Development of an Interpretive Document for the Bear River Migratory Bird Refuge

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DEVELOPMENT OF AN INTERPRETIVE
DOCUMENT FOR THE BEAR RIVER
MIGRATORY BIRD REFUGE

by

William R. Burbridge

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

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(Outdoor Recreation)

Approved:

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William R. Burbridge
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INTRODUCTION

Purpose and Desirability of Study

Since its inception, the National Wildlife Refuge System has been administered for management and restoration of habitat essential to the propagation and welfare of resident and wintering wildlife species. Acquisition of additional System units has been primarily directed to the benefit of the migratory bird resource. As of July 1, 1968 about 250 of the 321 refuge units were managed for the waterfowl resource (U. S. Department of Interior, 1968a). However, this growth of the System has been accompanied by an increase in recreational use of the refuges. In 1962, Public Law 87-714, the Refuge Recreation Act, was passed to provide direction for recreational development. The Act recognized that recreation must be limited in type and scope to avoid conflict with the primary wildlife management objectives. Although the primary function of the Refuge System is to meet the needs of wildlife, the entire System is based on the philosophical precept that the wildlife on these refuges is for the enjoyment of the public. It thus follows that refuges should provide for some public use.

In recent analyses of America's resource picture, the fastest rising curves and projection are those of travel and the recreational use of wildlands (Clawson, 1963). Attendance records at our wildlife Refuges have grown at a rate of 12 percent annually. Except for boating and fishing at reservoir sites, the fastest growth in outdoor recreation since World War II has been in the use of National Wildlife Refuges (Clement, 1964).
The Bureau of Sport Fisheries and Wildlife has sought to accommodate the influx of recreationists by providing facilities and opportunities for wildlife observation, hunting, fishing, and other related activities. Interpretive facilities have been an integral part of the Bureau's outdoor recreation program. Visitor centers or contact stations have been established at several refuges, including Moosehorn, Blackwater, and Seney National Wildlife Refuges. Tamarac, Sacramento, Tule Lake, Bear River, Fort Niobrara, Wichita Mountains, and the National Bison Range are only some of the refuges which have developed self-guiding automobile tours to accommodate increasing visitor numbers.

Use and interest at the Bear River Migratory Bird Refuge has reflected this trend. In 1969 attendance records indicated that 16,693 birdwatchers, 4,039 hunters, and 807 fishermen visited the Refuge (Bear River Migratory Bird Refuge, 1969). A new contact station has recently been placed along the 12 mile loop drive in the Refuge, and a colorful tour booklet was recently completed (U. S. Department of Interior, 1968b).

Visitation patterns indicate that the Bear River Migratory Bird Refuge attracts visitors of widely varied backgrounds and interests. Hunting, fishing, birdwatching and photography are the primary activities.

The value of the Bear River to local educational institutions must also be considered. Forty-two percent of the Refuge visitors in 1969 were organized school groups ranging from kindergarten to college (Bear River Migratory Bird Refuge, 1969). Since most attitudes and behavioral patterns are formed early in youth, it is important that conservation learning take place with other learning processes. Wildlife refuges serve as three-dimensional living classrooms. In these ecological
laboratories students can witness the interrelationships of the wetland organisms and their adaptations to this part-land, part-water environment. A well developed interpretive program can add valuable assistance to the school conservation education program as well as generating an ecological awareness among our future generations.

Satisfaction of the visitors' present and long range needs through a quality ecologically-oriented recreation program is the ultimate purpose of this study. The results hopefully, will reach beyond the satisfaction of the visitors' immediate needs. A stimulating interpretive program possesses the potential to enrich people's lives on the one hand and instill in them a land ethic on the other. Hopefully, this will result in an intellectual awareness of ecological phenomenon which will create concern coupled with intelligent well reasoned argument and action. It is as simple as Paracelsus said, "He who knows nothing, loves nothing ... but he who understands also lives, notices, sees ..." (Badaracco, 1968).

**Objectives**

The objectives of this study are threefold:

1. To provide the Bear River Migratory Bird Refuge and the National Wildlife Refuge System with an "Interpretive Document" which will serve as a key in developing interpretive programs and facilities. This document will embrace both an Interpretive Master Plan and Prospectus, which as outlined by the National Park Service includes the following:

   Specifically, the Master Plan identifies the major themes to be interpreted and tells where facilities should be located. The Prospectus determines the kinds of facilities and services needed, and outlines the content of interpretive presentations. (U. S. Department of Interior, 1965)
2. To incorporate current interpretive research and innovations in the development of the Interpretive Document for the Bear River Migratory Bird Refuge.

3. To propose interpretive philosophies within the Interpretive Document as a contribution to the state of art of interpretive planning.

Scope of Study

This study is geographically limited to the confines of the Bear River Migratory Bird Refuge. It will however, relate to phenomena in other areas of the basin of the Great Salt Lake. This will enable the visitor to leave Bear River with a comprehension of it as one phenomenon within a greater geographic, intellectual, and ecological whole.
PROCEDURE

The procedure which was used to develop the Interpretive Document for the Bear River Migratory Bird Refuge is as follows:

1. Review of objectives and policies of the National Wildlife Refuge System;
2. Review of literature pertinent to the interpretive resource at the Bear River Migratory Bird Refuge;
3. Inventory the potential interpretive phenomena at Bear River;
4. Analyze the interpretive techniques and facilities at other marsh areas from secondary data;
5. Review recent interpretive research, innovations, and philosophies;
6. Field review interpretive facilities of various land use agencies within and adjacent to the state of Utah, and
7. Prepare an Interpretive Document for the Bear River Migratory Bird Refuge.

Review the Objectives and Policies of the National Wildlife Refuge System

As of July 1, 1968 the National Wildlife Refuge System administered 28.6 million acres of wildlands for the purpose of management and restoration of habitat for the propagation and welfare of resident and wintering wildlife species. Although the System has been founded on the belief that the wildlife resource is for the enjoyment of the
public, recreational activities must adhere to specific guidelines so they will not destroy the very purpose for which a refuge was established. Therefore, before initiating any action it was first necessary to review the goals and objectives of the National Wildlife Refuge System in order that all proposed recreation activities remain compatible with these doctrines. The National Wildlife Refuge Handbooks were a valuable source for such information.

Review of Literature Pertinent to the Interpretive Resource at the Bear River Migratory Bird Refuge

The publications reviewed for information regarding the interpretive resource of the Bear River Migratory Bird Refuge are found in Appendix A.

Inventory the Potential Interpretive Phenomena at Bear River

Continuous travels throughout the Bear River marshlands revealed potential interpretive phenomena. These travels also helped in creating a love or feeling for the land which Freeman Tilden identifies as the "Priceless Ingredient" of interpretation. With this reverence, the interpreter can stimulate the visitor by conveying the mood and spirit of the environment.

Refuge personnel were an invaluable source in developing such an inventory. Working at the Refuge headquarters and conducting guided tours provided constant interaction with all visitor types. This was valuable in revealing Refuge phenomena deserving interpretation.
Analyze the Interpretive Techniques and Facilities at Other Marsh Areas from Secondary Data

The interpretive facilities and techniques at other National Wildlife Refuges including Aransas, Blackwater, Seney, Moosehorn, Malheur, and Okefenokee were reviewed and evaluated through correspondence. Any particular assets or problems at these refuges were considered when similar conditions existed at Bear River. Interpretive leaflets forwarded by these Refuges were also valuable in developing an inventory of potential interpretive phenomena at Bear River.

Review Recent Interpretive Research, Innovations, and Philosophies

A review of recent interpretive research, innovations, and philosophies was conducted. The list of publications and articles examined is found in Appendix B.

Field Review Interpretive Facilities of Various Land Use Agencies Within and Adjacent to the State of Utah

A one week tour, June 9-15, 1969, was made to study the interpretive facilities and techniques of various natural resource agencies within and adjacent to the state of Utah. The displays and exhibits of the visitor centers were the main objective of the tour, since the exhibit plan for Bear River's contact station held high priority. The following sites were visited: Timpanogos Cave National Monument, Zion National Park, Pipe Spring National Monument, Arizona, Bryce Canyon National
The Bear River Migratory Bird Refuge supports abundant populations of wildfowl. A total of 219 species of birds has been recorded at the Refuge. Sixty-two species nest here (Gunther, 1966). Historically these marshes have been recognized as hosting some of the largest concentrations of waterfowl in North America. Recent archaeological findings in the valley bottom indicate that waterfowl provided sustenance for the Indians (Aikens, 1967).

In 1824 the trapper and frontiersman, James Bridger, floated the Bear River from Cache Valley to its outlet in the Great Salt Lake. He was probably the first white man to see the Bear River marshes. After Bridger, explorer John C. Fremont made a similar journey. He described the waterfowl of the area as follows:

The whole morass was animated with multitudes of waterfowl, which appeared to be very wild ... rising for the space of a mile around about the sound of a gun, with a noise like the distant roar of thunder. (Nelson, 1966)

Captain Howard Stansbury, a government surveyor, floated the river and entered Bear River Bay in 1849. An account of his visit follows:

... immense flocks of wild geese and ducks, among which many swans were seen. I have seen large flocks of these birds before, in various parts of the country, and especially on the Potomac, but never had I beheld anything like the immense numbers here congregated together, thousands of acres, as far as the eye could reach, seemed literally covered with them. (Nelson, 1966)

The Bear River marshes were world renowned for their populations of wildfowl. The steamboat, "City of Corinne," was instrumental in
building such an international reputation. The boat was launched in 1871 and traveled up and down the Bear River from Corinne to the Great Salt Lake. In 1874 sandbars prohibited further use on the river. However, during those three years many foreign dignitaries traveled on the "City of Corinne" and were amazed by the vast population of ducks, geese, and swans (Anderson, 1969).

The area became nationally famous in the days of market hunting. From 1877 to 1900 over 200,000 ducks were shot annually and sent to eastern markets (U. S. Department of Interior, 1968b). The following is from an 1899 advertisement for "Davis" Duck Camp which was located near the mouth of the Bear River:

MY DEAR SIR: - The open season for duck shooting commences September 15th and closes December 15th. I should be very much pleased to have you come and spend some time with me in the swamps. ... My terms are two dollars per day for board, lodging, and boats ... .

For the benefit of those who question me as to the flight of game, I here print my score of last season. I shot 51 days, killing 4,220, averaging 82 birds and a fraction per day, ... .

If you wish comfort while shooting bring a camp stool. Bring hip boots, guns, shells, and decoys if you have any. I do not furnish decoys. (Daniels, McKenzie, Vallery, 1901)

At the turn of the century the condition of this vast marshland began to deteriorate. Irrigation upstream meant less water reaching the marsh each successive year. This was detrimental to the waterfowl. Much of the marsh began to vanish, being replaced by mud flats and stagnant pools of alkaline water. Botulism became rampant in the area. In 1910, and again in 1913, at least one million ducks died near the mouth of the Bear River (Butcher, 1955).

The U. S. Biological Survey soon sent representatives to investigate the mortality. One of the agents, Dr. Alexander Wetmore, spent
three summers on the Bear River marshes. He quickly realized the potential of the area as a waterfowl refuge. In his reports he repeatedly expressed this opinion. His dreams became a reality on April 28, 1928, when a Special Act of Congress authorized the establishment of the Bear River Migratory Bird Refuge.

Today, 1970, the Refuge is administered under the Bureau of Sport Fisheries and Wildlife of the U.S. Fish and Wildlife Service. The Bear River Migratory Bird Refuge still maintains its reputation as host for some of the largest concentrations of waterfowl in North America.

**Setting**

The Bear River Migratory Bird Refuge lies on the Great Salt Lake delta of the Bear River. It consists of 65,000 acres of wet treeless land met by the rolling Promontory Mountains on the west and on the east by the rugged 9,000-foot peaks of the Wasatch Range. Snow remains on these peaks until late summer. In the mornings and evenings their rugged beauty is mirrored on the shallow Refuge impoundments. This is an important aesthetic resource of the Refuge. The Bear River Refuge is centered in the wide and spacious Bear River Valley. At an elevation of 4,200 feet, the climate is quite pleasant. The humidity is low, and the winters are not severe.

The Bear River begins 60 airline miles away and travels 600 miles to reach its delta. It is tranquil here after winding down through the high country to the north and east. The river terminates at the Refuge headquarters where it is dammed and diverted into five shallow Refuge impoundments. The water levels are controlled and manipulated to give the best growing conditions for the aquatic vegetation that waterfowl use as food and cover. These highly alkaline waters are rich in
dissolved minerals. In the summer the ponds are covered with sago pondweed. It has been estimated that 43,600 tons of this plant are produced annually (Cranner, 1964).

In September the shallow impoundments, choked with sago pondweed, lure from 500,000 to 1,000,000 ducks. Canada and snow geese, whistling swans, avocets, dowitchers, marbled godwits, and many other marsh birds are attracted to this lush environment.

One of the unique assets of the Refuge is the calm and serene atmosphere. The importance of this amenity to interpretive planning cannot be overemphasized. This mood is readily transmitted to the visitor who is often inspired just to stop and listen. The marsh is a ceaseless chatter of voices, the squawk of a night heron leaving its favorite fishing site, the frogs presenting their evening chorus, or the honking Canada geese departing for morning feeding. This perpetual maze of sound and activity transmits an unforgettable mood. As such, the sound amenity along with the landscape amenity constitute a perceptual resource integral to the visitor's experience and enrichment.

**Interpreter's Goal**

Visitors with widely varied backgrounds and interests come to Bear River. An intense interest and appreciation for the birdlife of this marsh community enables amateur ornithologists to leave Bear River fulfilled. They will be satisfied whether or not interpretive facilities are available.

However, due to a paucity of interpretive facilities the visitor without this background is leaving the Refuge short-changed. This large
Figure 1. Vicinity map of Bear River Migratory Bird Refuge.
Figure 2. Map of Bear River Migratory Bird Refuge.
group represents the greatest challenge to interpretive planning at the Refuge. A stimulating interpretive program will not only satisfy the immediate needs of this group, but an appreciation of the environment could result as a by-product. Again referring to a statement by Paracelsus, "He who knows nothing, loves nothing ... but he who understands also lives, notices, sees ..." (Badaracco, 1968).

The underlying theme for Bear River's interpretive program will be "marsh ecology." Ecology does not isolate, instead it is synthetic. This insures more than just a pointing out of natural phenomena. The theme explains both how and why the individual phenomenon has developed and its relationship within the natural community. The Bear River Refuge is an ecological laboratory with a vast potential for illustrating the relationships of the organisms to their total environment. The Refuge is comprised of many different ecological communities. The organisms associated with these communities have developed many intellectually stimulating adaptations for the occupation of niches.

Ecology has sociological as well as biological implications. Our large cities today possess an environment which is becoming increasingly congested, cluttered, and besmogged. By the year 2,000, nine out of ten Americans will dwell in such urban surroundings. Man, like every other species on this earth, is a product of his environment. Areas such as the Bear River Migratory Bird Refuge offer surroundings capable of nourishing many human spirits. Hopefully, the recognition of a quality environment's relationship to Bear River's wildlife can be transcended to the parallel illustration of the importance of a quality environment to man.

The goal of this interpretive program will be a quality ecologically and aesthetically-oriented recreation experience. The results are
hopefully directed to reach beyond the satisfaction of the visitors' immediate needs. In addition, this interpretive program strives to develop a so-called "land ethic" so that the layman can be enlisted for the future protection of other natural areas. An enlightened and responsive public is essential to foster the goals and ambitions of the National Wildlife Refuge System.

The Visitor and the Interpretive Program Today

The interpretive program at the Bear River Migratory Bird Refuge today is felt to be less than adequate. Modernization will bring it up-to-date with present thinking, new interpretive techniques, and visitor demands.

All visitors entering the Refuge today make initial contact with an uniformed employee at the administrative headquarters. Several displays, a relief map of northern Utah, and photographs and mounts of Refuge birds serve as an aid both to the visitor and to the Refuge employee in pointing out the phenomena of the area.

At the headquarters five leaflets are available to the visitor. The leaflet which presently receives the greatest attention contains illustrations of the common Refuge birds, a map of the self-guiding tour, and a brief introduction to the history of the Refuge. For the more advanced birdwatcher, a checklist of the Refuge birds is available and another leaflet graphically illustrates their seasonal abundances.

After leaving Refuge headquarters the visitor usually takes the twelve-mile self-guiding auto tour around Unit Two. To provide a more valuable recreational experience, three observation towers and five interpretive stops are located along the tour. The visitor can purchase a color tour guide (30 cents) at the headquarters. Most of the
information in the booklet coincides with the topics at the five interpretive stops. The tour guide also treats topics other than those at the interpretive stops.

The Bear River Refuge has been designated a fee area under the Land and Water Conservation Fund. In order to take the tour the visitor must pay a fee of one dollar per car unless he possesses a Golden Eagle Passport. Organized groups are allowed entrance without charge, and if previous arrangements are made a Refuge employee will accompany the group as a guide.

Factors Affecting Interpretive Program

Policies of the National Wildlife Refuge System

National Wildlife Refuges have been established to achieve certain objectives, whether they be to preserve a notable piece of habitat, a distinct ecological unit of plants and animals, or a single species. Some refuges are as small as an acre. Some western game ranges exceed a million acres. Although they may differ in size and specific management objectives, they all share a common bond:

The goal of the National Wildlife Refuge System is to preserve and manage wildlife environments for the continued enjoyment and benefit of the American Public. (U. S. Department of Interior, 1967b)

Specific objectives may vary by refuge. The objectives of the Bear River Migratory Bird Refuge are as follows:

The Refuge serves a dual role by being a major production area and a primary migration area. To some species its importance as a breeding area is paramount while to others the migration or wintering area takes on the more important role. Because of the many species involved, it is important not to favor one use over the other, or to classify the Refuge other than in this dual capacity role. (Gunther, 1966)
Although the System is founded on the doctrine that wildlife on refuges is for the enjoyment of the public, recreational use must be limited in type and scope in order to protect the needs of the wildlife resource. Interpretation can be considered as an activity within the spectrum of recreational activities. The national policy concerning recreational uses on the National Wildlife Refuges states:

Recreational use. Lands and waters administered by this Bureau offer opportunities of national significance for outdoor recreation. The purposes of these fish and wildlife conservation areas vary, as do their physical adaptability and accessibility. The Bureau has primary jurisdiction over most of these areas, administers some of these areas jointly with another agency, and on some areas has secondary jurisdiction.

All areas of the National Wildlife Refuge System, the National Fish Hatchery System and the fish and wildlife research stations are dedicated to the welfare and enhancement of fish and wildlife resources of value to mankind. Recreational uses which are compatible with the primary objectives of each area are encouraged. Recreation facilities are developed and maintained and land and water are used for public recreation, consistent with the Bureau's objectives, and funds or other resources, and in accordance with approved plans for specific types of recreational use of designated sites at specific times.

A. Recreation, when authorized. Appropriate public recreation is authorized as an incidental or secondary use of national wildlife refuges, game and wildlife ranges, national fish hatcheries, and fish and wildlife research stations. These uses will be authorized where there is a significant local or national recreational need which can be met without conflict or interference with primary objectives for the areas and without detriment to the facilities; where the safety and welfare of the using public can be satisfactorily assured; and where there will be no duplication of adequate recreational facilities on National, State, or local forests and parks within a reasonable distance.

B. Uses directly associated with fish and wildlife. The greatest contribution to recreation of fish and wildlife special purpose areas is to foster those recreational pursuits associated directly with fish and wildlife habitat. To achieve this objective emphasis is first given to those appropriate public recreational uses which are directly associated with public enjoyment by observation, utilization, interpretation, and understanding of fish and wildlife populations, habitats, and conservation values.
Recreation uses of this type include:

(1) **Sightseeing.** Priority is given to the development of recreational facilities and services which facilitate and encourage the enjoyment by viewing, study, and interpretation of fish and wildlife in their habitat.

(2) **Nature observation and photography.** This recreational use is encouraged when no significant adverse effects will result. The number of persons using an area is controlled or restricted during periods when fish and wildlife would be disturbed or when such use conflicts with project operations.

(3) **Interpretive centers and exhibits.** The Bureau's national goals and objectives for fish and wildlife conservation can be effectively furthered through visitor centers, aquariums, fish rearing ponds, display pools, big game exhibit pastures, and wildlife displays appropriate to the unit at which situated. Such facilities are constructed and operated wherever need and opportunity warrant, and funds permit. Also see 7 AM 1.6 for an expression of policy on Bureau exhibits.

(4) **Hunting of resident wildlife and fishing on Bureau-administered lands and waters.** The policy, for providing recreational opportunities in fishing and hunting of resident wildlife on Bureau-administered lands and waters, is set forth in the Secretary of the Interior's May 25, 1966, letter to the President of the International Association of Game, Fish and Conservation Commissioners.

(5) **Hunting of migratory birds.** Programs for hunting on the National Wildlife Refuge System depend on the provisions of law or executive order applicable to the area, and upon a determination by the Secretary that the opening of the area to hunting is compatible with principles of sound wildlife management and is otherwise in the public interest. Hunting on Bureau areas is subject to Federal and State regulations and aboriginal rights and may be further restricted by special regulations.

C. **Uses associated with fish and wildlife.** Those public recreational uses which are associated with fish or wildlife habitat, but which are not primarily directed toward an appreciation of fish and wildlife, are given consideration. Where these uses support recreational programs directly associated with fish or wildlife, they are encouraged. Where there is other public demand, the requirement will be met at a minimal level, as the need is demonstrated.

Recreational uses of this type are:

(1) **Picnicking.** This recreational use is encouraged at designated sites where it can be supervised and main-
tained with no significant damage to facilities or habitat,
or disturbance to wildlife. The acquisition of adjacent
areas for picnicking will be considered as authorized in
Sec. 2 of the act of September 28, 1962 (76 Stat. 653;

(2) Swimming. Swimming may be permitted, at designated
beaches or sites, on areas that have suitable waters, in
accordance with Federal, State, or local laws, regulations
or ordinances at such times as no significant disturbance
will result to fish or wildlife or to recreational pursuits
directly associated with fish and wildlife. Recreational
scuba or skin diving may be permitted only on carefully
selected sites and under stringent safety regulations.

(3) Boating. The use of boats is permitted where it
materially contributes to public enjoyment, utilization,
and appreciation of fish and wildlife through programs of
nature observation, fishing, and hunting. Pleasure boating
not directly associated with fish and wildlife values is
given secondary consideration. Boating is restricted to
specified water areas or zones and is subject to those
restrictions and control measures deemed necessary to
avoid conflict with fish and wildlife management objectives
or to safeguard the lives of boating and non-boating visitors.
The use of boats on all areas is subject to Federal, State,
and local law or regulations.

(4) Water skiing. This activity is not desirable on
Bureau fish and wildlife areas. It may be permitted on
large, deep-water areas, subject to rigid control in
designated zones during periods of low waterfowl use if no
significant or unusual safety hazards, or disturbance to
fishermen or swimmers result.

(5) Camping. Because of inherent conflicts with wildlife
needs, camping is restricted on most Bureau lands. Camping
may be permitted on game or wildlife ranges, on areas where
camping was authorized either prior to refuge's establish-
ment or by an establishing order, and on other large areas
where primitive overnight camping may be required to permit
the satisfactory harvest or enjoyment of fish and wildlife.
When a significant demand for camping facilities exists,
which would materially enhance the other public recreational
uses of Bureau lands, the acquisition of adjacent areas for
camping will be considered, as authorized in Section 2, of the

(6) Field trials for dogs. This activity may be
permitted under the sponsorship of a responsible organization,
in accordance with the terms of a permit issued for this
purpose, provided that no conflict with wildlife management
programs and no damage to Bureau property or facilities is
assured.
Authorized persons may be allowed to use firearms with dog trials, only when no interference with or undue disturbance to wildlife species on the area will occur.

(7) Ancillary recreational uses. Such recreational pursuits as ice skating and cross-country skiing may be permitted. Golf, baseball, target shooting, etc., are foreign to the concept of conservation areas and are discouraged.

Persons may not search for semi-precious rocks or mineral specimens, except under a permit issued pursuant to 50 CFR 26.28.

The search for and removal of arrow heads and other artifacts or objects of antiquity is prohibited by law and regulation on Bureau lands, except under the provisions of permits issued by the Office of the Secretary under the provisions of 43 CFR, Part 3. Where such attractions exist on Bureau areas, it is the policy to further scientific knowledge or educational interest by encouraging reputable scientific or academic organizations in their study, under the appropriate authority of the Office of the Secretary of the Interior.

D. Services and incidental facilities. Authorized recreational sites must provide safe and sanitary conditions to the using public. Toilets and trash receptacles commensurate with the size and use capacity of the area and, wherever practical, a safe and adequate water supply must be made available. The operation of recreational facilities by concessioners may be authorized by contract where recreational use plans justify a demonstrated need for large-scale recreational activities.

Facilities and services directly supporting interpretation, fishing, or hunting activity are provided and managed by the Bureau, wherever possible. State conservation agencies, and non-profit conservation organizations may be authorized to provide and manage these facilities and services under appropriate arrangements.

Maps, leaflets, regulations or interpretative natural resource conservation or historic materials are made available to users of recreation sites.

E. Fees and charges. Permits may be issued and reasonable fees charged for public use of areas of the National Wildlife Refuge System and the National Fish Hatchery System.

The Bureau encourages private capital or local sponsoring groups to provide and maintain recreational services (except interpretive, fishing and hunting services), whenever it is feasible. Normally, this is done by con-
tract, and allows for the charging of fees commensurate with the costs of furnishing the special services and facilities, providing a fair profit to the concessioner and an equitable return to the Government. (U. S. Department of Interior, 1967a)

Public use activities on the Bear River Refuge will adhere to the policies established in the National Wildlife Refuge Manual. Interpretation should be integrated into the overall Refuge management plan. In addition to providing public enjoyment, interpretation can also be instrumental in attaining prescribed Refuge goals. However, public use will only be promoted when compatible with the primary purposes for which the Refuge was established. More specifically,

Use of the Refuge by educational groups, birdwatching enthusiasts, photographers, nature study groups, and similar pursuits will be encouraged. The use of the Refuge for water sports will not be permitted. (Gunther, 1966)

Interpretation, of all recreational pursuits, thus is certainly the most compatible with Refuge policies and uses.

Environment

The topography of the area does not present unusual interpretive development problems. Nevertheless careful study will be required to determine the best locations for interpretive facilities and trails. Consideration should be given to special problems associated with this marsh environment. The highly alkaline soil is extremely corrosive. Materials placed underground may require special treatment. Instability of the ground also necessitates wider, reinforced footings on all structures (Valcarce, 1969).

The birds themselves present a unique and serious problem. Many interpretive signs and markers serve as perches for the birds. Their droppings often leave signs illegible and also damage the sign material.
Interpretive facilities located in the marsh could present such a maintenance problem. In addition to the damage from the perching birds, many birds would use such facilities as nesting sites. Cliff swallows and ravens already use several of the observation towers for their nests. The use of interpretive structures for nesting sites is currently not a problem. However, the situation of nesting in close proximity to the visitor may eventually create unforeseen management problems.

Precipitation has little or no effect on visitor use. The 25-year Refuge annual average (1940-1964 inclusive) is 11.95 inches of precipitation. Most of this occurs during the winter months when the Refuge, because of low bird populations, provides little or no attraction to visitors.

Spring and fall climate is generally pleasant and mild with temperatures in the 70's. During July and August afternoon temperatures climb into the 90's. The summer heat sends many of the local residents to nearby higher elevations for relief. Although resident visitation decreases, this slack is taken up by the nonresident. The increase in nonresident visitation during the summer months is attributed to vacationing nonresidents.

January and February usually find the Refuge gripped in ice. Winter temperatures do not affect visitor use since the Refuge holds little attraction during these months. Most of the birds have departed for their winter homes in California, Mexico and the Texas Gulf Coast.

Insects are a problem at Bear River. Mosquitoes are a definite constraint to outdoor evening amphitheater programs. There presently are insufficient overnight campers to warrant such programs. However,
increasing numbers of campers on the Refuge and demand from local residents may eventually require the initiation of evening programs.

Except for the hardy naturalist, mosquitoes and flies could be a sufficient nuisance to prevent the use of trails. An elevated boardwalk would be necessary to eliminate contact between the visitor and the vegetation. This would reduce the magnitude of the problem, but it would not eliminate it.

The seasonality of this problem must also be considered. During the high visitor use months of April and May, mosquitoes and flies would not prevent trail use. With a variety of Refuge activities, a wider spectrum of the visiting public can be satisfied. A nature trail can also be beneficial in spreading the visitor load by relieving pressure on the twelve-mile self-guiding auto tour.

The Visitor
1. Level of Use

The following figures were taken from the Refuge's annual narrative reports:

Table 1. Visitor types and levels of recreation use at the Bear River Migratory Bird Refuge for 1966, 1967, 1968 and 1969

<table>
<thead>
<tr>
<th>Visitor types</th>
<th>1966</th>
<th>1967</th>
<th>1968</th>
<th>1969</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hunters</td>
<td>5,039</td>
<td>5,981</td>
<td>4,655</td>
<td>4,039</td>
</tr>
<tr>
<td>Fishermen</td>
<td>1,159</td>
<td>800</td>
<td>470</td>
<td>807</td>
</tr>
<tr>
<td>Miscellaneous*</td>
<td>17,940</td>
<td>15,257</td>
<td>19,192</td>
<td>16,893</td>
</tr>
<tr>
<td>Total</td>
<td>24,138</td>
<td>22,038</td>
<td>24,317</td>
<td>21,739</td>
</tr>
</tbody>
</table>

*Miscellaneous includes all visits other than those intended specifically for hunting or fishing.
It is difficult to establish any significant trends in the above figures. When considering levels of use many important variables must be taken into account, including road conditions, weather, and waterfowl populations.

2. User Types

The Bear River Migratory Bird Refuge attracts visitors of widely varied backgrounds and interests. A listing of visitor types follows:

1. Fishermen
2. Hunters
3. Sightseers
   a. local resident—destination predetermined
   b. local resident—out for a drive and attracted to the Refuge by roadside signs
   c. nonresident—passing through area and attracted by roadside signs or other promotion
   d. avid birdwatcher—destination usually predetermined.
   
   There are many nonresidents within this group.

4. Photographers
5. Picnickers
6. Official visitors
7. Organized groups (senior citizens, garden clubs, religious groups, and so forth)
8. Educational groups (kindergarten to college level)
9. Youth groups assigned conservation projects

3. Age Levels

The 1966 Narrative Report indicates that approximately 30 percent of the Refuge visitors are less than 16 years of age. This group
represents a very important audience for the interpreter. Since most attitudes and behavioral patterns are formed early in youth, it is suggested that meaningful interpretive programs can create environmental awareness. This group thus represents a very important challenge.

4. Visitors and Vandalism

Most of the visitors to the Bear River Refuge are very conscious of their natural surroundings. The psychology of the Refuge environment appears to inhibit littering and vandalism at present use levels. It is not known if this phenomenon will continue with increased visitation. Certainly, increasing visitor levels will alter the psychological impact of the area.

The 15-mile drive from Brigham City also appears to select for conscientious visitors. In Brigham City visitors are informed that the Refuge is 15 miles distant. The long drive tends to "weed out" those lacking a sincere interest in the wildlife resource. Furthermore, the road does not possess any other attractions and because of this, mere "passers-by" seem to be eliminated.

5. Seasonality of Visitors

Visitation at the Refuge is year-round, but it is extremely light during January, February, and early March. The greatest visitor use occurs during May and early June. During this period the majority of visits are from educational groups and families whose homes are within two hours of the Refuge. They are attracted to the Refuge each spring by the birds in their breeding plumage and their broods of young.

During the hot summer months the proportion of nonresident visitation increases. This increase can be partially attributed to greater
numbers of out-of-state tourists in northern Utah. Also, most of the local residents seek the higher elevations to escape the valley heat.

Resident visitation again increases in September. Hunters attempting to preview the upcoming season is one of the reasons for this upswing. The Refuge's reputation for early fall duck concentrations lures many sightseers which is also a probable cause for the increased resident interest during September (Carrol, 1965).

6. Length of Stay

The estimated time a person spends at the Refuge varies according to interest. Some photographers spend several weeks. Hunters and fishermen usually spend a day. Those on a Sunday drive may only spend an hour.

Visitor Hours

Sunset on the marsh comes as close as anything in delivering complete peace of mind. The Refuge ponds are calm and quiet. A patient great blue heron is silhouetted against the crimson waters. Even at the close of day this bird persists in its search for food. Avocets, stilts, willets, killdeer, and lesser shorebirds are busy running along a mudflat, feeding, raising their wings, and calling. The medley of blackbird calls, of coot and grebe, and the raucous squawk of the night heron is part of a summer evening. The marsh is a maze of sound and activity. As the sun disappears, it becomes quiet.

The Bear River Migratory Bird Refuge is open daily from 8:00 A.M. to 4:30 P.M. Eight hours daily is more than sufficient to accommodate those wishing to visit the Refuge. However, the Refuge is inaccessible during those hours when it is capable of contributing one of its most important emotional amenities—the mood and spirit of the marsh. This
is especially true during the hot summer months. At mid-day's 90 degree temperature there is very little marsh activity. At this time, visitor satisfaction is low.

In the mornings and evenings, the marsh is a perpetual maze of sound and activity. It is during these hours when the spirit and mood of the land can be transmitted. The sound amenity along with the landscape amenity constitute a perceptual resource. This resource must not be overlooked if a quality recreation experience is to be attained.

Limited staff at Bear River would prevent attendant duty during the hours before opening and after closing. Therefore, a self-registration system should be considered. Aransas National Wildlife Refuge in Austwell, Texas, initiated such a program in 1968, and it has worked very well according to Gordon H. Hansen, Refuge Manager (Hansen, 1969). Aransas has many more annual visitors than the Bear River Refuge.

In addition to enhancing aesthetic values, a self-registration system would have other benefits. It would have great appeal with the local public. The Refuge could become a popular destination for an after-dinner ride. Also, during the morning and evening hours, valley haze is at a minimum. Photograph quality in turn is enhanced. Photography is a popular Refuge activity.

A water-tight self-registration desk of anodized aluminum was designed by Aransas personnel. The desk contains a locked box in the lower left-hand corner. In the lower right-hand corner another box contains self-registration envelopes. The upper portion of the envelope is retained by the visitor as a receipt. The fee is placed in the envelope and deposited in the locked box. Both portions of the envelope have the same number. On the fee section of the envelope
Table 2. Average monthly visitor use at the Bear River Migratory Bird Refuge, excluding hunters and fishermen, for 1960-1964

<table>
<thead>
<tr>
<th>Month</th>
<th>Percent of Total Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan.</td>
<td>13</td>
</tr>
<tr>
<td>Feb.</td>
<td>26</td>
</tr>
<tr>
<td>Mar.</td>
<td>344</td>
</tr>
<tr>
<td>Apr.</td>
<td>1591</td>
</tr>
<tr>
<td>May</td>
<td>1937</td>
</tr>
<tr>
<td>June</td>
<td>749</td>
</tr>
<tr>
<td>July</td>
<td>108</td>
</tr>
<tr>
<td>Aug.</td>
<td>24</td>
</tr>
<tr>
<td>Sept.</td>
<td>1511</td>
</tr>
<tr>
<td>Oct.</td>
<td>1692</td>
</tr>
<tr>
<td>Nov.</td>
<td>1814</td>
</tr>
<tr>
<td>Dec.</td>
<td>3247</td>
</tr>
</tbody>
</table>
the visitor records his name, address, city, state, and auto license number. In the self-registration desk there is ample room for Refuge leaflets, tour instructions, pens, and a registration book. Periodic checks would have to be made on the dike to prevent misuse of this system.

**Function of the Interpretive Facilities**

**Visitor Center**

The entrance road into the Refuge leads the visitor to the parking area in front of the visitor center. This will be the initial point of contact where the visitor will be oriented and dispersed. This will be accomplished at the information desk in the visitor center through direct contact with a uniformed station attendant. At the information desk questions about rest-rooms, overnight accommodations, restaurants, available literature, and general directions will be handled. The primary function of the information desk will be to get the visitor "on the road to understanding."

A series of exhibits in the visitor center will feature the history of the Bear River marshes and the ecology of the area. Hopefully this initial contact will stimulate the visitor's desires to witness these phenomena in the field.

**Self-Guiding Auto Tour**

A total of 219 species of birds have been recorded at the Refuge. Sixty-two of these species nest at Bear River. Many of these species can be seen along the tour. It is also possible to witness the various stages of marsh succession and the plants and animals associated with each phase. This vast variety of wildlife creates a complex web-of-life.
The interrelationships between the organisms are omnipresent, enabling the visitor to leave with the concept that the marsh is a "whole" unit with all forms of life contributing. Or that, no animal is completely independent of its environment. This principal as an intellectual transition creates visitor identity; that is, no man is an island. Thus, the main function of the tour would be to identify the marsh inhabitants and reveal their relationships in the environment.

Display Pond

The display pond will contain species of waterfowl which are not always seen along the 12-mile tour. It may be that such species occupy remote areas of the Refuge, or perhaps they use the Refuge for only a short time. For example, thousands of snow geese use a remote area of the Refuge for roosting. However, very few visitors ever see these birds. Whatever the reason, the pond will be reserved for such species. They should be birds which in some way relate to Bear River. Signs around the pond will identify the birds and mention their significance. The pond should be kept as natural as possible and not cluttered. Some of the birds which should be included are whistling swan, canvasback, redhead, scaup, ringneck, bufflehead, wood duck, cinnamon teal, ruddy duck. Tracy Aviary in Salt Lake City should be considered as a possible source for many of these birds.

Nature Trail

A trail is one of the most effective methods of providing opportunities for first-hand experience of the outdoors (Ashbaugh, 1965). Trails capitalize upon the ability of natural phenomena in normal environs to stimulate interest and increase understanding. Trails
enable the visitor to experience the environment through several senses. The mood and feeling of the marsh is unique. By transmitting this mood, there is a greater possibility of the visitor achieving maximum enrichment since interests will be roused and understanding enhanced. One of the best means of conveying this spirit is through trails, which permit direct contact between the visitor and the natural setting.

Outline of Content of Interpretation

Visitor Center

The major interpretive function of the visitor center, as stated in the previous chapter, will be the stimulation and provocation of the visitors' interests. In an attempt to achieve the objective, the following techniques should be considered at the Bear River Visitor Center.

Underlying theme: marsh ecology. Marsh ecology will be the underlying theme for the visitor center. The vast majority of the visitors come to see the birdlife. Therefore, an attempt should be made to cultivate this active interest. Many other interesting subjects are also pertinent to this geographic region. A natural inclination is fostered to place too many exhibits in the visitor center. This would result in confusion and should be avoided since space is already at a premium.

Man as a member of a biotic team. The visitor center will play a major role in interpretation of the key elements of the Refuge. A series of exhibits will reveal the ecology of the marsh including man's role as a secondary consumer. An ecological interpretation of the Bear River Valley history will portray man as a member of a biotic
team. Many events which led to the establishment of the Refuge are explained solely in terms of human enterprise. In Bear River's visitor center these events will be interpreted as biotic interactions between people and the land.

Visitor center as a whole. Since the major theme of interpretation is marsh ecology, the marsh as a "whole unit" with all members interdependent should be stressed. An attempt should also be made to achieve this objective within the visitor center itself. In the visitor center there will be an exhibit sequence. Each preceding exhibit will lend support to the one which follows. The exhibits, just as are the organisms in the marsh, will be interrelated. All the exhibits should be arranged and planned to give the appearance and feeling of one total experience. Visitors come to see the museum rather than individual exhibits. They probably carry away an overall impression. Therefore a museum needs to be designed as a whole (Lewis, 1964, p. 83). It is much easier for the visitor to recall if the exhibits are interrelated than if they are a series of unrelated concepts.

Visitor's first impression. The visitor's first impression upon entering the visitor center does much to influence the total recreation experience. This initial contact can be enhanced through exhibits which are clean, neat, and simple in design and through an aesthetically pleasing visitor center both interiorly and exteriorly. These factors in combination create a professional appearance as well as insure a favorable first reaction from the visitor.

Exhibits should be simple in design and gimmicks, gadgets, and novelties avoided. Pictures, drawings, cultural artifacts, or mounted specimens should be used to lend support to the interpretation. The
basic premise should be to avoid verbage and allow the exhibit itself to do the interpreting.

**Establishing correct traffic flow.** A traffic flow through the museum should be established which will enable the visitor to view each exhibit in its proper sequence. Sequence can be achieved spatially and temporally by physical movement and visitor flow. A left-to-right movement should be the objective. People read from left to right. Exhibits are usually arranged in this manner. General circulation in an exhibit room should be from left to right. Admittedly many people resist that inescapable left turn, but once made, they progress naturally to the right as this is the direction in which they read and hence must view the individual cases. This facilitates the progressive flow in one direction from case to case which does not prevail if circulation in a counterclockwise direction is employed (Schulz, 1962, p. 9). If this flow is not achieved, serious problems can result. The visitor center at Dinosaur National Monument in Vernal, Utah, has a right-to-left visitor flow. The visitor must begin reading at the end of the exhibit, or walk to the beginning. This is not always possible when many visitors are present. Counterclockwise flow thus "stacks-up" visitors and disrupts sequence.

At Bear River a partition will be placed at the entrance to the visitor center. This will funnel the visitor in the right direction and enable him to view the exhibits in sequence. Sequence is also achieved through chronological placement of subject matter. At Bear River exhibits begin with the early history and lead up to the establishment of the Refuge in 1928.

**Establishing mood.** In the visitor center the visitor will be oriented as well as introduced to the ecology of the area. A transfer
of facts and figures is not enough to accomplish the desired stimulation. In order to stimulate the visitor, the visitor center must convey the feeling and atmosphere of the marsh environment. This can be achieved by "piping-in" the voices of the marsh inhabitants. At low volume these sounds would hardly be noticeable as they imprint upon the visitor. This should create the appropriate atmosphere within the visitor center. It will also relate to the visitor's personal experience as the voices are recalled in the field.

The colors to be used in the exhibits is an important factor which must not be overlooked. Since stimulation is the main objective, earthy color tones which complement and harmonize with the natural environment should be chosen. Correct color scheme is essential if the appropriate mood is to be obtained in the visitor center.

Another technique which can be used to create a marsh atmosphere in the visitor center would be to cover an entire wall with a photograph of the marsh. If used in combination with the voices of the Refuge birds, this can definitely create a favorable mood. The limited space in the present facility would prohibit such a technique. This should, however, be considered in the expansion of the visitor center in the near future.

*Establishing psychological movement.* The creation of psychological movement or a natural exhibit flow should be incorporated in the visitor center. Again, interpretation of the history of the Bear River marshes creates such a movement, since periods of time which led to the establishment of the Refuge are successively being recounted. When interpreting the history, the Refuge today is actually a culmination. By devoting more panel space to each successive era, movement and a dynamic effect can be generated.
Through good panel design and art work a smooth exhibit flow can also be created. A flow of vegetation, or birds flying in the background can create movement. This technique must be used subtly so it does not distract from the interpretive content. This continuous flow of vegetation or flying birds in the background of all the exhibits will also tie the exhibits into the "one whole" experience which was stated earlier as a prime objective.

Personal contact. The exhibits can be interpreted more elaborately via personal contact by the station attendant. Therefore, if time is available, it is recommended that the attendant guide the visitors through the station, interpreting the exhibits and answering questions.

Personal contact by the station attendant can "humanize" an exhibit. In interpreting the market hunting era, a photograph of hunters during the late 1890's will be used in conjunction with the following caption, "From 1877 to 1900, 200,000 ducks were shot by market hunters and sent to the eastern markets." Personal contact can go beyond this. For example, "One of the hunters in the photograph is the late Vincent Davis of Perry, Utah. He was one of the best marksmen to hunt the Bear River marshes. He averaged from four to five thousand ducks annually during the 1880's and 1890's. His reputation extended beyond the boundaries of Utah. In fact the major arms and ammunition companies sent representatives to Utah to compete with Davis. In later years Vincent Davis lost much of the use of his left arms, after being gored by a bull. This did not slow down 'Old Vince.' On many occasions Davis would raise up with his old Browning automatic and shoot five times into a flock of ducks, resulting in five dead ducks in the air at the same time." Such tidbits of information have great human
appeal and can be effectively translated through personal contact. All of the exhibits planned for Bear River's visitor center can be enhanced with additional explanation.

Present visitor use levels at the Bear River Refuge would permit the attendant to personally guide visitors through the station. The lack of space in the visitor center prevents the interpretation of many important subjects. However, personal contact has no limits. Subjects which are not mentioned in the center can be discussed by the interpreter. Through personal services, interpretation becomes flexible and meets the exact needs of the visiting public. Some of the advantages of personal services as outlined in the National Park Service Interpretive Planning Handbook include:

Most visitors are receptive to personal services. The personality (and uniform) of the interpreter can enhance the appeal of the message and the effectiveness of communication.

Personal services make possible a deeper penetration of subject matter.

The possibility of using group reaction to stimulate individual interest and encourage desired attitudes is an important advantage.

Two-way communication makes possible a degree of informality which has characterized the traditional National Park interpretive experience.

It has the unparalleled advantage of being alive and capable of being tailored to the needs of the individual or groups. It can take advantage of unexpected and unusual opportunities.

The National Park Service uniform symbolizes authenticity and lends credibility to the interpretation. (U. S. Department of Interior, 1965)

There are space deficiencies in the present visitor center. This problem must be resolved by providing the visitor an informal, high-quality recreational experience through personal service.
Exhibits

A. Fossil Bird Tracks

Purpose: To illustrate the existence of birdlife similar to today's which existed 50 million years ago on the former shorelines of ancient Lake Uinta.

Suggested Form: A plate of fossil bird tracks will be placed in a three-foot by five-foot black-and-white photograph of a desolate mud flat. On the mud flat will be today's bird tracks passing through the tracks on the slate and disappearing in the distance.

B. History of Bear River Marsh

Purpose: To illustrate the various stages of development in the valley which led to the establishment of the Refuge.

Suggested Form: A series of either pictures, drawings and artifacts will be used to illustrate the stages of development in the valley. The exhibit will begin with the Indians in 1100 A.D. and conclude with the establishment of the Refuge in 1928.

C. Today

Purpose: Illustration of the multiple uses which the Refuge provides today.

Suggested Form: A series of mounted color photos illustrating the fulfillment of the various Refuge objectives. Photos of migratory birds with their young (breeding area) and large concentrations of waterfowl (resting and feeding area). This exhibit should also include photos of the recreational pursuits which the Refuge satisfies (hunting, fishing, photography). On the background of this exhibit should be a painting of a marsh scene or birds characteristic of the Refuge.

D. Adaptations of the animals to marsh environment.
Purpose: This exhibit will illustrate the different adaptations which the fauna has developed to meet the conditions of this part-land, part-water environment.

Suggested Form: To be located in one of the display cabinets, this exhibit will use a combination of mounted specimens and drawings. In the center of the exhibit will be an overall photo of the marsh.

E. Plume hunters

Purpose: To illustrate how the wholesale slaughter of egrets, herons, and grebes for breeding plumes to be used on ladies' hats almost led to their extinction. This exhibit would also point out that through refuges and protective laws these birds today flourish. Since these are very conspicuous on the Refuge today, this exhibit would relate quite strongly to the visitor's personal experience.

Suggested Form: The plumes of the birds will be mounted on red velvet which provides an excellent background. Also, the red velvet lends a connotation of richness and luxury which was also symbolic of plumed hats. These hats were especially characteristic of the upper classes. Besides the plumes, photos of plume hunters, plumed hats, and a warehouse with cases of confiscated plumes packed for shipping will be used. An 11 x 14 colored photograph of a snowy egret will be included in order to illustrate the breeding plumes.

F. Nests

Purpose: To illustrate the extremes of nest building, different nesting sites, and the sizes and colors of eggs.

Suggested Form: Actual nests will be used to fulfill the above objectives. On one end of the display case is a gravel bed and an excited killdeer with outstretched wings attempting to lure a would-
be intruder from its nest. Upon closer inspection the visitor will discover four killdeer eggs in a slight depression in the gravel. The visitor has a difficult time finding the eggs because they are protectively colored. In this exhibit the visitor is discovering the information to be interpreted. Through this element of discovery he will gain far more satisfaction and retention. There will also be a Canada goose and a white-faced ibis nest. These species were chosen because they show a wide range of egg color, size, shape, and nest construction. More important is the fact that these birds are very conspicuous on the Refuge. This exhibit will therefore relate heavily to the visitor's personal experience.

G. Migration

Purpose: To explain the triggering mechanisms which initiate migration and indicate the migration routes of the Refuge birds. Banding, which has been responsible for determining these routes, will also be illustrated.

Suggested Form: This exhibit will be located in one of the display cases. In the center will be a map of North America and the migration routes of the birds of the Refuge. In the lower left-hand corner will be a mount of a flying drake pintail with other flying pintails painted on the background. The relationship of banding, as a determinant of migration routes, will also be illustrated through photos and actual bands.

H. Refuge mammals

Purpose: To identify some of the more conspicuous Refuge mammals and to show their relationship in the marsh community.
Suggested Form: This exhibit will be placed in one of the large display cabinets. Three mounted long-tailed weasels, in the different color phases (summer, winter, transition), will be illustrated in conjunction with a painted background of their characteristic habitat and appropriate season. A striped skunk raiding a duck nest and a muskrat will also be used. A marsh scene will be painted on the cabinet backing and the mounted specimens arranged to coincide.

I. Bear River--A National Wildlife Refuge

Purpose: To point out that Bear River is one of 330 National Wildlife Refuges throughout the country satisfying many needs.

Suggested Form: Mounted photos illustrating endangered wildlife species, big game, waterfowl, and recreation activities being provided through the National Wildlife Refuge System.

Self-Guiding Auto Tour

The 12-mile self-guiding auto tour can be considered a continuation of the flow and sequence established in the visitor center. Since provocation is an important objective of the visitor center, observation of the Refuge phenomena in the field is the activity most likely to follow.

The 12-mile self-guiding auto tour is the main Refuge attraction. During certain seasons of the year it offers for public viewing some of the largest concentrations of waterfowl in the United States. However, the tour does not attain its interpretive potential. Presently there are five interpretive stops along the tour and three observation towers, but only two stops relate to the ecology of the marsh. Marsh ecology should compose most of the interpretive content of the tour.
The present 12-mile self-guided tour falls short of achieving the objectives of spreading an ecological awareness. Although the present topics along the tour deserve interpretation, many topics concerning the wildlife have been neglected. These subjects should be interpreted in the field where the visitor can actually witness the phenomena being interpreted.

There are many areas along the tour where certain species of birds are consistently seen. Interpretation and identification of these species will have greater impact if accomplished in the field. While witnessing the phenomenon the visitor is also stimulated and will seek interpretation.

The use of interpretive signs along the tour will not achieve the desired on-site interpretation for the following reasons:

1. The signs would have to be large enough for everyone in the automobile to read the interpretive content. Anodized aluminum signs, which are usually used because of their durability, are very expensive especially in the large sizes which would be necessary. Anodized aluminum signs cost approximately twenty cents per square inch. Printing is not included in that price. Many large signs along the tour would also detract from the natural environment which is an important aesthetic resource.

2. Small interpretive signs would not be obstructive. However, these signs might go unnoticed.

3. With smaller interpretive signs it may be necessary for the visitor to leave the auto to read the message. The swarming midges and other insects make this assumption unrealistic.

A supplement to the present tour-guide is the most practical solution. The supplement would coincide with the seasons, therefore,
the interpretive content would always be current, always relating to the visitor's personal experience. By changing the interpretive content, the messages would not become stagnant for the local recreationists who visit the Refuge regularly. This tour guide would identify the marsh birds, their adaptations, feeding habits, and their significance in the environment. Interpretive content should be concise but interesting, and attempt to stimulate interest.

A painting of a particular Refuge species together with a number would be located where the organism has consistently been seen. At such places the visitor is likely to stop. While viewing the species, the visitor will probably be stimulated enough to seek its identity which is provided in the leaflet along with an interpretive message. Numbers on the signs in the marsh will be correlated with the numbers in the interpretive leaflet. A painting of the bird is included on the sign to insure that the interpretive message is being related to the proper organism. This is important since wading birds and shore birds are often mixed with other species. The signs should be moved to those locations the organism frequents; disruption of sequence wouldn't be a problem.

Although the same species may be the subject of interpretation during different seasons of the year, the interpretive content should be altered to best fit the appropriate season. For example, the following interpretation of Canada Geese through the various seasons might be appropriate. During April, May, and early June the interpretative message may read: Canada Geese - Canada geese mate for life. They do not breed until their second year. Canada geese will return to breed in the same area where they were hatched. They average four to
six young per year. Approximately 2,000 Canada geese are produced in the Refuge annually. From late June until mid-September the interpretive message can be altered to read: Canada Geese - During June, the Canada geese molt. They lose all their flight feathers and are unable to fly for some weeks. This explains the feathers along the dike. During this time the geese will retire to inaccessible places like open-water or the bullrushes. All ducks, grebes, swans, and geese lose their flight feathers all at once. All birds molt, but most of them lose their feathers gradually, never becoming flightless. During October, November and December an appropriate message would be:

Canada Geese - These dry flats on the south side of the dike are important for Canada geese. Geese do not feed in the water like ducks. They are grazing birds. The "toothed" beaks of geese, helped by powerful jaw muscles, cut up the vegetation they eat.

Other wildlife or Refuge phenomena deserving interpretation during April, May and early June follows:

1. Ruddy Duck
2. American Avocet
3. Black-Necked Stilt
4. White Pelican
5. Carp
6. Western Grebe
7. Snowy Egret
8. Great Blue Heron

The following is a listing of phenomena to be interpreted from late June until mid-September.

1. Marsh Wren
2. White Pelicans
3. Duck Broods
4. Snowy Egret
5. Great Blue Heron
6. Carp
7. Western Grebe
8. American Avocet
9. Black-Necked Stilt
10. Sago Pondweed

Low visitor use levels from non-consumptive users during October, November, and December make the preparation of a seasonal tour leaflet coincident with this period unrealistic. However, when the demand becomes sufficient, the following subjects can be interpreted through the seasonal tour leaflet:

1. Muskrat House
2. Whistling Swans
3. Lowering Water Levels
4. Merganser

Nature Trail

A nature trail should be included in Bear River's interpretive program. Although wildlife can be viewed more extensively along the 12-mile self-guiding auto tour, only direct contact between man and the environment is capable of best conveying the mood and spirit of the land. Outdoor trails enable nature to "speak" more meaningfully for itself. Outdoor trails provide an inspirational experience, giving motivation to learning and stimulating creative expression.

The use of trails in teaching also offers many advantages. Conservation education via the textbook-classroom combination alone,
falls short of achieving its objectives. Many educators today are turning their attention to the outdoors and to the use of trails where circumstances are less structured and the setting is filled with real objects, real situations and demonstrations, and where there are opportunities to see cause-and-effect.

Insects would be a nuisance during the summer months. An elevated boardwalk might alleviate much of this problem. A boardwalk would also help in preserving the natural environment. Perhaps some of the work involved in establishing a nature trail could be performed by local boy scouts or other youth groups. Oftentimes group leaders call the Refuge to explore the possibilities of future work projects.

By providing a variety of activities, the needs of a wide assortment of visitor types can be satisfied. Nature trails would also produce a greater dispersion of visitors. In the future, as visitation increases, trails can be expected to take some pressure from the self-guiding auto tour. At present on Sunday afternoons in May or June, the last cars to travel around Unit Two receive far less satisfaction than those in the morning. Constant dike traffic keeps the birds far from the road. Trails can perhaps spread the load, allowing the visitor as rich a recreation experience as possible.

The nature trail can also be used for guided walks. These tours can be given to organized groups requesting them in advance or scheduled at designated times during periods of heavy use. Guided walks have the advantage of providing the visitor with a personal service. This is probably an ideal interpretive method. The interpreter (or uniform) represents one who commands respect and is "skillful in the ways of the out-of-doors and knowledgeable in the secrets of nature." The
visitor seeks to gain identity with the interpreter. Two-way communication usually characterizes these walks which creates a degree of informality. The interpreter can also ascertain from feedback or group reaction the depth to which he should explain certain ecological concepts. As the group progresses in this informal atmosphere, the interpreter can identify plants and animals. The guided walk thus allows the visitor to experience the natural environment through many senses.

A good location for a trail would be the small dike opposite the boat launch in unit three. Since it is located immediately outside the main Refuge gate there would be no parking problem. The trail should be a loop not longer than one mile. It should be primarily self-guiding through signs and markers although a trail guide should eventually be developed for children. At the beginning of the trail the visitor should be informed of the approximate time required to walk the loop and the distance. Along the trail the following features should be interpreted:

1. Plant Succession
2. Muskrats
3. Identification and Role of Marsh Plants in Ecosystem
4. Refuge Fish
5. Wading Birds
6. Regulation of Water Levels
7. Shorebirds

**Expanded Visitor Center Complex**

Since this interpretive document is being prepared to serve as a key for future interpretive development at Bear River, it was
necessary to be specific in outlining visitor center facilities and exhibit content. This is especially significant since plans for an expanded visitor center at the Refuge are presently being considered by the Bureau of Sport Fisheries and Wildlife. Therefore, although a large section of this interpretive document has been devoted to the expanded visitor center complex, it is not the author's intent that the visitor center dominate the Refuge interpretive program. Provocation and stimulation of the visitor's interest remains the principal function of the visitor center, complementing those activities, the self-guiding auto tour and nature trail, which best convey the mood and spirit of the marsh.

The contact station at Bear River, a giant step in the right direction, is too small to satisfy the today's visitor needs. This lack of space prevents the interpretive program from achieving its potential.

Interpretive planning in the present visitor center lagged behind the development program. The visitor center was programmed, designed and placed under construction before an interpretive naturalist was able to present a reasonable statement of the interpretive function of the building. This section of the prospectus is designed to prevent this from occurring in the expanded facilities.

A visitor center usually consists of:

1. A large lobby which functions as a general milling space and gathering area for tours. In it will be the information desk with its sales department for literature and maps.

2. An exhibition area which will usually be an extension of the lobby.

3. An audio-visual room for cinema or slide talks.
4. Ranger offices (the administrative office of the Refuge may also be combined with the visitor center building).


**Lobby**

The present contact station should function as the lobby. The information desk should be located in the lobby along with all available literature. The panels which are planned for the present contact station should remain when that facility is converted to a lobby. The panels depict the various periods which led to the establishment of the Refuge today. Therefore, the panels serve as an orientation for the visitor.

A large map of northern Utah located behind the information desk would provide the visitor with a valuable service. In addition to informing the visitor about other attractions in the area, it would also give directions, distances and the type of activities offered. Points of interest to be highlighted would be Golden Spike National Monument, Ogden Bay Refuge, Cache National Forest, Willard Bay Reservoir, University of Utah Museum of Natural History, Temple Square, other museums, and state and national parks. Besides serving as a travel guide for visitors, this map will promote attendance at these sites. By visiting other areas in northern Utah, the visitor will gain a comprehension of the Bear River Refuge as one phenomenon within a greater whole.

The lobby should function only as an information and orientation area. A bulletin board should also be included which would present the visitor with a schedule of events. It would also mention any unusual sightings of Refuge wildlife.
A sales desk should also be established in the lobby. In addition to the leaflets and tour guides available, material pertinent to the Refuge could be purchased here by the visitor. On-site services such as the sales desk are important while the visitor's curiosity and interest are at a peak. Such a service will enhance the visitor's personal experience as well as Bear River's overall interpretive program. A sales desk would not conflict with Fish and Wildlife policy.

A National Policy released March 10, 1964 states:

Facilities and services directly supporting interpretation, fishing, or hunting activity are provided and managed by the Bureau wherever possible. State conservation agencies and non-profit conservation organizations may be authorized to provide and manage these facilities and services under appropriate arrangements (U. S. Department of Interior, 1964).

Various pertinent books such as Peterson's Field Guide to Western Birds, Department of the Interior's Waterfowl Tomorrow and Birds in Our Lives, Murphy's Wild Sanctuaries, Niering's The Life of the Marsh, Errington's Of Men and Marshes, Hochbaum's Travels and Traditions of Waterfowl, and so forth that are already on the commercial market should be included at the sales desk.

Exhibit Room

Entrance into the exhibition area will be at the northeast corner of the lobby. Visitors will be attracted into the room by an enlarged marsh photograph extending from ceiling to floor. The function of this marsh scene will be twofold: (1) it will create the feeling and mood of the marsh which will have a stimulating effect on the visitor; (2) it will help in establishing the correct "left-to-right" visitor flow. The first two exhibits in the exhibition area, a diorama of the marsh, and a food chain set the stage for the exhibits which follow
since they provide the visitor with a broad introduction into marsh ecology. This demonstrated the importance of establishing the correct visitor flow in the exhibition area.

Exhibits

Marsh diorama

Purpose: This large exhibit will serve many purposes. Besides identifying the animals (mainly birds), it will enable the visitor to associate the species with their particular type of habitat. It will also point out the anatomical adaptations of marsh birds which have evolved enabling them to best occupy a certain niche in the environment. The importance of wetlands for the survival of these birds should also be emphasized.

Suggested Form: This exhibit will be a large diorama. It will contain cattails, pockets of open water, annual weeds, salt grass and mounted specimens of the animals associated with each type of habitat. The background will be a painting of a marsh scene. Audio messages with earphones will interpret this exhibit.

Food chain

Purpose: To point out how the marsh community functions and the interrelationships of the organisms in creating a "whole" unit. With the use of the food chain, the effects of pesticides, especially on secondary consumers, can also be included.

Suggested Form: A combination of mounted specimens and illustrations or paintings can be incorporated into this exhibit, showing the relationships between the various consumer levels. The organisms selected for this exhibit should relate to the visitor's experience
at Bear River. The role of man (trapper, fisherman, or hunter) as a secondary consumer should be included.

**Refuge fish**

Purpose: To exhibit the fish which inhabit the Refuge waters and the type of conditions for which they are adapted.

Suggested Form: This display will consist of one or two aquariums with live carp, channel catfish, and/or bullheads. Live animals provide a valuable source for interpretation since they will usually attract and hold the visitor. Next to manned exhibits those involving movement, sound, or particularly live animals draw and hold most attention. It is important, however, that the exhibit is coordinated into the overall plan, for if it is too dominant it will distract from the other exhibits and disrupt visitor flow (Lewis, 1964, p. 84). Thermometers in the tanks will show the visitor that these fish are adapted to warm water. The adaptations which these fish have developed, especially the catfish, for feeding in turbid conditions can be viewed easily by the visitor. This exhibit will also reveal the importance of these "so-called" trash fish as a food source for many of the Refuge birds. The feeding habits of the carp and its effect on the growth of aquatic vegetation may also be mentioned. By disturbing the bottom in search of food, carp muddy the Refuge impoundments. This prevents sunlight from penetrating the water; thus photosynthesis is restricted and the aquatic vegetation is endangered.

**California gull**

Purpose: To point out the life history of the California gull and discuss how this bird relates to the ecology of Bear River. The California gull has been selected not only for its significance in
the marsh, but also for its historic significance in Utah. The California gull is the state bird. During the early settlement of Utah by the Mormon pioneers, the California gull is said to have averted a complete catastrophe by devouring hordes of crickets which invaded the settlers' crops. Many Refuge visitors ask about the role of the California gull in Mormon history.

Predation by the California gull on young ducks and geese on the Refuge should be revealed. This can be contrasted with their role as scavengers, cleansing our inland and coastal waters. The gull control practices employed on the Refuge today in an attempt to maintain a natural balance could be included in this exhibit. However, this area should be treated delicately, since this bird holds both religious and historic significance in Utah.

Suggested Form: The California gull story should be presented through drawings and mounted specimens. Some of the preserved Mormon crickets which the Refuge possesses could be included to give the visitor an idea of this insect's size.

Muskrat

Purpose: To point out the importance of the muskrat to the marsh community and to man.

Suggested Form: A mounted muskrat will be centered in a display case chewing on the rootstock of a cattail plant. The background of the case will be a painting of a marsh scene. The scene will include a muskrat house and emergent vegetation with many pockets of open water. In these pockets of open water, feeding ducks should be included. Interpreted here will be the importance of the muskrat to waterfowl (muskrats...
prevent the cattails and bullrushes from invading the open water by eating the rootstocks of these plants).

Muskrat trapping should also be included in the exhibit. Due to a lack of natural predators (mink) on the Refuge, the muskrats would flourish if left uncontrolled. They then could destroy the stands of cattails and bullrushes. Man intervenes and attempts to maintain nature's balance. Therefore, trapping is permitted on the Refuge on a limited basis. If possible, let the visitor touch a muskrat pelt. Appeal to as many senses as possible.

**Midges**

Purpose: To point out the life cycle of the midge and its importance in the food chain of the marsh community.

Suggested Form: This exhibit will mainly depend on artwork illustrating the various stages of midge development and the organisms which depend on these insects as a source of food.

**Botulism**

Purpose: To point out the history of this disease in the Bear River marshes. This exhibit should also reveal the relationship between avian botulism and the more common types known to affect man. The necessary conditions for the growth of the bacteria should be included, along with the measures known to combat its spread.

Suggested Form: A mounted duck lying dead on a mud flat will be depicted in a display case. A painted background will reveal many other dead ducks far into the distance. Discuss those previous outbreaks when dump truck after dump truck was filled with dead ducks. Use pictures of past outbreaks if available. This would have great impact on the visitor. A discussion of Bear River Research Station should also be included in this exhibit.
White Pelican

Purpose: To interpret the role of the pelican in the ecology of the Refuge. Their nesting grounds (Gunnison Island in the Great Salt Lake) and the pelicans' daily flight to the Refuge should be included. The migration pattern of the white pelican also should be incorporated in this exhibit. It also may be desirable to mention the parasites which plague and possibly benefit these birds. Dr. Malcolm McDonald of the Bear River Research Laboratory is a valuable source for such information.

Suggested Form: In order to conserve space it would probably be necessary to have only the head of a pelican mounted. By using the head the adaptations of the bill and feeding techniques could be interpreted. In the background of the display case a map should be used to illustrate the relationship of the Refuge to Gunnison Island.

Management and maintenance practices

Purpose: To point out the various management and maintenance practices which are employed in order to meet the Refuge objectives. This display would also be instrumental in creating agency rapport with the public.

Suggested Form: The primary objectives of the Refuge should be pointed out. Then, through a series of photographs, the practices employed to achieve these objectives can be illustrated. The dikes, water control, control burning, spraying of noxious plants, and predator control are some of the practices which should be included.

Rotating Exhibit

Purpose: To create greater rapport between the Refuge and the visiting public and local agencies and organizations.
Suggested Form: A display cabinet should be set aside for exhibits to be displayed by the public. Refuge personnel should encourage visitors or organizations to utilize this display cabinet. Subject matter would in some way relate to the Bear River Refuge. An old decoy collection or photographs of early Brigham City are an example. Perhaps the Utah Division of Wildlife Resources could have an exhibit illustrating their role in waterfowl management, the local Daughters of the Utah Pioneers may be interested in an exhibit on the early history of the valley, or the Utah Chapter of the Wildlife Society may be interested in preparing an exhibit. This would be an interesting experiment.

Audio-Visual Room

An audio-visual room should be included in the visitor center complex. Such a facility would be valuable to the many educational groups which visit Bear River. In 1969 organized school groups constituted 42 percent of all Refuge visitors (Bear River Migratory Bird Refuge, 1969). Films and/or slide talks geared for various educational levels should be available and presented before these groups leave for the guided tour. The visitor thus can relate what is seen in the field to his experience in the visitor center.

Automatic slide programs should be scheduled for the audio-visual room. A schedule of the showings can be listed on the bulletin board in the lobby. If visitors must wait for these presentations, they can visit the Refuge display pond or climb the 100-foot tower. Species identification and the ecological relationships of the Refuge organisms should be the central theme of these showings. This type of program will relate to the visitor's experience in the field. By interpreting these basic concepts at the visitor center, interpretive signs along
the tour can be kept to a minimum. This will insure that the tour remains as natural as possible without a cluttering of signs along the dike.

When sufficient demand exists, the audio-visual room could be used for evening programs. Insects would restrict the scheduling of evening outdoor amphitheater programs. The eve of the duck season opener would be appropriate for a waterfowl hunting or waterfowl identification program since many hunters camp on the Refuge on this night.

If the Refuge was open to the public after 4:30 during the summer months, scheduled evening programs might lure some of the local people. Many visitors have requested an extension of the closing hour since temperatures are cooler and Refuge wildlife more active.

Slide talks and/or movies should be prepared by the Refuge public use specialist. In addition to their use in the audio-visual room, these programs can be used to meet the growing demand by schools and other organizations for off-site interpretation. The following is a listing of suggested program titles:

1. Marsh Ecology
2. America's Waterfowl Resource and the Role of Refuges (Federal, State, Private Gun Clubs, etc.)
3. National Wildlife Refuge System
4. Refuge Management
5. Species Identification (designed for the non-consumptive user)
6. Waterfowl Identification (designed for the hunter)
7. The Four Seasons of the Bear River Migratory Bird Refuge

In preparing a talk on the seasons of Bear River, it is essential that the interpreter convey the mood and spirit of the marsh. Slides
should be used which not only illustrate the solitude of winter but also transmit this mood. By using music (or preferably the sounds of the Refuge) this can be accomplished. For example, September's peak populations can be identified with a thunderous roar of wings, whereas January's freeze can be characterized with silence. In order to prepare such a program the interpreter must have a deep feeling and appreciation for the marsh. Paul L. Errington's book, *Of Men and Marshes*, is an emotional and inspirational work of art. Errington's description of the seasons of an Iowa marsh would be a valuable guide in preparing a program on Bear River's seasons.

**Public Use Specialist Workshop**

The visitor center complex should include a workshop for the public use specialist. In addition to ample working area, the shop should also contain enough storage space for interpretive equipment. The workshop should include the following:

1. audio-visual equipment
2. slide cabinet
3. drawing board
4. artist supplies
5. photography equipment
6. Refuge photographs
7. taxidermy supplies
8. graphic supplies

The public use specialist would be responsible for the maintenance of all equipment and supplies in this area.
Library

A small library should also be established as part of the visitor center complex. The visitor whose curiosity is stimulated beyond the interpretive content of the visitor center will be encouraged to use this facility. Books and other sources of information should be arranged according to subject matter. A listing of other sources should also be available for visitor use. The library would also serve the needs of the Refuge personnel.

Off-Site Interpretation

A Refuge public-use specialist should plan a broad off-site interpretive program coordinated with local schools, youth organizations, and other groups. These activities should be promoted during the winter months when visitor-use levels are low.

Off-site interpretation should be extended to include a school presite orientation program. The Refuge public-use specialist should design interpretive programs for various grade levels. They would be distributed to school groups prior to their Refuge visit. Coordination between the public-use specialist and local school authorities would be essential for developing such a program. Attempts should be made to integrate this presite program into existing school course work. The result of such a plan would be a Refuge experience of greater significance and meaning.

The National Park Service is currently in the process of developing an environmental educational program which will be integrated into the overall educational process. The following account of this program
National Environmental Education Development (NEED) is a National Park Service program designed to provide deeper understanding of the values to be found in visits to National Park areas, and to foster environmental awareness and involvement in the individual child, beginning with appreciation, and leading at high school levels, to a pragmatic environmental ethic. Under this program curricula for various grade levels will be developed and integrated into the overall educational process. The program is built out of the universal environmental constants such as interrelationships, interdependency, change with continuity, similarities and diversities within patterns, adaptation, evolution.

These are the big ideas of the NEED program, the environmental "strands" that run through lessons as diverse in subject matter as history, communications, mathematics, art, geography, social studies, and so forth. As the child learns to identify these strands, wherever they occur in nature and in human culture, he gains a sense of himself, of how he fits into the world, of the idea that he has a right to be there, of the fact that there are certain rules he can depend upon and even learn to manipulate to his own advantage. (Miller, 1969, p. 9)

Curriculums for the NEED program are currently being developed. This program is not being designed exclusively for National Park Service use. It will be available to any school district or youth organization. If such a program was adopted locally, the Bear River Migratory Bird Refuge could satisfy the "on-site" part of the NEED program which usually consists of one week in an "outdoor laboratory."

The Refuge public use specialist should watch for the completion and inauguration of NEED, as well as other environmental awareness programs. They should be examined with local school authorities regarding their application in northern Utah.

The interpreter should also be encouraged to develop a working relationship with the newspapers in Brigham City, Logan, Ogden, and Salt Lake City. A knowledge of the schedule of these media and their
requirements for news items is important. It would also be advisable to extend this relationship to the local radio and television stations. A conservation agency has much to gain through good public relations. According to Gilbert (1964) the benefits include: goodwill, recognition, community acceptance, support from other agencies, few misconceptions and prejudices, promotion of goods and services, prevention of misunderstanding and ill will, and a lack of apathy and ignorance.

Research and Collections

Research Projects

Several research projects concerning the visitor use program at Bear River should be initiated. These projects would attempt to insure that each Refuge visitor is afforded a quality recreation experience.

The following is a list of suggested research projects:

1. **Effectiveness of Bear River's Interpretive Program.** The interpretive program at Bear River should be analyzed for its effectiveness in order for it to satisfy desired objectives.

2. **Determination of Visitor Carrying Capacity on Self-Guiding Auto Tour.** In order to maintain a quality experience for all visitors, it will be necessary to determine the effects of various use levels on visitor satisfaction. When use exceeds the determined carrying capacity, then access will have to be limited. Guided bus tours leaving at regular intervals may be the solution.

Study Collections

The public-use specialist should attempt to establish collections of exhibit items pertinent to the Refuge. A collection of mounted
specimens should be made. A few historical items may also be acquired.

The public-use specialist should arrange the 35 mm color slides, and color and black-and-white photographs into specific categories. This will enable him to determine areas which are deficient, and attempts should be made to fill these voids. Presently there are very few slides or photographs illustrating the marsh during the different seasons.

A collection of tapes of the sounds of the marsh should also be made. They should be collected during the different seasons. The tapes could serve as a background for slide programs and could also be used in the marsh diorama planned for the expanded visitor center.

The public-use specialist should always watch for potential exhibit items. These collections would serve as a reservoir for future displays and interpretive programs.

**Staff Requirements**

The Bear River Refuge does not have any permanent staff members specifically assigned to the public-use program. In order to accomplish the desired objectives, a permanent Public-Use Specialist position should be established at a GS-7 or GS-9 level. The Public-Use Specialist would also be involved with the biological and maintenance practices in order to receive an overall comprehension of Refuge operation.

During the winter the public-use specialist should interview students for seasonal employment at the Refuge. The student would be asked to work weekends only during April and May, and full-time during the summer. This would be a GS-4 position.
Much of the evolution and construction of the Interpretive Document was accomplished within the duration of a temporary appointment of the writer as a Public-Use Specialist at the Bear River Migratory Bird Refuge. During this interim, it became apparent that the relationship between interpretation and recreation in the National Wildlife Refuge System was in a transitory and critical stage. This relationship has not received the attention and study on the National Wildlife Refuges that it has in the National Park System and in the National Forests. Interpretive philosophy for the Refuge System has not yet evolved. As recreation use of the System increases and demands other than traditional demands are articulated, management problems will reach crisis proportions in the immediate future. This situation will precipitate an analysis and sharpening of policy for the Refuge System. Because interpretation is not only a recreational activity but also an instrument of policy, interpretive philosophy will play an important role in shaping the future of the System. The interpretive philosophy adopted by the Bureau of Sport Fisheries and Wildlife will be a strong indicator of the course of policy accepted for the wildlife refuges. It is in this sense that the following analysis and conclusions about interpretive philosophy is submitted. Interpretive philosophy, recreation development, and refuge policy are all intertwined. Each will exhibit causal impacts upon the other.

As recreation development in the Refuge System is in a stage of infancy and a review of current ideas and philosophies regarding the
interpretive planning art is an objective of this study, it is appropriate that conclusions be advanced relative to this relationship.

The demand for pleasuring grounds in America is growing even faster than the population due to increased leisure time, improved transportation, and higher income. Recreational use on National Wildlife Refuges is reflecting this trend. From 1951 to 1956 this use showed an increase of 115 percent, which contrasts with an increase of 48 percent for the National Park System, and 75 percent for the National Forests for the same period (Kohler, 1967, p. 71). Except for boating and fishing at reservoir sites, the fastest growth in outdoor recreation since World War II has been in the use of National Wildlife Refuges. Attendance at federal refuges has grown at a rate of 12 percent per year (Clement, 1964). What is the reason for this surge in popularity of our National Wildlife Refuges? This increasing interest is probably as much a commentary about the limitations of the visitor's personal environment as it is about the attractions of refuges. National Wildlife Refuges provide a diversion, or respite from the visitor's personal surroundings. National Wildlife Refuges provide an environment where the visitor can be reminded of the fundamental organization of the biota.

Unfortunately, at many natural areas today, visitors are deprived of this basic communication. Overcrowding and the provision of too many "so-called" benefits accounts for this deprivation. An excellent example is our National Parks which were established to preserve unique natural and historic areas for the benefit and enjoyment of the people. This motto meant something quite different at the time of its creation than it means today. Benefits and enjoyment in our National Parks is defined superbly in the following quotation by William H. Eddy, Jr.:
Under the category of benefits come such things today as trailer campsites with water facilities, sewage outlets, and electrical connections - and hotels, shops, grocery stores, medical facilities, cocktail lounges, and restaurants. In other words, the concept of benefits to be found in a National Park has come more and more to mean physical utilities and services.

Under the category of enjoyment today, comes not only boating, swimming, fishing, hiking, and game viewing, but also movies, magicians, professional singers, and musicians - and even a fire-fall. Thus, the concept of enjoyment today has come more and more to mean mere entertainment. (Eddy, 1967, p. 75-76)

Today, the National Park Service is attempting to reduce the confusion which exists as to the distinction between a recreational facility and a National Park. The National Wildlife Refuge System should also consider this problem. The objectives of both agencies are quite alike. The National Wildlife Refuge System is much more closely aligned conceptually with the National Park Service than with the U.S. Forest Service. National Parks have been established to preserve unique natural and historic sites for the enjoyment and benefit of the American public.

According to the National Wildlife Refuge Handbook:

The goal of the National Wildlife Refuge System is to preserve and manage wildlife environments for the continued enjoyment and benefit of the American public. (United States Department of Interior, 1967b)

Since similarities in objectives do exist, it would be wise for the National Wildlife Refuge System to ponder this dilemma which today plagues the Park Service in order to avoid similar confusion.

Certain refuges have already let the pendulum swing too far concerning the provision of recreational facilities. According to the report of the Advisory Committee on Wildlife Management in the National Wildlife Refuge System, there are some refuges, especially those situated in highly populated areas of the East and Midwest, which have
become so oriented to mass recreation that there is some question whether these areas are serving their original function as wildlife reserves. Crab Orchard Refuge in Illinois is an example with 1.5 million visits recorded in 1966 (Leopold, et. al., 1968). Not only is the primary function of the refuge being obstructed, but the quality of the recreation experience is being diluted. Recreational facilities should be dictated, as suggested by Nobel Buell (1967), Assistant Director of the Bureau of Sport Fisheries and Wildlife, by the ability of an area to supply a quality recreation experience - not its ability to accommodate quantity.

Unfortunately, the proximity of urban masses to many of our National Wildlife Refuges leads inevitably to pressure for larger picnic grounds, camping facilities, improved swimming beaches, motorboat marinas, waterskiing, baseball fields, bridle paths, target ranges and other forms of play. Once any of these activities are adopted they become difficult to terminate.

The unique appeal of National Wildlife Refuges is not the provision of these so called benefits but instead their absence.

As facilities and accommodations become more and more conspicuous, they destroy the naturalness of our refuges and in so doing they destroy their unique appeal. Parker River Refuge on the Massachusetts coast is surrounded by twenty million people but offers a lonely bird walk among the sand dunes, a small cove for fishing, a resting place for waterfowl, a haven for shorebirds. It is this communion with nature and this contrast with modern living which makes our National Wildlife Refuges so attractive. Aldo Leopold (1949) lucidly stated this when he said, "Recreation is valuable in proportion to the intensity of its experiences,
and to the degree to which it differs from and contrasts with workaday life."

Our National Wildlife Refuges are capable of providing the visitor with a unique recreation experience based on the natural qualities of the environment. The landscape of an area along with its feels, its smell, its sounds comprise these qualities. Such qualities constitute a perceptual resource, which is probably the most important ingredient that has gone into the establishment of the particular mood or spirit which characterizes each individual refuge. Descriptions of refuge experiences reflect the presence of these moods:

**Sabine National Wildlife Refuge in Southwest Louisiana:**
There is a mysterious and hidden life in an enormous marsh. Flat it may be, but the very sweep of it is like the sweep of a dark, marsh grass sea, surrounding one as far as the eye can reach so that anything that moves in the air can be seen. Such a sweep exerts a spell of its own, in which dimension and time are lost. (Murphy, 1968, p. 84)

Vanez Wilson, former Refuge manager at the Bear River Migratory Bird Refuge describes the feelings that the Refuge has transmitted to the photographers that visit Bear River annually:

Most of them have told me at one time or another how much they loved the place for its great sweep and feeling of tranquility, for the surrounding ridges seem to hold off the busy world and let the clear vitality of the Wild West possess it. (Murphy, 1968, p. 143)

The mood and spirit of each of our National Wildlife Refuges must be preserved if a quality recreation experience is to be a goal. The psychology of the area must not be sacrificed. This requires a maintenance of naturalness.

The importance of naturalness in refuge management was also stressed by the Advisory Committee on Wildlife management in the National Wildlife Refuge System. A major recommendation proposed by this committee follows:
In so far as possible, plans for the development and manage­
ment of individual refuges should include preservation or
restoration of natural ecosystems along with the primary
management objective. All native animals and plants should
benefit by the presence of a refuge unit. This in time will
add greatly to the recreational, educational, and scientific
value of the area. Naturalness in management is to be con­
sidered a virtue. (Leopold, et al., 1968)

Since recreation, interpretation, and refuge management policies are
all interrelated, philosophies adopted for each will have impacts upon
the others. However, the impact from an interpretive program which is
dependent upon the natural qualities of the land will complement present
and recommended refuge management policies.

Care to keep our refuges as natural as possible will also make the
job of interpretation easier. Refuges should be allowed to speak the
very message which alone will give it the chance. The land itself can
often speak a message far above our chatter. As former Secretary of the
Interior, Steward Udall, has stated:

I see a boy alone at dusk on Dundas Hill. He sees a V of
geese headed south, and he hears their haunting call. His
heart leaps up; where they come from, where they fly, he does
not know; nor can he tell you what he feels in the immensity
of a waning autumn day. (Udall, 1964, p. v)

No attempt should be made to interpret that which is only--or better--to
be apprehended by feeling. To the boy on Dundas, the sight, the sounds,
and the mystery of those migrating geese were an inspiration far beyond
that which any interpretive message could communicate. As suggested by
Freeman Tilden:

When the interpreter is dealing with aesthetics he will do
well to restrict himself to two offices; just, to create the
best possible vantage point from which the beauty may be
seen and comprehended; and second to do all that discreetly
may be done to establish a mood, or sympathetic atmosphere.

Whenever the major aspect of the thing is aesthetic, I would
have no oral or written interpretation that did more than
deftly create a feeling, and rather for the whole than for a
part. (Tilden, 1967, p. 85)
Unfortunately the land does not interpret itself to all. In such cases it is the job of the interpreter to reveal that beauty which does not readily appear to the senses. Americans have been conditioned to accept Nature's beauty as that which is the biggest, the oldest, the tallest, the smallest, or the only one of a particular natural object. The National Wildlife Refuge System cannot boast such unique attractions, therefore, interpretation in the System must reveal those less conspicuous forms of beauty - nature at work. Beauty, as defined by Plotinus, is all that symbolizes in a form perceptible to the senses, laws externally active (Tilden, 1967, p. 84). A statement by Dr. J. Alan Wagar provides an appropriate summary, "... through interpretation we can make each person's recreational experience more meaningful and can make major attractions out of what seems to be very ordinary places" (Mahaffey, 1969).

Quality must be the key for future recreation development in the National Wildlife Refuge System. Inspiration should be the goal. Quality and inspiration, dependent upon the natural features of the environment should provide direction. Limiting access may eventually be necessary to maintain the psychology of an area and to insure a quality experience. Naturalness must not be sacrificed. The value of our refuges will be lost if they are allowed to become mass play grounds. Aldo Leopold (1949) once said, "Recreational development is not a job of providing facilities and roads into lovely country, but of building receptivity into the still unlovely human mind."
LITERATURE CITED


Lewis, Ralph H. 1964. Interpretation in Museums. Park Practice Guideline--Interpretation. 1/64 17. Park Practice Program. 2 p.


APPENDIXES
Appendix A

Literature Pertinent to the Interpretive Resource of the Bear River Migratory Bird Refuge

History of Bear River Marsh

Box Elder Chapter Sons of Utah Pioneers. Box Elder Lore of the Nineteenth Century. Box Elder News and Journal, Brigham City, Utah. 169 p.


Ornithology and Marsh Ecology


Bear River Migratory Bird Refuge Interpretive Program


Appendix B

Literature Concerning Recent Interpretive Research, Innovations, and Philosophies


VITA

William Robert Burbridge

Candidate for the Degree of

Master of Science

Thesis: Development of an Interpretive Document for the Bear River Migratory Bird Refuge

Major Field: Outdoor Recreation

Biographical Information:


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