000 litres (13,000 gallons) of fresh water; and 114,000 litres (30,000 gallons) in the harbor seal basin. Special exhibit themes include the Fishing Industry in New Brunswick and the History of Boat Building in New Brunswick.

The Marine Research Centre operates year-round, but the aquarium is seasonal. In 1987, the Centre is open to visitors from May 3 to September 6. During the off-season, the Centre is open for groups with reservations. Daily hours are 10 a.m. to 6 p.m. Admission to the Centre is C$3.00 for adults, and C$1.50 for students 6-16 years old. Children under 6 and senior citizens who are residents of New Brunswick are

admitted free. Because the Centre is owned by the Province, there are no memberships sold.

In 1986, approximately 58,000 visitors toured the aquarium, of which 47,000 were paid admissions. Aquarium staff estimate that 60 percent of visitors are from Quebec, 30 percent are from New Brunswick and the Atlantic Provinces, 2 percent from Ontario, 1.5 percent from the U.S., and 1 percent from Europe. The estimated length of stay for visitors is one to one and one-half hours. This includes an audio-visual presentation at the beginning of the visit which lasts 25 minutes. Aquarium staff estimate that 40 percent of total visitation occurs during July, 30 percent during August, and 15 percent each in May and June.

Maine Aquarium; Saco, Maine

The Maine Aquarium, located on Route 1 in Saco, Maine, opened in September 1984. The privately owned facility is housed in a 14,000 square foot building on 70 acres of land. The Maine Aquarium's orientation is educational as well as entertainment.

The aquarium's collection includes moray eels, penguins, an octupus, tropical fish, sharks, trout and spiney lobsters. Three hundred specimen are housed in 25 separate tanks including a 28,000 gallon shark tank and a 16,000 gallon seal tank. Habitats created at the aquarium include: salt marsh; Maine lake; Biddeford pool community; Atlantic nearshore; Pacific, Hawaiian and Caribbean coral reef communities; and an Amazon River community. There are also videotape presentations.

The adult admission price at the aquarium is $5.00; students ages 5 to 12 pay $3.50; children ages 2 to 4 pay $1.00 and children under 2 are admitted free. Adult chaperones with student groups are admitted free. Memberships are available for families for $40.00 and for individuals for $25.00. Most of the aquarium's 3,000 memberships are family memberships. Hours of operation from June through Labor Day are 9:00 a.m. to 9:00 p.m., and from September to May 31st are 9:00 a.m. to 5:00 p.m. The aquarium is closed on Christmas Day. The aquarium employs 13 year-round employees and

an additional two to five as summer employees. In addition, the aquarium has ten volunteer workers.

Last year, approximately 100,000 visitors toured the Maine Aquarium, with 60 percent of total yearly visitation occurring in July and August. The majority of aquarium visitors are from Maine and Massachusetts, with additional visitors from New Hampshire. On average, visitors spend one to one and one-half hours at the aquarium. School groups spend, on average, two to three hours at the aquarium.

Marine Extension Service; Skidaway Island, Georgia

The Marine Extension Service, founded in 1970, is an integral part of the University of Georgia, a Sea Grant University. The function of the Marine Extension Service is to provide education, research, and advisory services on marine-related topics to the people of Georgia. The Marine Extension Center on Skidaway Island, Georgia (near Savannah) is the primary marine education facility for the Maine Extension Service.

The Center consists of an aquarium/museum facility, lecture halls, laboratories, a 54-bed dormitory, a cafeteria, a dock on the Skidaway River, and five boats for marine education fieldwork and research.

The aquarium facility located in the Marine Extension Center is a functional part of the educational program provided by the Center. Over 200 live animals are on exhibit representing approximately 50 species of fish and invertebrates commonly found on the Georgia coast. Additional exhibits in the aquarium show the historic and economic utilization of the marine environment from prehistoric times to the present.

Admission to the aquarium is free. The aquarium is open 9:00 a.m. to 4:00 p.m. on weekdays and 12:00 noon to 5:00 p.m. on weekends. The aquarium is closed on major holidays. Nearly 100,000 visitors toured the aquarium last year and nearly 15,000 students participated in organized marine education programs conducted by University of Georgia faculty and staff. Visitors not participating in a marine education program spend an average of one-half hour or less in the aquarium.

Fisheries Aquarium; Woods Hole, Massachusetts

The Fisheries Aquarium at Woods Hole, Massachusetts is the only aquarium in the U.S. run by the Federal Government (through the Department of Commerce; National Oceanic and Atmospheric Administration; National Marine Fisheries Service). It is also the oldest aquarium in the U.S., having been founded in 1885. The aquarium has two primary goals; to educate the public, and to support research related to the commercial fishing industry.

The Woods Hole Complex includes the Marine Biological Laboratory and the Woods Hole Oceanographic Institution (both private laboratories); and the Northest Fisheries Service and the Branch of Atlantic Geology of the U.S. Geological Survey (both government facilities) in addition to the Fisheries Aquarium. Taken together, the institutions occupy more than 50 buildings, use 13 research vessels and collecting boats, employ more than 1,000 persons, and offer instruction to approximately 500 students.

The aquarium's facilities are quite small; approximately 20,000 square feet on a two-acre site. The aquarium houses 16 salt water display tanks ranging in size from 75 to 2,800 gallons, displaying 30 or more species of fish. All fish in the aquarium are from the northeast coast of the U.S., with an emphasis on commercial species. In the summer, the Fisheries Aquarium has two harbor seals borrowed from the Mystic Marinelife Aquarium on display.

The Fisheries Aquarium charges no admission and does not offer memberships. The aquarium is open seven days a week from 10:00 a.m. to 4:30 p.m. during the summer and is open Monday through Friday from 9:00 a.m. to 4:00 p.m. during the winter months. The aquarium is closed on major holidays. Educational tours of the facility are offered to school groups ranging from children aged three to graduate students. The tours last approximately one and one-half hours. The aquarium has four full-time employees, in addition to six volunteers during the summer months.

Attendance at the Fisheries Aquarium is approximately 200,000 visitors annually, with visitation peaking in August. Tourists to

Nantucket and Martha's Vineyard account for 80 percent of total aquarium visitation. Visitors stay an average of one-half to three-quarters of an hour in the facility. This abbreviated length of stay is due to three primary factors: the aquarium is located proximate to the ferry terminal linking Nantucket and Martha's Vineyard with the mainland; the aquarium charges no admission; and the aquarium's collection is limited.

Gulf of Maine Aquarium; Portland, Maine

The Gulf of Maine Aquarium is proposed for development on a 2.2 acre waterfront site in Portland, Maine. From 1978 to 1982, a seasonal aquarium constructed on a floating barge was operated in Portland. The mini-aquarium was closed in 1982 in order for the sponsoring group to devote all its resources to planning for a permanent facility.

Preliminary design plans call for a 27,000 square foot facility. The planned exhibit sequence will take visitors through Maine's fresh and salt water environments; from Mount Katahdin to the Sea.

Current plans call for an admission price of $5.00 for adults, $4.00 for students, and $3.00 for children. A 1983 study conducted by a consultant to the sponsoring group projected annual attendance in the range of 275,000 to 325,000 for the proposed facility. Total development costs for the proposed aquarium range from $10.5 to $13.5 million.

Fund-raising efforts to date have secured $600,000 for the development effort. Current family memberships number 750 and business memberships exceed 200.

SUMMARY

Economics Research Associates interviewed personnel at five existing aquariums and one proposed aquarium comparable to that being considered in Bangor. General characteristics of these facilities are provided in Table III-1. With the exception of the Skidaway Island, Georgia facility, all the aquariums are located in New England or the Atlantic Maritime Provinces of Canada. Visitation levels range from lows of 23,000 at the Huntsman Aquarium-Museum and 58,000 at the Shippagan Marine Centre (both

Table III-1

GENERAL CHARACTERISTICS OF COMPARABLE AQUARIUMS

	Huntsman Aquarium Museum; St. Andrews, NB	Shippagan Marine Centre; Shippagan, NB	Maine Aquarium; Saco, ME	Marine Extension Service Skidaway Island, GA	Fisheries Aquarium Woods Hole, MA
Attendance					
Total	23,000	58,000	100,000 3/	100,000	200,000
Paid	NA	47,000	80,000	-0-	-0-
Hours					
Summer	10-6	10-6	9-9	9-4 M-F 12-5 S, S	10-4:30
Winter	NA	NA 1/	9-5	9-4 12-5 S, S	9-4 M-F
Ticket Prices					
Adult	C$3.00	C$3.00	$5.00	-0-	-0-
Student	2.00	1.50	3.50	-0-	-0-
Child	Free	Free	1.00	-0-	-0-
Seniors	2.00	3.00 2/	5.00	-0-	-0-
Number of Memberships	NA	NA	3,000	NA	NA
Membership Prices					
Family	NA	NA	$40	NA	NA
Individual	NA	NA	$25	NA	NA
Building Area	10,000 s.f.	38,000 s.f.	14,000 s.f.	NA	20,000 s.f.
Site Area	70 acres	8 acres	70 acres	680 acres	2 acres
Estimated Average Length of Stay	1-1.5 hrs	1-1.5 hrs	1-1.5 hrs	.5 hrs	.5-.75 hrs

1/ Open to groups with reservations.
2/ Admission free for seniors who are residents of New Brunswick.
3/ Estimate provided by owner of aquarium.

Source: Aquariums surveyed and Economics Research Associates

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facilities are located in remote areas and are oriented primarily toward research), to highs of 100,000 at the Maine Aquarium in Saco and the Skidaway Island facility, and 200,000 at the Fisheries Aquarium at Woods Hole, Massachusetts (these facilities are located in areas of heavy tourist traffic).

The Huntsman Aquarium-Museum and the Shippagan Marine Centre are open to visitors only during the summer months, while research is conducted year-round. The Skidaway Island facility and the Woods Hole Aquarium do not charge admission. The Maine Aquarium in Saco, Maine charges an adult admission price of $5.00 and offers memberships for $40.00 (family) or $25.00 (individual).

The smallest facility surveyed is the Huntsman Aquarium-Museum (10,000 square feet), and the largest is the Shippagan Marine Centre (38,000 square feet). The Skidaway Island facility has the most extensive grounds (680 acres), and the Woods Hole Aquarium has the least (2 acres). The Skidaway Island facility and the Woods Hole Aquarium have the shortest estimated average length of stay of visitors (.5 to .75 hours). Both of these facilities have small display areas and collections.

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Section IV

PROPOSED PROGRAM FOR THE BANGOR AQUARIUM

The Bangor Waterworks building complex provides a special opportunity for a mixed-use development focused on the Penobscot River and the creation of a unique River Center.

The buildings which comprise the Waterworks are for the most part single story brick structures, most of which enclose high spaces with open wood framed roof trusses. These structures surround the forebay, an embayment designed to contain the Penobscot's diverted waters and operate the turbines in the Waterworks. This man-made embayment is conceived as the central element of the complex and the location of the primary aquatic exhibits. The embayment or forebay, would be reinforced and, if necessary, reconstructed. The public galleries would be built within the structure of the forebay with viewing windows located continually along the forebay edge. Within the forebay, major outdoor naturalistic exhibits concentrating on the river system from its source at Moosehead Lake to the sea would display river otters, beavers, harbor seals, cormorants, a Penobscot Bay tank (interior space), and a rocky shore tide pool exhibit. The forebay would become a miniaturized piece of the river and bay. With minimum cost, the forebay could provide a setting for the major large scale exhibits.

The roof of the viewing galleries and Penobscot Bay tank would be covered by a deck for public access thereby providing overlooks to the river and places for above-water close-up viewing of the mammals and birds.

New construction within the forebay would provide 10,000 square feet of interior public gallery space with viewing into approximately 14,000 square feet of natural habitats. Within the gallery, the following exhibits are envisioned:

- Introduction to the Penobscot River system;
- The River's Source;
- White water tank;

- Penobscot River Room - River view and jewel tanks;
- River Otters (exterior habitat exhibit);
- Beavers (exterior habitat exhibit);
- Atlantic Salmon;
- The Art of Fishing;
- Harbor Seals (exterior habitat exhibit);
- Diving Birds (exterior habitat exhibit);
- Penobscot Bay Tank.

Exhibits on the upper level deck areas would deal directly with the river and bay habitats presented. A boardwalk could extend this deck area out into the tidepool exhibits and allow both children and adults an opportunity to inspect the rock crevices for crabs, mussels, starfish and sea urchins. Exhibits on boat-building, the Penobscot Indians, lumbering and other river topics could create interest and activity in the deck area.

The entrance to the Waterworks would serve as the entrance for the aquarium experience with views out to the embayment, to the otters and seals and the Penobscot River beyond. Adjacent to the entrance, a 150-seat auditorium and a changing exhibit gallery would be immediately accessible from the lobby at the upper level. Another portion of the Waterworks containing the majority of the original turbine equipment could present an exhibit on the building's original use and man's efforts to control the river.

A gift shop, bookstore, snack bar, and tackle shop are also proposed. The snack bar would open directly onto the deck area, allowing outside dining during warm weather. In addition, space would be available in the remaining structures for possible restaurant and retail development. The addition of a structure at the north end of the forebay would enclose the outdoor exhibit space and provide a structure for 15,000-20,000 square feet of retail space.

The space program outlined on Table IV-1 is organized by major use. These uses are indicated on the Waterworks plan shown in Figure IV-1 and the concept plan shown in Figure IV-2. A cross-section of the Waterworks through the embayment is shown in Figure IV-3.

Project Capital Costs

The existence of the forebay provides a unique opportunity. The new exhibit gallery within the space of the forebay is conceived as a single concrete construction with large viewing windows into the underwater exhibits, the roof covered with a wood deck platform. The forebay walls provide a form for new walls and habitat construction. The result is a series of large-scale habitat exhibits seen both above and below the water surface at a minimum cost.

The existing brick structures house dry exhibits and non-aquarium uses appropriate for these spaces.

The estimate of capital costs provided in Table IV-2, is based on the experience at other similar facilities and is for budget purposes only. Preliminary review of the existing structures has been completed by Webster, Baldwin, Rohman, Day, Czarniecki, P.A., Architects and Engineers of Bangor, Maine. The cost of restoration is presented in their report of July 27, 1987. A developed preliminary design will generate a more definitive estimate of probable cost.

Development Considerations

The estimated capital costs discussed in the preceeding section indicate that the Waterworks project could be developed as a mixed-use project, which could include both the aquarium use as well as restaurant, retail and/or office uses. The development could be phased to include the aquarium facilities and associated commercial uses with new construction (retail/office) coming later in the process. A non profit entity could develop the project and then master lease the retail space to a retail developer, or, some of the office space might be leased to associated users such as the University Sea Grant program or others. A major

Table IV-1

SPACE PROGRAM

	Building Reuse	New Construction
Aquarium (Interior Areas)		
A 1. Lobby	2,400 s.f.	
A 2. Auditorium (150 seats)	1,300	
A 3. Changing Exhibit Area	1,000	
A 4. Administration/Education	2,400	
A 5. Exhibit Galleries/Exhibits		14,000 1/
A 6. Service/Mechanical	6,000	
Total	13,100 s.f.	14,000 s.f.
Aquarium (Exterior Exhibits)		
B 1. River Otter Exhibit		(3,500)
B 2. Beaver Exhibit		(1,500)
B 3. Harbor Seal Exhibit		(6,500)
B 4. Cormorant Exhibit		(1,000)
B 5. Tide Pools		(2,500)
Total		(15,000)
Gift Shops		
C 1. Souvenir Shop/Storage	1,500	
C 2. Book Shop/Storage	1,500	
C 3. Tackle Shop/Storage	1,000	
Total	4,000	
D. Snack Bar/Kitchen	2,000	
E. Restaurant/Kitchen	5,400	
F. Retail	5,000	
G. Retail (potential)		10,000-15,000
TOTAL (Interior Areas)	29,500 s.f.	24,000-29,000 s.f.
TOTAL (Exterior Exhibits)		(15,000) s.f.

1/ Includes Penobscot Bay tank (1,500 s.f.)

Source: Cambridge Seven Associates.

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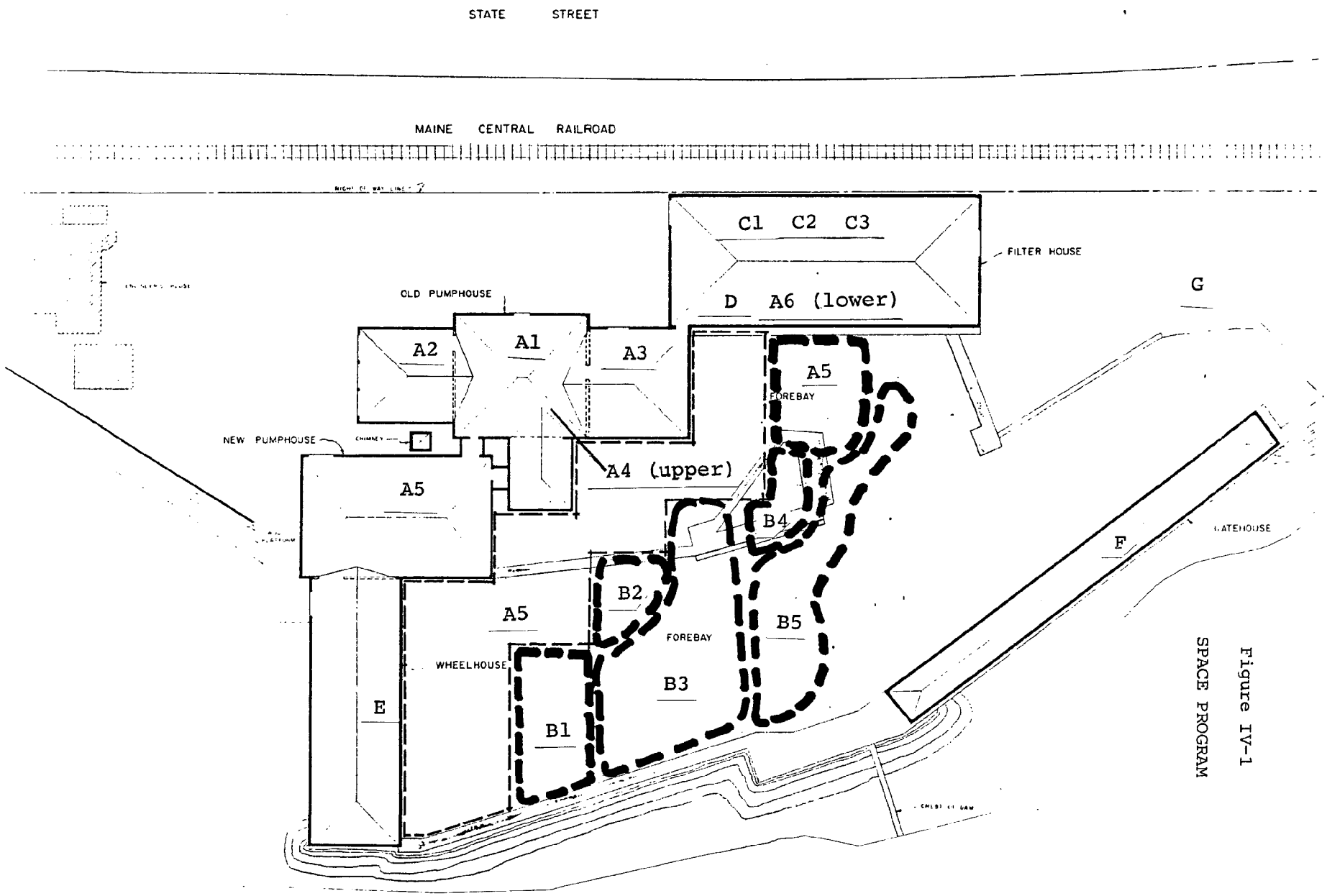

Figure IV-1
SPACE PROGRAM

Figure IV-2

WATERWORKS CONCEPT PLAN

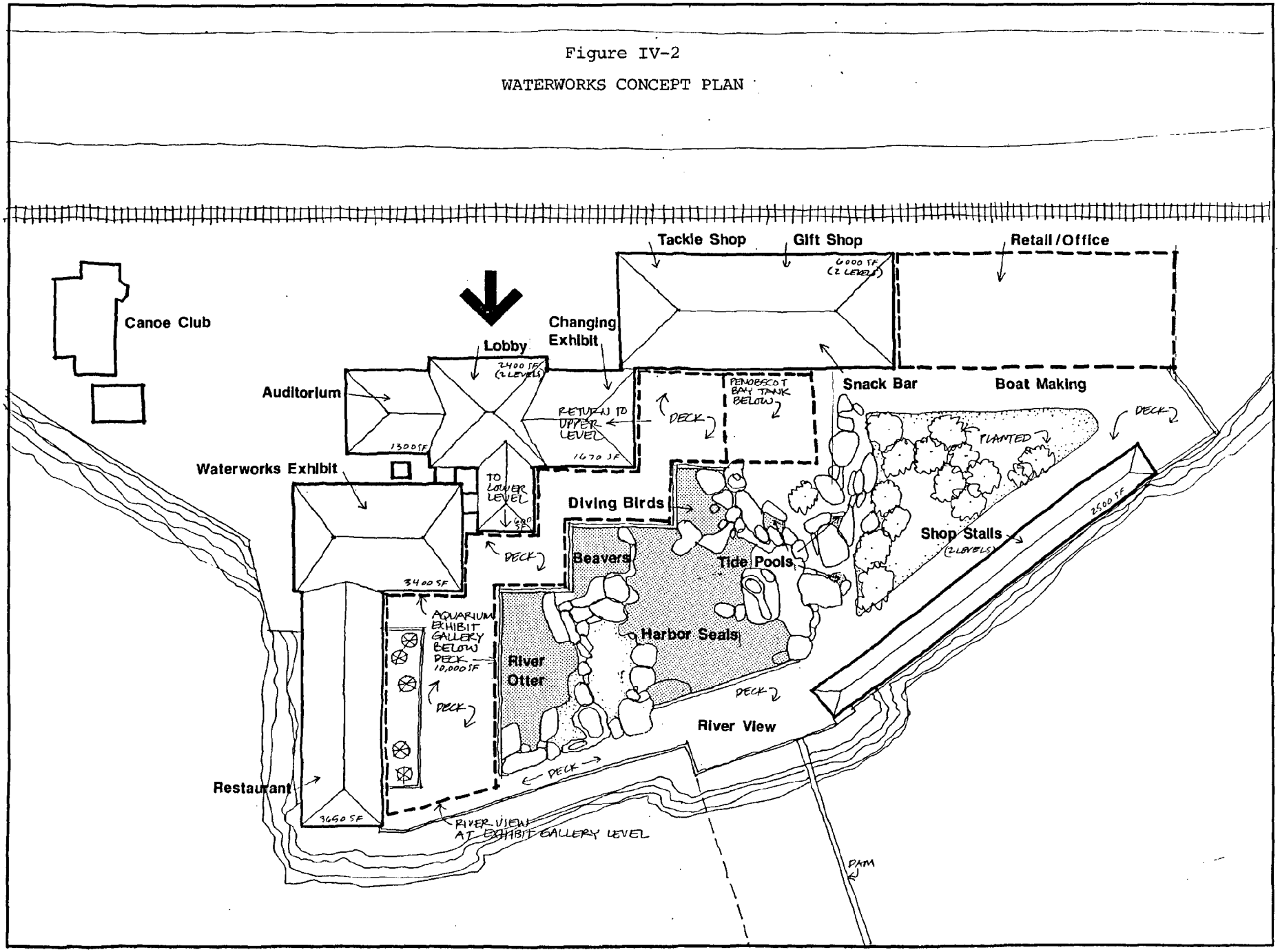

Figure IV-3

WATERWORKS CROSS-SECTION THROUGH EMBAYMENT

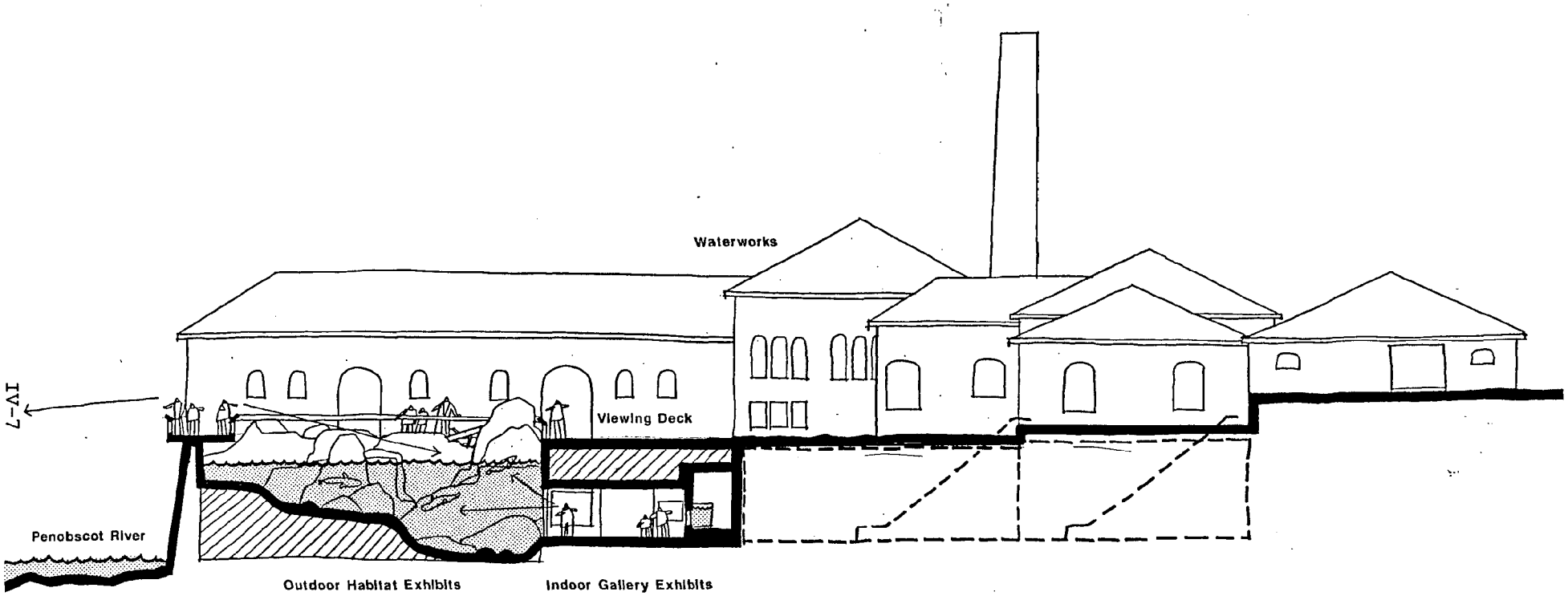

Table IV-2

ESTIMATE OF CAPITAL COST

Interior Aquarium Construction and Exhibits	Range of Cost	
Building Re-Use (A1-4, A6, C, D) (19,100 SF x $60-75 per SF)	$ 1,146,000 - $1,432,500	
Exterior Exhibits (B) (15,000 SF X $150-$200 per SF)	$ 2,250,000 - $3,000,000	
New Gallery Construction (A5) (14,000 SF x $200-$250 per SF)	$ 2,800,000 - $3,500,000	
Exterior Deck and Landscape Work	$500,000	
TOTAL AQUARIUM BUDGET		$ 6,696,000 - $ 8,432,500
Mixed-Uses		
Building Re-Use (E, F) (10,400 SF x $40-$60)	$ 416,000 - $ 624,000	
New Construction (G) (10,000-15,000 SF x $120)	$ 1,200,000 - $ 1,800,000	
TOTAL MIXED-USES		$ 1,616,000 - $ 2,424,000
TOTAL RESTORATION 1/		$ 1,000,000
TOTAL PROJECT BUDGET ESTIMATE		$ 9,312,000 - $11,856,500

1/ From Webster, Baldwin, Rohman, Day, and Czarniecki report, July 27, 1987.

Source: Economics Research Associates; Cambridge Seven Associates; and Webster, Baldwin, Rohman, Day, and Czarniecki as noted for restoration estimate.

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retailer with an outdoor line of goods would also be a natural joint user for the property. The specifics of the mixed-use approach would need to be worked out in detail but should prove workable.

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Section V

ATTENDANCE PROJECTIONS AND PRO FORMA DEVELOPMENT FOR THE BANGOR AQUARIUM

Based on a review of successful smaller and/or seasonal aquariums in North America, existing tourism in the region and other related factors, and the proposed program as described in Section IV, Economics Research Associates outlines the following attendance projections, facility sizing, and preliminary operating budget for the Bangor Aquarium.

Attendance Projections

As in any work of this kind, a number of assumptions have been made about the operation of the proposed Bangor Aquarium. It is important to recognize that projections of potential attendance are predicated on the following assumptions:

- The design of the new facility and its exhibits will serve to create a high quality, stimulating attraction with broad-based audience appeal and a distinctive image.
- The aquarium will be a significant attraction; that is, it will be large and contain many exhibits.
- The facility will be competently and effectively managed.
- An aggressive promotional campaign will be developed and implemented.
- The aquarium will be open to the public on a year-round basis.
- There will be no physical constraints to impede visitors to the facility.

Attendance projections for the proposed Bangor Aquarium are summarized by the data in Table V-1. A stable year is defined as a year in which the Bangor Aquarium is fully operating with no major events or obstructions affecting attendance. The first and second years of operation are not considered stable years and may have higher attendance due to the aquarium's status as a new facility.

Table V-1

STABLE YEAR ATTENDANCE PROJECTIONS

	1991 Population Projection	Capture Rate 1/	Projected Stable Year Attendance 2/
Primary Market	121,887	.20 - .30	24,377- 36,566
Secondary Market	170,790	.10 - .15	17,079- 25,619
Tertiary Market	451,298	.03 - .05	13,539- 22,565
Total Resident Market			54,995- 84,750
Tourist Market	1,100,000 3/	.03 - .05	33,000- 55,000
Total Projected Attendance Range			87,995-139,750
Attendance Range Average			113,873
Planning Estimate			114,000

1/ Market area capture rates based on experience of other aquarium attractions and competitive position of the aquarium in relation to other visitor attractions in the Bangor area.

2/ Range dependent upon program content, hours of operation, membership program, marketing, and other related factors. Assumes adequate parking and transportation access, and $4.00 adult admission.

3/ Estimate based on 1985 estimate of non-resident tourism levels in the Downeast/Acadia Region, as described in Section II of this report. Resident tourism would add another 1.2 million visitors.

Source: Economics Research Associates

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Economics Research Associates projects annual attendance of 87,995 to 139,750 visitors for the proposed facility. Using 1991 population projections, Economics Research Associates estimated that the facility will achieve a penetration rate of 20 to 30 percent of the primary market, 10 to 15 percent of the secondary market, and 3 to 5 percent of the tertiary market. Adding these markets together results in an estimated attendance range of 54,995 to 84,750 from the total resident market. An additional 33,000 to 55,000 may be expected from the tourist market. For the purposes of this analysis, Economics Research Associates used a planning estimate of 114,000 total visitors, the rounded average of the projected attendance range.

Facility Sizing

The information presented in Table V-2 utilizes the attendance projections to estimate the size of the facility. In a stable year, 50 to 55 percent of the total visitation should occur during the peak months of July and August. Using the planning estimate of 114,000 visitors, this results in an attendance range of 57,000 to 62,700 people in these two months. Weekly attendance during the two-month peak period would average 6,436 to 7,079 visitors. Average high day counts (most likely weekend days) during this period are projected at 1,287 to 1,416 people.

Assuming an average length of stay of two hours, peak accumulations of visitors within the Bangor Aquarium are estimated at 386 to 425 people. Sizing estimates for the facility are shown based on the peak visitation within the facility. If 30 square feet of exhibit space were required for each visitor in the facility, the exhibit area would measure 11,580 to 12,750 square feet. If 40 square feet of exhibit space were required, the exhibit area would measure 15,440 to 17,000 square feet. At a 1.5 ratio of exhibit space to support space (administration and education) the total facility would measure 17,370 to 25,500 square feet. At a 2.0 ratio, the total facility would measure 23,160 to 34,000 square feet.

Parking requirements also are a function of peak visitor accumulations in the facility on a high day of visitation. Assuming 95 percent of the visitors arrive by automobile at an average of 2.5 visitors

Table V-2

STABLE YEAR AVERAGE VISITATION

Annual Visitation Estimate	114,000 visitors
Peak Two Months (50-55%)	57,000-62,700 visitors
Average Weekly Attendance During Peak Two Months (8.857 weeks)	6,436- 7,079 visitors
Average High Day Attendance During Peak Two Months (20% of weekly average) 1/	1,287- 1,416 visitors
Peak In-facility Attendance (30% of average high day) 2/	386- 425 visitors
Parking Requirements 3/	147- 162 cars
Sizing of Exhibit Area	
Minimum (30 sq.ft. per peak visitation)	11,580-12,750 sq.ft.
Maximum (40 sq.ft. per peak visitation)	15,440-17,000 sq.ft.
Total Size (1.5 to 2.0 of Exhibit Area)	
Minimum Size: 1.5 ratio	17,370-19,125 sq.ft.
2.0 ratio	23,160-25,500 sq.ft.
Maximum Size: 1.5 ratio	23,160-25,550 sq.ft.
2.0 ratio	30,880-34,000 sq.ft.

1/ Typically a weekend day or holiday.

2/ Assumes two-hour length of stay.

3/ Assumes 95% of visitors arrive at destination by auto on average high day in summer months. During school visitation periods, mode-split will increase to account for arrival by school buses. 2.5 persons per vehicle are assumed for recreation trips. A longer average length of stay at the facility could increase parking demand. A higher mode-split could decrease parking demand.

Source: Economics Research Associates

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per car, the average high day during peak season would produce a peak parking accumulation of 147 to 162 cars. These calculations are also shown in Table V-2.

Operating Characteristics

Some assumptions regarding the Bangor Aquarium were made after reviewing the very preliminary program described above. This information was used to estimate expenses and revenues for the facility. First, Economics Research Associates assumed winter operating hours of 9:00 a.m. to 5:00 p.m. and summer hours of 9:00 a.m. to 7:00 p.m. The later summer hours allow the facility to capitalize on the warmer weather, beautiful view, and increases in summer visitation. Summer hours run from Memorial Day through Labor Day.

Also, an adult ticket price of $4.00 was assumed. At the comparable aquariums, children's prices generally are approximately 60 percent of adult costs. Economics Research Associates, therefore, used 60 percent of adult ticket price to determine children's entrance fees. It is estimated that the average visitor would spend two hours in the proposed aquarium.

Achievable Operating Revenues

The range of operating revenues is dependent on the number of visitors. The planning estimate of 114,000 visitors per year was used, with results shown in Table V-3. Using a $4.00 adult admission and $2.50 admission for children (and taking into account free and other admissions factors), Economics Research Associates estimates that admissions revenue will approximate $348,840. It is projected that ten percent of the facility's attendance will be free or group attendance. Fifty-four percent of the facility's attendance will be adults, and the remaining 36 percent will be children, yielding a per capita admission of $3.06. This was used to derive the $348,840 figure for annual revenue from admissions. With a membership level of approximately 3,000 people at $30 a year, ERA estimates membership revenue at $90,000. Retail revenues are estimated at $2.00 per visitor. The Other Revenue category is estimated at $50,000, and would include investment earnings, private grants and donations, potential event rental income, and other revenues. Total revenues equal approximately $716,840.

Table V-3

SUMMARY OF ANNUAL OPERATING SURPLUS BASED
ON STABLE YEAR AVERAGE ATTENDANCE PROJECTIONS

	Average Stable Year
PROJECTED ATTENDANCE	114,000
REVENUES	
Admissions 1/	$ 348,840
Membership 2/	90,000
Retail Sales 3/	228,000
Other 4/	50,000
TOTAL REVENUES	$ 716,840
EXPENSES	
Exhibit Development & Display 5/	$ 199,500
Education & Research 6/	-0-
Facilities 7/	228,000
Administration/Accounting/Marketing 8/	171,000
Retail Sales 9/	91,200
TOTAL EXPENSES	$ 689,700
OPERATING SURPLUS	$ 27,140

1/ Admission is $4.00 for adults, and $2.50 for children; assuming that of the total visitation: 10% pay $0.00 Admission
54% pay $4.00 Admission
36% pay $2.50 Admission

Per Capita = $3.06 Admission

2/ 3,000 members at $30 per membership.
3/ $2.00 sales per visitor, at the aquarium shop only.
4/ Includes investment earnings, private grants & donations, potential event rental income, and other miscellaneous revenues. Does not include rental income from mixed-use development, which could be significant.
5/ $1.75 per visitor.
6/ Assumed to be self-supporting, with income from and relationships to other educational and research institutions. Typically $1.00 to $2.00 per visitor.
7/ $2.00 per visitor.
8/ $1.50 per visitor.
9/ 40 percent of $2.00 sales per visitor = $.80 per visitor.

Source: Economics Research Associates.

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Achievable Operating Costs

Operating Costs also were estimated on a per capita basis, ranging between $1.50 per visitor for administration/accounting/marketing, to $2.00 per visitor for facilities costs. Retail sales expenses are estimated at 40 percent of sales revenue, or $.80 per visitor. Using this methodology, total expenses are estimated at $689,700. It should be noted that marketing costs for the opening year will be higher than in a stable year of operation, as the Bangor Aquarium will be preparing initial announcements and positioning itself within the market. These costs, however, are likely to be offset by higher attendance revenues.

With these revenues and expense projections, the Bangor Aquarium would achieve an annual operating surplus of $27,140. At this point in the feasibility analysis, it appears that the proposed aquarium could draw sufficient visitation to achieve adequate operating revenues in a stable year.

Summary

We estimate an average visitation of 114,000. This estimate is within the range of comparable aquariums' market penetration ranges. A stable year pro forma for the facility indicates a slight surplus in operating revenue.

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