Nationalpark Schleswig-Holsteinisches Wattenmeer

One Idea – Many Approaches

Andreas Schubert 1990

Visiting Coastal and Marine Protected Areas in the USA, sponsored and organized by the German Marshall Fund – September and October 1989

ONE IDEA - MANY APPROACHES

Marine and Coastal Protected Areas in the United States

by

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Nationalpark
"Schleswig-Holsteinisches Wattenmeer"

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The exchange of environmentalists is a great idea. Reading about the environmental situation and the status of natural resources in other countries can only give you a basic idea. Actually going to this country and experiencing the problems and the approaches to their solutions is a totally different story. In fall 1989 the German Marshall Fund of the United States gave me the great opportunity to visit many protected areas along North American coasts, too talk to people running these areas and to talk to professional "conservationists" in various government and non-government organizations.

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Finally I´d like to say: It was great to be in America!

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I. Introduction

The protection of nature and natural resources is not a new idea. Already 300 B.C. forests in India were turned into reserves. Roman emperors established protected areas in Lebanese cedar forests. Some hundred years ago European aristocrats restricted public access to certain wooded areas.

Ruling classes wanted to protect shortening resources; they believed to be their exclusive property. In the age of industrialization nature was altered and destroyed with accelerating speed. As a response, naturalists pushed for protecting important plant and animal habitat. In 1872 the U.S. established the first national park in Yellowstone "for the enjoyment and benefit of the people". 50 years later every continent could be proud of similar parks. Today more than 3500 protected areas with over 400 million hectares exist on our planet (Durell, IUCN 1986).

The first parks´ mission was mainly focused on keeping scenery and natural beauty unimpaired, while today the major goal of establishing a protected area is the conservation of resources. According to the World Conservation Strategy (IUCN 1980) conservation is defined as the management of the biosphere (the thin covering of the planet that contains and sustains life) to the benefit of present and future generations - a task only to be met by conserving living resources on land and in the area. The major objectives of the World Conservation Strategy are:

- to maintain ecological processes and life support systems,
- to preserve biological (genetic) diversity,
- to ensure the sustainable use of species and ecosystems.

For a long time only terrestrial habitats were put under legal protection. However, in recent years the world became aware of the importance of coastal and marine area. High nutrient influx rates promote high productivity in coastal wetlands. Various invertebrates in the sheltered soft bottoms are a vital food source for birds and fishes. The majority of the world´s fish species have their hatching grounds in these wetlands. Migratory birds use them as stopover sites. Intact coastal and marine ecosystems have also great importance as a human food source (fisheries) and for recreational activities worldwide many biologically significant areas along the coasts and off-shore are threatened

- by industrial and residential development,
- by eutrophication and contamination of water, soil and organisms,
- by drainage and conversion for agricultural purposes,
- by over-exploitation of living resources (e.g. fishing),
- by off-shore mineral exploitation and waste disposal.

With the rising awareness of these problems more and more coastal and marine areas are put under legal protection in order to manage their resources in a sustainable way.

In 1985 two national parks were established in the German part of the Wadden Sea, a very important and diverse coastal ecosystem along the southeastern edge of the North Sea. Apart from the high Alps the Wadden Sea is the only large area in central Europe still mainly in its natural state. It belongs to the most reproductive ecosystems in the world (in terms of biomass production). The northernmost of the two national parks "Schleswig-Holsteinisches Wattenmeer" covers 280 000 ha of tidal streams and gullies, intertidal mud and sand flats, salt marshes, sand banks and small islands. It provides breeding grounds for a great number of birds, some of them belonging to highly endangered species. In springtime and fall up to 1.3 million migratory birds can be counted at a time within the national park. Intertidal sandbanks are very important haul-out places for several Harbor Seals.

Apart from its ecological importance the Wadden Sea has been for many centuries the home and the important source of the means of living of the local population, dwelling the islands and the adjoining mainland. The most common uses are sheep grazing on the salt marshes, commercial shrimp and mussel fishing on sub- and intertidal areas and shipping activities.

Since over a hundred years tourism plays an increasing role in the Wadden Sea. Formerly being restricted to bathing and sunbathing as well as hiking the emerged tidal flats, tourist activities nowadays include cruising with pleasure boats and windsurfing. Most of the coastal areas along the Wadden Sea are below sea level, so measures of coastal protection are of vital importance for the inhabitants of these areas. However, dike construction, jetties and drainage of salt marshes have considerably altered many parts of the Wadden Sea.

According to the enacting park legislation, a state law passed by the Schleswig-Holstein parliament, unreasonable impairment upon the interests and the customary practices of the local population shall be avoided. The regulations of the national park take these aspects into consideration, restricting the use and exploitation of areas only where this is essential for the preservation of nature, and even then to a varying degree. This implies that both, protective aims and users interests have to be considered in park policies and compromises have to be found.

Since the Wadden Sea national parks are very young, the elaboration of management strategies is still in an early stage. In Germany no federally organized National Park Service exists. The parks are by state governments, each park is more or less doing its own thing. For this reason an exchange of ideas and methods on different national park issues not only is helpful but is indispensable to ensure an adequate management.

In fall 1989 I crossed the Atlantic Ocean to learn how coastal and marine protected areas are managed in the United States. On a six weeks stay I visited various parks, refuges and .sanctuaries throughout the US. On my two weekly stay in Washington, D.C. I had a chance to talk to many experts in the headquarters of agencies running these protected areas and the main off ices of non-government environmental and nature conservation organizations. Institutions visited are listed below:

- Washington. D.C.: federal agencies: National Park Service (NPS), National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA), Non-government organizations: Nature Conservancy, Wilderness Society, Sierra Club, Coast Alliance
- Cape Cod: National Seashore
- Gateway: National Recreation Area, Littoral Society, Clean Oceans Action (New York, New Jersey),
- Denver: Denver Service Center and Rocky Mountain Regional Office (NPS), Rocky Mountain National Park (unofficial),
- San Francisco Area: Western Regional Office, Golden Gate Recreation Area, Point Reyes National Seashore, Tamales Bay State Park, Point Reyes Bird Observatory, Gulf of the Farallones National Marine Sanctuary,
- Davis, Cal.: University of California, Cooperative Park Study Unit (CPSU),
- Channel Islands: National Park and Marine Sanctuary,
- South Florida: Everglades National Park, Big Cypress National Preserve, Biscayne National Park, John Pennekamps State Park, Key Largo National Marine Sanctuary.

In Germany there are basically two levels of agencies running protected areas: The state governments are in charge of the national parks and the county administrations are running the protected landscapes (Naturschutzgebiete, Landschaftsschutzgebiete, Naturparke). The federal government of Germany is only indirectly involved in protected area issues (funding, etc.)

In the United States there is a broad variety of agencies managing protected areas, as will be shown in the following chapters. In all these agencies appears a main IDEA (goal) behind their MANY APPROACHES: the conservation of nature and natural resources to the benefit of present and future generations.

The present report is mainly written for planners and managers within German parks, especially in the Wadden Sea area and representatives of non-government organizations dealing with protected area issues.

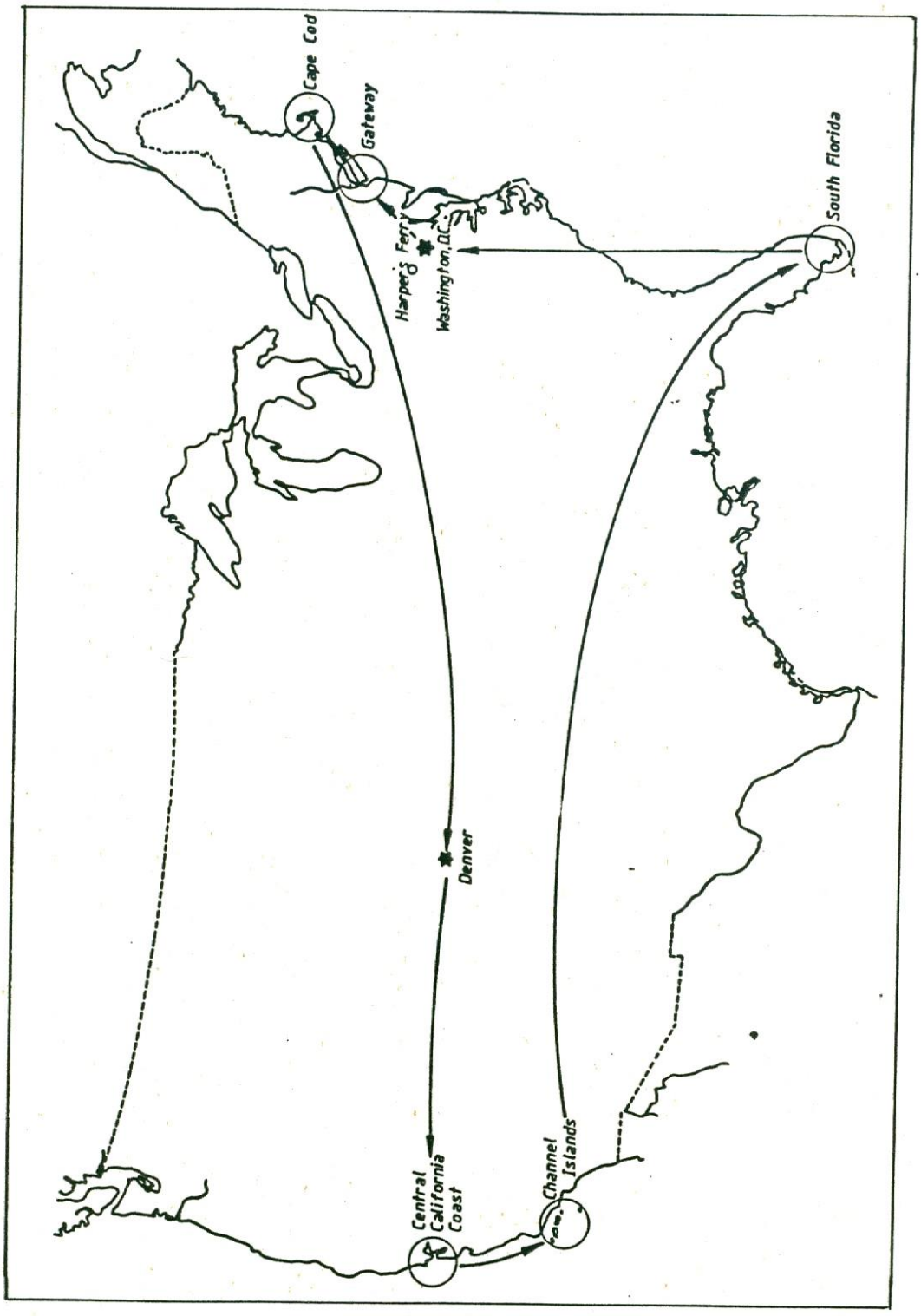


Fig 1: Itinerary of the six weeks fellowship travels

2 Protected Areas in the United States - a field guide to public land management agencies

Realizing that the maintenance and development of human habitat requires areas retaining in a rather natural state, Congress (the parliament of the United States) and the U.S. government set aside ecologically and geomorphologically important sites to protect their resources from over exploitation. Almost everybody in Germany has heard of the national parks, especially from places like Yellowstone, Grand Canyon and Everglades. However, beside these glamorous parks many other protected areas exist in the U. S., supervised by very different federal, state and even private organizations. Fig.2 gives an overview of these organizations and the protected areas they run.

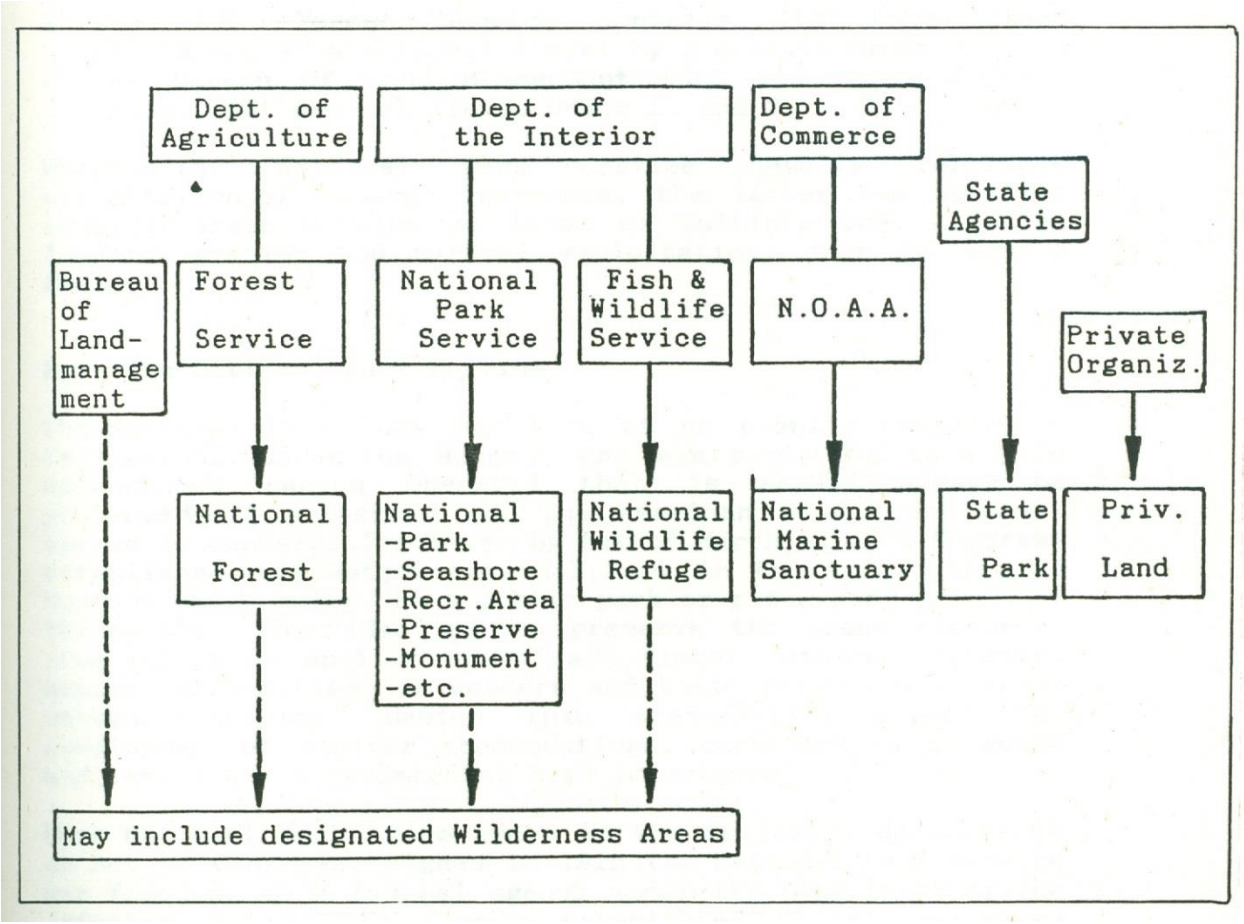


Fig. 2: Federal, state and private agencies and protected areas under their supervision

2.1 Historical background

In 1776 the 13 British colonies along the Atlantic coast become independent and joined to form the United of America. Within the next decades the land west of these original states was settled, new states were formed and added to the Union. In the early 1800s the U.S. government purchased the Missisippi-Missoury and Midwestern regions from France. Later on, all the new land west of the Mississippi as well as Alaska became federally owned land. Even though vast areas were sold or given away to settlers, most of this land still is in federal ownership.

Today three agencies supervise the majority of the federal lands:

1. National Park Service runs all areas belonging to the National Park System
2. U.S. Forest Service controls all forest land proclaimed as a National Forest by Executive Order
3. Bureau of Land Management runs all other federal lands, that are not listed under 1. and 2.

Whereas the National Park Service heavily restricts exploitation of natural resources, the latter two agencies consider their domains as lands of multiple use, allowing logging, grazing and mineral exploitation, just to name a few.

2.2 The National Park Service

The National Park idea was born at an evening campfire in Yellowstone. Cornelius Hedges, who was exploring this wild and unknown region observed that is should always be protected and preserved for the American people and never opened to commercialization. By Act of March 1, 1872 Congress established Yellowstone National Park in the territories of Montana and Wyoming "as a public park or pleasuring ground of the people". The idea was to preserve the areas resources from injury or spoliation, of all timber, mineral deposits, natural curiosities, or wonders and their retention in their natural condition. Beside this preservation aspect the development of visitor accommodations, construction of roads and trails was considered of high importance.

More national parks were added in the following decades. In an Act of Congress, signed in 1916 the National Par k Service was founded, as a federal agency under the Department of the Interior, to run the already established 17 national parks and 22 monuments.

An Executive Order in 1933 transferred 63 national monuments and military sites from the Forest Service and the War Department to the National Park Service. So today's national system of parks includes areas of historical as well as of scenic and scenic and scientific importance. Except for National Monuments, which can be proclaimed by Executive Order (by U.S. President), additions to the park system are in general made by Act of Congress. The Secretary of the Interior is generally asked by Congress for his recommendations on proposed additions to the system. The Secretary is counseled by the National Park Service Advisory Board, composed of private citizens, which advises him on possible additions and policies on its management.

Nomenclature

The National Park Service knows more than 20 different titles to name their protected areas. Here the titles of park-units that mainly protect natural resources shall be listed (Source: The National Parks, NPS index 1987):

National parks are relatively large areas where one or several ecosystems are not significantly altered by human exploitation and occupation, where geomorphological and biological conditions are of special scientific, educative and recreative interest or the landscape of great beauty.
Though visitors are allowed in almost any part of a national park, their activities are restricted to those having little or no impact on the natural resources.

National monuments are intended to preserve at least one nationally important resource, which because of uniqueness, should be protected. In the U.S. National monuments can include almost anything from the man-made Statue of Liberty in New York City to the 827 000 ha large Death Valley in the California Desert. National monuments are established by Executive Order.

National Sea- and Lakeshores focus on the preservation of natural features along the U.S. coast and Great Lakes. Public shoreline recreation ia provided and even promoted.

National Recreation Areas were mainly established in areas altered by man s activities, though still being important habitat and having great value for recreation. Most of these recreation areas are situated around reservoirs or in the vicinity of urban centers.

In **National Preserves** many activities that might have a considerable impact on nature are permitted, usually due to pre-existing rights. Mineral extraction, hunting and off-road vehicle use are some of these activities. However, the preserve administration has to make sure that natural values are not jeopardized.

In 1987 the U.S. Park system included 341 units with 32 215 000 ha, equaling 3.4% of the US land surface.

	number	Size (ha)
National Parks	49	18.997.000
National Monuments	77	1.887.000
National Sea/lakeshores	14	341.000
National Recreation Areas	17	1.475.000
National Preserves	12	8.784.000
others (historical etc.)	172	731.000
TOTAL	**341**	**32.215.000**

Wilderness Areas

In the Wilderness Act of 1964 Congress created a tool to effectively protect the pristine, unspoiled areas throughout the U.S. New wilderness areas can be designated (by Act of Congress) on any unimpaired federally owned land, no matter if it is controlled by the National Park Service, the Forest Service or the Bureau of Land Management. Unimpaired means, no commercial enterprises like logging, mining, construction of permanent structures (like roads, dams, power lines, etc.) have altered the pristine character. Once designated as Wilderness Area no use of mechanized vehicles including bicycles-, of any motorized equipment, motor boats, no aircraft landing and no construction of permanent structures and installations is allowed. Wilderness areas are open to hiking, in some cases horseback riding, primitive camping and similar pursuits. Human is but a visitor who leaves nothing behind and who only brings home memories after visiting. Designation as Wilderness Area is the highest possible level of protection in the United States. The National Park Service is required by law to conduct a Wilderness Study for all are as of 2000 ha or more without roads on park lands, to testify if they meet the Wilderness Act.

Organization of the National Park Service

The Park Service is organized on three levels. The headquarters are situated in Washington, DC with some offices in Denver, Colorado (Denver Service Center, Geographic Information System GIS, Statistical Office, etc.) and in Harpers Ferry, West Virginia (Interpretation). On the middle level 10 regional centers service the different regions. The 341 park units are either run independently or are combined under one superintendent (park director). The superintendent of the Everglades National Park also takes care of Big Cypress National Preserve and Fort Jefferson National Monument, for example.

The Washington Office, Harpers Ferry Center and Denver Service Center

The Washington Office. The park service headquarters in Washington D. C. is the link between Congress and Government on one side and the park employees working in the regional offices and in the park units on the other side. Here policy guidelines are worked out. The management of natural and cultural resources, visitor services, interpretation, planning and development, budget and administration are supervised. Figure 3 gives an overview on the branches within the Washington office. Some of the divisions are located in Denver (Air Quality, Geographic Information Systems, Planning and Design).

The Division of Wildlife and Vegetation in the natural resources branch (fig. 3) formulates and revises national policies and guidelines relating to the management of natural resources in national park units. It also manages several natural resource programs at the national level including:

- Management of endangered species on park land - together with Fish and Wildlife Service
- Integrated pest management
- Management of alien (introduced) animal and plant species
- Consumptive uses like hunting and fishing
- UNESCO Man and the Biosphere Program (MaB) in the U.S.
- Public Relations work concerning issues of national significance (e.g. reintroduction of wolves in the greater Yellowstone area)

Endangered Species. Park lands are very important sanctuaries for threatened and endangered plants and animals, since they offer habitat that might be lost already in surrounding areas. However these species can also be jeopardized within parks. In Big Cypress National Preserve panthers were killed in car accidents, in many coastal parks nesting piping plovers are disturbed by sunbathers, in southern Florida parks manatees are killed or wounded by motor boat propellers.

Plans for management and protection of endangered species on park lands are worked and carried out in cooperation with the U.S. Fish and Wildlife Service.

Integrated pest management. Many natural areas in the United States suffer from pests. Pests are microorganisms, introduced plants or animals significantly threatening native ecosystems. Forest lands throughout the U. S. are heavily impacted by the Gipsy Moth, introduced by a scientist in the early 1900s. In Florida freshwater are invaded by tree species introduced to dry up swamps. On the Channel Islands off California goats, pigs and rabbits cause nightmares to park managers. To preserve or restore natural areas, pests have to be fought either with biological methods or with pesticides. To make sure that always the least harmful but most efficient method is used, any pest control actions have to be approved by the Washington headquarters.

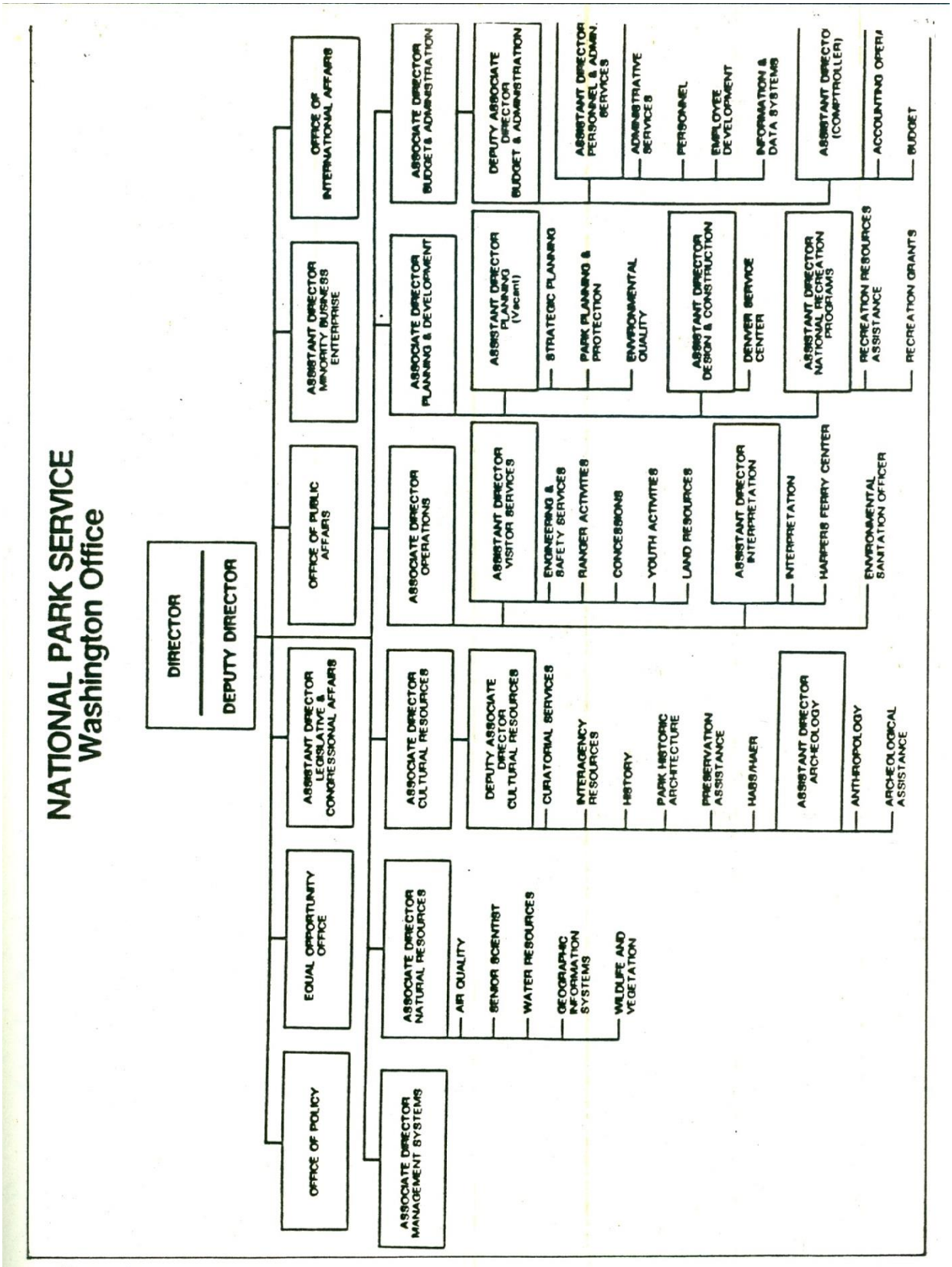


Fig. 3: Structure of the National Park Service at its Washington office

Consumptive uses. Fishing and hunting on park land is regulated in the enabling legislation of each park unit. To minimize adverse impacts on natural resources, consumptive practices have to be reviewed by park staff.

Center of Interpretation at Harpers Ferry

In Harpers ferry / West Virginia, 1 ½ hours' drive from Washington D. C. the Interpretive Design Center is located. Here the interpretation of all national park units is planned and produced. The center is equipped with film studios, workshops where entire visitor centers, nature trails with wayside, books and brochures are designed and produced. Very skilled film producers, sound engineers, writers, graphic designers, mapmakers and so on work in Harpers Ferry. Whenever a new national park is installed or an older park needs an updating of interpretation media, these experts together with interpretive staff members from the regional office and the unit concerned, plan which media will be used and work out a way to tell the park's individual story. Most media, such as folders, wayside exhibits, indoor exhibits etc. are standardized. Having the producers of most interpretive media in one location makes the National Park Service very effective at interpreting a parks specialty.

The Denver Service Center

In Denver the planning, design and construction Center of the entire National Park Service is located. Whenever a new area is considered for inclusion into the National Park System, when an existing park needs a General Management Plan, when new infrastructure within a park needs to be designed and constructed, experts from Denver are involved in the process.

All the planning is done by Denver in-house staff, design services are provided through in-house staff or by contracting with architectural and engineering firms. Construction is provided through private firms, though supervision of construct ion is provided by the Center. The planning process will be explained in more detail later on.

The Regional Offices

To run the National Park Service more effectively in a vast country like the United States, the country is divided into 10 regions, each with a Regional Office:

Alaska	Anchorage
Pacific Northwest	Seattle
Western	San Francisco
Rocky Mountains	Denver
Southwest	Santa Fe
Midwest	Omaha
Southeast	Atlanta
Mid-Atlantic	Philadelphia
North-Atlantic	Boston
National Capital	Washington, D.C.

The Regional Offices have basically the same divisions as in the Washington Office: Natural and cultural resources, visitor services and protection, interpretation, budget and administration.

National Park Units

- Every National Park Unit has a superintendent. The staff is basically composed of four divisions:
- Chief of maintenance is responsible for attendance of all structures in the park, like roads, trails, buildings, machinery, etc.
- Chief Ranger, supervises visitor protection (police, law enforcement) and resource management
- Chief of Interpretation is responsible for visitor – information and education
- Administrative officer takes care of personal, supply, budget, etc.

The chief ranger is the head of law enforcement rangers and resources management specialists. Since national park units are on federally owned land, in general violations of the law have to be prosecuted by a federal officer, in this case a park ranger, no matter if a flower was picked or somebody was killed. Therefore many rangers are trained like police officers and carry guns while on duty. Resource management rangers are responsible for the adequate protection of the natural resources. With the help of researchers they find out where resources are threatened and coordinate actions to reduce threats. In general resource managers have a scientific background (biology, ecology, geology etc. They are assisted by law enforcement rangers: signing and fencing nesting sites, monitoring activities, pest control, and fire management.

The national parks in the Waddensea leave the costly branches of maintenance and law enforcement to other agencies like the Office for Land and Water Management (ALW, local police authorities and honorary nature wardens.

In general park units do not have a Research branch. Scientific research has been mostly organized through so called Cooperative Park Study Units CPSU), based at universities. This enables scientists to do practical research in different park units and still have all conveniences a university can offer, like libraries, computers, and exchange of knowledge with experts. These cooperative units are under the regional offices. More recently, in some parks which cover very large and complex ecosystems like Yellowstone and Everglades research centers within the park have been established to provide the parks resource management with data needed for their work.

Sources: NPS 1988: Management Policies

2.3 Fish and Wildlife Service

The Fish and Wildlife Service is the sister organization of the National Park Service, also placed under the Department of the Interior. It was founded in 1940 uniting the "Biological Survey" and the "Bureau of Fisheries". In general issues dealing with commercial and recreational fishing and game hunting including monitoring of animal stocks are under State control (Fish and Game). The federal agency "Fish and Wildlife Service" is responsible for:

- Endangered species; enforcing the endangered species act - Enforcing CITES (e.g. control of import and export of animals and animal products) requiring adequate habitat for endangered species (e.g. Wildlife Refuges)
- Migratory birds: enforcing the Migratory Bird Conservation Act
- Restoration of depleted fisheries
- Management of wildlife on all federal lands.

National Wildlife Refuges

In the early 1900s much of the once common wildlife was facing serious threats from loss of habitat and excessive hunting. Wading birds, waterfowl and big game had suffered particularly' severe losses. Some species were reduced to remnants of their former populations. In 1903 the first National Wildlife Refuge was set aside, to combat wildlife losses on Pelican Island in Florida. Many others followed.

Today the National Wildlife Refuge System includes 436 units with a total of 36 million ha, all run by the U.S. Fish and Wildlife Service. The original purpose of the Refuges was the closing of

areas to all hunting and trapping. Throughout the decades this purpose was modified and today recreational hunting is a primary use within the refuge system. Other uses can be farming, grazing, logging, oil and gas development and recreational activities, for example off-road vehicle use. These activities will be allowed whenever the Secretary of the Interior finds them compatible with particular refuge´s original purpose.

Source: FWS 1984: Fish, Wildlife and People

2.4. National Oceanic and Atmospheric Administration (NOAA)

Unlike the U.S. Forest Service and the National Park Service N.O.A.A. is a relatively new agency, established under President Nixon to consolidate ocean and atmospheric management. NOAA is now the main civilian ocean affairs agency, though many sea-related activities still pervade a large number of other departments in the federal government. EPA (Environmental Protection Agency), National Park Service, Fish and Wildlife Service and others also have programs relating to ocean and seashore protection. NOAA and EPA have similar Estuary Protection Programs. NOAA is also involved in enforcing ocean fishing and shipping regulations. The protection of all marine mammals and all endangered sea living species enforced by NOAA, as long they are located in the sea. Once they haul out above mean high tide level, U.S. Fish and Wildlife Service is responsible for them. The United States is one among 72 nations that have declared an Exclusive Economic Zone extending 200 nautical miles from their shores according to the United Nation Convention on the law of the Sea (UNCLOs). Within this zone the U.S. have sovereign rights to fish, exploit minerals etc. However these waters are not U.S. territory in terms of shipping or anchoring here.

National Marine Sanctuaries

In the late 1960s offshore oil development had quickened after OPEC oil embargo, Oil spills like other the 1969 blowout on a drilling rig in the Santa Barbara Channel (California) .arid various tanker collisions around the world made U.S. citizens very concerned about the ocean´s future. So did the increasing pollution with solid waste and toxic runoff. In 1972 Congress passed the Marine Sanctuaries Act to preserve ocean areas and resources from such threats. Under the law the Secretary of Commerce may designate ocean and coastal waters as Marine Sanctuaries.

In 1983 NOAA published a list of potential sanctuaries compiled by evaluation teams, based on criteria established by NOAA:

- natural resource values (representation of species and communities, biotic character)
- human use values (fishery, recreation, research, cultural importance, etc.)
- potential activity impacts management concerns (accessibility, economic considerations, etc.)

One key objective is that the selected sites are representative of each region of U.S. coastal waters: North and South Atlantic, Caribbean, Gulf of Mexico, Eastern and Western Pacific, Great Lakes. Marine sanctuaries can protect coral reefs, submerged banks, marine mammals, seabirds, fishes, invertebrates and even historical resources like a civil war ship wreck. Protecting regulations within sanctuaries are:

- oil and gas development and exploration is prohibited in general (exception: some marginal leases in Channel Islands NMS)
- discharges are prohibited except for biodegradable materials like fish wastes
- alteration of, or construction on the seabed is not allowed except for maricultures, navigational devices, etc.)
- removal or damaging of cultural of natural resources is strictly forbidden

The designation as a marine sanctuary does not interfere with shipping regulations, (except for anchoring in fragile areas like coral reefs) and with fishing regulations.

Today seven marine sanctuaries already exist. Another 29 are proposed on the Site Evaluation List (SEL). NOAA is required, to select "Active Candidates" from the SEL, work out a draft management plan (including proposed regulations) and present it to the public. After public and congressional review the new Sanctuary can be designated by the Secretary of Commerce.

Marine sanctuaries are somewhat different from terrestrial protected areas. Except for the edge of the land, boundaries are not defined by fences or landmarks. The water of a protected area is shifting constantly, so organisms in a marine reserve are affected by influences from outside:

dredging, oil exploration, sediment runoff from erosion, toxic materials and sewage. Monitoring is complicated by the three-dimensional nature of the sea. Law enforcement on the seas and interpretation and education activities are more complicated than on land. Some sanctuaries are well outside of the territorial three mile zone and under exclusive federal jurisdiction (e. g. Key Largo NMS). Others reach to mean high tide level and therefore overlap with state territory or with areas run by other agencies (e.g. Farallones and Channel Islands NMS). In the latter cases overlap of responsibilities occurs, planning or enforcement of regulations can be difficult.

Sources: Oceanus 1988: U.S. Marine Sanctuaries. NOAA 1987: Gulf of the Farallones NMS management plan

2.5 Agencies on the State level

The various states have Fish and Game Services corresponding to the Fish and Wildlife Service on the federal level. Fish and Game deals with the management of consumptive species in terrestrial and water ecosystems, including fisheries within the three mile offshore zone. In general federal agencies like the National Park Service and NOAA have to work together with state agencies managing fish and game stocks when their protected areas include territorial state lands or waters.

State Parks

Like the federal National Park Service, each state has a State Park System. Over half of the state park systems are divisions in environmental "super agencies"; others are managed by smaller departments of "parks and recreation" or even by commissions. State park systems often include recreation areas, museums, gardens" and preserves beside actual state parks. Some states like California or Florida can have more than 100 park units. Most units cover rather small areas, others like the Anza Borrego Desert State Park in southern California can be very large. Tamales Bay State Park near Point Reyes, Cal. covers only 800 ha. The approximately 2 million visitors a year are serviced by one park ranger and two maintenance employees.

In 1985 state parks in the U.S. covered about 4,000,000 ha, equaling about 0.4% of the nation´s land surface. The number of state parks at the same time was about 4,500 with an average size of 900 ha. A unit within the National Park System must possess nationally significant natural, cultural or recreational resources. In general this seems to 'be less import for units of' state par k systems. Only few states specify that protected resources should be unusual, outstanding or the most significant.

Source: Myers, P. & S. Green, State Parks in a new era, Vol. I. & III.

2.6 Non-Government Organizations (NGOs)

In the following privately run non-profit organizations, land trusts, conservation groups etc. working on environmental and nature protection issues are referred to as non-government organizations (NGOs). Private organizations cover a broad range of activities, which will be discussed later on.

Private Nature Reserves

Some NGOs like the Nature Conservancy, the National Audubon Society and the Trust for Public Land, buy land to prevent it from being sold to developers. After purchase this land is often run as a nature reserve by its owner. Using its chief tool, the checkbook, the Nature Conservancy has built the largest private sanctuary system in the world. The Conservancy manages more than 1000 nature reserves, covering a total area of 1.4 million ha equaling about 0.15% of U.S. land surface. Lately this organization is expanding south, buying land in Central and South America to protect rain forest ecosystems. The key objective of land purchasing is the preservation of biodiversity: providing habitat for endangered species, preserving leftover fragments of landscape (e.g. prairies), etc. Often land in the vicinity of existing protected areas is bought to develop large reserves or cluster of reserves that include more diverse habitat and can easier buffer changes (e.g. climate). A special method used by the Nature Conservancy to fight development and habitat destruction is to buy land resell it with conservation restrictions. Often land is also traded with or sold to state or federal agencies or developed in a more restricted way than would have been otherwise. A showpiece of the Conservancy is the Virginia Coast Reserve, a designated MaB biosphere reserve including 13 barrier islands along the Virginia coast.

Sources: National Geographic Dec. 1988, Nature Conservancy Magazine 1989

2.7 Biosphere Reserves

In 1971 the United Nations Educational, Scientific, and Cultural Organization (UNESCO) started the Man and the Biosphere Program (MaB). Park of this program is nomination of so called Biosphere Reserves to conserve examples of characteristic ecosystems of the world's natural regions. In 1987 a total of 269 reserves in 70 countries existed, covering nearly 1.4 million sq. km. In the U.S. there are 44 reserves, most of them including park service land, but also wildlife refuges, national forests and privately owned land.

The main objective of biosphere reserves is to protect natural resources while still allowing and promoting sustainable land use. To achieve this purpose, a zoning is necessary. One or more core zones, with high diversity, with centers of endemism or habitat for higher order predators, shall be excluded from human utilization. In the surrounding buffer zone uses are possible and in the outer transitional zone they are desired, as long as they are traditional and sustainable.

Biosphere reserves require research to monitor natural and human-caused changes and so improve the management of natural resources. The third premise of MaB is education and public involvement. Only when the public is able to understand the need for protection of resources and is involved in this protection, can management be successful. This applies especially to local inhabitants.

Many MaB reserves are just national parks or nature reserves, on which the label "biosphere reserve" had been attached, with little attempt to integrate the different biosphere reserve functions or to link up the sites into a network through the exchange of information and personnel. For example, the Everglades National Park is a reserve since 1976. It only includes the park itself and Fort Jefferson NM. Only recreational uses are allowed in this park. No buffer or transition zones exist. Urban and suburban residences or heavily used agricultural areas (irrigation, pesticides) are right next to the park. Newer ones like the Central California Coast Biosphere Reserve (see 4.2) are trying much harder to translate the MaB idea into action.

Source: UNESCO 1984: Action plan for biosphere reserves; 1987: A Practical guide to MaB

The Dutch part of the Wadden Sea has been designated as a biosphere reserve in 1986. Possibilities for the designation of the German (e.g. Schleswig-Holstein) part will be discussed further ahead.

3. Mechanisms to develop park policies

The whole National Park System is standing on three pillars: research division, resource management and interpretation. Fig. 4 explains in a simplified mode L: how these pillars are connected in which ways information and decisions go. The "scientific community" supplies the research division with date on natural resources: their status, trends, and impacts. The research division collects and analyses this date and passes the information to the resource management and interpretation divisions. Interpreters use the information in telling the park´s story. Resource management requires reliable information to protect the resources in an adequate manner. For example, if an important resource is decreasing for certain reasons, the management division can work out plans to do something, about it. Very often the protection of a resource requires restrictions. Now the information on these restrictions is passed on to the interpretation division. Interpreters have to explain to the public that these are and why there are restrictions. Management decisions, especially concerning restrictions, are considerably influenced by politics, as will be shown later. So far this system is basically the same in the United States and in Germany. The main difference though is that every park unit in the U.S. has to supply the public with plans or statements on the management of the park and its resources. The 'public is involved in the planning process. It can review comment on these plans as will be explained later.

3.1 Planning and Resource Management in the National Park System

New Area Studies. As mentioned above, the Secretary of the Interior and the National Park Service Advisory Board recommend new areas to be included into the par k system. Very often local “grass rout" groups, interested people or politicians have been pushing the subject. The field studies to determine if an area is nationally significant and if it is suitable and feasible to include it, is carried out by the park service itself. These studies include suggestions on management strategies. After the process of public review Congress can pass the enacting legislation.

The General Management Plan. Every national park unit is required by law to have a General Management Plan (GMP) explaining the park strategies for the next 10 to 15 years. In the absence of a completed plan a Statement for Management provides the necessary guidance for day to day park operating decisions. General Management Plans are worked out by a team of planning and management experts from the park unit, the regional office and the Denver Service Center in a joint operation. The planning team works out a GMP draft that needs to be reviewed by the public. The draft includes a range of management alternatives, from allowing

harmful visitor uses with little restrictions through a no action alternative to strict regulations. For every alternative an environmental impact statement (EIS) has to be presented.

Potential environmental effects, resource protection, visitor safety, visitor use and enjoyment of park resources, interests of par k associated communities and groups, short-and long-term cost-effectiveness will be important considerations in the selection of proposed actions. Every citizen of the United States has the right to review the GMP-draft and to comment on it. Several public hearings are held before the draft is finally approved by the regional director.

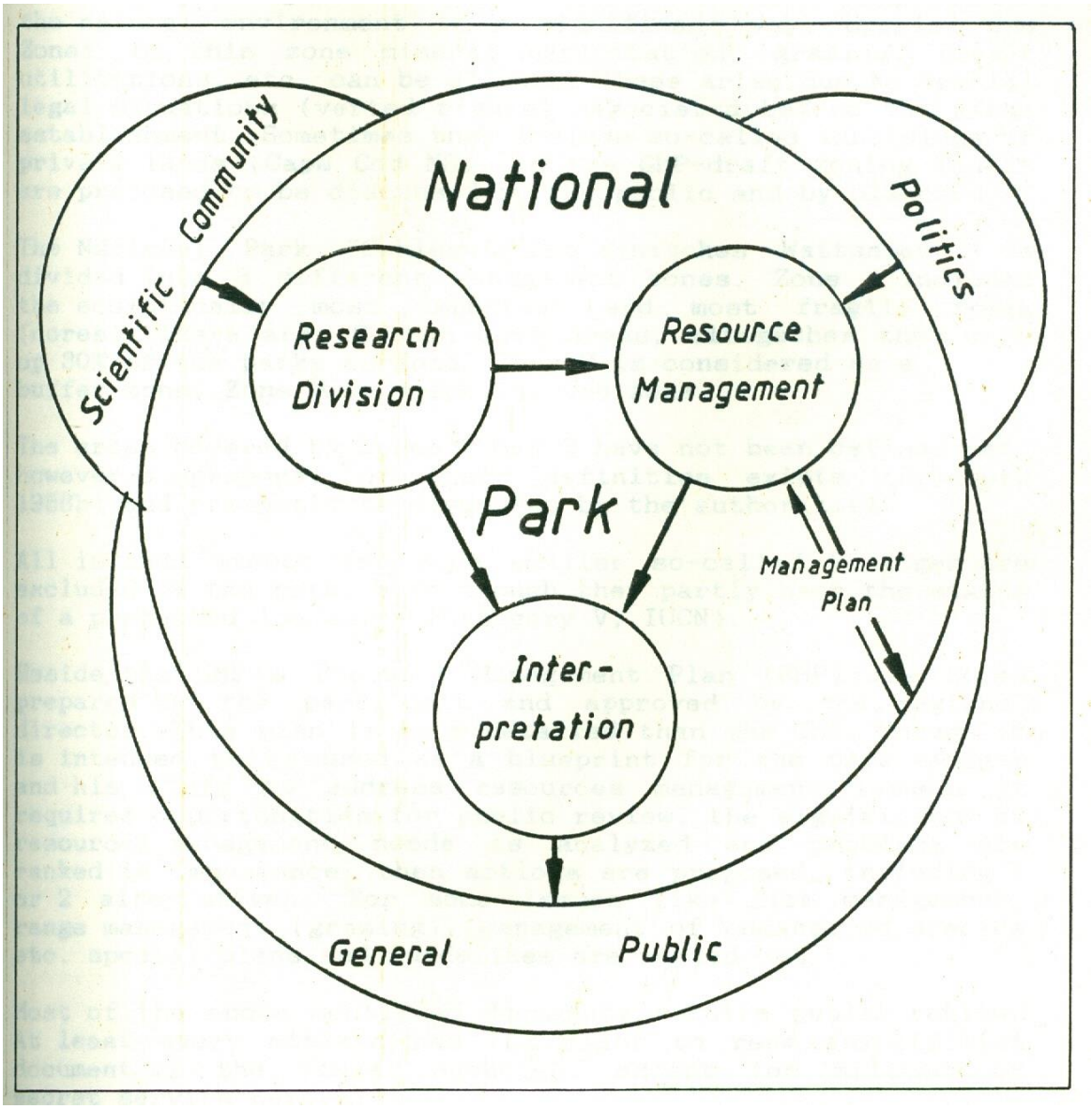


Fig. 4: Model of the National Park System: Flows of information and decisions

Management Zoning. According to the distribution of natural and cultural resources and the visitor activities within the par k zoning is necessary to best fulfill objectives and achieve the purpose of the park. U.S. parks have 4 different management zones.

Natural Zone: Main objective is to conserve natural resources and maintain ecological processes. Visitor use shall have no adverse effect on the resources. The **Cultural Zone** is managed for preservation, protection an interpretation of cultural resources. The **Park Development Zone** includes facilities like building, parking lots and other structures that might alter the natural environment in a significant way. **Special Use Zone**: In this zone mineral exploitation, grazing, forest utilizations, etc. can be allowed. These arise due to special legal situations (verted rights), negotiated before the park´s establishment. Sometimes they include so-called inholdings of private lands (Cape Cod NS). In the GMP-draft zoning models are proposed to be discussed by the public and by planners.

The National Park "Schleswig-Holsteinisches Wattenmeer" is divided into 3 different management zones. Zone 1 includes the ecologically most important and most fragile areas (cores). There are 16 such core areas, all together they make up 30% of the parks surface. Zone 2 is considered as a buffer zone, Zone 3 as a special use zone.

The areas covered by zones 2 and 3 have not been defined yet, however a proposal of their definition exists (Schubert 1988b) and presently is discussed by the authorities. All islands except for some smaller so-called Halligen are excluded of the park, even though they partly have the status of a protected landscape (Category V, IUCN).

Beside the GMP a Resource Management Plan (RMP) has to be prepared by the park unit and approved by the regional director. This plan is more detailed than the GMP. Though it is intended to be used as a blueprint for the park manager and his staff to address resources management issues, it requires opportunities for public review, the significance of resources management needs is analyzed and problems are ranked in importance, then actions are proposed, including 1 or 2 alternatives. For some issues like fire management, range management (grazing), management of endangered species etc. special plans and guidelines are worked out.

Most of the above mentioned documents require public review. At least every citizen has the right to read any official document of the fiscal agencies, except for military or secret service papers.

For the park in "Schleswig-Holstein" no general management document has been elaborated yet. However, any long term-planning document needs to be discussed and approved by the boards of trustees representing the people of the two counties adjacent to the national park.

Source: NPS 1988: Management Policies, NPS 1989 RMP guidelines

3.2 The role of Non-governmental Organizations (NGO)

Within the existing system of protected areas, all the legislation protecting wildlife and vegetation (e.g. endangered species) results from more than a hundred years of hard work by environmentalists and conservationists within governmental agencies and not less important in non-governmental organizations. The idea to establish protected areas can be very controversial. In some c e.ae a real estate brokers and developers might lose the possibility to earn a lot of money. Recreational activities like off-road driving or hunting might be restricted. Oil and gas development might become impossible. Often very wealthy and powerful people or organizations are affected by a new or by-management regulations of an existing protected area. Concessioners, running hotels, marinas or tour-boat services within such an area might want to expand their enterprise -possibly causing an impact on natural resources. All these persons or organizations have their ways to push their interests, mainly through lobbying their congressman. Unlike in Germany members of parliament directly represent their electoral district. They are only responsible to the people that voted for them (or pushed their election campaign) and little to the party they belong to. This system means that the politicians elected or running for Congress are easily influenced. If there were no counterbalance to the lobbyists mentioned above, much more important land would be lost today and many more species extinct.

To play the role of this counterbalance is the purpose of the non-governmental organizations. If they want to be effective they need money: a lot of money. Some of the bigger NGOs have very large budgets. A few have own office buildings in Washington and networks or local offices throughout the entire country. They hire very well educated professionals and so have accumulated a lot of expertise in various fields:
Environmental lobbyists attempt to influence congressmen or government officials on various issues related to a better protection of environment and natural resources. Lawyers work on legal issues, like adequate application of environmental laws. In 1984, for example, the park service in Cape Cod was successfully sued by conservationist to restrict off-road vehicle use in the dunes. The public relations division of NGOs informs (campaign) the public on threats to resources.

So, public pressure on government agencies builds up, often forcing them to find better solutions. Research scientists are actually doing the field work, finding out, where and in which way resources are impacted and they 'also work on plans for solving problems. Only some very big NGOs like the Wilderness Society combine all four fields of expertise.

Most other groups mainly focus on one or two fields. To be more effective organizations join to form an umbrella organization like the Clean Ocean Action with more than 100 member groups and individuals. The Clean Ocean Action itself is a member of the Coast Alliance, another umbrella group. These organizations work on several issues concerning pollution of the oceans and coastal wetlands, near shore development, etc. By joining, also smaller organizations are able to put pressure on the nation´s politicians.

3.3 Governmental Agencies: the punching ball between controversial interests?

As shown above governmental agencies often have to cope with controversial interests. In the given political system they are supposed to be more or less neutral. Fig. 5 explains possible ways to influence park policies in order to push one l e own interest: A park unit concessioner wants to enlarge his marina thus most probably impacting park resources. He and his wealthy and influential customers get in contact with his congressman pressing him to push the issue in the National Park Service (Washington level). The Washington office urges the park superintendent and his staff to propose the enlargement of the marina as an important improvement of the parks recreation possibilities. The superintendent cannot just say he disagrees with this plan, but be can let environmentalists know about it, so they can act against it. If the enlargement proposal does not entirely meet legal requirements environmentalists can file a law suit. Another possibility would be a campaign to mobilize public awareness of the problem and cause public pressure on the park service. The third possible way is the direct lobbying in Congress to counterbalance the concessioners' lobbying. If counter pressure is strong enough, the proposed enlargement can be stopped or at Ieast enough, the proposed enlargement can be stopped or at agency can only successfulIy fight many adverse impacts with the help of non-government organizations.

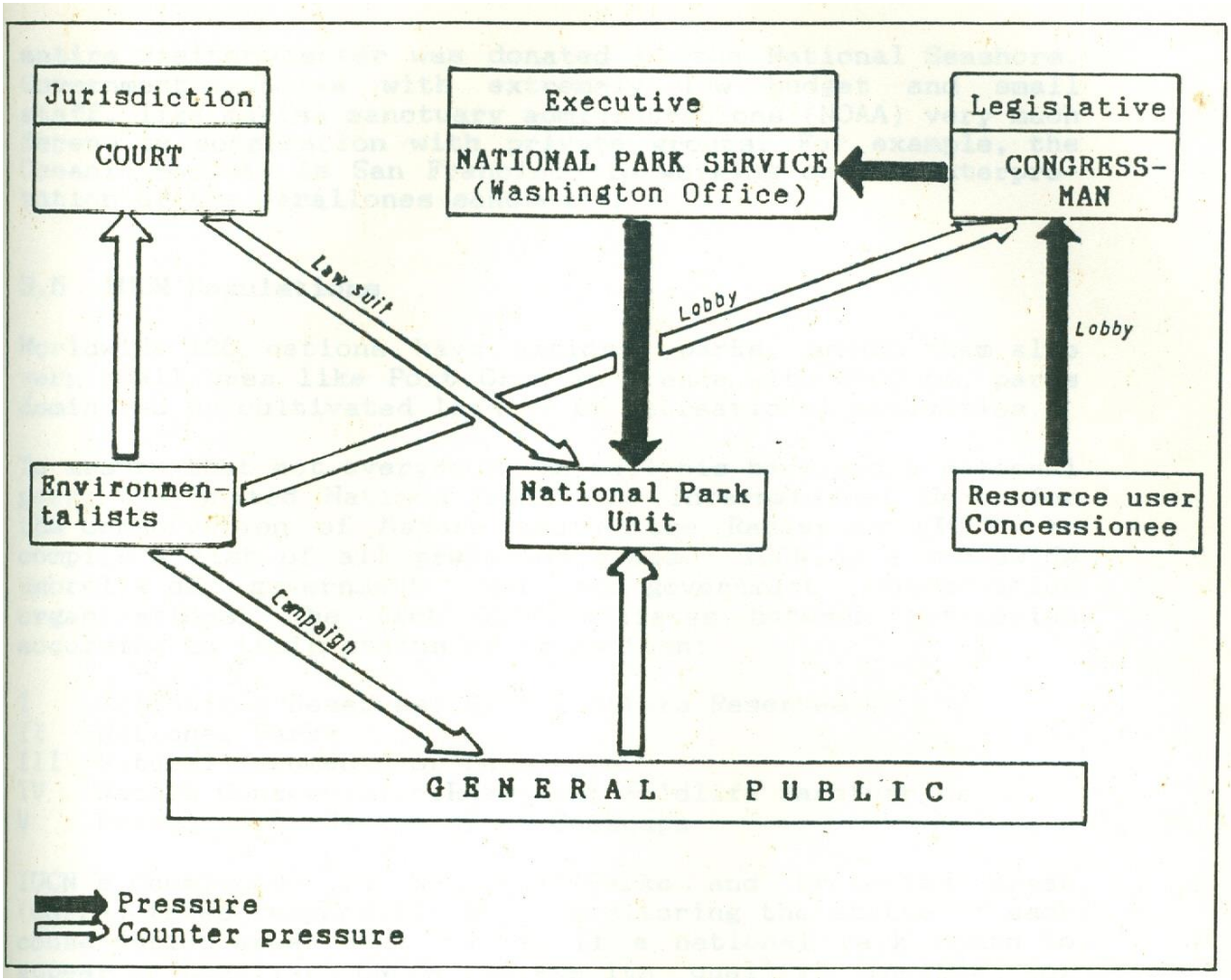


Fig. 5: Possible ways to influence par k policies in the U.S. explications see text

3.4 Cooperating Associations

The National Park Service and its different park units are supported by privately organized cooperating associations. In 1920 the first association was founded to develop a museum and visitor contact in Yosemite. Today there are 56 associations providing service to 230 are as of the National Park System. Their primary function is to support the interpretive and related visitor service activities of the park service. They operate book shops and sales counters in visitor centers selling books and other items that assist the visiting public to better understand the parks and their resources. Money from the sales and from donations is used to sponsor interpretive programs. It is especially in times where government funding is low that these private associations significantly help to maintain or even develop the standard of interpretation: In Point Reyes for example an entire visitor center was donated to the National

Seashore. Government agencies with extremely low budget and small staff, like marine sanctuary administrations (NOAA) very much depend on cooperation with private groups. For example, the Oceanic Society in San Francisco is working on the interpretation of the Farallones sanctuary.

3.5 IUCN Regulations

Worldwide 120 nations have national parks, among them also very small ones like Port Cros in France with 2500 ha, parks dominated by cultivated land or by Recreational activities. To assure that not everybody can call his backyard a national park, the United Nations asked the International Union for the Conservation of Nature and Nature Resources (IUCN) to compile a list of all protected areas. IUCN is a worldwide umbrella of government and non-government conservation organizations. The list differentiates between categories according to their status of protection:

I Scientific Reserves; Strict Nature Reserves
II National Parks
III Natural Monuments or Landmarks
IV Nature Conservation Reserves; Wildlife Sanctuaries
V Protected Landscape of or Seascape

IUCN´s Commission on National Parks and Protected Areas (CNPPA) takes responsibility of monitoring the status of each conservation area. This means: If a national park wants to appear on the list, CNPPA reviews its "quality". In 1986, for example, the National Park "Hohe Tauern" in Austria applied to be put on the list under category 11. A CNPPA delegation visited the park and concluded that for various reasons the park can only be listed under V. What does IUCN require for parks to be listed under II? A national park must be relatively large, should be run by the highest authority in the country and should exclude exploitation like agricultural and pastoral activities, hunting and fishing, lumbering, mining, residential or industrial occupation (IUCN 1986).

In the United States National parks and other protected areas do not seem to be checked by IUCN (according to IUCN- Washington). However in the 1986 list 45 park units were listed under category II. Included are places like Big Cypress NPres, where hunting, off-road driving, oil exploitation, etc. is permitted and Channel Islands NP, were hunting and grazing is -partly- allowed. Recreational fishing is not restricted in most national parks, commercial fishing possible in some (Biscayne NP). Table 1 shows which commercial and recreational activities are

allowed in which protected area. The IUCN-list categorizes U.S. protected areas as follows (IUCN 1986):

I	1 national reserve, 1 scientific reserve, 1 national preserve
II	all national parks, 3 national preserves
III	most national monuments
IV	most national wildlife refuges
V	national sea- and lakeshore, some national recreation areas, some scenic rivers and trails

In West-Germany two national parks (Bayrischer Wald, Berchtesgaden) are listed under II, several but not all nature reserves (Naturschutzgebiete) are listed under IV and V.

Source: IUCN 1985, and Protected Areas United Nations List of National Parks

4 Examples for the Protection of Natural Resources in coastal and marine Ecosystems

4.1 The Coast of the United States

The United States are to great extend surrounded by water. Many thousands of shoreline kilometers stretch along Atlantic and Pacific Oceana, the Gulf of Mexico and the Great Lakes. The coasts always had an important meaning to American people. Here the first settlers landed. From here the conquest of the entire continent started. The major metropolitan centers are situated near estuaries or coastal bays.

Natural features of the coast. Stretching from arctic Alaska to subtropical Florida U.S. coastlines offer a broad variety of geomorphological structures and wildlife and vegetation habitat. Main types of shoreline are rocky coasts, sandy beaches and dunes, bays and estuaries, saltmarshes, mangrove swamps and coral reefs. Salt marshes and mangrove swamps trap sediment and increase their hold by spreading over vast areas. Coral shores have been created entirely by living organisms. Intertidal mud and sand flats occur, but are limited to relatively small areas. To an extent certain features of the U.S. coasts, like dunes, beaches and parts of the salt marshes resemble features found in the Wadden Sea. Some species common to the Wadden Sea can also be found along the American Atlantic coast, many species have relatives of the same genus.

Threats to natural resources in coastal regions. Almost 75% of the American people live within 50 miles (80 km) of the coast. Since 1950 the population of coastal counties almost doubled. In the past decades it became very popular to live as close to the shoreline as possible. Property along beaches sold for incredible princes. People built their homes right along the ocean front, blocking public access to the water in many places. Nearly 50% of the coastal wetlands in the United States have been destroyed since the first settlers arrived. Residential Development, including the construction of roads, canals and marinas for pleasure boats and the creation and stabilization of beaches have caused a severe degradation of many coastal areas.

Most Urban centers have so called combined sewer systems, combining rain water and sewage. After heavy rainfalls sewage treatment plants release untreated sewage into estuaries and into the sea. Other sources of contamination are runoffs from industrial complexes, waste disposal sites (landfills), agriculturally used land and ocean dumping. The Exxon Valdez oil spill in Alaska (1989) shows how vulnerable coastal and marine ecosystems are and how much damage a single oil (or chemical) accident can cause.
Source: The Wilderness Society coastal parks 1989: Americas imperiled

4.2 The North Atlantic Coast

Many protected areas can be found along the U. S. Atlantic Coast. Two units of the National Park System along the northern Atlantic Coast will be presented: the Cape Cod National Seashore in Massachusetts and the Gateway National Recreation Area in New York City, including Sandy Hook in New Jersey.

Cape Cod National Seashore

Natural Features. Cape Cod is ,a peninsula about 150 km southeast of Boston, Mass. It was shaped by glacial deposits during the ice age. The Atlantic Ocean has considerably altered the Cape´s shape by transporting sands from the central part to either north or south forming spits, sandy beaches and dunes. Today most dunes are covered with shrubs, leaf- and pine forests. Oligotrophic ponds originating from melting glacier chunks are scattered over the cape. Protected by sand barriers, sandy salt marshes stretch on either side of the peninsula. At low tide minor tidal flats emerge on the cape´s leeside.

The National Seashore provides many different animal habitats. In the forest many song birds, raptors, lizards, snakes and mammals like the white-tail deer can be found. The wetlands are inhabited by amphibians, fishes and crustaceans. Waders, terns and gulls nest in the dunes and on beaches. Only few migratory birds forage in the salt marshes as Cape Cod is off the .main flyway. The ocean around the Cape offers important habitat for sea mammals like .various whale species, grey seals and harbor seals.

Human activities. Cape Cod has a long history of human uses beginning with the Mayflower pilgrims, who first landed here. In the 18th and 19th century whaling was the main income for Cape Codders. Since the 1950s an increasing number of tourists have visited the area. People from the big cities bought second homes, retirees discovered the peninsula and settlements were spreading. Today a 4 lane highway links the Cape with the metropolitan areas of Boston and Providence. Places like Provincetown in the north with about 5000 inhabitants shelter up to 60 000 people in the summertime. In 1986 about 4 million people visited Cape Cod; in 1988 5 million were counted. The main attraction is the seashore with its beaches. Visitors come here to sunbathe, swim, windsurf or fish in the ocean. Whale watching is an important industry in the harbor towns. The dune areas and forests are used for hiking, bicycling, driving with off-road vehicles or fruit picking. Hunting is allowed throughout the National Seashore: White tail deer, waterfowl and pheasants are reared in captivity by the state of Massachusetts, and then released to be hunted. Only shotguns may be used for hunting. When the National Seashore was established 600 improved private lots (with houses on them) were included.

Major threats to natural resources. The tremendous amount of visitors coming to the Cape every summer puts an increasing stress on natural resources. Communities neighboring the National Seashore run short on fresh water in the summertime. Community officials put pressure on the park administration to allow drilling for water within the park. In some places ground water qualities decreased with ocean water moving in after the taking of too much freshwater. Solid waste and pollutants on and in ocean waters are becoming a problem. Erosion in the dune areas caused by off-road vehicles, but also by pedestrians is increasing. Nesting shorebirds are frequently disturbed by visitors.

Strategies to reduce impacts. In 1961 the Cape Cod National Seashore was established by Act of Congress, to ensure public access to the area and to protect its natural resources. The Seashore is about 60 km long and covers an area of about 70,000 ha. Most private land could be purchased by the federal government. The owners of the 600 private inholdings have to obey certain regulations, like restrictions on construction of new buildings or the use of natural resources. Recently the park administration took away a person´s property after he had chopped all the trees on it. The park service also buys inholdings whenever there is a chance. Today almost 2/3 of the national seashore is federally owned.

In the 1970a the off-road lobby had put a lot of pressure on the park service forcing it to allow off road vehicle use in almost the entire park. In 1980 nature conservation groups joined in and took the National Park Service to court for not protecting natural resources in an adequate way. Today off-road vehicles are still allowed, though limited to smaller areas in the northern part of the seashore.

Cape Cod resembles in many ways the island of Sylt in the Wadden Sea. It has a similar shape (mirror asymmetrical), was formed by similar natural forces like glaciation and post-glacial erosion. Like Sylt the northern and southern parts are covered with sand dunes. Cape Cod is about twice as large and so are the Cape's problems: summer tourists invading the peninsula, bumper to bumper traffic on the main highway, development in and around bathing resorts, heavy erosion problems in dune areas. Sylt is not included in the Wadden Sea National Park, though large natural areas on the island are designated as nature reserves (Naturschutz-gebiete). In both areas government agencies have the delicate task to provide a maximum of recreational possibilities and at the same time protect natural resources to the greatest possible extent. Even though many adverse impacts still need to be taken care of in both sites, the fact that large areas are under legal protection ensures a high level of de facto resource conservation. The National Seashore per se plays an important role on the Cape Cod peninsula. It attracts many visitors, spending their money in the surrounding communities. It also is an important tool to address resource protection to people. On Sylt more than ten different

nature reserves exist. Though they are all supervised by the country, day to day management is taken care of by local conservation groups, some of them having little financial and personal resources. To give these areas more importance they should be united under one umbrella organization or be included into the Wadden Sea National Park.

Gateway National Recreation Area. The Hudson River estuary was probably the most important gate, which immigrants used to enter the New World. While around the estuary metropolitan centers like New York City and Newark were spreading, some natural areas at the very mouth of the Hudson like Jamaica Bay and Sandy Hook were spared from urban development, mainly due to the fact that they were important military sites. In the late 1960s military moved out and in 1972 Congress decided to establish the Gateway National Recreation Area. Today Gateway covers about 10 000 ha including Jamaica Bay and Breezy Point in Brooklyn, New York and Sandy Hook unit in New Jersey.

Natural features. Jamaica Bay stretches behind the Rockaway barrier peninsula. It is connected with the Atlantic Ocean through Rockaway Inlet. The bay is almost thoroughly encircled by urban New York City. Most of the bay´s shorelines have been used as landfills -mainly to deposit construction waste. One of the nation´s most important airport, the John F. Kennedy Airport was built on a landfill now covering the former northeast section of the bay. Another vast area was filled in for the construction of former Floyd Bennett Field Airforce Base now sheltering the recreation areas head-quarters. In the center of Jamaica Bay many sandy islands surrounded by saltmarshes, sandy and muddy tidal flats somehow managed to survive despite being so close to New York City. Today this area is especially protected as a wildlife refuge. The main task of the Gateway administration is to restore degraded parts of the recreation area, for example replant disturbed uplands like landfills, to dismantle military infrastructure, restore wetlands etc. The idea is to convert a mostly degraded landscape into a naturally looking, but manmade landscape. This way habitat for formerly abundant animal and plant species can be restored. Today 326 species of migratory birds and 75 species of nesting birds can be seen in Gateway. Threatened and endangered species, like Piping Plover, Least and Common Tern, osprey and northern harrier nest here. Snakes, lizards and turtles, salamander, frogs and toads various mammals and butterflies had either survived or were reintroduced after habitat restoration.

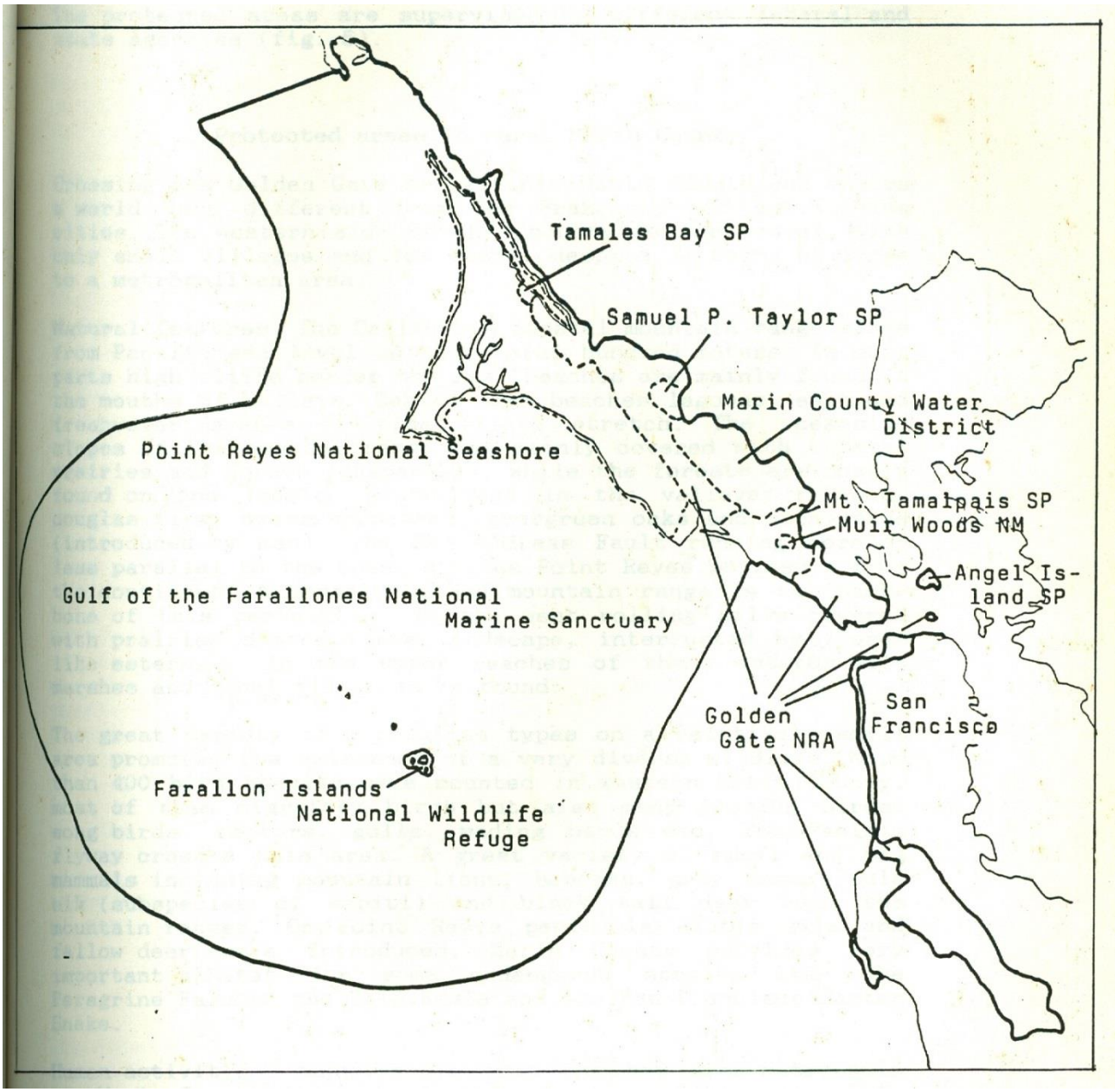
Human activities. Gateway National Recreation Area is a very important urban area park. Every year up to 10 million visitors are counted, most of them only coming for a day on the beach. Beside sunbathing and swimming, surfing, windsurfing, fishing, picnicking, boating, canoeing, hiking and bird watching area favorite recreational, actions. Off-road vehicle use is possible at Breezy Point. No Hunting is allowed at Gateway.

Threats to natural resources. Gateway is facing various threats related to the fact that it is so close to New York City. After heavy rainfall untreated sewage flushes into Jamaica Bay due to the combined sewer system. The development of suburban areas right next to Gateway put in a considerable pressure on the park itself air pollution originates from the neighboring John F. Kennedy Airport and the city itself. Tremendous amounts of solid waste are washed ashore. This waste often injures or kills animals. In 1988 even medical wastes, including anything from injection needles to body parts were found on Gateway beaches. Probably the most serious problems cause some of the landfills, where illegally very hazardous waste was dumped, now threatening the whole area. A giant amusement park project within the recreation area was stopped by the concerned public. The Sandy Hook unit is heavily threatened by beach erosion. In the summertime big crowds of city people invade the beaches and disturb nesting birds, especially the endangered Piping Plover.

Strategies to reduce impacts. The Gateway administration has a hard job dealing with all these serious adverse impacts, especially since funding has been very low under the Reagan administration. The Sandy Hook erosion problem is fought by pumping subtidal sediments on the beach. The costs are paid by raising an entrance fee for the hook. To limit crowding, the park rangers close Sandy Hook when more than 20 000 people have entered. Nesting sites are marked or fenced, certain areas closed to the public. To fight industrial and residential development around the recreation area a "Buffer the Bay" program is organized by Audubon Society and the Trust for Public Land.

4.3 The Central California Coast

In this report the central coast of California refers to the area around San Francisco since 1989 parts of it are included in the Central California Biosphere Reserve.



Fíg. 6: The Central California Biosphere Reserve and its parts: SP: State Park, NM: National Monument, NRA: National Recreation Area

This coastline is not only characterized by the vast city complexes of more than 5 million people dwelling around San Francisco extensive natural are as can be visited. Today most of these areas are protected. Even the Pacific Ocean north-west of San Francisco is protected as a marine sanctuary. The protected areas are supervised by different federal and state agencies (fig. 5).

Protected areas in rural Marin County

Crossing the Golden Gate Bridge into Marin County one enters a world very different from San Francisco and surrounding cities. The western side of this county is very rural, with only small villages and few roads, despite it being so close to a metropolitan area.

Natural features. The California coastal mountain range rises from Pacific sea level up to several hundred meters. In many parts high cliffs border the sea, beaches are mainly found at the mouths of valleys. Behind some beaches lagoons, salt and freshwater marshes or tidal flats stretch. The oceanside slopes of the coastal range are mainly covered with coastal prairies and shrubs (chaparral), while the forests are mostly found on the leeside slopes and in the valleys: redwood, Douglas firs, dwarf cypresses, evergreen oaks and eucalyptus (introduced by man). The San Andreas Fault running more or less parallel to the coast divides Point Reyes peninsula from the continent. A densely wooded mountain range is the back- bone of this peninsula. To the west rolling hills covered with prairies dominate the landscape, interrupted by fjord-like esteros. In the upper reaches of these esteros salt marshes and tidal flats can be found.

The great variety of vegetation types on a relatively small area promoted the existence of a very diverse wildlife. More than 400 bird species were counted in western Marin County, most of them migratory birds but also many .nesting birds: song birds, raptors, gulls, wading birds etc. The Pacific flyway crosses this area. A great variety of small and big mammals including mountain lions, bobcats, grey foxes, tule elk (subspecies of wapiti) and black tail deer roam the mountain ranges. On Point Reyes peninsula exotic axis and fallow deer were introduced. Marin County provides very important habitat for some endangered species like the Peregrine Falcon, the Bald Eagle and the San Francisco Garter Snake.

Human activities. Many people from the bay area metropolis use Marin County for recreational purposes: hiking, mountain bicycling, horse riding and picnicking are main activities in the back country of the mountain ranges. Along the beaches people surf and windsurf, swim and sunbathe, fish and collect mussels. In most protected areas of western Marin County no

hunting and no off-road vehicle use is allowed, freshwater fishing is discouraged. Pastoral areas are used by ranchers raise horses, cattle and dairy cows.

Major threats to natural resources. In certain areas erosion is a considerable problem. It can be caused by various reasons: intense livestock grazing, poorly constructed old roads, hang gliding and mountain biking. Reservoirs in the coastal ridge have cut off migration routes of salmon and shrimps. Exotic species like the ice plant, French and Scott broom, kikuyu grass, axis and fallow deer are crowding out native species and upset the ecological balance of certain areas. Compared to other protected areas in the U. S. and considering the proximity to San Francisco, western Marin County appears to be little impacted by man.

Strategies to reduce impacts. Much of western Marin County is under federal, state or county protection: Point Reyes National Seashore, the northern part of Golden Gate Recreation Area, Tamales Bay and Mt. Tamalpais State Parks and the Marin Municipal water District. Within these protected areas no residential development is possible. In Point Reyes the remaining 11 ranches will be bought and leased back to the owner urging them to manage their pastures in a sustainable way. Local citizens are very supportive when it comes to preserve the environment in and around the parks.

Urban park areas around San Francisco

The Pacific and the Bay Shore north and west of San Francisco is included in Golden Gate National Recreation Area (GGNRA). Ocean beaches, former military forts, the former federal penitentiary "Alcatraz" and the National Maritime Museum belong to this part of GGNRA. According to park service statistics this are as is the most visited unit within the park system with approximately 25 million visitors per year. Like in other urban parks many problems arise with drug dealing, robbery and many other violations of the law.

Beside the law enforcement rangers this unit employs 60 park police officers. Compared to the cultural resources, few outstanding natural resources need protection in this section of the recreation area.

The Farallon Islands and the Marine Sanctuary

The Farallon Islands are located about 50 km west of San Francisco, the waters surrounding them are known as the Gulf of the Farallones.

Natural features. The gulf is part of the continental shelf. West of Farallon Islands this shelf drops down to below 2000 m. In springtime offshore winds cause upwelling: cold but nutrient rich waters are brought up from the sea-floor to the surface enabling marine algae to bloom and so allow other marine creatures to prosper. Many sea birds like cormorants, pelicans, puffins and auklets, sea mammals like seals, sea lions, sea otters, dolphins and whales use these waters year round or during certain parts of the sea lions, elephant, fur and harbor seals, some of them having large breeding colonies on the islands. Every spring more than 300 000 seabirds nest on the fairly small Farallones.

Human uses. Due to the upwelling many fishes can be found in gulf waters, so commercial and recreational fishing is very important: gillnetting, trawling, trap fishing and collection of abalones. Important shipping lanes are leading to the bay area. U.S. Navy and U.S. Coast Guard use the gulf for their operations (air, surface and submarine). The coast guard runs a station on the Farallon Islands.

Major threats to natural resources. Abalone fishing close to the islands disturbs nesting birds and hauled-out sea mammals. Eutrophicated and contaminated waters drain from the bay area and the whole central California valley into the gulf. The city of Santa Rosa wants to drain part of its sewage into a lagoon north of Point Reyes. Any time an accident of vessels shipping dangerous chemicals and oil to bay area harbors could happen.

Strategies to reduce impacts. The Farallon Islands are protected as a National Wildlife Refuge under the Fish and Wildlife Service. It is absolutely prohibited to land on the islands. Only scientists, mainly from the Point Reyes Bird Observatory and Coast Guard employees stay on the Farallones. The surrounding waters are protected as a National Marine Sanctuary under NOAA. They stretch east to the coast, which is included from the Golden Gate Bridge up to Bodega Bay. The waters around Cordell Bank north of the Farallones will become a marine sanctuary in the near future. The presence of these sanctuaries makes any oil and gas development in this area impossible. No discharges are allowed. The problem of abalone harvesting around the islands cannot be solved by the existence of the refuge and sanctuary. In the Biosphere Reserve around San Francisco 10 protected areas exist, being run by 5 different agencies. In several cases responsibilities overlap. The boundary of Point Reyes National Seashore lies about 400 m offshore, overlapping with the marine sanctuary, whose boundary is the mean high tide level. On the other side, ocean waters within the three mile zone are under state control. This means that three different agencies manage the coast around Point Reyes.

In 1989 the Central California Biosphere Reserve was established. It includes the 10 protected areas mentioned above. One of the key objectives of this biosphere reserve is to have some sort of umbrella organization helping to coordinate research and management policies among all these different agencies. Bayside governmental agencies also non-governmental groups participate in research: University of California, Point Reyes Bird Observatory and the California, Academy of Sciences. Public conservation groups like the Oceanic Society and the Whale Center are mainly involved' in interpreting nature and the need to protect natural resources. All these institutions need a high level of cooperation and communication, if the marine and terrestrial environmental are to be protected in an adequate way. Unlike many others this biosphere reserve includes a vast area managed by different agencies. However there is no administrative structure to run the reserve. All work is done on an honorary basis with one person being' the driving force and pushing the project. The success depends on the persistent enthusiasm of the people involved.

4.4 South Florida

Southern Florida has been submerged in and then resurrected from the sea several times in the past million years. Bryozoans (tiny marine invertebrates) have built colonies now shaping the limestone bedrock of southern Florida. To the east the slightly higher elevated Atlantic Coastal Ridge provides favorable land for people to settle. Beside this nowadays heavily populated ridge, low flat plants extend to the east: These, the Everglades, slightly drop southward and finally turn into the shallow Florida Bay. Florida Bay is bordered by the Keys, an island chain surrounded by coral reefs.

Freshwater ecosystems of the Everglades

Natural features. The Everglades are a very vast plain, beginning north of Lake Okeechobee. Unlike other ecosystems the Everglades depend on extreme seasonal changes. Animal and plant life are well adapted to dry winters with little precipitation and wet and hot summers. During the summertime an 80 km wide but only 15 cm deep river creeps seaward from Lake Okeechobee. In fall this river dries up, leaving only small ponds, where all the animals which depend on the water concentrate. Most of the Everglades are covered with saw grass; only slightly higher elevations allow pine trees or cypresses to grow. Within the vast saw grass prairies. Little "islands" of tropical hardwood forests, so called hammocks arise. The western part of the Everglades is called the Big Cypress Swamp due to its cypress forests. In the Everglades a unique combination of tropical and temperate plants with over 1000 seed-bearing species can be found. More than 300 species of birds nest or winter here. Many threatened

animal species live in the Glades, some of which are found nowhere else in the United States: for example the Florida Panther and the American Crocodile.

Human activities. The unique wildlife and vegetation draws more than a million visitors. Visitor activities concentrate around roads, since it is difficult to enter the wetlands, at least during the wet season. The northern part of the Glades around Lake Okeechobee is used for agriculture (sugar cane, citrus). Farms in the southern part have been purchased by the federal government. Parts of the northern Everglades are used to supply urban centers like Miami with water. In the Big Cypress Swamp oil and gas is exploited.

Threats to nature resources. To the visitor the Everglades look like an almost unlimited unspoiled natural area. U. S. conservationists (e.g. Wilderness Society) consider the Everglades to be the most endangered national park in the whole country. The urban development of "mushrooming" Miami affects directly and indirectly (water supply, air pollution) the natural resources. Canals, dikes and other flood control feature have dramatically altered the flow of water. The impact on vegetation and bird nesting sites has been profound. The wading bird population has plunged by 90% since the 1930s. Pressures for private development inhibit the restoration of an adequate water flow. Runoff from sugar cane and citrus areas south of Lake Okeechobee flows into the Everglades. Laden with phosphorous and nitrogen, this runoff promotes the growth of cattails, which crowds out native vegetation and thus alters the delicate ecological balance. Exotic plants like Brazilian pepper, Melaleuca and Casuarina have been introduced to the Everglades to dry wetlands. Beginning from disturbed areas (road sides, former farm land) they have crowded out native species and put a severe threat on the entire ecosystem. In Big Cypress Swamp hunters use off-road vehicles and air boats for hunting, leaving broad scars and destroying much of the fragile vegetation.

Strategies to reduce impacts. Most of the Everglades have some status of protection today, beginning with Everglades National Park (560 000 has) established in 1947. Big Cypress National Preserve (230 000 has) was put under federal protection in 1974. To the north, state controlled water conservation areas and the Loxahatchee National Wildlife Refuge guarantee a certain level of protection. The purchase of -for the ecosystem very important- land to be added to Everglades National Park and Big Cypress NPres will be completed in the near future. In some areas sluices have be built into the dikes to allow a more natural water flow. Concerning the agriculture runoff problem the federal government (National Park Service) is at presenting the state of Florida for not adequately enforcing its own water quality laws. If this lawsuit is won the state government must atop the runoff. This lawsuit is unusual even for the United States as it own territory but also to work on solutions outside the park boundaries. The invasion of exotic pest plants is fought intensely (burning, chopping, herbicide use).

Marine and coastal ecosystems of Florida Bay and the Keys

The Florida Keys (from Spanish cayo, meaning island) form a chain of islands that stretches from Miami Beach down to Key West. When sea level was higher (interglacial) the Keys were formed by reef building corals. When the sea level dropped the reefs emerged and new reefs started to grow off the Atlantic shore of the Keys. On the north western side (Gulf of Mexico) the shallow Florida Bay, and further north the Biscayne Bay are located.

Natural features. Florida Bay has a mean depth of about 1 m. Small islands (also called keys) encircled by mangrove forests are spread all over the bay. The seagrass beds that cover almost the entire by provide habitat for fish and crustacean nurseries, many of them being commercially important. Also large fishes like rays and sharks can be seen. Along the northern coast the endangered American Crocodiles live. Spoonbills, pelicans, flamingos, egrets, herons and many other birds use islands to nest and the rich fish abundance as an important food source. The coral reefs on the other side shelter a very diverse marine ecosystem, overwhelming in its architecture and its colors. Coral reef organisms have very high demands: high water temperature and clean clear water. Chemical and thermal pollution from shoreline installations and oil from ships quickly kill the delicate polyps.

Human activities. The special climatic and scenic conditions of the keys attract many visitors and many people to permanently live here. As in most other coastal parts of Florida people have their motor boats. Marinas have been cut into the limestone to provide residential homes with boat access. The boats are used to go fishing in Florida Bay or sponging in Biscayne Bay and for snorkeling or scuba diving excursions on the reefs. Concessioners of the parks offer glass bottom boat rides to show the reefs. There are not many beaches on the keys since mangrove forests dominate the shore line.

Threats to natural resources. The use of motor boats (high densities) in the bays and in the coral reefs areas causes several impacts. Propellers scratch the sea bottom in shallow waters leaving many scars in the sea grass beds. Quite often dead or injured manatees are reported, being hit by boat props. Nesting and wintering birds are disturbed by boaters. Corals are being destroyed by boats that anchor in the reefs. Recreational and commercial fishing steadily increases impacts on fish stocks cannot be excluded. In Florida Bay vast deeds of seagrass are dying. Exact causes are unknown, although stressful environmental conditions (high salinity and temperature) might have triggered the process. The high salinity of up to 0.6% could be caused by low freshwater influx from the Everglades. Biscayne Bay is threatened by sewage runoffs from nearby Miami and by agricultural runoffs from the intense cultivation around Homestead. After incident at Turkey Point nuclear power plant the whole area might become contaminated.

Within one month (Nov. 1989) three vessels have stranded on reefs off Key Largo damaging big parts of the corals. If an oil tanker were running aground, much of this fragile ecosystem would be lost forever.

Strategies to reduce impacts. Today much of the waters around the northern keys are protected. Florida Bay is part of the Everglades National Park. Biscayne Bay, Elliott Key and adjacent reefs are included in Biscayne National Park. The mangroves forests and reefs off Key Largo belong to John Pennekamps Coral Reef State Park and to Key Largo National Marine Sanctuary (fig. 6). Sharing similar natural resources, these four areas have different regulations to protect them in Florida Bay, only recreational fishing with rod is allowed. Biscayne NP also allows spear fishing (harpoon), lobster trapping, sponge collection and commercial fisheries. In John Pennekamps SP and Key Largo NMS commercial fishing is included, the latter tolerates lobster trapping. The comparison of regulations in the four areas shows that a national park (Biscayne NP) must not necessarily have the strongest restrictions.

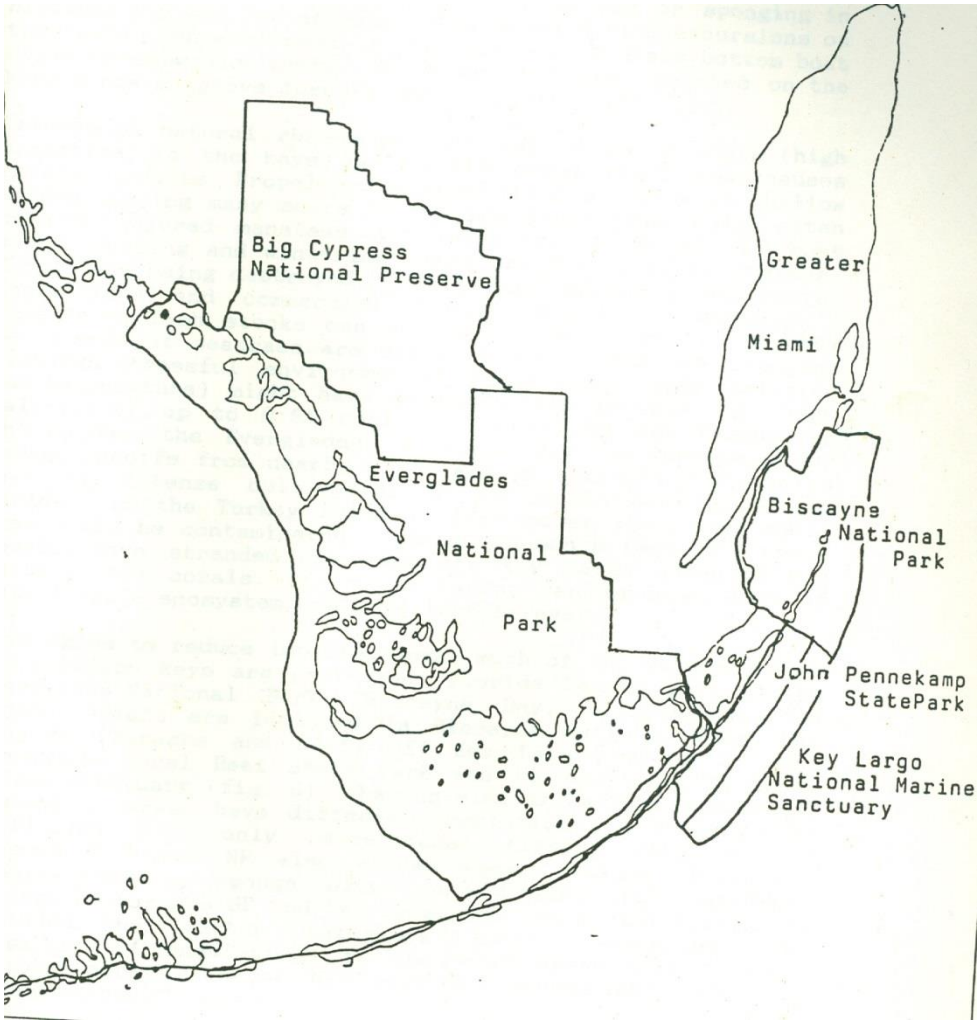


Fig. 7: Protected areas in South Florida

5 Conclusions

5.1 The Standard of protection in the Wadden Sea

How good is natural resources protection in the National Park "Schleswig-Holsteinisches Wattenmeer" (hereafter referred to as Wadden Sea Park) compared to similar protected areas in the coastal United States? Fisheries play and important role in the Wadden Sea, especially shrimp fishing and blue mussel fishing mariculture. The latter two considerably alter the sea bottom and its impact will be worked New management strategies to reduce this impact will be worked out in the near future. However, restrictions or reductions of quota are heavily fought by the fishing lobby. Many marine protected areas of the U.S. also provide commercial fishing, not only marine sanctuaries (NOAA), but also some national parks (Biscayne NP, Channel Islands NP) allow various commercial fishing practices that have or could have impacts on natural resources. In many cases species composition and age composition within a species become heavily disarranged.

Other consumptive uses. Recreational fishing is not important within the Wadden Sea park. Hunting is prohibited, as in most U.S. national parks.

Mineral exploitation. The Wadden Sea Park “inherited" an oil platform, located close to the most sensitive core area. However, further drilling has been stopped and the existing platform is supposed to have a very high safety standard. Oil or gas exploitation does not occur within U.S. national parks, though can occur just outside of park borders or in national preserves (e.g. Big Cypress).

Degradation of resources (here: salt marshes). Draining and overgrazing have degraded the originally very diverse Wadden Sea salt marshes to the status of golf course like lawns. This degree of alteration by human activities can almost be compared with the situation in Gateway NRA, where many wetlands have been destroyed by landfilling. In both cases park administrations have inherited the results of decades of mismanagement.

Visitor restrictions. Zone 1 (30% of the Wadden Sea park) is closed for visitors. Some exceptions are made, however they require an official permit. Boats are still allowed to sail in Zone 1, they are not allowed to ground and leave their boat to walk on the flats. A new federal law prohibiting any recreational boat traffic in Zone 1 is in preparation. In U. S. national parks and other protected areas hardly any zones totally exclude human visitation. Exceptions: small

breeding areas of endangered birds (e.g. piping plovers on Cape Cod or in Gateway), reproduction areas of the American crocodile in Florida Bay. Even in designated wilderness areas (highest on standard) people can hike or canoe.

	Commercial			Recreational				
	Mineral exploitation	Commercial Fishing	Grazing, Agriculture	Hunting	Off-road vehicles	Hiking, bicycling,etc	Boating, surfing, etc	Recreational Fishing
NP Rocky Mountain, Color.						#		#
NP Everglades, Florida						#	#	#
NP Biscayne, Florida		#				#	#	#
NP Channel Islands, Cal.		#	#	#		#	#	#
NS Cape Cod, Massachusetts		#		#	#	#	#	#
NS Point Reyes,California		#	#			#	#	#
NRA Gateway, New York		#				#	#	#
NRA Golden Gate, Cal.			#			#		#
NPres Big Cypress, Florida	#		#	#	#	#	#	#
NMS Key Largo, Florida		#					#	#
NMS Gulf of the Farallones		#					#	#
NWR Farallon Islands, Cal.								
SP Tamales Bay, Cal.						#	#	#
SP John Pennekamps, Fla.		#					#	#
NP Schleswig-Holsteinisches Wattenmeer, FRG	#	#	#			#	#	#

Table 1: Comparison of human activities that are legal in protected areas visited by the author. NP: National Park, NS: National Seashore, NRA: National Recreation Area, NPres: National Preserve, NMS: National Marine Sanctuary, NWR: National Wildlife Refuge, SP: State Park

Summary. In many respects the standard of the National Park "Schleswig-Holsteinisches Wattenmeer" can be compared with the standard of U.S. coastal parks and protected areas. Various recreational and commercial uses exist. For the enabling legislation and for the day to day management, compromises between conservation necessities and user s interests have to be worked out. In the first U.S. national parks, commercial and residential uses could be excluded, except for visitor accommodations and services provided by the private sector. In some cases, like Great Smoky Mountains NP, settlers were moved out of the park, when it was established in 1930. Along the American coast, park units are relatively young. Here people could not just be evicted, traditional uses not just be prohibited. The same situation exists in the Wadden Sea. If a use causes an impact on the resources, ways to reduce this impact can only be found in cooperation with the user.

5.2 What can we learn from American Parks?

Centralized Organization. The administration of protected areas is in general organized centrally, no matter if they are called national parks, wildlife refuges or marine sanctuaries. Even though park units and their superintendents have very powerful positions, many directives and guidelines come from the Washington Office and Department of the Interior. Funding is provided mainly by the U.S. Government. In Federal Germany all protected areas, including national parks, are run by the Länder (states). All directives come from state governments, almost all funding is provided from the state. Every park is more or less doing its own thing:

- Conservation policies differ to a great degree,
- No common planning and management strategies exist,
- Every park works out its own structures and contents of interpretation,
- Cooperation and of information with other parks exists, but could be much more intense.

There are great differences even between the two national parks in the Wadden Sea, despite the fact that they protect pretty much the same resources and were established in the same year.

A federally run national park system as in the U.S. would probably not make too much sense in West Germany with its four parks. Though a "European National Park Service" might be a step forward to improve European nature conservation. Advantages are a much better coordination and efficiency of research; resource management and interpretation (see 2.2 Harpers Ferry, Denver SC). The main disadvantage is the dependence upon a large bureaucratic administration. Funding is not simply just for one or two parks but for a whole system. In the

United States parks have to compete for funding. If a park is on the bottom of the list it might take a very long time before it is provided with a visitor center for example. Political influences also play an important role. During the Reagan administration little funding was provided for the parks. Very often Congressional legislation on conservation issues could not be translated into action, because the executive did not provide the money.

Democratic processes. In the United States the relationship between administrative agencies and the public seems to be based more on democratic rules than in Germany. The main difference is that a federal law urges government agencies to allow any citizen to view its documents, (exception military and secret service documents). In Germany very limited access to administrative documents is provided Offices have many secrets! Therefore a lot of citizens do not trust them.

The six weeks in U.S. parks taught me that public relations work and public involvement complicate matters and increase the work load. However in the end it pays off to "play with open cards". People, especially local citizen, appreciate much more natural values and identify themselves much more with "their" park.

In the U.S. agencies can be sued by conservationists for not adequately doing their job. Examples for this are given in the chapters above. In Germany only persons directly affected by administrative acts can go to court: Fishermen, when their fishing practices are restricted, chemical plants when they are forced by officials to reduce their poisonous runoff, etc. A person, who uses a resource, is always directly affected, a person, who wants to protect a resource, is not. In most cases conservationists can only indirectly influence policies. Their activities rely more on lobbying, nature education and political actions such as demonstrations, to put pressure on politicians. I assume that agencies running protected areas in Germany would do a better job, if the possibility of being taken to court existed.

Man and the Biosphere. The German part of the Waddensea should be designated as a biosphere reserve (see 2.7). The Dutch part of the Wadden Sea has been designated as a biosphere reserve in 1986. In the German (e. g. Schleswig- Holstein) part a designation is still discussed. A major problem is the term “reserve” (Reservat) that makes local people think of American Indian "reservations" and open range zoos. A biosphere reserve in the German part of the Waddensea should:

- maybe not be called biosphere area,
- include beside one or the two national park areas also the islands and parts of the coastal mainland,

- should have a sufficient permanent staff to make it actually work according to the Man and the Biosphere idea.

Cooperative associations. In Schleswig-Holstein a cooperative association to promote research activities in the Waddensea has recently been founded. Yet, no association to help the park in the field of interpretation exists, so money, badly needed to improve the present status of interpretation, is not available.

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