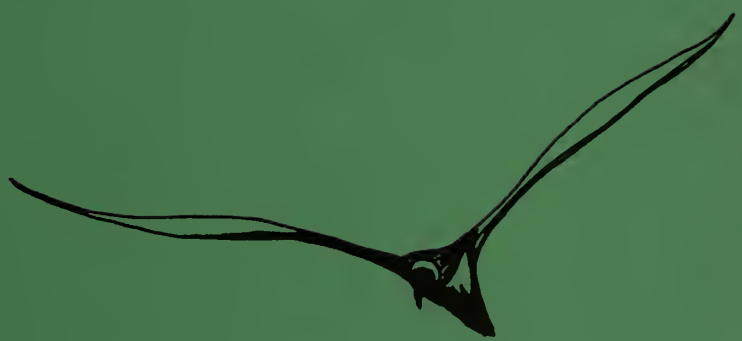

ASSESSMENT OF ALTERNATIVES

REQUEST OF PROVINCETOWN, MASSACHUSETTS TO WITHDRAW WATER FROM WITHIN CAPE COD NATIONAL SEASHORE

MARCH, 1979

ASSESSMENT OF ALTERNATIVES

EMERGENCY WATER SUPPLY
TO
PROVINCETOWN, MASSACHUSETTS
FROM
CAPE COD NATIONAL SEASHORE

Prepared by

North Atlantic Region
National Park Service
Department of the Interior

March 1979

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I. PROBLEM STATEMENT

On October 6, 1978, the Town of Provincetown, Massachusetts formally requested, for the second consecutive year, permission from the National Park Service to withdraw water from within Cape Cod National Seashore from April through November of 1979. This request was made because the restoration of the Town's South Hollow wellfield, which is presently shut down because of the existence of gasoline in the immediate vicinity of the wellfield, cannot be completed until after the start of the 1979 summer tourist season. Without the South Hollow wellfield, the Town could face the prospect of meeting a 2.0 million gallons per day (mgd) maximum day demand with a maximum supply of only 1.3 mgd available from the Knowle's Crossing wellfield and from the temporary well at the North Truro Air Force Station.

This Assessment of Alternatives will consider Provincetown's current request to withdraw water from within the National Seashore in the face of a continuing water supply emergency. It will evaluate the Park Service's alternatives in responding to this request in light of environmental, park management, socioeconomic and legal concerns.

II. DESCRIPTION OF THE ENVIRONMENT

Cape Cod, a boldly shaped peninsula projecting 70 miles into the Atlantic Ocean, is the easternmost extension of the Commonwealth of Massachusetts (Figure 1). It is part of the highly urbanized northeast, the most populous region in the country. Nearly one third of this nation's people live within a day's drive of the Cape and the National Seashore.

Cape Cod National Seashore, created in August of 1961 to assure this and future generations the opportunity to enjoy the unique natural and cultural resources found at the Seashore, stretches along the Cape's Atlantic coastline from Chatham at the elbow to Provincetown at the Cape's northern tip. Provincetown is one of the Cape's major resort towns. Both of Provincetown's municipal wellfields lie to the south in the Town of Truro. Approximately 5,000 residents of Truro's Beach Point area are served by Provincetown's water supply system. Also in Truro, but within the boundaries of the National Seashore, is the Park Service's test well site #4 from which Provincetown withdrew water during the summer of 1978. North Truro Air Force Station, the site of Provincetown's other supplementary water supply well for the summer of 1978, is also located in Truro within the boundaries of the National Seashore and slightly to the southeast of Provincetown's disabled South Hollow wellfield (see Figure 2).

Throughout the Cape, residential, commercial and recreational growth are applying increasing pressures upon the area's natural resources.

The problems now being encountered, especially in the areas of water supply and wastewater disposal, are seriously complicated because no regional plans or controls currently exist to deal effectively with the issues of growth management and the responsible utilization of critical, and frequently finite, resources.

History of the Problem

Under normal circumstances, the South Hollow wellfield has a water production capacity of 1.2 mgd. The Town's Knowles Crossing wellfield, its only other municipal supply source, has a maximum capacity of 0.8 mgd. Together these wellfields can supply Provincetown with a maximum yield of 2.0 mgd. The water from these two sources is, and has been for several years, inadequate to meet the Town's maximum summer day water demand, which occurs during the height of the tourist season. Provincetown's three water tanks provide a storage capacity of 7 million gallons and frequently augment the Town's water supply during periods of peak demand.

The discovery of gasoline (estimated to be between 2,000 to 3,000 gallons) in the immediate vicinity of the South Hollow wellfield in December of 1977 led to the determination in March of 1978 that the wellfield should not be utilized for public water supply. It was clear that additional sources of water were essential to meet summer demands. By May of 1978 Provincetown was able to secure temporary water supplies not only from the North Truro Air Force Station but from the National Park Service as well. Together these two supplies totaled 1.25 mgd (0.75 mgd from the Park Service and 0.5 mgd from the Air Force) and slightly exceeded the maximum yield of the South Hollow wellfield (1.2 mgd). After critical review of the Technical Application Docket* and careful consideration of the potential for environmental damage to the Seashore's resources, the National Park Service accepted the Town's assertions that: there were no reasonable alternatives to the use of Seashore resources, there was indeed an emergency and the possible impacts associated with the granting of the Special Use Permit for a 5 month period were outweighed by the probable threat to the public health and safety and the probable economic hardship the Town would have experienced without the use of the Seashore's water.

On May 15, 1978, the Park Service granted Special Use Permit #1730 CX-8-0014 to the Town which was valid from May 15 through October 31, 1978. Subsequent investigations have not produced any evidence which clearly contradicts the analysis and conclusions presented by the Town in the Technical Application Docket. A copy of the permit is included as Appendix A.

Several general and specific provisions were incorporated in the permit to protect the values and resources of the Seashore. In general the provisions of the permit were adequately complied with. Further discussion of three specific conditions, however, is warranted:

1) Provision 12, regarding soil erosion, states that "the permittee shall take adequate measures, as directed and approved by the Superintendent to restrict and prevent soil erosion on the lands covered hereby and shall so utilize such lands as not to contribute to erosion on adjoining lands."

* The Technical Application Docket, submitted in support of the Town's application for a Special Use Permit, documented the existence of an emergency situation, alternatives to the use of Park Service water, the recommended water supply scheme and potential long-range supply sources.

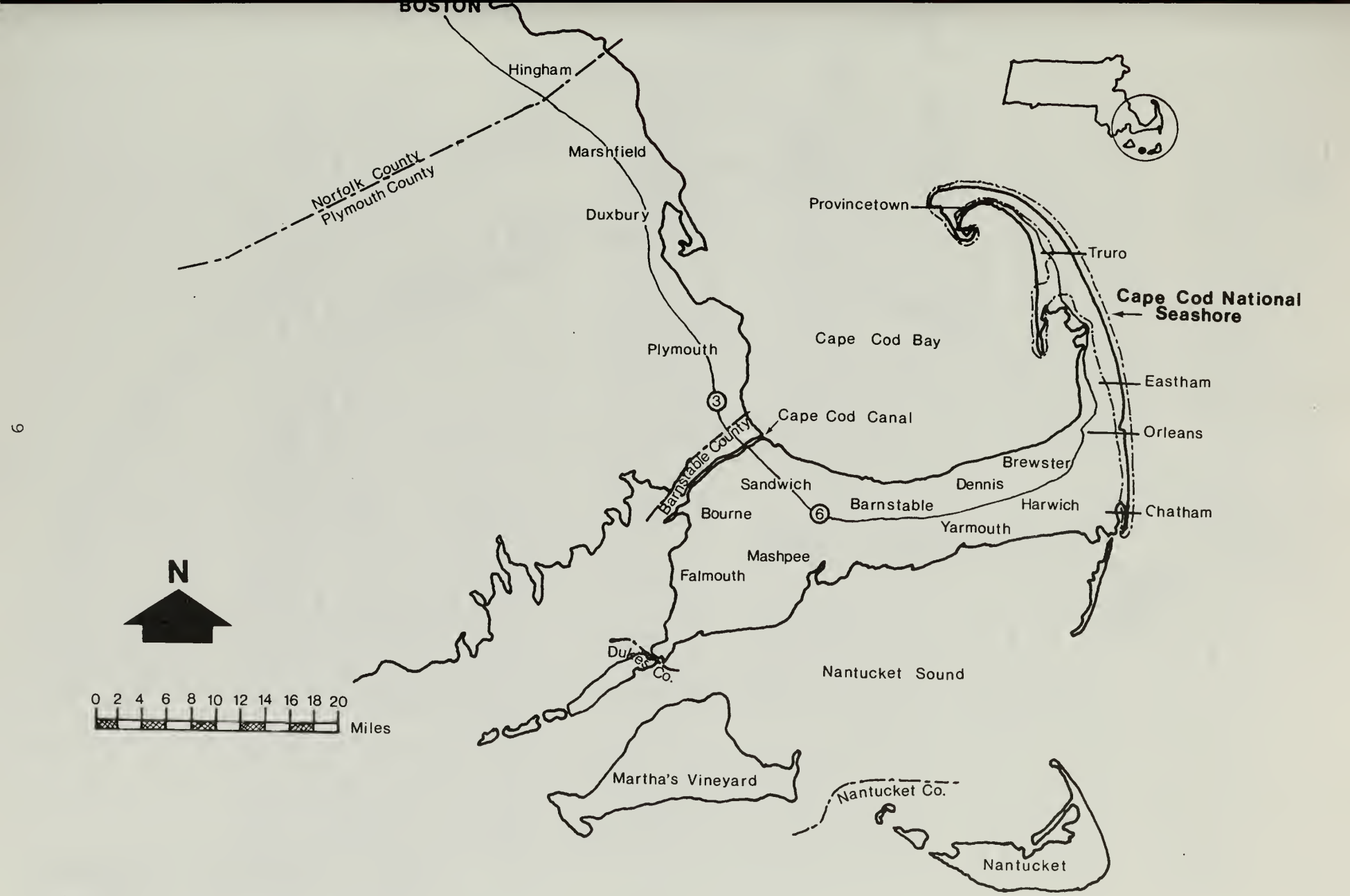


FIGURE 1 - REGION MAP

While the Town took steps, following the installation of the pumping station to prevent the erosion of the 1/4 mile long, 8 foot wide access road to the site, erosion has occurred. Adequate measures are needed to stabilize the slope at the well site.

2) Provision #20 states that "Daily pumpage from this well shall not exceed 0.75 million gallons per day" and, with the exception of 6 days in August, this requirement has been complied with. However, on these days, actual pumpage substantially exceeded the allowable rate and, on August 27 the actual withdrawal was nearly twice the allowable quantity. Over pumping was apparently the result of inadequate monitoring of the wells during supply system changes.

3) Provision #25 states "All changes or disturbances of the existing conditions of the area including landscape, roads or structures during drilling and testing are to be repaired or replaced by the permittee as nearly as possible in the original condition in a manner acceptable to the Superintendent, Cape Cod National Seashore." The landscape at the site has been disturbed by the removal of vegetation during road construction and the continuing erosion of the kettle hole slope. Some restorative work is now required to avoid permanent or long lasting damage to this site, regardless of whether Provincetown uses the Park Service well in 1979 or not.

The National Park Service well was utilized as Provincetown's first line supply source from July through October of 1978. Typically, the Knowle's Crossing supply was pumped after the allowable amount of water was withdrawn from the Park Service well. The North Truro Air Force Station well was utilized when demand exceeded the yields of the Park Service well #4 and Knowle's Crossing supplies.

On October 31, 1978, as specified in the Special Use Permit, water withdrawal from the Park Service well was scheduled to cease. However, pumping continued with the consent of the Park Service until November 8, 1978, so that the Knowle's Crossing wellfield could be shut down and needed operational changes could be made. On December 11 the Park Service well was drained and deactivated. A total of 58.3 million gallons was withdrawn from within the National Seashore during the summer and early fall of 1978. During this time the Knowle's Crossing wellfield was operated at an average of 0.5 mgd and chloride levels remained at or below 170 parts per million (ppm). The Air Force well was deactivated sometime in early November. Since the shut down of the Park Service and Air Force Station wells, Provincetown's water supply needs have been met by the Knowle's Crossing wellfield supplemented, on high demand days, by the Town's two active water tanks

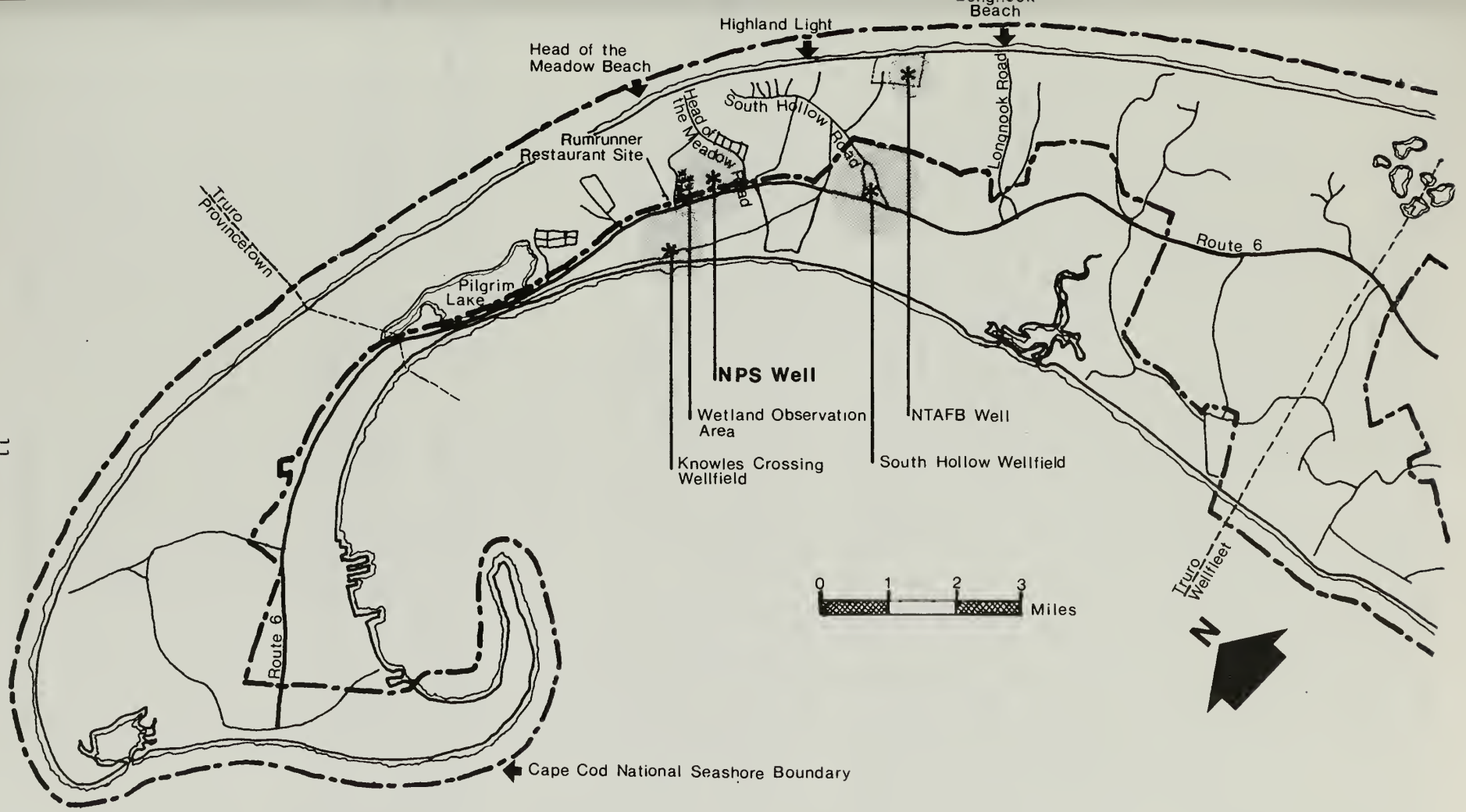


FIGURE 2 - VICINITY MAP

which have a combined storage capacity of 3.5 million gallons. A third storage tank (with a capacity of 3.5 million gallons) was drained and painted at the end of the 1978 summer season. This tank is expected to be on line for the 1979 tourist season.

In the Technical Application Docket submitted by Provincetown to the Park Service in support of its original application for a Special Use Permit, it was estimated that voluntary conservation measures would reduce demand by approximately 20%. However, the effectiveness of the Town's conservation program (included as Appendix B) is unclear. In 1977, the average summer day consumption was estimated to have been 1.54 mgd. In 1978 the average summer day consumption was 1.4 mgd (actual recorded use).* This represents a reduction of 11%. A 20% reduction in consumption from 1977 to 1978 would have resulted in an average summer day consumption of 1.23 mgd. Furthermore, part of this 11% reduction must be attributed to the fact that a major new water main was recently installed in Town, considerably reducing leakage in the water distribution lines. The maximum day demand for 1978 was projected to reach 2.8 mgd in the Technical Application Docket, but actual consumption reached a level of only 2.0 mgd. In line with actual 1978 consumption figures, the 1979 average summer day consumption is projected to be 1.45 mgd and the maximum day demand is projected to be 2.0 mgd.** Figure 3 illustrates Provincetown's monthly water consumption for 1977 and 1978.

Assuming a more stringent conservation program (which could reduce the average summer day consumption to 1.23 mgd), use of the Knowle's Crossing wellfield (at 0.5 mgd) and the North Truro Air Force Station well (at 0.5 mgd), the Town could reduce its reliance on the Park Service supply. On an average summer day the supply could be met with 0.45 mgd from the Park Service well. During maximum demand periods, with Knowle's Crossing pumping at the rate of 0.8 mgd, 0.7 mgd would be required from the Park Service well to meet the 1979 projected maximum day demand of 2.0 mgd.

* The average summer day consumption is based on the days of the Town's summer demand period June through August. The period of maximum demand always occurs in the summer.

** Letter of October 25, 1978 from Mary Jo Avellar, Chairman, Provincetown Board of Selectmen to the Acting Regional Director of the National Park Service, North Atlantic Region (see Appendix C).

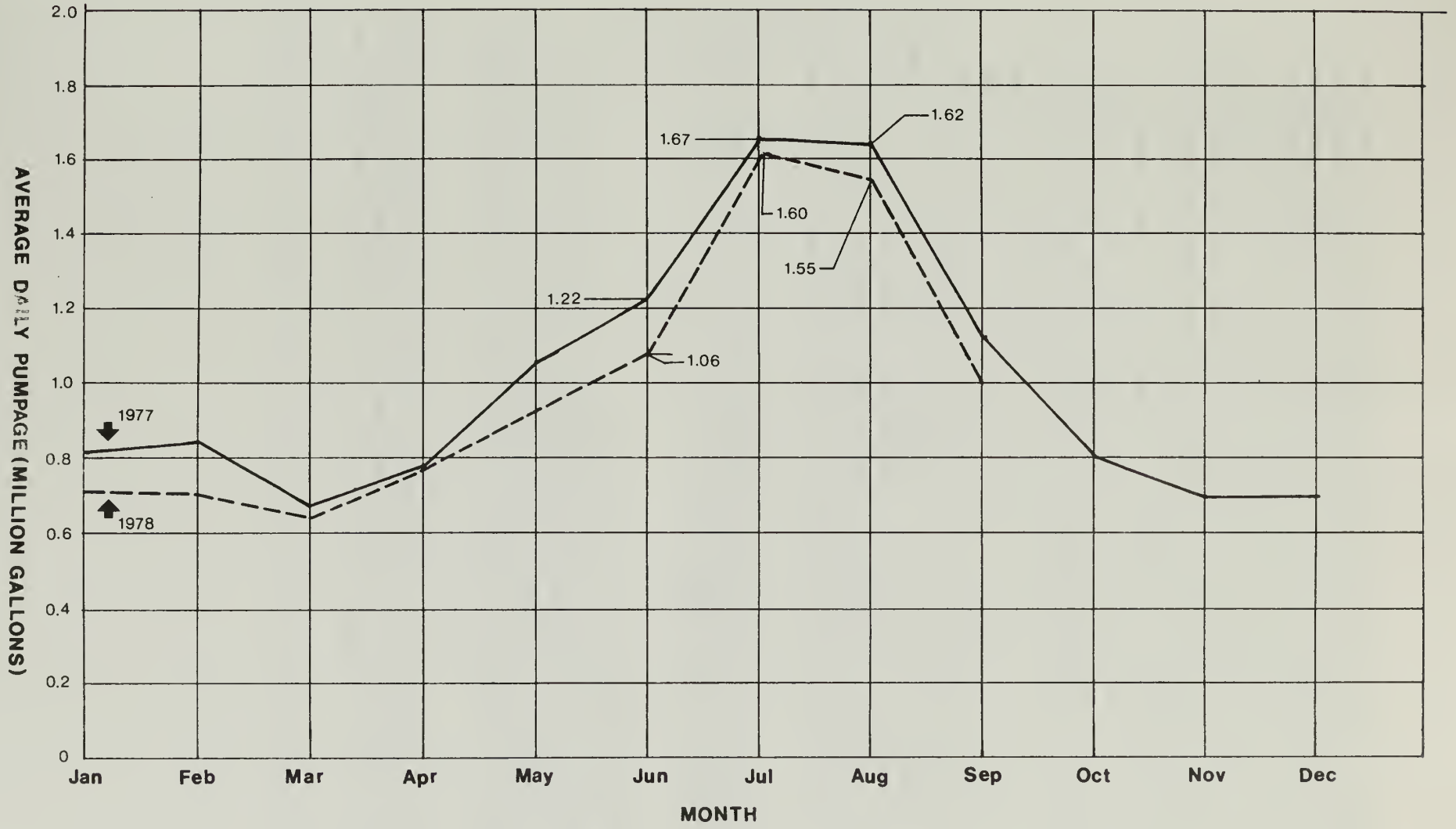


FIGURE 3 - AVERAGE DAILY WATER CONSUMPTION 1977-1978

Provincetown's water supply problems were effectively alleviated last summer by utilizing water from within the National Seashore and North Truro Air Force Station. Following the connection of these temporary supplies to the municipal system, the Town and its engineers concentrated on the development of a program to reclaim the South Hollow wellfield. After evaluating several alternatives for the reclamation of the South Hollow wellfield, the Town's engineering consultants recommended a combined physical recovery and stimulated hydrocarbon bioreclamation program. Subsequently, in October 1978, the Town voted to proceed with this program. The physical recovery operation would skim the extensive lens of gasoline held above the groundwater boundary in the immediate vicinity of the spill. The bioreclamation program would then be established to degrade the residual gasoline present in the soil and groundwater within a 76 foot radius of the spill. The gasoline remaining in the groundwater, which was detected on one occasion 600 feet away from the spill site at the edge of the wellfield, is expected to be diluted to an acceptable level once the major concentrations of gasoline are removed and pumping resumes. Initial cleanup activity began on February 21, 1979. Physical recovery should be underway by mid-March. The entire recovery and cleanup process is expected to take from four to twelve months. This means that the South Hollow wellfield will, in all probability, not be on line in time to meet the high demands of the 1979 summer tourist season.

Provincetown, in its continuing attempt to develop adequate water supply sources to meet both its present and future needs, has allocated funds for a long-range water supply study to be undertaken by its consulting engineers in the near future.

The National Seashore

The National Seashore is a highly utilized, unique and vulnerable natural resource. It preserves an outstanding glacial landscape with a great diversity of natural communities and historic and cultural resources of national significance. The Seashore has been modified and reworked by the forces of time and nature and by human occupation and use.

The basic configuration of Cape Cod is the result of glaciation modified by post-glacial erosion. During the final stages of the Wisconsin glaciation (10-15 thousand years ago) moraines were deposited along the

terminal edge of the ice sheet at the upper Cape. Glacial meltwater carried sand, gravel and small rocks and deposited these materials as an outwash plain. As the glacier retreated great quantities of sand, gravel and clay were deposited often covering blocks of ice left by the melting glacier. When the ice melted, the surface collapsed forming kettle holes. Subsequently, the unconsolidated deposits were eroded by ocean currents, wave and wind action creating expansive ocean beaches, sand cliffs, dunes, pamets and other features. Throughout the Cape, the soils are primarily unconsolidated sands and gravels.

Numerous ponds and wetlands exist within the Seashore. Pilgrim Lake's wetlands and another small wetland are located slightly to the north of the Park Service's well. These environments are vulnerable to changes in water level and/or salinity.

At one point the Cape was covered with mature hardwood or pine forests. The European occupation of the Cape, however, produced radical changes and by 1850 these first growth trees had been virtually eliminated. Today the Cape exhibits twenty typical plant associations which differ with soil, slope, moisture, drainage, wind, exposure to light, salt spray and human alterations. Six of these are tree associations, six are shrub and eight are herbaceous. In general these communities maintain a fragile balance within a stressful environment.

Wildlife on the Cape and within the Seashore includes a wide variety of fairly common species (i.e. stripped skunks, squirrels, cottontails, mourning doves, blue jays, etc.). No endangered species are known to exist within the Seashore.

The Cape's climate is greatly influenced by its proximity to the ocean. It has a "maritime climate" which has higher minimum temperatures in the winter and lower maximum temperatures in the summer than inland areas in the same latitude. Rainfall is very abundant averaging 40 inches annually. May, June and July are the driest months receiving an average rainfall of 2.94", 2.74" and 2.64" respectively. January is the month of maximum precipitation, averaging 3.89". Precipitation during the winter of 1977-78 was substantially above normal and recharge to the aquifer was abundant during the period of last year's pumping at well site #4. Precipitation during the winter of 1978-79 has been slightly above normal.

Severe storms frequently hit the Cape. In winter northeasters with strong winds and heavy rain or snow create high tides which further

modify the Cape's beaches and dunes. Tropical storms in the summer and fall bring winds of hurricane force, heavy rains and high tides. These storms frequently cause damage to developments and structures sited in vulnerable areas.

Cape Cod, and other areas located within the humid region of the eastern United States, is vulnerable chiefly to short droughts. Prolonged droughts, though occuring rarely in humid regions, have the potential to reduce ground and surface water.

The sole source of fresh water on Cape Cod is precipitation. The movement of water through Cape soils (primarily unconsolidated sands and gravels) is rapid and primarily downward. The structure of the ground water system consists of a fresh water lens floating on top of salt water. Only one fresh water lens exists beneath the outer Cape. It is confined in some places by clay lenses which limit its ability to yield a consistent quantity and quality of water. Other factors which limit the Cape's sole water resource include: salt water intrusion into wells (caused by overutilization of a given site) and contamination of ground water supplies by leaching field effluent or runoff from landfill sites. Excessive pumping from this lens, on a local or a regional basis, can lead to declining water quality (especially salt water intrusion), the inland movement of the fresh water/salt water interface and lowering of the water table. Any changes in the configuration of the fresh water lens will eventually be reflected by various pond, wetland and other natural communities within the effected area.

Because this lens is the sole source of fresh water for all the surrounding towns, is one of the most important factors limiting future growth on the Cape and is a critical factor in maintaining the natural environment of the Seashore and other lands on the Cape, it is imperative that this resource be managed and protected to ensure that the natural and economic vitality of the Cape is not substantially impaired in the future.

Well Site Description

The Park Service's test well site #4 is located within the Town of Truro at the bottom of a kettle hole about 500 feet in diameter. It is approximately 0.2 miles east of Route 6 (the Mid-Cape Highway) and approximately 4.0 miles south of Provincetown. Local access is via an extended, existing rough dirt road. Provincetown's temporary well facilities, which were installed last summer, include: a small fenced pumping station which includes a 24" diameter well, a pump and drive system and other pertinent equipment. An 8" water main connects the well to Provincetown's distribution system. Approximately 500 feet of pipe is located within the Seashore. Figure 4 illustrates the layout of these facilities.

This site is within the physiographic division called the North Truro Plain and is separated from the adjacent Wellfleet Plain by an escarpment. The soils within this area are predominately sands interspersed with lenses of clay deposits. A well developed profile is lacking and the soils are dry and poor with very little humus.

The well site is located within an area dominated by one of Cape Cod's most familiar plant communities--pitch pine (Pinus rigida) woodlands. This species usually grows on drier sites with considerable dead wood and litter often in association with inflammable understory species. Here the pines grow with deciduous trees and shrubs including: scrub oak, huckleberry, blueberry, bayberry and inkberry. Ground covers on the forest floor include lichens, grasses, bearberry, running club mosses and other herbaceous species. Pinus rigida is slow growing -- any plant over 3 feet is generally in the 20-40 year class. Bearberry and lichen are also slow growing species. In addition, bearberry is mychorrizal-- it requires the presence in the soil of particular microorganisms before it can flourish and spread. The vegetation toward the bottom of the kettle includes fewer pines and a more shrubby, thicket type of growth.

In the vicinity of the well are the remains of the old Kings Highway. While there are no current plans to restore or interpret this trail, it should be noted that this is an historical route that has existed on the Cape for well over 100 years.

This site is located within "Class 3-- Natural Environment Area" identified on the Land Classification Map and within "Zone II-- Preservation Conservation" of the Zoning Plan identified in the Master Plan for the Seashore.

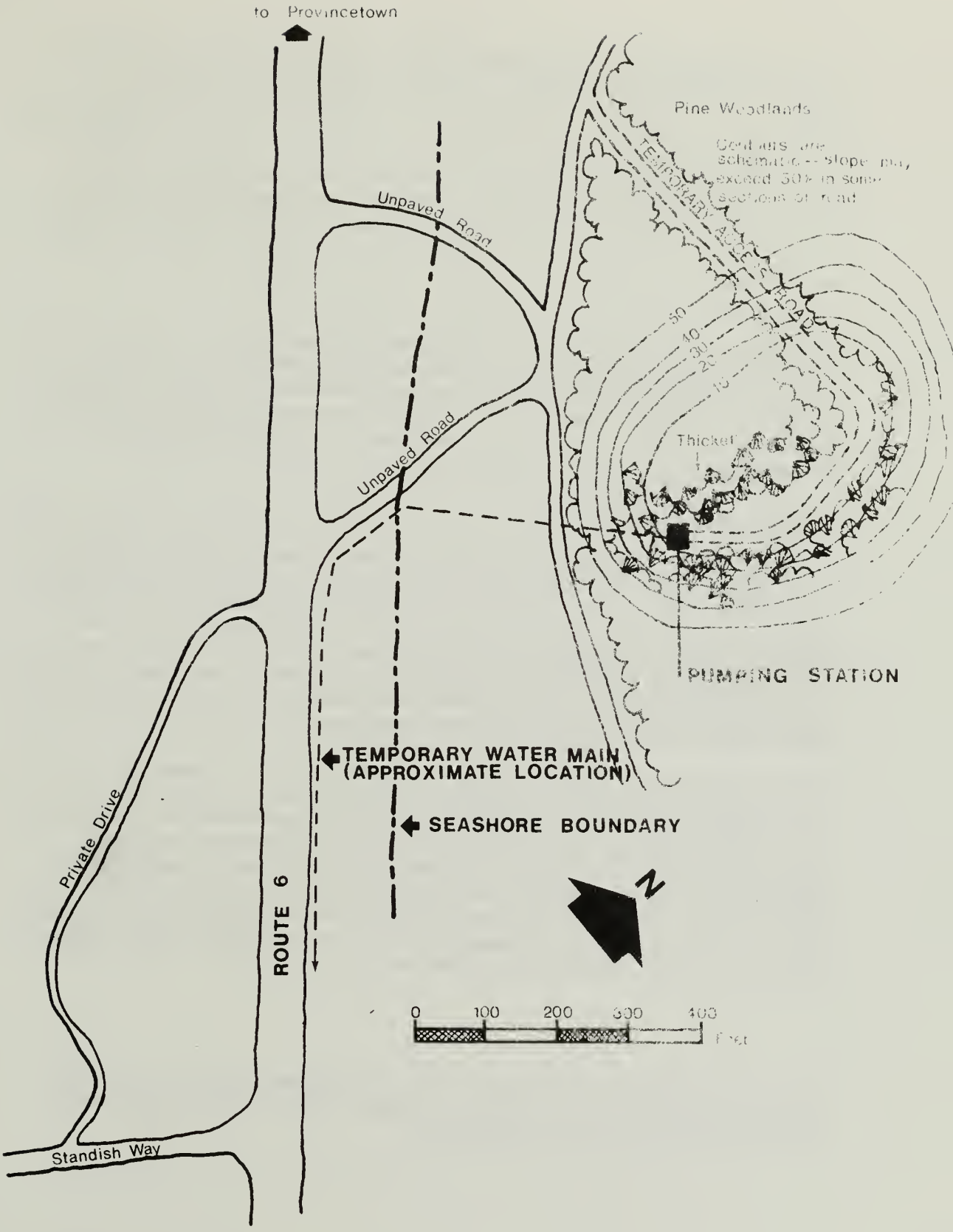
Changes in the Environment Since Summer of 1978

The actual pumping station, piping and related equipment were installed early last summer and will eventually be removed.

In order to move a large well drilling rig and other equipment to the well site, a temporary sand road approximately 1/4 mile long and 8 feet wide was constructed off an existing fire-road. Approximately 65 trees were cleared at this time. At the time of construction, approximately 64 cubic yards of a locally obtained clay material was applied to the road to facilitate access by four wheel drive vehicles. Following heavy rains in August 1978, almost all of this material was washed to the bottom of the kettle. Subsequently, an additional 300 cubic yards of hardening material was applied in an attempt to stabilize the road.Efforts to stabilize the access road have failed to stop the continued erosion of the kettle slope. Approximately 200 cubic yards of clay material, 6-8 inches thick in some places, has been deposited at the bottom of the kettle since June of 1978. This material is beginning to accumulate around the bases of several pitch pines and shrubs near the bottom of the kettle. The presence of a clay layer several inches deep around the bases of many of these species may eventually result in damage to, or destruction of, individual plants.

The bearberry undergrowth and lichen colonies growing on the forest floor were also removed during construction. The bearberry and lichen undergrowth, so prevalent on the forest floor in this area will be fairly slow to reestablish (providing that erosion can be adequately checked so that new plants will not be continually washed out).

Throughout the pumping of last summer and fall, water levels at several U.S. Geological Survey observation wells were monitored to determine whether or not the withdrawal of water from this site precipitated observable changes in the fresh water/salt water interface and/or the groundwater table. From these observations it was possible to infer whether the Park Service well was confined and limited by a clay lens. Drawdowns at the U.S. Geological Survey observation wells, however, were not great enough to cause significant impacts to vegetation or to private wells in the vicinity. No complaints were received by the Park Service from private well owners during the period of pumping. There was no indication of confining layer effects (clay lenses) from observation well monitoring.



URE 4 - WELL SITE MAP

A wetland observation area (identified on Figure 2) was established by the Park Service near well site #4 to monitor the impacts of pumping on the wetland. Base data were collected late last summer and, if a second Special Use Permit is granted, will be compared with data collected in the summer of 1979. No obvious signs of stress were noted at this site in late summer and it is assumed that the impacts of pumping were minimal. However, continued collection of data will be required to document actual changes and impacts. It should also be noted that last year was wetter than normal and any impacts caused by pumping were much less intense than would have been (or could be) the case during a drought year.

Chloride levels in the water withdrawn from the Knowle's Crossing wellfield remained below 170 ppm during the 1978 tourist season. During the summer Knowle's Crossing was operated at its recommended average of 0.5 mgd. Pumping of Knowle's Crossing at higher rates could increase this level. The Environmental Protection Agency's recommended limit for chlorides in drinking water is 250 ppm.

Socioeconomic Environment

Cape Cod is one of the Commonwealth's most popular summer resorts and offers a great diversity of recreational activities. The summer tourist industry is the mainstay of the Cape's economy. The vast majority of tourists visit the Cape during the months of July and August. Recently, however, there has been a slight tendency for more visitors to come to the Cape at other times of the year. This is a trend that would be beneficial for Cape Cod National Seashore and, probably, for neighboring towns as well.

The growth pattern on the Cape since the fifties is remarkable. While population in New England as a whole increased only 27% from 1950 to 1970, Barnstable County's population increased by a dramatic 107%. Growth projections for the period 1975-1995 are equally impressive.* The Cape's total winter population will increase by more than 32% (from 128,000 in 1975 to 187,000 in 1995). The total summer population will increase from 382,000 in 1975 to 570,000 in 1995--an increase of approximately 50%. Provincetown's 1975 summer population of 17,000 will increase to 20,000 by 1995. The Town's

*Source for population figures: Draft: Proposed 208 Water Quality Management Plan/EIS for Cape Cod; March, 1978; Cape Cod Planning and Economic Development Commission

winter population will only increase from 4,000 in 1975 to 4,100 in 1995. Truro's 1975 summer population (11,900) is projected to reach 17,000 by 1995. The 1975 winter population of 1,490 will climb to 2,100 by 1995.

In 1975 nearly 5,750 of Provincetown's 6,400 acres were reserved open or wetlands. Of the remaining 650 acres, 570 acres were developed and 80 acres were buildable. By 1995, 630 acres will be developed and 20 acres will be buildable.

The increasing numbers of permanent residents and seasonal visitors on the Cape has led to the construction of new homes, rental cottages, restaurants, gas stations and other facilities. This growth is also reflected in rising water demands, increasing fire and police protection needs and a lack of suitable land area for such uses as landfills and sewage disposal.

Some communities have responded to the increasing pressures of rapid growth and development by adopting zoning regulations to control the density and intensity of land use within their boundaries. Such measures as large lot zoning are particularly important for communities whose residents rely primarily on individual systems for water supply and sewage disposal.

Cape Cod National Seashore is strongly interrelated with the surrounding towns in the region. Many challenges facing both the Seashore and the towns can be met only through close cooperation. Among the most important of these are water resource management and the establishment of optimum development and use capacities for the Seashore and for the Cape as a whole.

The National Seashore contributes to local economies as an employer of local people and as a purchaser of local goods and services. It is also a major recreational resource which adds to the attractiveness of the Cape and draws visitors to the region. On the other hand, greater numbers of visitors increase the police, fire and other needs of nearby towns.

Legislative and National Park Service Constraints

Public Law 87-126 authorizing Cape Cod National Seashore clearly places the preservation of the Seashore's natural resources above visitor convenience and other concerns. Section 7(b)(1) states: "In order that the Seashore shall be permanently preserved in its present state no development or plan for the convenience of visitors shall be undertaken which would be incompatible with the preservation of the unique flora and fauna or the physiographic conditions now prevailing . . ."

Section 3(e) of Public Law 91-383, 84 Stat. 827 authorizes the Secretary of the Interior to enter into contracts which provide for the sale or lease of services, resources or water available within areas of the National Park System if the potential recipient: 1. provides public accommodations or resources within the immediate vicinity of an area of the National Park System to park visitors and 2. demonstrates that there are no reasonable alternatives to the use of park resources (see Appendix D).

National Park Service Special Directive 78-2, implementing PL 91-383 (see Appendix E), provides further clarification of the standards which must be met before park resources may be sold or leased. Section 7 specifically states "water use agreements provide for National Park Service review and approval of planned development by the applicant that would create increased water demands."*

This directive concludes, "It should be emphasized, that while Public Law 91-383 conditionally allows the Secretary of the Interior to authorize the sale of services, resources or park water, the Secretary's primary commitment, as mandated by the Congress, is the preservation and protection of National Park System resources which includes the conservation of System area water resources and related water dependent environment. In this regard, Service management policy limits water development and use, assuming no adverse impact on the natural environment, to the minimum required to meet visitor and employee needs. In essence, water is a vital part of the park environment and a natural resource the Service is committed to protect and in reality cannot be 'excess' or 'wasted' water, as viewed by some applicants."

* This section is particularly important in light of former Superintent Lawrence Hadley's request that Provincetown supply the Park Service with copies of recent building permits. To date, the Park Service has not received copies of these permits. It is noted that a major subdivision proposal is currently before the Provincetown Planning Board.

Elsewhere, in the National Park Service Management Policies Notebook (1978 edition) the following general statements provide a good sense of Park Service views governing the sale or lease of resources within the boundaries of a National Park:

1.) ". . . the protection of ecological health and historic integrity is our first consideration and priority." (p.3)

2.) ". . . park uses shall be limited to those activities which are dependent upon and protective of the natural and historic values each park was established to preserve." (p.3)

3.) "In the absence of adequate knowledge, operational programs will be aimed at maintaining the status quo and avoidance of long-term or possible irreversible impacts until priority research can provide necessary information for management changes." (p.IV-3)

4.) "As a general policy, the Service does not allow consumptive utilization of renewable or non-renewable park resources." (p.IV-3)

The legal and policy constraints summarized above provide a decision-making framework within which the National Park Service will operate when considering requests to purchase or lease resources within a National Park.

III. ALTERNATIVES

Two alternative courses of action are open to the Park Service, either to grant or to deny Provincetown's request to utilize water from within the National Seashore from April 1 through November 30, 1979. Each of these alternatives is evaluated in terms of the various impacts and the means by which these impacts might be mitigated. Any adverse effects which cannot be avoided are identified and considered. The short and long-term relationships of resources and commitments of resources that may be irreversible or irretrievable are also discussed.

A. Alternative A: Deny Request for Special Use Permit

Under this alternative Provincetown would not receive additional water from the National Park Service to help offset the temporary loss of the South Hollow wellfield. The Town would have to rely primarily on the supply from its Knowle's Crossing wellfield (0.5 mgd on average days and up to 0.8 mgd for maximum days) and the North Truro Air Force Base well (0.5 mgd) which will be available to Provincetown from April 1 through November 30, 1979. As has typically occurred in the past, water from the Town's storage tanks would be utilized to meet periods of high demand. Since Provincetown's average summer day consumption is projected to be 2.0 mgd, it is clear that additional sources would have to be developed, if possible, and that water consumption would have to be curtailed substantially.

Without the Park Service supply, even potential sources of water would be extremely limited and would undoubtedly require additional expenditures by the Town. The following options might still be available:

1) Utilize the South Hollow wellfield while the bioreclamation program is in progress. This would, however, double the cost and length of time required for the cleanup operation which was initially estimated to require 4-12 months and $200,000-300,000. The National Park Service does not favor this course of action since it would prolong Provincetown's reliance on water withdrawn from within the Seashore.

2) Develop the Rumrunner Restaurant site. This alternative was rejected last year as a supply source because of the potential for generating high chloride levels at the nearby Knowle's Crossing wellfield if a well here was pumped at 0.75 mgd. It might, however, yield 0.45 mgd on average demand days and 0.7 mgd on peak demand

days if the withdrawal was limited to the three month tourist season only. Development of a well at this site could equal the costs of developing well site #4--approximately $150,000. This site, located within the Seashore, is privately owned and is operating under a certificate of suspension of condemnation. The impacts on the Seashore's water resources which could result from withdrawing water from this site would not vary significantly from the impacts associated with withdrawals from well site #4.

3) Establish a stringent conservation program to curtail water consumption through the three months of the tourist season. California's drought plagued communities were able to reduce water consumption by 65% (25% of this was totally voluntary) during the height of the recent drought. If Provincetown achieves a 30% reduction over last summer's consumption, it could possibly meet its own needs with the supply available from the Knowle's Crossing and Air Force Station wells.

Impacts

1. If Provincetown is not allowed to withdraw water from within the National Seashore, the Town would be required to commit additional funds (perhaps up to $300,000) to develop alternative sources for the summer of 1979. This would add to the financial commitments already undertaken by the Town in its efforts to reclaim the South Hollow wellfield.

2. The uncertainty surrounding the source and adequacy of Provincetown's summer water supply could restrict summer tourism, the Town's primary economic base. This could cause economic hardship for many of the Town's small businesses, some of which could be forced out of business permanently.

3. Visitors to the National Seashore could potentially experience greater inconvenience in obtaining lodging and other services in Provincetown if restaurants, motels, and hotels restrict their services or close their establishments when faced with the need to sharply curtail water consumption.

4. If Provincetown decides to utilize the South Hollow wellfield during the restoration process, the length of time required to install a barrier well and to complete the cleanup would increase the total length of the cleanup operation by up to 12 months.

5. If Provincetown decides to develop the Rumrunner Restaurant site as a temporary (3 month) water supply, there is a possibility that the chloride concentration of water from the Knowle's Crossing wellfield would increase.

6. A stringent water conservation program, if instituted, would require some private and public expenditures to retrofit existing fixtures with water conserving devices and to enforce the provisions of the program. The institution of a stringent water conservation program would, however, have a positive effect on water resources in this area.

7. Town residents would experience the inconveniences encountered when water consumption is curtailed, i.e., short showers, empty pools, full washing machine and dishwasher loads, dirty cars, neglected gardens, etc.

Mitigating Measures

1. It is possible that the Town could recover any increased expenditures if it is awarded all or part of the $25 million relief it is seeking through litigation against the parties allegedly responsible for the gasoline leak. However, the legal process is very slow and the Town may not receive any monetary relief for many years, if at all. The Town has been awarded a $250,000 grant from the Department of Housing and Urban Development to deal with the gasoline spill and the State Department of Water Pollution control is contributing approximately $40,000, in services, to the physical recovery phase of cleanup. These funds will substantially alleviate the financial burden associated with the cleanup effort.

2. A well-planned and well-publicized alternative course of action could partially mitigate the adverse impacts on tourism caused by denial of permission to use the National Park Service well.

3. Visitor inconvenience could be minimized if Provincetown acted quickly to develop alternative water supplies, to retrofit existing systems and to adopt and publicize a stringent conservation program which would actively encourage tourist participation. This course of action could allow most hotels, motels, shops and restaurants to remain open.

4. The Knowle's Crossing wellfield could be closely monitored for chloride increases should the Rumrunner site be developed.

Adverse Impacts That Cannot Be Avoided

1. Provincetown could incur increased expenses in its efforts to restore the South Hollow wellfield and to provide temporary water supplies until restoration is complete.

2. Visitors and tourists as well as residents could suffer various, temporary inconveniences until the South Hollow wellfield is back on line.

Short-Term/Long-Term Relationship of Resources

No significant long-term economic or environmental effects would result from a denial of the Special Use Permit.

Irreversible and Irretrievable Commitments of Resources

The potential loss of some business concerns could be irreversible.

B. Alternative B: Grant Request for Special Use Permit

Under this alternative the National Park Service would grant Provincetown permission to withdraw water from the National Seashore to help meet the high demands of the tourist season. Within the context of this alternative are several mitigating measures which could be incorporated in the Special Use Permit to guarantee the Park Service's interests in resource protection while still allowing Provincetown to withdraw sufficient water to meet its summer demands. A decision to issue a Special Use Permit could save the Town the cost of installing a barrier well system at South Hollow or developing a new well at the Rumrunner Restaurant site. However, this should not inhibit the development of a more stringent water conservation program. This alternative would not require increased expenditures for additional temporary water supplies since the production well, distribution lines and other necessary equipment are already in place at well site #4. With this alternative the South Hollow reclamation could continue on schedule without further delays.

Impacts

1. Up to 0.75 mgd of water would be withdrawn from this well from April 1 through November 30, 1979. This level of pumping would probably cause a slight upward and landward migration of the freshwater/saltwater interface. Slight groundwater drawdowns (between 1-1.5 feet) are also expected to occur. This drawdown is not greater than would occur during extended dry weather conditions. Based on the results of data gathered from several observation wells during the operation of the Park Service well during the summer of 1978, these changes in the freshwater lens are not expected to effect private wells, the chloride levels in the water withdrawn from the well, the chloride levels at Knowle's Crossing (whose area of influence overlaps that of National Park Service well #4) or the wetlands which lie within the areas of influence of these two wells.* It must be emphasized that while no appreciable impacts are anticipated for short-term (up to 6 months) use of this well, the impacts resulting from longer periods of withdrawal are not clear. The winter, spring and summer of 1977-78 were wetter than normal and water recharged to the aquifer was abundant. To date, the winter of 1978-79 has been somewhat wetter than usual and recharge to the aquifer will

*See Appendix F for the U.S. Geological Survey's discussion of hydrologic impacts.

be somewhat above normal. The impacts which could result from pumping in a dry year are not well known. Changes in the wetland areas could resemble the conditions produced during an extreme drought. It is estimated that wetland ecosystems would recover within 1-2 years time unless there is an extended drought period. In which case, impacts would be more severe and possibly of longer duration. The wetland observation area north of the Park Service well site, though not obviously effected by last year's pumping, is potentially quite vulnerable to sustained pumping, especially during a dry year(s), since it lies partly within the overlapping areas of influence of the Knowle's Crossing and Park Service wells.

2. If the existing access to the well site is retained for use by four wheel drive vehicles, erosion will undoubtedly continue. The application of additional clay hardening material will not stabilize this situation to an acceptable degree. The accumulation of clay around the bases of trees and shrubs could adversely effect vegetation in the immediate area. Also, because this material is clay, it may be difficult for plant species to reestablish growth over the "delta". The continued loss of soil and the organisms in the soil, so important to "mycorrhizal" species such as bearberry, could present serious restoration problems.

Mitigating Measures

1. To reduce further the risks of upconing and significant changes in the freshwater/saltwater interface the Park Service could restrict use of its water to the minimum required to meet demands over and above the supply available from the Air Force and Knowle's Crossing wells but not to exceed 0.75 mgd. This would require an operational arrangement which would utilize the Park Service well as the third, rather than the first, line source of supply. This type of operational set up would be consistent with Park Service policy not to allow the lease or sale of water resources unless there is no reasonable alternative.

2. The Park Service could issue a Special Use Permit to cover the months of June, July and August. These months are clearly the only months when use of the Park Service well would be required to meet actual demands (see Figure 3). Issuance of the permit for

the three month period of actual need rather than for eight months (April through November) would not only reduce the possibility of upconing, groundwater drawdowns, increases in chloride levels and the migration of the freshwater/saltwater interface but would be consistent with National Park Service policies and guidelines.

3. Immediate steps to stabilize the temporary access road could be developed and undertaken by the Town with the cooperation and approval of the National Park Service. Revegetation of the site could be delayed until the pumping station and related equipment are permanently removed. Options to consider in this regard include: closing the road to vehicular use; laying of some type of material perpendicular to the length of the road to catch and hold the soil; laying a strong but flexible (perhaps degradable) matting material along the length of the road to catch and hold soil; establishing an organic and/or inorganic mulch over a matting framework to absorb the force and impact of falling rain and flowing water on the kettle slope and to permit the reestablishment of a soil structure which would again support plant life; berming at the top and/or sides of the kettle slope to slow and redirect the flow of water.

4. The Park Service would continue monitoring the wetland which lies between the Knowle's Crossing wellfield and the Park Service well. Monitoring of production and observation wells by the Park Service and Provincetown could be continued in an effort to identify any impacts related to pumping so that water withdrawal could be reduced or stopped if the Seashore's resources were threatened.

5. The Park Service could retain the option to review and approve development proposals which would increase water demands in Provincetown.

Adverse Impacts That Cannot Be Avoided

Some additional erosion of the access road will occur before an adequate stabilization program can be accomplished.

Short-Term/Long-Term Relationship of Resources

This alternative would allow Provincetown to minimize the expenditures required to provide additional water supplies for Town residents and tourists during the summer season. It would also permit the cleanup program at South Hollow to proceed without further delay.

However, continuation of short-term use of Park Service water in succeeding years could provide an incentive to establish this supply as a long-term, de facto element in Provincetown's water system. This type of arrangement could generate significant, long-term effects on the Seashore's resources.

Irreversible and Irretrievable Commitments of Resources

No major irreversible or irretrievable impacts appear to be associated with the strictly short-term withdrawal of water from this site at a maximum rate of 0.75 mgd.

IV. CONSULTATION AND COORDINATION WITH OTHERS

During the development of this Assessment, the National Park Service consulted extensively with the Town of Provincetown, Massachusetts and the Town's consulting engineers, Camp, Dresser & McKee, Inc. in an effort to understand the Town's situation and the problems associated with the reclamation of the threatened South Hollow wellfield.

In addition, the Park Service contacted a variety of government agencies, private firms and organizations with interest or expertise in the fields of conservation, resource preservation, water supply engineering and/or hydrocarbon reclamation technology, including the United States Geological Survey; the Environmental Protection Agency; the Town of Truro, Massachusetts; Suntech Group, Marcus Hook, Pennsylvania; Culligan Company, Albuquerque, New Mexico and the Cape Cod Economic Planning and Development Commission, Barnstable, Massachusetts

This Assessment is being published and distributed for public and other agency review. Comments received will be analyzed and their synthesis, along with this Assessment, will be used during a Review of Alternatives to assist the Superintendent in making his alternative selection recommendation to the Regional Director.

V. APPENDICES

Form 10-114
(Rev. March 1971)

APPENDIX A

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

This permit consists of 5 pages including attachments.

SPECIAL USE PERMIT

PERMIT NO.	EXPIRES
1730-CX-8-0014	
PREVIOUS PERMIT NO.	

Cape Cod National Seashore
(Area)

The Town, of Provincetown, Massachusetts is hereby authorized during the period from May 15, 19 78, through October 31, 19 78, to use the following-described land in the above-named area:

1. A parcel of land located in North Truro, Massachusetts comprising approximately 50 ft. by 50 ft. identified as test well No. 4, as shown on accompanying sketch A.

2. A plot of land approximately 1,000 ft. in length between South Highland Road and South Hollow Road. The location is shown on accompanying sketch B.

for the purpose of

1. Constructing a temporary water supply well, a temporary well pumping station, and an above-ground connecting water main. A location plan of the facilities is attached (Sketch A).

2. Installing a temporary, above-ground, 8" connecting water main (Sketch B).

subject to the conditions on the reverse hereof and attached pages and to the payment to the Government of the United States ~~of the sum of~~ ~~Dollars ($~~), ~~in advance~~ Monthly (~~Monthly, semiannually, etc.~~), ~~or as follows~~: an amount calculated at the rate of $0.11 per 1000 gallons of water withdrawn, as metered and recorded at the pumping station, in accordance with Special Condition No. 2 herein. payment to be made to the Superintendent by Express or Postal Money Order, Certified Check, or Draft payable to the National Park Service, or Cash.

Issued at South Wellfleet, MA (City), this 26 day of May, 19 78

/s/
Lawrence C. Hadley
Superintendent.

The undersigned hereby accepts this permit subject to the terms, covenants, obligations, and reservations, expressed or implied, therein.

TWO WITNESSES TO SIGNATURES	* PERMITTEE (Signature)
NAME /s/ Marjorie S. Burling	NAME /s/ Charles Cobb, Town Manager
ADDRESS Brewster, MA 02631	ADDRESS Town of Provincetown, Provincetown, MA 02657
NAME /s/ Lesley D. Lawson	NAME
ADDRESS Osterville, MA 02655	ADDRESS

APPROVED: *(If approval is required by higher authority)*

NAME	TITLE	DATE

*Sign name or names as written in body of permit; for copartnership, permittees should sign as "members of firm"; for corporation, the officer authorized to execute contracts, etc., should sign, with title, the sufficiency of such signature being attested by the Secretary, with corporate seal, in lieu of witnesses.

16—35968-8

Distribution — Field Finance Office

CONDITIONS OF THIS PERMIT

1. **Regulations.**—The permittee shall exercise this privilege subject to the supervision of the Superintendent, and shall comply with the regulations of the Secretary of the Interior, or other authorized officer of the Government, governing the area.

2. **Definition.**—The term "Director, National Park Service" as used herein shall include the appropriate Regional Director or Superintendent as the representative of the Director.

3. **Rights of the Director.**—Use by the permittee of the land covered hereby is subject to the right of the Director, National Park Service, to establish trails, roads, and other improvements and betterments over, upon, or through said premises, and further to the use by travelers and others of such roads and trails as well as of those already existing. If it is necessary to exercise such right, every effort will be made by the National Park Service to refrain from unduly interfering or preventing use of the land by the permittee for the purpose intended under this permit.

4. **Nondiscrimination.**—See attachment A.

5. **Damages.**—The permittee shall pay the United States for any damage resulting from this use which would not reasonably be inherent in the use which the permittee is authorized to make of the land described in this permit.

6. **Construction.**—No building or other structure shall be erected under this permit except upon prior approval of plans and specifications by the Director, National Park Service, and the premises and all appurtenances thereto shall be kept in a safe, sanitary, and sightly condition.

7. **Removal of structures and improvements.**—Upon the expiration of this permit by limitation of time or its termination for any reason prior to its expiration date, the permittee, if all charges due the Government hereunder have been paid, shall remove within such reasonable period as is determinted by the Superintendent, but not to exceed 90 days unless otherwise stipulated in this permit, all structures and improvements placed on the premises by him, and shall restore the site to its former condition under the direction of the Superintendent. If the permittee fails to remove all such structures and improvements within the aforesaid period, they shall become the property of the United States, but that will not relieve the permittee liability for the cost of their removal and the restoration the site.

8. **Water rights.**—Water rights will be perfected, w necessary, by the United States in its own name for w developed or used in connection with this permit. The mittee will furnish to the United States such information necessary for perfection, including statutory fees, and management and protection of the resource.

9. **Disposal of refuse.**—The permittee shall dispos brush and other refuse as required by the Superintend

10. **Timber cutting.**—No timber may be cut or destro without first obtaining a permit therefor from the Direc National Park Service.

11. **Fire prevention and suppression.**—The permi and his employees shall take all reasonable precaution prevent forest, brush, grass, and structural fires and shall assist the Superintendent in extinguishing such fir the vicinity of any tract which may be used hereunder.

12. **Soil erosion.**—The permittee shall take adeq measures, as directed and approved by the Superinten to restrict and prevent soil erosion on the lands cov hereby and shall so utilize such lands as not to contri to erosion on adjoining lands.

13. **Benefit.**—Neither Members of, nor Delegates to C gress, or Resident Commissioners shall be admitted to share or part of this permit or derive, either directly o directly, any pecuniary benefit to arise therefrom: *Prov however,* That nothing herein contained shall be const to extend to any incorporated company, if the permit b the benefit of such corporation.

14. **Assignment.**—This permit may not be transfe or assigned without the consent of the Director, Nati Park Service, in writing.

15. **Revocation.**—This permit may be terminated u breach of any of the conditions herein or at the discre of the Director, National Park Service.

*Number all succeeding pages and attachments in consecutive order and identify each with the permit number.

U.S. GOVERNMENT PRINTING OFFICE

5. The Town must terminate withdrawal of water from the well site by November 1, 1978.

7. The Town will continue to require adherence by all water users to the water conservation program adopted by the Provincetown Board of Water Commissioners on April 24, 1978. Amendments or changes in the conservation measures embodied in that program must be submitted to the National Park Service for concurrence.

8. The Town will bear the total cost of constructing and dismantling this temporary well system, including necessary metering equipment.

9. All water distribution lines crossing Federally-owned lands within the Seashore must be located above ground, except that such water lines may be placed underground where necessary to cross roads, trails, paths and other travelled rights-of-way.

10. Daily pumpage from this well will not exceed 0.75 million gallons per day.

11. The Town will keep sufficient records so that daily withdrawals can be determined; such records to provide the basis for computing charges to the Town for water withdrawn from the site. Copies of records of all daily pumping rates will be furnished to the Superintendent, Cape Cod National Seashore, weekly.

12. The National Park Service intends to monitor the impacts of withdrawal on Seashore resources by means of an independent study including, but not limited to, a monitoring well system. Information gathered from the study will be used by the National Park Service to prepare appropriate environmental compliance documents, and, concurrently, to evaluate the environmental impacts of the actions authorized herein. The National Park Service reserves the right to terminate this Permit whenever unacceptable impacts are found.

13. The Superintendent, Cape Cod National Seashore, or his designated representative, shall have the right at any time to enter upon the lands assigned hereunder for any purposes he may deem reasonably necessary for the administration of the Seashore, and the fulfillment of the purposes he may deem reasonably necessary for the administration of the Seashore, and the fulfillment of the purposes and conditions of this Permit.

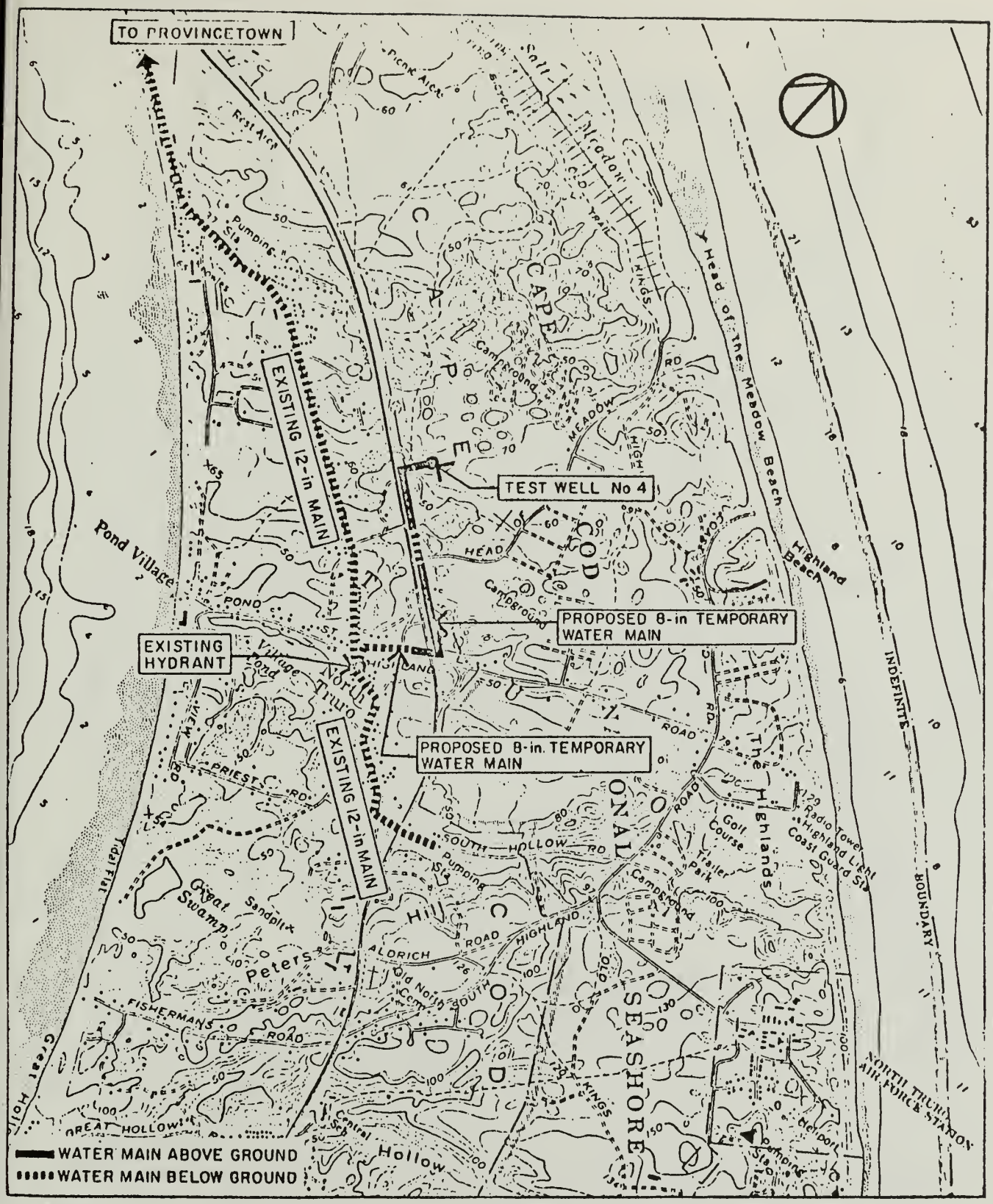
☆ U. S. GOVERNMENT PRINTING OFFICE: 1976-622-277

24. The Town of Provincetown agrees to hold the United States free and harmless from any and all claims for injuries to persons or damage to property resulting from the exercise of privileges granted by this Permit.

25. All changes or disturbances of the existing conditions of the area including landscape, roads or structures during drilling and testing are to be repaired or replaced by the permittee as nearly as possible in the original condition in a manner acceptable to the Superintendent, Cape Cod National Seashore.

26. When the emergency condition is alleviated by action of the Town in securing and developing a water source outside the Seashore the authority to withdraw water provided herein will be terminated, and the temporary system including the structures, equipment, distribution lines and well casing will be removed.

☆ U. S. GOVERNMENT PRINTING OFFICE: 1976-622-277



TOWN OF PROVINCETOWN, MASSACHUSETTS

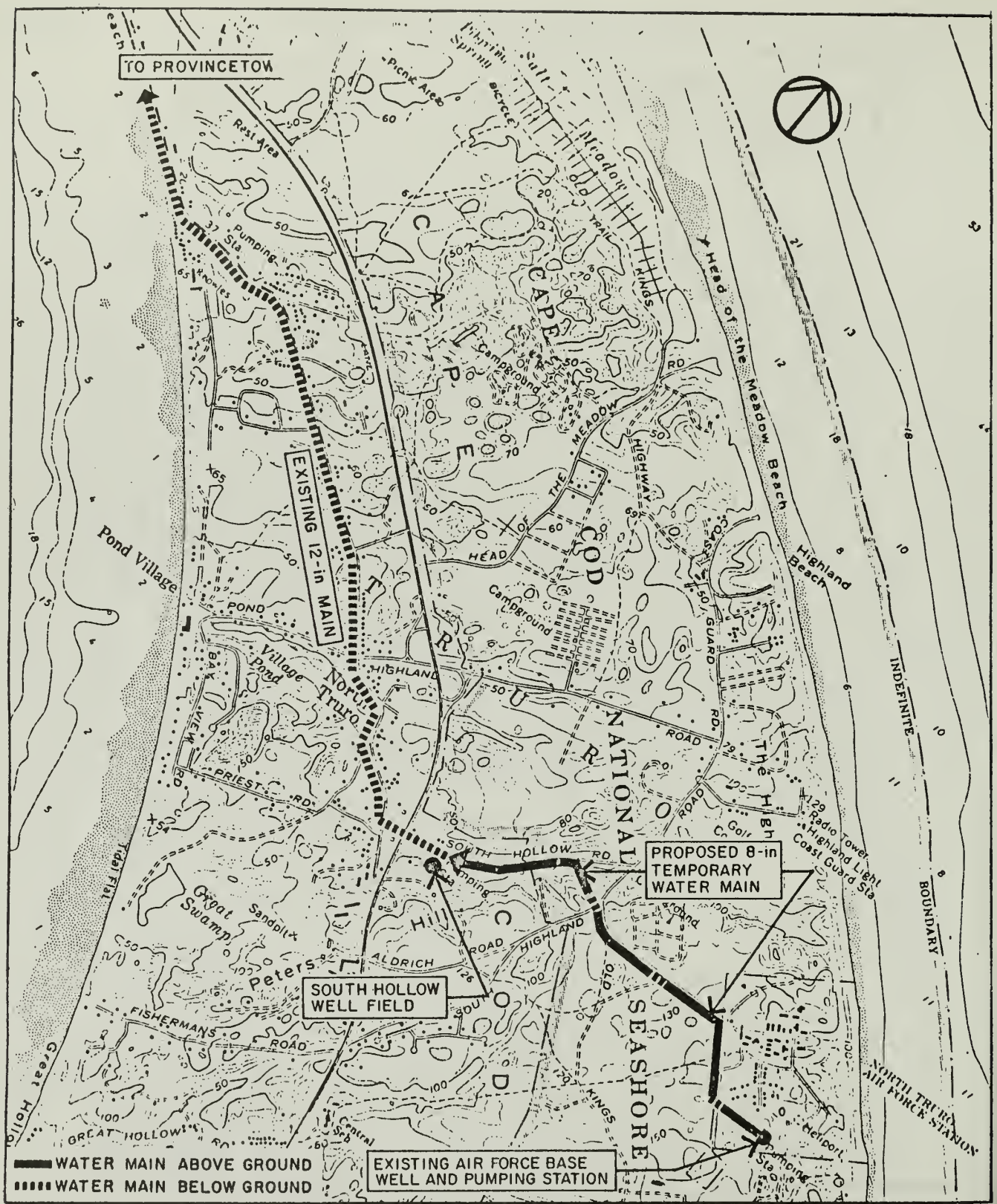
45

A

FIGURE 5

NATIONAL PARK SERVICE TEST WELL SITE No. 4

PROPOSED TEMPORARY CONNECTION TO PROVINCETOWN SYSTEM



TOWN OF PROVINCETOWN, MASSACHUSETTS

B

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FIGURE 6

NORTH TRURO AIR FORCE BASE

PROPOSED TEMPORARY CONNECTION TO PROVINCETOWN SYSTEM

SCALE: 1" = 2000'

MAY 1978

ATTENTION WATER CONSUMERS

WATER USE REGULATIONS

Section 29. No person shall use lawn sprinklers or Town Water for outdoor purposes in violation of Water Department Regulations.

1. The use of lawn sprinklers and sprinkler hose for the watering of lawns and gardens is hereby prohibited during the period of May 1 through September 30 inclusive, unless specific authorization is granted by the Board of Water Commissioners after a public hearing.

2. The use of nonattended water hoses is prohibited unless specific exemption is granted by the Board of Water Commissioners after a public hearing.

3. No water shall be used from a fire hydrant except by the Fire Department without first obtaining a written permit from the Board of Water Commissioners.

4. The use of Town water supply for the purpose of driving piling is prohibited unless a permit is obtained therefor from the Board of Water Commissioners.

5. It shall be unlawful to use the town water supply to fill or cure any swimming pool unless a written permit is obtained therefor from the Board of Water Commissioners.

6. It shall be unlawful to use the town water supply for use as a coolant in a Central Station Air Conditioning and/or refrigerating and/or open circuit type system, utilizing, evaporating, and/or water-cooled condensers or cooling-tower utilizing chilled water, and/or Unit Air Conditioners and/or refrigerators which are water cooled of the open circuit type without the express written consent of the Board of Water Commissioners.

The Board of Water Commissioners is empowered to make other rules and regulations pertaining to the use of the municipal water supply after public hearing. Such regulations shall take effect when promulgated by publication in a newspaper of general circulation in the Town of Provincetown and by posting the same on the bulletin board at the Town Hall.

A violation of the aforementioned articles shall be punished by a fine not to exceed Fifty ($50.00) Dollars per day; each day constituting a separate offense.

THE FOLLOWING EMERGENCY REGULATIONS WERE PROMULGATED BY THE WATER COMMISSION AT A MEETING HELD MONDAY, APRIL 24, 1978. THESE REGULATIONS WILL GO INTO EFFECT FRIDAY, APRIL 28, 1978, AND WILL CONTINUE IN EFFECT FOR A PERIOD OF NO LONGER THAN 90 DAYS, OR UNTIL FURTHER NOTICE, AT WHICH TIME THEIR CONTINUED NECESSITY WILL AGAIN BE REVIEWED BY THE WATER COMMISSION.

1. No town water shall be used to wash road vehicles.
2. No town water shall be used to wash down any boats.
3. The use of water hoses to clean the exterior of buildings shall be prohibited.
4. No water shall be served at restaurants unless requested by patrons.
5. Permits for the filling of pools in Provincetown and the Truro Beach Point Area may be obtained from the water commission on Monday, May 1, 1978, between 10 a.m. and 5 p.m. in Town Hall, at which time a staggered two-month schedule will have been developed by the Town for the filling of said pools.
6. All citizens with private wells must display medallions readily visible from the street: Failure to do so will subject them to the same fines as non-well owners. Medallions may be obtained from Town Hall and must be displayed no later than May 5, 1978.

A VIOLATION OF THE ABOVE REGULATIONS SHALL BE PUNISHED BY A FINE NOT TO EXCEED FIFTY ($50.00) DOLLARS A DAY; EACH DAY CONSTITUTING A SEPARATE OFFENSE.

THE BOARD OF WATER COMMISSIONERS, THE BOARD OF HEALTH AND THE BOARD OF SELECTMEN WILL BE ENFORCING AGENTS FOR THE ABOVE BYLAW AND EMERGENCY WATER USE REGULATIONS.

THE BOARD OF WATER COMMISSIONERS ALSO STRONGLY ENCOURAGES THE FOLLOWING WATER CONSERVATION METHODS:

1. The use of stickers or signs in restaurant and hotel restrooms encouraging tourists to conserve water.
2. The adjustment of valves below sinks to cut maximum volume by one-half.
3. The use of water saving devices in homes and business. These will be made available at cost through a citizens' steering committee working with the water commission and will be on display at Town Hall as of Monday, May 1, 1978.

Thank you for your cooperation.

PROVINCETOWN BOARD OF WATER COMMISSIONERS
Charles A. Mayo III, Chairman
C. Page McMahan
Valerie Martin
John Nunes

Provincetown Advocate
April 27, 1978

APPENDIX C

COPY

Town of Provincetown

MASSACHUSETTS 02657
(617) 487-3900

October 25, 1978

Mr. Denis P. Galvin
Acting Regional Director
National Park Service
15 State Street
Boston, Mass. 02109

RE: Provincetown, Mass., Water Supply Emergency

Dear Mr. Galvin:

As you are aware, Provincetown successfully averted its water supply crisis this past summer, specifically because of the assistance of the National Park Service through development of a production well at Test Site No. 4, in the Cape Cod National Seashore. We extend our appreciation and gratitude to you and the Cape Cod National Seashore Park personnel for your timely and effective efforts in our behalf. The emergency well supply has operated flawlessly this summer and to the present date.

Recently, our Mr. Charles K. Cobb, Town Manager and Mr. Robert A. Weimar of Camp, Dresser & McKee, Inc., met with your Mr. David Clarke, Ms. Nancy Nelson, and Mr. David Price, Engineer at the Cape Cod National Seashore Park in Wellfleet. From these discussions, it is our understanding that we generally complied with all stated requirements in our Special Use Permit agreement for water supply development at Test Site No. 4. However, Mr. Price indicated that some of our operation reports were incomplete. Mr. Cobb and Mr. Weimar are attempting to complete these records. In addition, Mr. Price referred to a recent letter from Mr. James C. Killian, Acting Superintendent of the Cape Cod National Park, which stated that on six separate dates the Test Site No. 4 pumping station had produced more than the allotted 0.75 mgd under the Special Use Permit. After discussing the circumstances at those times with Mr. Joseph Smith of our Water Pumping Department, our consulting engineers can only offer one explanation for the overpumping: that shutdown of the North Truro Air Force Station and Knowles Crossing supplies caused low

(more)

transmission main pressures; and, therefore, increased pumping rates from the well pump at Test Site No. 4. CDM has suggested close monitoring during supply system changes to insure overpumping does not occur in the future.

Mr. Price indicated to Mr. Cobb and Mr. Weimar that the well pumping station, connecting water main, and access road construction were generally satisfactory. He did note that some erosion of the access road had taken place within the kettle-hole, particularly during the torrential rains during early August. He indicated that repair and grading of the access road stabilizing materials had been satisfactory to date; however, some improvement to the road may be required if the water supply system was to remain in operation for another year. We would appreciate any suggestions your staff may have in this regard.

We understand that your staff is currently preparing the environmental compliance documents required under Federal Guidelines for Special Use Permits. We have been contacted by your staff regarding several items which require additional documentation. We have instructed our consulting engineers (CDM) to assist you in these matters and provide any additional information which may be available.

At this time, Provincetown's water supply emergency is not abated. Gasoline removal from the groundwater aquifer has not yet started, and is complicated by the accompanying litigation. The Town's water supply needs are, therefore, precariously reliant solely on the Knowles Crossing Well Supply. Any breakdown of equipment or unforeseen environmental conditions (such as an extended dry period) could severely reduce water supply to the Town. We realize that the Town has an obligation to minimize its reliance on the National Park Service and the groundwater well supply at Test Site No. 4; however, the emergency situation as presented in our Technical Application Docket to you still remains. Therefore, we have prepared the following data which is intended to supplement the previous Technical Docket and support our request for an extension of our present Special Use Permit for one additional year.

Water Consumption

In general, Provincetown's water consumption has increased in recent years; the average daily consumption has increased from 0.86 million gallons per day (mgd) in 1974 to 1.00 mgd in 1977, an average annual increase of 4.9%. Based on this previous annual trend, a January-through-September average daily water consumption of 1.14 million gallons per day (mgd) would have been projected for 1978 from the 1977 value of 1.08 mgd over that same period. The actual 1978 average consumption during this period, however, has been 0.99 mgd to date. This represents an 8.5% decrease from the 1977 consumption and a 12.8% decrease from the projected 1978 consumption. This

(more)

decline is clearly illustrated on the accompanying graph which charts the actual 1977 and 1978 pumpage; the 1978 pumping has been lower than 1977 every month to date. This reversal of the trend of previous years is an indication that the water conservation measures instituted by the Town have successfully reduced water demands.

In projecting water demands for the rest of 1978 and 1979, the 1977 demand curve on the attached graph can be used as an approximation of probable water consumption. It can be seen that the probable average daily demand for the remainder of this year through April 1979 ranges from 0.6 to 0.8 mgd. The probable average daily demand is estimated to increase to 0.8 to 1.0 mgd for May. A slight increase over 1978 water usage is expected for June to August 1979; the average daily demand is estimated to be approximately 1.45 mgd (1.40 mgd in 1978). The maximum day demand is estimated to be approximately the same as 1978, approximately 2.0 mgd.

It can be seen that utilizing the Knowles Crossing Well Field at 0.5 mgd and 0.8 mgd, for average and maximum production rates respectively, the temporary water supply facilities must fulfill an average day deficit of 0.95 mgd and a maximum day deficit of 1.2 mgd.

Use of Supply Sources

During the June-through-September period of recent years, the Knowles Crossing Well Field, through supplying less water than the South Hollow Field, has been operated at rates above the recommended average capacity of 0.5 mgd. During the emergency conditions that prevailed this year, the temporary facilities replaced the water supply from the South Hollow Well field, and also enabled the Knowles Crossing Well Field to be operated within recommended limits. The June-through-September pumpage for the different sources was as follows: Knowles Crossing supplied 61.1 million gallons; the National Park Service Well supplied 55.8 million gallons; the North Truro Air Force Station Well supplied 27.9 million gallons; and the South Hollow Well Field supplied 14.8 million gallons. This South Hollow pumpage was all before its early-June shutdown, which was necessitated by the fact that pumpage was inducing the flow of gasoline contamination toward the well field. The average daily pumping at Knowles Crossing was 0.50 mgd. The proper operation of this well field improved the quality of the produced water. The chloride content, which ranged between 160 and 180 parts per million (ppm) in May, dropped to 130 ppm on September 30.

Status of the South Hollow Well Field

Since last May, when the Technical Docket was completed and approved, the analysis of the groundwater conditions at the South Hollow Well Field has been completed. In addition, a proposal for the cleanup

of the gasoline contamination, and subsequent reopening of the well field, has been submitted to us in a report by our consulting engineers, Camp, Dresser & McKee Inc. (CDM) of Boston, Massachusetts. Copies of the report entitled "Report on Gasoline Contamination at the South Hollow Well Field", dated October 17, 1978, have recently been forwarded to you for your use. CDM's field work documented the fact that a gasoline spill of several thousand gallons has taken place at an automotive service station located about 600 feet from the nearest supply well of the South Hollow Well Field. Some gasoline has adhered to the soil particles above the water table. In addition, there is a lens of nearly pure gasoline floating on the water table adjacent to the service station. The lens is as much as two and one half feet thick, but appears to be really limited. At other locations nearby, gasoline has been detected in the groundwater on some occasions but not on others. This indicates that some of the gasoline probably exists as small, discrete bodies which move in response to water table level changes in the groundwater system. It is expected that some gasoline exists in the vicinity of the well field, although no gasoline has been detected in water produced by the South Hollow Well Field to date. CDM's report established the fact that sustained withdrawal in excess of 175 gallons per minute (gpm) will induce flow of the main body of gasoline toward and, ultimately, into the South Hollow Well Field. Hence, the well field was shut down as soon as the temporary water supply facilities were completed.

Our engineers have proposed that the hydrocarbon bioreclamation technique marketed by Suntech, Inc., of Marcus Hook, Pennsylvania, be used in conjunction with physical recovery for treatment of the gasoline contamination. Free gasoline will be removed by bailing or skimming it off the top of the water table from one or more production wells. Free gasoline will be pumped to a tank trailer for eventual disposal off-site by a licensed oil disposer. The bioreclamation process will be utilized to accelerate the growth of naturally-occuring, gasoline-utilizing microorganisms. These microorganisms convert the gasoline in the soil and groundwater into carbon dioxide, water and waste heat which is absorbed by the groundwater. Pilot testing of the Suntech process will be performed to insure that the process is feasible at this site. If it is, injection wells will be drilled around the site of the contamination to supply oxygen and nutrients to the groundwater system. Representative of Suntech estimate that the length of the expected cleanup process will be between four and twelve months. A detailed explanation of the hydrocarbon bioreclamation process is presented in "Report on Gasoline Contamination at the South Hollow Well Field", previously mentioned.

During the bioreclamation treatment period, it is recommended that the South Hollow Well Field remain shut down. Although it is possible to drill a production well into the contamination site to create water table gradients which would counteract any pumpage from the

from the well field, this creates the problem of disposal of the produced water, increases cleanup costs and lengthens the time required for gasoline cleanup. It appears likely that the South Hollow Well Field will remain shut down until December 1979 and possibly somewhat beyond that time.

Extension of Agreements to Utilize Temporary Facilities

As stated previously, the expected average daily demand for the remainder of this year ranges from 0.6 to 0.8 mgd. After the October 31, 1978 scheduled shutdown of the temporary supplies, the only water supply source available to the Town will be Knowles Crossing Well Field. While the maximum daily capacity of this supply is 0.8 mgd, the recommended average daily capacity is 0.5 mgd. It can be seen that expected demands will exceed the average capacity of the well field and may exceed its maximum capacity. As discussed in the Technical Docket, it is not desirable to operate the well field at rates exceeding these capacities due to the certainty of chloride intrusion. In addition, extended periods of overpumping could permanently contaminate the aquifer system around the well field by upcoming salt water forcing abandonment of the field. Past operating history of the well field shows that chloride concentrations of 180-200 ppm have occured. This is near the 250 ppm limit recommended by the Federal Safe Drinking Water Act of 1974.

Provincetown's continued reliance on the Knowles Crossing and South Hollow Well Fields, particularly during the summer months, created the need for construction of alternative power drives and an additional water storage facility. Electric drive systems were designed and construction bids received during early 1978 for installation this past spring. However, they could not be installed because of the water supply emergency. The Town plans and needs to install these facilities in the Knowles Crossing Well Field during early November in preparation for winter operation. Basic construction of the water storage tank (3.5 million gallons) was completed during June 1978; however, the tank was not painted. Instead, the tank was filled to provide additional storage for emergencies during the summer tourist season. The tank was recently drained and final coatings are now being applied. It is expected that the tank painting may be completed and the tank ready for use by mid-November 1978.

These factors, coupled with the unavailability of the South Hollow Well Field, present a difficult situation for the Town. We, therefore, are requesting permission to leave the temporary system, the NPS Well Site No. 4, energized until approximately mid-December when freezing conditions would force shut down. We expect that operation of the North Truro Air Force Station facilities (we have requested extension of our agreement with the Air Force) will fulfill the majority of our demands during this period. However, if extended periods of high demands occur or if the renovations of the Knowles Crossing Well Field are not completed in a timely manner, use of the

NPS Test Site No. 4 supply would be required. This short term request is intended to provide a backup system to the Knowles Crossing and NTAFS supplies which would provide the primary supply.

As mentioned above, the reclamation project at South Hollow Field will probably still be ongoing next summer. Therefore, the state of emergency which was documented in last May's Technical Docket will still be in effect this coming summer. We thus are requesting that permission be granted for use of the temporary facilities at the North Truro Air Force Station and the National Park Service Test Site No. 4 through November 1979. It is proposed that the NPS Test No. 4 facilities be available to be put on-line again as soon as non-freezing weather conditions prevail; we suggest a tentative date of April 1.

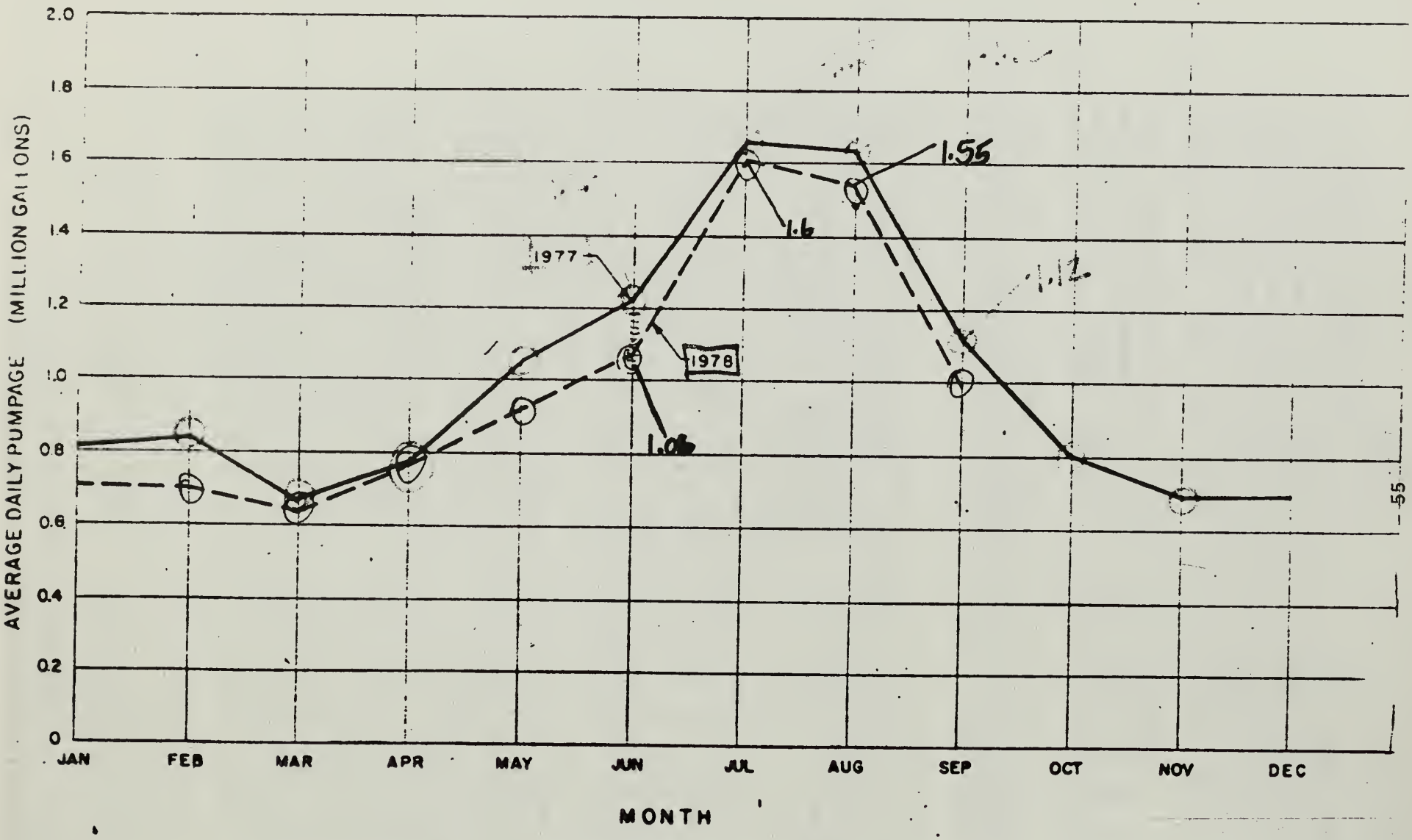
At the termination of the bioreclamation procedures and the reactiviation of the South Hollow Well Field, use of the temporary systems would be discontinued. The provisions already agreed upon for permanent shutdown of these facilities would then be enacted. Provincetown has already requested CDM to prepare an engineering study to examine long-range water supply alternatives to meet demands exceeding recommended pumpage rates from the Knowles Crossing and South Hollow Well Fields. This work includes an examination of several water supply development alternatives. An evaluation of ensuing effects on the transmission distribution system, and hydrologic, ecological and financial impacts of different schemes included in the proposed work. The "Proposed Scope of Work" recently submitted by our engineers for this project is enclosed for your review and comment. We expect this project to be funded at our Special Town Meeting on November 13, 1978.

We would be pleased to furnish any additional information which you need in regard to these matters. Please accept our apologies for the late date at which these requests are being made for any inconveniences this may cause. We are grateful for your cooperation and response to the needs of the people of Provincetown.

Very truly yours,

/s/

Mary-Jo Avellar, Chairman
Board of Selectmen
Town of Provincetown



AVERAGE DAILY WATER CONSUMPTION TRENDS 1977-1978

PROPOSED SCOPE OF WORK

1. Determine annual and long-term water consumption trends. Recent water meter records shall be reviewed as well as total water use records. Estimates of tourist water use shall be made, including tourist usage in Truro. Effectiveness of water conservation to control any excessive consumer usage shall also be evaluated. In addition, unaccounted-for water use shall be analyzed; a leakage survey shall be conducted by a subconsultant to CDM as part of this program.

2. Evaluate existing water supplies. Maximum water supply capacities from the Knowles Crossing Well Field and the South Hollow Well Field shall be estimated. Chloride intrusion shall be considered to estimate maximum average withdrawal rates.

3. Estimate the maximum water supply development alternatives. The alternatives shall be limited to groundwater supplies at the following sites: (1) the Atkins-Mayo Road Site in Provincetown, (2) Test Site No. 4 at the Cape Cod National Seashore Park in Truro, (3) "Long Nook Road" site in Truro (as designated by the United States Geological Survey), (4) the south Truro area (the "Hiltre Site" as designated by previous correspondence) and (5) development of additional well supply at the South Hollow Well Field. Estimates of withdrawal rates shall be based on previous pump test results by others and water level drawdown data from the operating supplies. Any potential water treatment requirements shall also be considered.

4. Evaluate effects of alternative water supply development on the distribution-transmission system. The need for water main improvements shall be determined.

5. Determine hydrologic impacts of groundwater withdrawals at each site. Water table lowering, upconing of the saltwater-freshwater interface, and reduction of freshwater discharge to the sea shall be evaluated.

6. Evaluate the long-term usage of water supply development alternatives with respect to the regional groundwater usage. The water supply development schemes shall be coordinated with the United States Geological Survey Regional Groundwater Model. These studies shall be made in cooperation with the Barnstable County Commerce & Development Commission.

7. Evaluate ecological impacts of the proposed water supply alternatives. Studies shall consider the general impacts of water withdrawals for alternative groundwater sources. An environmental impact analysis is not to be conducted under this program.

8. Prepare preliminary facilities plans for each water supply alternative. These plans shall include pump station, transmission system and water treatment facility improvements, as appropriate. Capital Costs and operation and maintenance for the alternative supplies shall be estimated.

9. Evaluate financial impacts of water supply development alternatives. The long-term cost-effectiveness of each alternative shall be based on required usage to meet Provincetown's water supply demands.

10. Recommend water supply development program for the Town to meet future water demands.

11. Summarize investigations and recommendations in a draft report. The report shall include a detailed plan of the recommended alternative(s) facilities. A total of fifteen (15) copies shall be provided.

12. Assist the OWNER in obtaining approval of the draft report from the DEQE.

13. Assist the OWNER in presenting the report recommendations and conclusions to interested public agencies, including but not limited to: the United States Department of the Interior, National Park Service; the Town of Truro; and the Barnstable County Planning and Development Commission. A total of six (6) formal meetings shall be attended under this agreement.

14. Present the investigations and recommendations in a bound final report. Twenty-five copies of the completed report shall be provided.

Public Law 91-383
91st Congress, H. R. 14114
August 18, 1970

An Act

To improve the administration of the national park system by the Secretary of the Interior, and to clarify the authorities applicable to the system, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That Congress declares that the national park system, which began with establishment of Yellowstone National Park in 1872, has since grown to include superlative natural, historic, and recreation areas in every major region of the United States, its territories and island possessions; that these areas, though distinct in character, are united through their inter-related purposes and resources into one national park system as cumulative expressions of a single national heritage; that, individually and collectively, these areas derive increased national dignity and recognition of their superb environmental quality through their inclusion jointly with each other in one national park system preserved and managed for the benefit and inspiration of all the people of the United States; and that it is the purpose of this Act to include all such areas in the System and to clarify the authorities applicable to the system.

National park system. Administration: authority clarification. 16 USC 21.

84 STAT. 825

SEC. 2. (a) Section 1 of the Act of August 8, 1953 (67 Stat. 496; 16 U.S.C. 1b), is amended by deleting "and miscellaneous areas administered in connection therewith" and "and miscellaneous areas" wherever they appear.

84 STAT. 826

(b) Section 2 of the Act of August 8, 1953 (67 Stat. 496; 16 U.S.C. 1c), is amended to read as follows:

"SEC. 2. (a) The 'national park system' shall include any area of land and water now or hereafter administered by the Secretary of the Interior through the National Park Service for park, monument, historic, parkway, recreational, or other purposes.

"National park system."

"(b) Each area within the national park system shall be administered in accordance with the provisions of any statute made specifically applicable to that area. In addition, the provisions of this Act, and the various authorities relating to the administration and protection of areas under the administration of the Secretary of the Interior through the National Park Service, including but not limited to the Act of August 25, 1916 (39 Stat. 535), as amended (16 U.S.C. 1, 2–4), the Act of March 4, 1911 (36 Stat. 1253), as amended (16 U.S.C. 5) relating to rights-of-way, the Act of June 5, 1920 (41 Stat. 917), as amended (16 U.S.C. 6), relating to donation of land and money, sections 1, 4, 5, and 6 of the Act of April 9, 1924 (43 Stat. 90), as amended (16 U.S.C. 8 and 8a–8c), relating to roads and trails, the Act of March 4, 1931 (46 Stat. 1570; 16 U.S.C. 8d) relating to approach roads to national monuments, the Act of June 3, 1948 (62 Stat. 334), as amended (16 U.S.C. 8e–8f), relating to conveyance of roads to States, the Act of August 31, 1954 (68 Stat. 1037), as amended (16 U.S.C. 452a), relating to acquisitions of inholdings, section 1 of the Act of July 3, 1926 (44 Stat. 900), as amended (16 U.S.C. 12), relating to aid to visitors in emergencies, the Act of March 3, 1905 (33 Stat. 873; 16 U.S.C. 10), relating to arrests, sections 3, 4, 5, and 6 of the Act of May 26, 1930 (46 Stat. 381), as amended (16 U.S.C. 17b, 17c, 17d, and 17e), relating to services or other accommodations for the public, emergency supplies and services to concessioners, acceptability of travelers checks, care and removal of indigents, the Act of October 9, 1965 (79 Stat. 696; 16 U.S.C.

Authorities, uniform applicability.

65 Stat. 95.

46 Stat. 1053.

70 Stat. 908.

79 Stat. 969.

78 Stat. 897.
16 USC 460l-4 note.
16 USC 460l-5.

20-20g), relating to concessions, the Land and Water Conservation Fund Act of 1965, as amended, and the Act of July 15, 1968 (82 Stat. 355), shall, to the extent such provisions are not in conflict with any such specific provision, be applicable to all areas within the national park system and any reference in such Act to national parks, monuments, recreation areas, historic monuments, or parkways shall hereinafter not be construed as limiting such Acts to those areas."

Secretary of Interior, authority.

SEC. 3. In order to facilitate the administration of the national park system, the Secretary of the Interior is authorized, under such terms and conditions as he may deem advisable, to carry out the following activities:

(a) provide transportation of employees located at isolated areas of the national park system and to members of their families, where (1) such areas are not adequately served by commercial transportation, and (2) such transportation is incidental to official transportation services;

(b) provide recreation facilities, equipment, and services for use by employees and their families located at isolated areas of the national park system;

(c) appoint and establish such advisory committees in regard to the functions of the National Park Service as he may deem advisable, members of which shall receive no compensation for their services as such but who shall be allowed necessary travel expenses as authorized by section 5 of the Administrative Expenses Act of 1946 (5 U.S.C. 5703);

80 Stat. 499; 83 Stat. 190.

(d) purchase field and special purpose equipment required by employees for the performance of assigned functions which shall be regarded and listed as park equipment;

84 STAT. 826
84 STAT. 827

(e) enter into contracts which provide for the sale or lease to persons, States, or their political subdivisions, of services, resources, or water available within an area of the national park system, if such person, State, or its political subdivision—

(1) provides public accommodations or services within the immediate vicinity of an area of the national park system to persons visiting the area; and

(2) has demonstrated to the Secretary that there are no reasonable alternatives by which to acquire or perform the necessary services, resources, or water;

(f) acquire, and have installed, air-conditioning units for any Government-owned passenger motor vehicles used by the National Park Service, where assigned duties necessitate long periods in automobiles or in regions of the United States where high temperatures and humidity are common and prolonged;

(g) sell at fair market value without regard to the requirements of the Federal Property and Administrative Services Act of 1949, as amended, products and services produced in the conduct of living exhibits and interpretive demonstrations in areas of the national park system, to enter into contracts including cooperative arrangements with respect to such living exhibits and interpretive demonstrations and park programs, and to credit the proceeds therefrom to the appropriation bearing the cost of such exhibits and demonstrations.

63 Stat. 377.
40 USC 471 note.

U.S. Park Police, jurisdiction in D.C. environs.

SEC. 4. The Act of March 17, 1948 (62 Stat. 81), is amended by deleting from section 1 thereof the words "over which the United States has, or hereafter acquires, exclusive or concurrent criminal jurisdiction," and changing section 3 to read as follows:

"SEC. 3. For the purposes of this Act, the environs of the District of Columbia are hereby defined as embracing Arlington, Fairfax, Loudoun, Prince William, and Stafford Counties and the city of Alexandria in Virginia, and Prince Georges, Charles, Anne Arundel, and Montgomery Counties in Maryland." Definition.

Approved August 18, 1970.

LEGISLATIVE HISTORY:

HOUSE REPORT No. 91-1255 (Comm. on Interior and Insular Affairs).
SENATE REPORT No. 91-1014 accompanying S. 2985 (Comm. on Interior and Insular Affairs).
CONGRESSIONAL RECORD, Vol. 116 (1970):
July 14, S. 2985 considered and passed Senate.
July 20, considered and passed House.
Aug. 4, considered and passed Senate, in lieu of S. 2985.

GPO 48-139

APPENDIX E

United States Department of the Interior

NATIONAL PARK SERVICE
WASHINGTON, D.C. 20240

REPLY REFER TO:
A-5623 (550)

MAR 30 1978

Memorandum

Annual Review

SPECIAL DIRECTIVE 78-2

To: Field Directorate and all Park Superintendents

From: Director

Subject: Sale or lease of services, resources, or water available within an area of the National Park System

Section 3(e) of Public Law 91-383, 84 Stat 827, authorizes the Secretary to enter into contracts which provide for the sale or lease to persons, States or their political subdivisions, of services, resources, or water available within an area of the National Park System if such person, State or its political subdivision:

1. Provides public accommodations or services within the immediate vicinity of an area of the National Park System to persons visiting the area; and

2. Has demonstrated to the Secretary that there are no reasonable alternatives by which to acquire or perform the necessary services, resources, or water.

On the basis of the Assistant Solicitor's comments and findings, which are applicable Serivcewide, see enclosed February 2, 1978 memorandum, relative to Public Law 91-383, the November 24, 1970 "Standards for Implementation" memorandum signed by former Director Hartzog is hereby rescinded. The revised standards for implementation of New Authorities under Public Law 91-383 are as follows:

In the granting of permits for services, resources or water, the Directors of the Regions will have exercised this authority satisfactorily when the following conditions have been met:

1. The services provided by the applicant are of direct benefit to the park, or to the National Park Service for the direct or indirect benefit of park visitors;

2. It has been determined that the applicant has no reasonable alternative to the use of park resources or services;

3. Effects of use of the resource or service on the park's environment, administration, management and protection, and visitors have been examined and these effects have been determined to be acceptable. The environmental impacts of the use or service will be assessed and an environmental impact statement prepared if required according to NPS Guidelines for Environmental Assessment and Statements;

4. When it is determined that use of water by the applicant will be in accordance with laws and regulations governing ownership and use of Federal water and rights;

5. Charges have been established for services, resource or water use that permit recovery of the full cost to the government of providing the services, resource or water use in accord with 31 U.S.C. 483 a and OMB Circular A-25;

6. An application docket containing a draft of the special use permit, background materials and recommendations has been received by the Washington Office for submission to appropriate congressional committees for review and concurrence prior to consummating any legally or morally binding commitments. The application docket should reflect multi-disciplinary regional involvement and clearance of the proposed application.

7. The permitted use is for a short term period (one year or less) and is revocable at the discretion of the Secretary at any time without compensation and no permanent property rights are conveyed to the user for any resource or water within an area of the National Park Service. Water use agreements provide for National Park Service review and approval of planned development by the applicant that would create increased water demands.

It should be emphasized, that while Public Law 91-383 conditionally allows the Secretary of Interior to authorize the sale of services, resources or park water, the Secretary's primary commitment, as mandated by the Congress, is the preservation and protection of National Park System resources which includes the conservation of System area water resources and related water dependent environment. In this regard, Service management policy limits water development and use, assuming no adverse impact on the natural environment, to the minimum required to

meet visitor and employee water needs. In essence, water is a vital part of the park environment and a natural resource the Service is committed to protect and in reality cannot be "excess" or "wasted" water, as viewed by some applicants.

Enclosure

United States Department of the Interior

GEOLOGICAL SURVEY

Water Resources Division
150 Causeway Street, Suite 1001
Boston, Massachusetts 02114

May 12, 1978

Mr. Jack E. Stark
Regional Director
National Park Service, North Atlantic Region
15 State Street
Boston, Massachusetts 02109

Dear Mr. Stark:

This letter is submitted in response to your request to evaluate the hydrologic impacts of the water supply developments proposed in the technical docket submitted to you by the town of Provincetown.

The recent findings contained in the report concerning the extent of the contaminated zone near the South Hollow well field have led to recommendations that this field not be used as a source of supply except for short periods of time under extreme supply and demand conditions. This report also indicates that the time and financial constraints, under which the town must operate, eliminate all but two of their proposed alternatives. These are:

1) purchase water pumped from the North Truro Air Force Base well at the rate of 0.5 million gallons per day (MGD) and

2) install a well at Test Site #4 to pump at a rate of 0.75 MGD.

The hydrologic impacts of developing a permanent 1 MGD capacity well field at Test Site #4 were discussed in a letter dated January 4, 1978, and sent to Dr. Michael Soukup of your regional office. A 1972 report entitled " Evaluation of Proposed Ground-Water Withdrawal, Cape Cod National Seashore, North Truro, Massachusetts" and a 1976 report entitled "Potential for Development of Ground Water at a Test Site near Truro, Massachusetts"describe specific environmental considerations of well field development in North Truro. These include

1) Lowering of ground-water levels in domestic wells and in ponds and marshes

2) decrease in the natural discharge to oceans, streams and marshes,

3) landward and upward movement of the fresh-water/saline-water boundary in response to the reduction in natural discharge to the ocean and the possible contamination of domestic wells near the coast, and

4) upward movement of the fresh-water/saline-water boundary beneath the well field in response to pumping .

If the proposed well at Test Site #4 were pumped at a rate of 0.75 MGD for only four months (July-October, 1978 as indicated in the technical docket), the environmental impacts would be less severe than described in the previous letter and reports, which assumed a greater withdrawal rate and a permanent installation.

The proposed pumping rate of 0.75 MGD for Test Site #4 was determined on the assumption that Provincetown would be receiving 0.5 to 0.8 MGD from the Knowles Crossing well field and 0.5 MGD from the North Truro Air Force Base well. If the pumping rate from either of these two sites were to be reduced on a long term basis, the reduction in water supply would have to be balanced by a decrease in water use, an increase in the withdrawal rate from Test Site #4, or development of an alternate supply. The salt concentration of water samples taken from the Knowles Crossing well field is presently higher than normal for the Cape. If the salt concentration continues to increase, withdrawals from that well field may have to be reduced in order to curtail the rate of salt water intrusion and to keep the salt concentration at an acceptable level. The North Truro Air Force Base well is located approximately the same distance from the Atlantic Ocean as the Knowles Crossing well field is from Cape Cod Bay. The thickness of the fresh-water lens at this location is not presently known, and this well has not previously been pumped at a rate of 0.5 MGD for an extended period of time. It is not known whether the salt concentration in this well will respond to pumping in the same manner as at Knowles Crossing. Monitoring wells and a pump protection device are being installed to guard against salt-water encroachment and over-pumping. Should it appear that either of these situations is occurring the withdrawal rate from the Air Force Base may have to be reduced. There is a possibility, therefore, that to meet demands it may be necessary to pump Test Site #4 at a rate greater than 0.75 MGD and to keep the station in operation for more than four months.

The estimate of the impact of the proposed short-term pumping rate of 0.75 MGD was based on several assumptions regarding aquifer

characteristics, and it is indicated that estimates are conservative to insure that predicted impacts would be more severe than would actually occur. It is implied, however, that the base of the aquifer system in the vicinity of the test site is the fresh-water/saline-water boundary, and it is stated that the fresh water thickness is assumed to be approximately 200 feet. Our experience in that part of the Cape indicates that there are thick silt and clay layers which severly reduce the effective aquifer thickness. At the Longnook Road test site the fresh-water/saline-water boundary was identified at a depth of approximately 200 feet. The aquifer was only 100 feet thick, however, because of a series of silt and clay layers between the depths of 118 and 285 feet. The upper portion of the silt, clay zone was filled with fresh water, but the low permeability of this material prevented it from being a source of water to a pumping well. If a similar layer were to exist at Test Site #4, then the actual drawdown of the water-table in response to pumping would be more severe than was calculated in the technical docket, assuming all other aquifer parameters were correct. Because of its low permeability, however, such a layer would be an effective barrier against upconing of the fresh-water/saline-water boundary beneath the pumping well. We do not know of any wells or test holes in the vicinity of Test Site #4 which have been drilled deep enough to define the aquifer thickness or the fresh-water/saline-water boundary at that location.

JG/MMS

A test drilling program to define the nature and position of the fresh-water/saline-water boundary and the spatial variation of aquifer material at depth below and areally about the proposed production well and a monitoring program to document the responses of the fresh-water/saline-water boundary and the water table to variations in pumpage and natural recharge would provide information which could be used to estimate the hydrologic and environmental effects of a potentially larger or more sustained withdrawal rate of a permanent installation.

Several piezometers, each screened at a different depth, and installed in a test hole drilled to the fresh-water/saline-water boundary would provide information regarding the change in fresh-water potential and possible movement of this boundary in response to pumping. Several shallow wells each located at a different radial distance, up to about 1000 feet, from the pumping well would help document the change in water-table position in response to pumping.

The technical docket suggests that the National Park Service will again be asked to address the question of establishing a permanent

well field at Test Site #4. Should approval be given to establish a temporary well field at Test Site #4 the information which could be collected during emergency withdrawal through a test drilling and monitoring program would help the National Park Service, Truro, Provincetown, and the Massachusetts Department of Public Health formulate a plan for the management of water resources in the North Truro area.

For the District Chief, John A. Baker.

Sincerely yours,

John H. Guswa
Hydrologist

mga

APPENDIX G: Alternatives Analysis Team

The Alternatives Analysis Team included:

Former Superintendent, Lawrence Hadley, Cape Cod National Seashore;
Herbert Olsen, Superintendent, Cape Cod National Seashore;
Nancy Nelson, Environmental Protection Specialist, North Atlantic Region and Dr. Michael Soukup, Aquatic Biologist, North Atlantic Region.

Several National Park Service personnel were also involved with this project during the preparation of the draft assessment and, later, in its revision.

David Price, Civil Engineer, Cape Cod National Seashore;
Ken Shea, Supervisory Ranger, Cape Cod National Seashore;
David E. Clark, Chief, Environmental Compliance, North Atlantic Region;
Dr. William Anderson, Plant Pathologist, North Atlantic Region;
Dr. William Gregg, Chief, Environmental Compliance Office, Washington;
James Killian, Landscape Architect, Cape Cod National Seashore;
Dr. Stephen Maddock, Environmental Specialist, North Atlantic Region;
Frank McManamon, Archaeologist, North Atlantic Region and
Carol Sweeney, Environmental Technician.