



2.8 RECREATION

2.8.1 INTRODUCTION

Delaware’s natural resources provide a variety of recreational opportunities for the state’s residents and visitors. The Inland Bays/Atlantic Ocean Basin represents a major provider of tourist-based income and recreational opportunities. These include fishing, pleasure boating, shellfishing, crabbing, hunting, and visiting adjacent public lands for a variety reasons, which include hiking, hunting, wildlife watching, and as a means of gaining access to the bays themselves. The Basin contains four state parks, two state wildlife areas, two state fishing areas, eight public boat launch ramps, and one publicly-owned marina.

There has been a 25-year dialogue regarding the question of “killing the goose that lays the golden eggs.” The natural environment that draws people to coastal Sussex County is potentially threatened by its very popularity — increasing use, conflicting uses, development — all possibly compromising the long-term sustainability of the resource vis-a-vis its recreational value and appeal. This is a question that must be explored in depth, as 78 percent of respondents to a 1995 visitor profile study cited either “outdoor recreation,” or “beach,” as the primary reason for visiting coastal Sussex (Jacobson et al., 1995).

2.8.2 TOURIST-BASED RECREATION

The Inland Bays/Atlantic Ocean Basin includes four of Delaware’s fourteen state parks: Delaware Seashore, Fenwick Island, Holts Landing, and Cape Henlopen. These parks comprise about 8,600 acres — approximately 43 percent of the acreage in Delaware’s state park system, taking in more than 14 miles of Delaware’s 24 miles of Atlantic coast beaches. The Division of Fish and Wildlife manages more than 3,200 acres of land and water in the Basin that draw visitors for fishing, hunting, and other forms of recreation. These include Assawoman Wildlife Area and fishing sites such as Love Creek, Ingram Pond, Massey’s Landing, Pepper Creek, Millsboro Pond, and Rosedale Beach.

A visitor survey was conducted in all of Delaware’s state parks during May through October, 1993. According to this survey, the vast majority of visitors to the four state parks in the Basin are tourists, primarily from Maryland, Pennsylvania, and New Castle County. Of these parks, Holts Landing is the only one where the majority (58 percent) of the visitors are from Sussex County.

According to the survey, the most popular activities in which park visitors participate at the three beach parks (Cape Henlopen, Delaware Seashore, and Fenwick) are

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swimming, sunbathing, and walking. In addition, other highly popular activities at Delaware Seashore State Park include fishing, surfing, picnicking, and boating. At Holts Landing, the most popular activities are boating/canoeing, fishing, and clamming.

2.8.2.1 Indirect Water-Contact Recreation

Boating-Related Activities

The Delaware Division of Fish and Wildlife is responsible for overseeing recreational boating, including boat registration, boating safety courses, marine patrols, and public boating access. In addition to exploring these mechanics, several boating/water-use studies are explored herein (Pingree, 1989; Univ. of Delaware 1985 Recreational Boating Survey; Univ. of Delaware 1991; Falk, 1996).

Since 1989, uses have shifted to a degree, potentially as a function of more disposable income, the advent of personal watercraft, as well as increased regular access to the bays via an increase in second home ownership in the Basin.

Boating carrying capacity on the Inland Bays was explored in 1991. “Recreational Boating On Delaware’s

Inland Bays: Implications for Social and Environmental Carrying Capacity” examined social and environmental impacts of boating. Yet another survey in 1996 duplicated the methods used in the 1985 study. This report, entitled *1995 Delaware Boating Study: An Analysis of Delaware-Registered Boaters* by Jim Falk at the University of Delaware Sea Grant College Program, provides most of the following information.

The profile of the “average” boater responding to Falk’s 1996 survey was a 54-year-old male with at least a high school diploma, who earned between \$40,000 and \$50,000 a year in a full-time job, had 25 years of boating experience, owned a mid-sized boat (16 to 25 feet), and boated an average of 34 days per year (during the 1994 season) while fishing or pleasure boating on the Inland Bays. He was also likely to trailer his boat and launch at a public ramp because the site provides (1) safe parking; (2) easy launch and retrieval; and (3) an uncrowded, well-maintained facility (Falk, 1996). Forty-three percent felt additional ramps were needed in the Inland Bays. The most important boating-related concerns were:

- ◆ Boaters operating in an unsafe manner;
- ◆ Boaters operating while under the influence; and
- ◆ Poor water quality.

The 1995 study reported estimates of power boating activity within the Inland Bays. Of all boating activity engaged by Delaware-registered boaters, 33 percent of the boating occurred in the Inland Bays, comprising 21,000 boaters spending some time boating on the Inland Bays (52 percent of boaters using the Inland Bays multiplied by 42,452 registered boats statewide). Falk estimated that 481,123 total boating days occurred on the Inland Bays. Ten percent of all boating activity took place in the Atlantic Ocean, representing 144,337 boating days.

Congestion is an increasing problem. Drift fishing is especially popular in and near Indian River Inlet. Crowding at public launch facilities is also an increasing problem. As an example, the Lewes Fishing Access Area, with 75 parking spaces, is often over-flowing by 7:00 a.m. Crowding, plus boat congestion and conflicts, necessitated the hiring of a ramp attendant in 1996. Massey’s Landing, formerly a busy private marina and boat ramp at the end of Long Neck Road, was purchased by the Division of Fish and Wildlife in 1997 to satisfy the demand for access. Parking spaces were increased to 180 in the 1999–2000 renovation at Massey’s Landing Boat Launching Area.

A further example of congestion came with a terrible result in August 1998. A larger in-bound boat collided with a smaller aluminum boat within the Indian River Inlet, resulting in two fatalities.

A Water Use Plan was published in 1999 for the Center for the Inland Bays by the University of Delaware Sea

Grant College Program. The plan was developed under the Habitat Protection Action Plan of the Inland Bays Comprehensive Conservation and Management Plan. It address recreational uses, habitat, and habitat uses on the Inland Bays and the conflicts among these different issues. It includes strategies for dealing with these issues. An implementation committee is in place to work on implementing the water-use plan.

Fishing

Recreational saltwater fishing within the Inland Bays and nearshore Atlantic Ocean is extremely popular. In Falk’s 1995 Boating Survey, 78 percent of the boaters listed fishing as the primary reason for boating. The Inland Bays received an estimated 481,123 boating days. If 78 percent of the boaters also fished, a total of 375,276 days were spent fishing on the Inland Bays (as compared to 112,583 days on the ocean.)

The game species most sought after within the Inland Bays are summer flounder, sea trout, bluefish, tautog, white perch, rockfish, and winter flounder. In addition to these species, smooth dogfish, sandbar sharks, and kingfish are caught in the surf. The fishery in the ocean has the added variety of pelagic fish such as white marlin, yellowfin tuna, mako shark, cod, and ling.

Surf fishing is a popular activity at Delaware’s state park beaches. The Division of Parks and Recreation sells surf-fishing permits that allow users to drive their vehicles onto designated areas of the state park beaches for surf fishing. The number of state park beach miles open for surf fishing varies according to the time of year. While some areas are open for surf fishing year-round, other areas, such as the point at Cape Henlopen, are closed seasonally because of nesting birds or other management concerns. Between 1993 and 1997, there was an increase in surf fishing permit sales from 5,666 in 1993, to 6,909 in 1997.

Crabbing

Crabbing methods vary, including handlines, traps, trotlines, and pots. The most popular method is the familiar handline baited with chicken. The most popular commercial method of catching crabs is the crab pot. Crabbing with a hand line may occur from a pier, bank, or boat. Trotlines are usually long lines attached to a buoy on one or both ends, baited in 6-foot intervals with eel, fish, or chicken, and stretched along the bottom. Trotline use is limited in the Inland Bays. Resident crabbers, regardless of method of take, are limited to one bushel per person per day.

2.8.2.2 Land-Based Recreation

Hiking and Biking

Hiking and bicycling are activities that continue to grow in popularity. Trails and pathways are a growing

part of Delaware's recreation infrastructure. Over the past 10 years, the public has recognized a need to develop and expand trails and pathways to use for fitness, recreation, nature exploration, and transportation.

Delaware Outdoors, the state's comprehensive outdoor plan (SCORP), published in 1996, lists trails as one of the top 10 outdoor recreation needs statewide. In a 1995 telephone survey conducted in the development of the plan, trails, bike paths, and paved walkways were listed among the top needs in all of the SCORP planning regions that fall within the Inland Bays/Atlantic Ocean Basin. Trails and pathways in Delaware's state parks, wildlife areas, and other public areas help to meet this demand. These include Cape Henlopen State Park, Delaware Seashore State Park (Burtons Island), Holts Landing State Park, Assawoman Wildlife Area, and the James Farm site, managed by the Center for the Inland Bays.

While these trails help to meet the needs of residents and visitors in the Basin, additional investments in trails and pathways are needed to facilitate safe pedestrian and bicycle recreation and travel. Several options are currently being explored for trail alignments to connect Lewes with Rehoboth Beach. While the location of such a trail has been a matter of controversy, the need for pedestrian and bicycle trails and pathways off Route 1 is widely acknowledged.

The Division of Parks and Recreation works closely with local governments and other state agencies to provide trails for recreation and transportation. The Division grants one million dollars annually to local governments for the protection of greenway corridors and the development of trails through the Delaware Land and Water Conservation Trust Fund.

Wildlife Watching

Wildlife watching is a popular American past-time. Nearly 63 million U.S. residents participated in wildlife watching in 1996, including 192,000 people in Delaware. In FY 1998, 112,000 individuals visited Bombay Hook National Wildlife Refuge to observe wildlife. While this refuge is about one hour from the Inland Bays/Atlantic Ocean Basin, the attendance figures indicate that Delaware is a popular destination for wildlife watchers. Additionally, large numbers of foreign tourists participate in wildlife viewing in state and national parks, refuges, and other natural areas. Wildlife viewing opportunities abound within the Basin at a number of state parks and wildlife areas. Deer, whales, dolphins, and birds are some of the wildlife that attract visitors. Visitors from 47 states, Washington, DC, Puerto Rico, five Canadian provinces, and 24 foreign countries (other than Canada) signed a visitor log at the Cape Henlopen Seaside Nature Center.

While the majority of these visitors did not travel to the area solely for its wildlife watching, their visits to the

nature center speak to the universal interest in wildlife and perhaps the spiritual need and desire to connect with the natural environment that supports us all.

Golf

The growing legions of baby boomers taking up golf have swelled to more than 25 million — a 25 percent increase since the late 1980s. Golf course construction continues to escalate and currently stands at an average of about two courses constructed per day in the United States (double that of 10 years ago). Real estate development is associated with about 40 percent of the new courses, which can more than double the 150 acres typically needed for an 18-hole course. Research indicates that non-golfers are attracted to the open space.

Golf courses now represent a "mixed bag" relating to environmental consequences (associated with construction and maintenance). Golf course developers are beginning to build courses on degraded land. In addition, there are newly employed strategies for mitigating the inherently intensive use of water, pesticides, and inorganic fertilizers on golf courses. Studies done by the Attorney General of New York in the early 1990s and by privately funded studies found more pesticides used per acre on golf courses than on many crops. However, golf course pesticide use accounted for one percent of all agricultural pesticide use in the United States. The trend today is toward the use of an integrated pest management approach. "Integrated pest management" seeks to combine minimal water, pesticide, and fertilizer use, with more natural management strategies. Many newer courses have fallow (often wetland) out-of-bounds areas. Ball retrieval is often restricted in such areas. Some fairways are being left in a more natural (less manicured) state. This allows these areas to continue to grow while sustaining foot traffic (and divots), without intensive watering, pesticide, or fertilizer use.

Golf courses account for 0.3 percent of Delaware's land area. However, they represent 0.8 percent and 1.8 percent of the total tons of nitrogen and phosphorus, respectively, fertilizers sold in 1998. Superintendents implement most of the recommended BMPs on a regular basis (Waite et al., 2000).

Golf courses can probably be aesthetically and ecologically valuable if developed and managed properly. They can provide valuable green space and help to solve problems such as providing receiving lands for waste or process water. Some courses have planted communities of rare plants.

The golf course construction has accelerated recently on the Delmarva Peninsula, particularly around Ocean City, Maryland. Currently, there are five private golf courses and six public golf courses in the Inland Bays/Atlantic Ocean Basin. A new golf course on the outskirts of Ocean View called Bear Trap Dunes Public Golf Course is a good example of this expansion. The development includes 775 new homes that were annexed into the Ocean View in 1999.

Camping

Camping is a popular activity in the Inland Bays/Atlantic Ocean Basin. More than 20 private campgrounds and 2 public campgrounds at Delaware Seashore and Cape Henlopen State Parks provide more than 5,000 campsites. While data are not available on the use of private campgrounds, the Division of Parks and Recreation maintains data on attendance at its campgrounds. During 1997, the public campgrounds at Delaware Seashore and Cape Henlopen State Parks received more than 120,000 visitors.

Cape Henlopen has 159 campsites, all with water hook-ups, that are open April 1 through October 31. Delaware Seashore has 145 campsites with water, electric, and sewer hook-ups, and 133 campsites with no on-site utility hook-ups, with an additional 156 overflow campsites. Campsites are available from March 10 through November 11, and open year-round for self-contained units.

In 1995, the Division of Parks and Recreation conducted a survey of state park campers. Most of the campers surveyed in Delaware Seashore and Cape Henlopen State Parks came from Pennsylvania (66.7 percent, and 37.5 percent, respectively). At Cape Henlopen, 21.9 percent of campers surveyed were from Maryland, and 15.6 from Delaware. At Delaware Seashore, 8 percent surveyed were from Delaware, and 8 percent were from Maryland. Most of the remaining campers at these parks were from New Jersey, Virginia, New York, Washington DC, and Canada. Of the Delaware campers at Cape Henlopen, all were either from Kent County (46.7 percent), or from New Castle County (53.3 percent). At Delaware Seashore, most of the Delaware campers were from New Castle County (77.8 percent), with the remainder from Kent County. The results of this survey support the conclusion that most of the visitors to Delaware's beaches come from outside the Inland Bays/Atlantic Ocean Basin.

2.8.2.3 Direct Water-Contact Recreation

Beaches/Swimming

Beach use is, by far, the biggest tourism draw to the Inland Bays/Atlantic Ocean Basin. In the Southern Delaware Beach Region Visitor Profile Study, conducted by the University of Delaware College of Urban Affairs and Public Policy, 61 percent of respondents said that visiting the beach was their primary reason for visiting southern Delaware. In the 1993 State Park Visitor Survey, swimming and sunbathing were listed as the top two activities at Cape Henlopen, Fenwick Island, and Delaware Seashore State Parks. In addition, Cape Henlopen and Delaware Seashore are the most visited parks in Delaware's state park system. These numbers speak to the importance of beach tourism to the economy of southern Delaware and the entire state.

In recent years, swimming safety (risk related to pollution) has also become a concern. This is due more to an increase in public awareness than to any trends relating to water quality. In fact, since inception of the Clean Water Act in the early 1970s, our natural waterways are cleaner than they have been in perhaps 50-plus years.

Rainfall may raise bacteria levels in natural waterways due to runoff from the land. Pollution may also be introduced from point sources, concentrations of wild or domestic animals, or from other sources. These factors may influence the health risk associated with swimming.

Delaware's swimming beaches have been sampled since 1979. As part of an ongoing commitment to provide assurances for the state's residents and visitors regarding swimming water quality, Delaware implemented a revised, formalized Recreational Water Program in 1989. It is one of the most comprehensive programs of its kind in the United States. Approximately 50 miles of coastline, from Slaughter Beach, Delaware, south to the Maryland State Line, are sampled for bacteria, monitored for rainfall, and observed for other factors known to impact water quality. These criteria are a measure of possible human health effects associated with swimming, including gastroenteritis, and infections of the ears, eyes, nose, and throat. Occasionally, swimming-related illnesses may be more serious. Swimming is never a zero-risk activity, even in so-called "pristine" waters.

Delaware's swimming (primary-contact) standards are based on Delaware's declared acceptable risk of 12.5 illnesses per 1,000 swimmers. Studies suggest that the actual risk is in the range of 0.677 illnesses per 1,000 swimmers. Continuous notification to the general public regarding the advisory status of swimming areas is also maintained via a toll-free number: 1-800-922-WAVE.

Clamming

Delaware's Inland Bays have historically supported an important commercial and recreational fishery for the hard clam (*Merccenaria mercenaria*). This fishery is regulated as public shellfish grounds on the basis of state ownership of subaqueous lands. Given sporadic commercial harvests of oysters in the Delaware Bay (due to the effects of oyster diseases such as MSX and Dermo), the Inland Bays support the bulk of Delaware's commercial and recreational molluscan bivalve harvest. Management of the resource revolves around protecting public safety through health regulations and protecting the resource.

The Division of Fish and Wildlife regulates shellfish as a resource. Surveys are conducted to estimate recreational clammer effort, size, and total catch of clams taken, locations favored by recreational clammers, and residency of clammers. Data generated in this study document long-term trends in catch and effort and will document how



the resource is apportioned between commercial and recreational interests.

Thus far, catch-per-unit effort for recreational clammers has not declined. The recreational catch is an increasingly important component of the total fishery. During the past two decades, and concurrent with the decline in the commercial fishery, tourism and water-related recreational activities have increased several fold. Charles Lesser, of the Delaware Division of Fish and Wildlife, estimated 4,600 man-days of clammer effort in 1968. Roy Miller, also of the Division of Fish and Wildlife, estimated an increase to 16,300 clammer-days in 1978. Cole and others (1980) estimated 16,444 clammer-days of effort in 1979. Since catch per hour for recreational clammers has not declined, it seems evident that to quantify this relationship, Cole's 1979 study was repeated in 1985 using identical methodology. *Table 2.8-1* and *Table 2.8-2* summarize data from the studies.

Personal Watercraft

Canoes and kayaks provide important forms of recreation in Delaware's Inland Bays. Within the past five years, sit-on-top kayaks have become very popular. The Delaware Division of Parks and Recreation offers guided canoe and kayak trips in the Inland Bays. Several private companies also provide guided tours and/or boat rentals on Rehoboth, Indian River, and Little Assawoman bays.

Personal watercraft (PWC) refers to a variety of jet-propelled, shallow-draft watercraft built for one or two riders. PWCs are designed for fast, high-speed maneuvering, in all types of water. They are very popular. U.S. sales of PWCs exceeded 29,000 in 1987 and rose to 175,000 in

Table 2.8-1
RECREATIONAL CLAMMING USAGE (1979)

INDIAN RIVER BAY		REHOBOTH BAY	
Pennsylvania	67.7%	Pennsylvania	60.9%
Delaware	12.0%	Delaware	16.8%
Maryland	4.1%	Maryland	3.2%
New Jersey	3.8%	New Jersey	1.8%
Virginia	1.5%	Virginia	.6%
Florida	.6%	Florida	.6%
New York	1.5%	New York	.3%
Ohio	.3%	Ohio	.3%
North Carolina	.3%	Indiana	.3%
Massachusetts	.6%	Iowa	.3%
Michigan	.3%	California	.3%
		Washington, DC	.3%

Table 2.8-2

CATCH PER HOUR — REHOBOTH & INDIAN RIVER BAYS
JUNE — SEPTEMBER 1979 VS. 1985

STATION	1979 MEAN	1985 MEAN
1	26.8	29.6
2	24.0	38.2
3	17.7	32.3
4	22.2	21.4
5	32.6	28.0
6	28.4	34.3
Overall	25.3	30.6

1997 (Williams, 1998). Of Delaware's 43,461 registered boats in 1997, 11 percent were PWCs (4,615) (Rhodes, 1998).

Although outboard motors are found on most small watercraft within the Inland Bays, PWCs are generally operated differently than "conventional" boats. Rather than traveling from a dock to a destination, PWC operators seek sheltered waters as a destination, then operate in that area over and over again, in many cases going in circles and jumping wakes. According to the Coast Guard, PWCs account for only 9 percent of the nation's motorboats, but are involved in 36 percent of all reported boating accidents. The *Journal of the American Medical Association* reported that PWC-related injuries increased from 2,860 in 1990 to 12,288 in 1995 (Williams, 1998).

The National Park Service banned PWCs from the Everglades, Yellowstone, Dry Tortugas, Glacier, and Canyonlands National Parks to reduce noise and wildlife disturbance. A total ban within the National Park System is under consideration. The U.S. Fish & Wildlife Service banned PWCs from all 690 square miles of the Key West and Great White Heron National Wildlife Refuges. The PWC ban began when osprey nests dropped six-fold from 1986 to 1990. Nesting success was depressed four years after the ban; however, it did eventually recover.

In addition to the previously mentioned canoe and kayak rentals, several vendors within the Inland Bays rent PWCs, requiring that operators use a designated course. Heavy PWC use occurs in the northern reaches of Rehoboth Bay (head of Bay Cove) and the southern reaches of Little Assawoman Bay, close to rental vendors.

2.8.3 COMMUNITY-BASED RECREATION

2.8.3.1 Land-Based Recreation

In addition to the state parks and beach areas that draw tourists to the Inland Bays/Atlantic Ocean Basin, the

Basin’s year-round residents have a need for close-to-home recreational opportunities. While the Sussex County government provides no recreation services or facilities for its residents, several of the municipalities within the Basin operate parks that help to meet the recreation needs of their residents.

Within the Inland Bays/Atlantic Ocean Basin, there are about 299 acres of municipal parkland, providing playgrounds, picnic areas, ball fields, and other recreational amenities. While these parks and their amenities provide opportunities for residents to enjoy the outdoors, not all of the Basin’s community recreation needs are well met. *Table 2.8-3* lists the Basin’s municipal parks. *Map 2.8-1 Recreation Sites* shows recreation sites in the Basin.

In 1995, as part of the development of Delaware’s Statewide Comprehensive Outdoor Recreation Plan (SCORP), the University of Delaware conducted a statewide survey of outdoor recreation participation patterns and priority needs. Several needs were consistently reflected throughout the state, including the Inland Bays/Atlantic Ocean Basin. These include historic and nature education programs; programs for people with disabilities, teens, and seniors; public swimming pools; playgrounds and tot lots; trails and pathways; and camping areas. In addition to these needs reflected statewide, residents of the Inland Bays/Atlantic Ocean Basin expressed the need for ball fields, fishing and boating access, and organized sports leagues.

School playgrounds help to meet some of the recreation needs of the Inland Bays/Atlantic Ocean Basin residents.

Table 2.8-3

MUNICIPAL PARK ACREAGE IN BASIN

TOWN	ACRES OF MUNICIPAL PARKLAND
Bethany Beach	18
Lewes	22
Rehoboth Beach	105
Dewey Beach	34
Fenwick Island	22
Frankford	2
Georgetown	56
Henlopen Acres	6
Millsboro	17
Ocean View	3
Selbyville	4
South Bethany	10
TOTAL	299

However, across the state, school playgrounds tend to be in disrepair. Equipment is not up to date or well maintained. These playgrounds often contain safety hazards.

There are several Little League fields in the Basin that help to meet individual community needs. Little League fields, however, are usually not open to the general public. Within the Basin there are Little League fields in Georgetown, Millsboro, Roxana, Lewes, and Rehoboth.

Aside from the municipal and state recreation areas previously discussed, residents of the Inland Bays/Atlantic Ocean Basin have little access to recreational facilities. Sussex County government has been reluctant to provide open space, recreational facilities, or recreation programs to its residents. The 1996 SCORP recognizes this lack of service as one of the top outdoor recreation issues facing the state. The need for additional public open space and recreational services will only become greater as additional unincorporated areas are developed.

The Division of Parks and Recreation offers matching grants to local governments through the Delaware Land and Water Conservation Trust Fund for park and greenway acquisition and development. Grants from the Trust Fund can help to meet the needs of the residents of the Basin. Unfortunately, Sussex County government has not participated in the grant program.

Hunting

Hunting is an important wildlife management tool (especially deer hunting), and economic stimulator. Hunters spend an average of \$735.80 annually on equipment, travel, licenses, and leases (Hunter and Mackenzie, 1988).

The four most popular types of hunting, in order of decreasing participation, are deer, small game, waterfowl, and wild turkey. The Division of Fish and Wildlife sets seasons and licenses, educates hunters, and monitors harvest. Annual hunter success surveys measure game population impacts (Whittendale, 1996). Direct biological sampling occurs during the deer firearms seasons.

Many people within the Inland Bays/Atlantic Ocean Basin enjoy hunting. However, their numbers are uncertain. Approximately 21,000 hunters statewide bought hunting licenses in 1997. However, the total number of hunters is higher because landowners (owning more than 25 acres), juveniles (less than 15 years old), and seniors (over 64 years) are allowed to hunt without purchasing a hunting license. Based on deer harvest records, the Basin has a higher-than-average number of successful hunters.

Numerous studies document the importance of hunting to Delaware’s economy (Southwick Associates, 1987; Hunter and Mackenzie, 1988; Mackenzie, 1988; Eduljee and Mackenzie, 1989; U.S. Fish & Wildlife Service & Department of Commerce, 1993; and Southwick Associates, 1996).

Mackenzie (1988) reported that hunting in Delaware had a direct annual aggregate expenditure of \$25 million. Southwick Associates (1987) reported that the total economic “multiplier effect” of hunting within Delaware was \$21.3 million. By 1996, the same authors (Southwick Associates, 1996) estimated that hunting contributed \$58.6 million to the economy. No study gave regional breakdowns.

Deer, small game, and wild turkey hunting constitutes the first, second, and fourth most-popular type of hunting in Delaware, respectively. The public and private land surrounding the Inland Bays is an important resource relating to the demand for hunting opportunities.

Deer hunters spent \$350 per deer in marginal expenditures (Mackenzie, 1988). Waterfowl hunters spent more than deer hunters (Hunter and Mackenzie, 1988). Deer and waterfowl hunters out-spent small game and wild turkey hunters.

Habitat loss and unregulated shooting resulted in 113 years of closed deer seasons. Delaware opened its first regulated deer hunting season in 1954. During the two-day season (January 1954), 505 deer were taken. The state deer harvest has increased every year since 1983. However, deer killed by vehicles also increased (Whittendale, 1996). In 1997, over 10,000 deer were legally harvested by all means. The deer herd has exceeded its social carrying capacity in many parts of the state.

Delaware’s deer herd expanded under the regulated hunting program. The two-day deer season in 1954 grew to 139 days in 1998. In 1996, deer hunting regulations allowed 102 days of archery and 29 days of firearms hunting, with a minimum bag limit of two deer per year. More deer may be taken with special permits and if special conditions are met.

More hunters became deer hunters as deer became more plentiful. A survey of 10 percent of licensed hunters estimated that 17,156 hunters participated in the 1996–97 season (Whittendale, 1996), with over 211,633 hunting days, with a harvest of between 9,900 and 13,000 animals.

Delaware is divided into 17 deer management zones. Although small portions of Zones 12, 14, and 16 fall within the upper watersheds, deer management zones 15 and 17 represent the bulk of the Inland Bays/Atlantic Ocean. In 1996, the combined deer harvest reported within Zones 15 and 17 was 649 deer. Harvest within these zones represents 6.6 percent of the reported statewide deer harvest. This harvest rate is higher than the average for all deer management zones. No statistical analysis of significance is offered.

2.8.3.2 Indirect Water-Contact Recreation

Fishing Areas/Ponds

Silver Lake and Lake Gerar in Rehoboth are the only natural ponds in the Basin and in Delaware; all other

ponds in this Basin were made from dammed streams. The Basin has two private ponds: Betts (downstream of Ingrams Pond on Route 113 north of Millsboro), and Burton Pond (upstream of Burton Prong along Route 24). Ingrams and Millsboro ponds are the only large, publicly owned ponds in the Basin. Both have public boat ramps. Bank fishing is limited at Millsboro Pond. Memorial Pond — a former borrow pit (1/2 acre) at Assawoman Wildlife Area — was stocked in 1995 with largemouth bass, bluegill, and channel catfish. Only catch-and-release fishing is permitted here. Additionally, the Division of Fish and Wildlife stocks trout at old borrow pits at Gravel Hill, owned by the Department of Transportation.

Due to heavy fishing pressure on the freshwater ponds in the Basin, active fisheries management is necessary to sustain the resource and maintain recreational value. The most sought-after resident freshwater gamefish is the largemouth bass. Other species of interest are the bluegill, pumpkinseed, black crappie, white perch, yellow perch, chain pickerel, and catfish.

Community-Access Boat Ramps

Ramps associated with a particular community may be privately or publicly owned. Some ramps are at the end of state-maintained roads, such as Road 278 on Herring Creek. Some remain unimproved, although publicly owned, such as the ramp at the so-called “Boat Hole” on Arnell and Love Creeks. These ramps receive limited use relative to the larger public ramps. Public ramps, such as Lewes, Rosedale Beach, Maseys Landing, Holts Landing, and Indian River Inlet, are crowded during peak months. Ramps maintained by the Division of Fish and Wildlife are free for boats registered in Delaware. Boats registered out of state must pay a fee for use of the facilities. Ramps on state parks can be accessed for an entrance fee. Public access points to water are depicted in *Map 2.8-1*.

Many community access ramps are small and free to residents of the community. They are also poorly maintained. The upper Indian River area has seven boat ramps, including two public ramps (Rosedale Beach & Holts Landing) and five private ramps. The lower Indian River area has eight ramps. One is publicly owned; the others are privately owned. Little Assawoman Bay has five ramps, two of which are public.

Crabbing Piers

Most highway bridges, private and public marinas, residential docks and piers, and public boating access areas on brackish waters have potential for recreational crabbing. Waters with salinities below 10 parts per thousand (ppt) are unsuitable for blue crab habitat. Public crabbing piers located at Mulberry and Strawberry Landings on the Little Assawoman Bay within the Assawoman Wildlife Area are used extensively from Memorial Day to Labor

Day. Other public access points with crabbing piers managed by the Division of Fish and Wildlife include Masseys Landing and Rosedale Beach Fishing Access Areas. The Division of Parks and Recreation owns two parks which allow crabbing — Holts Landing and Delaware Seashore.

A privately owned pier on Love Creek charges for crabbing. Most private marinas allow crabbing, provided the people use the facilities for other purposes. Some highway bridges are suitable for crabbing access. However, most highway bridges are posted to prohibit fishing, crabbing, or parking for safety reasons.

Most recreational crabbers use crab pots. Crabbers use boats to set and check pots. Two crab pots per person are allowed. Pots must be checked every 72 hours to minimize mortality and incidental catch of non-target species such as diamondback terrapins.

Waterfowl Hunting

Waterfowl hunting has a long tradition in the Inland Bays. However, duck hunting shanties (small houses on a marsh built on pilings) commonly used for extended hunting trips gave way to shoreline blinds beginning in the 1960s. Shoreline development displaces more duck blinds and excludes more duck hunters from favorite marshes each year. Hunters must stay more than 100 yards from an occupied dwelling while hunting. Although blinds may be close to one another, duck boats must be more than 1,500 feet from the nearest blind. Space is limited.

Non-resident waterfowl hunting license sales slowed with the early restrictions and sharply declined when the Canada goose hunting season was closed. Season length and bag limit restrictions initiated in the early 1990s were the first response by the Division of Fish and Wildlife to a declining migratory Canada goose population. The season for Canada geese was closed in 1995 to protect the segment of the population that breeds in Canada and winters in Delaware.

Trapping

Trapping furbearing mammals in modern Delaware is more a recreational activity than an economic endeavor. Mackenzie, Eduljee, and Weidner (1990) found that money spent trapping outweighed the money earned through sale of pelts. Delaware has approximately 200 active trappers, 34 percent of whom trap in Sussex County. Most trappers (90 percent) are hunters whose primary vocation is associated with other wildlife-related activities (eg., farmers, guides, watermen). Most trappers are part-time, only spending an average of 39 days trapping per year.

Trapping is on the decline in Delaware. As an industry, trapping is probably more threatened by competition from furbearer ranching than public opposition, over-regulation, or declining demand for pelts. Most Delaware trappers cite low pelt prices as the determining factor as to whether they

will trap the following year. Although 82 percent of the trapping occurs on private lands, trapping leases are advertised for Assawoman Wildlife Area, Delaware Seashore, and Cape Henlopen State Parks. Muskrats are the primary target species. Raccoons, otters, mink, beaver, possum, skunks, and rabbits are also trapped and are listed in decreasing order of take. It is illegal to trap red fox in Delaware.

Whether boating, swimming, beach combing, fishing, or hunting, recreation is one of the primary attractions that the Inland Bays/Atlantic Ocean Basin has to offer. This recreation is dependent on the quality of the water and other natural resources. The very features that draw people to the Basin, as residents or as tourists, are threatened by their popularity.

As natural resource managers we must work together with citizens, the recreation and tourism industry, county and local governments, and other stakeholders to promote responsible recreation and tourism practices, responsible land development practices, and stewardship of the Basin's natural resources.

As we work to preserve the resources that make the Inland Bays/Atlantic Ocean Basin attractive to residents and visitors, we must also work toward meeting the recreation needs of the current and future residents. This includes working with the county and municipalities to urge the set-aside of open space as land is developed. As the Basin's population continues to grow, meeting the need for community recreation will continue to be an issue.

2.8.4 DATA GAPS AND RECOMMENDATIONS

1. Implement the Inland Bays Water Use Plan. *Lead Agency: Center for the Inland Bays.*
2. Require buffers in urban and agricultural areas to provide habitat, improve the aquatic environment, and filter runoff. *Lead Agencies: Sussex County and Municipalities & Nutrient Management Commission.*
3. Require environmental impact statement or LUPA review of new golf courses. *Lead Agency: Office of State Planning Coordination.*
4. Residents of the Inland Bays/Atlantic Ocean Basin, and throughout Sussex County, are underserved in recreation. Increase Sussex County recreational program infrastructure. *Lead Agency: Sussex County.*

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