

Bernardo Zentilli

Determining National Park Boundaries

More than a hundred years have passed since the United States established Yellowstone National Park in 1872, the world's first national park. The idea of preserving natural areas as national parks has since spread to most of the world's countries.

National parks have been established in various ways, but currently the tendency is to accept their creation only through special laws that will guarantee their protection in perpetuity.

Although differences exist from one country to another in both the method and the reasons for the establishment of national parks, most countries have adopted the definition put forth by the International Union for Conservation of Nature and Natural Resources (IUCN) at its 1969 meeting in New Delhi.* The New Delhi language is as follows:

A national park is a relatively large area: (1) where one or several ecosystems are not materially altered by human exploitation and occupation, where plant and animal species, geomorphological sites and habitats are of special scientific, educative and recreative interest or which contains a natural landscape of great beauty; and (2) where the highest competent authority of the country has taken steps to prevent or eliminate as soon as possible exploitation or occupation in the whole area and to enforce effectively the respect of ecological, geomorphological or aesthetic features which have led to its establishment; and (3) where visitors are allowed to enter, under special conditions, for inspirational, educative, cultural and recreative purposes.

Notwithstanding the above definition, each individual national park will of course have its own special characteristics which will require a close study by those persons responsible for planning, administration and management in order to enforce rules that will ensure fulfillment of the purposes for which the park was established and to preserve the values it contains.

One of the most important and most difficult initial actions will be the definition of the area to be included within the park.

Determining a national park's boundaries

Park administrators normally face the problem of boundary definition from one of two different conditions: (a) an undefined area considered to have the outstanding attributes to justify its establishment as a national park, and a recommendation must be made as to the best boundaries for the area; or (b) a revision of the boundaries of an existing national park is necessary. The methodology followed in both situations is similar, starting from the

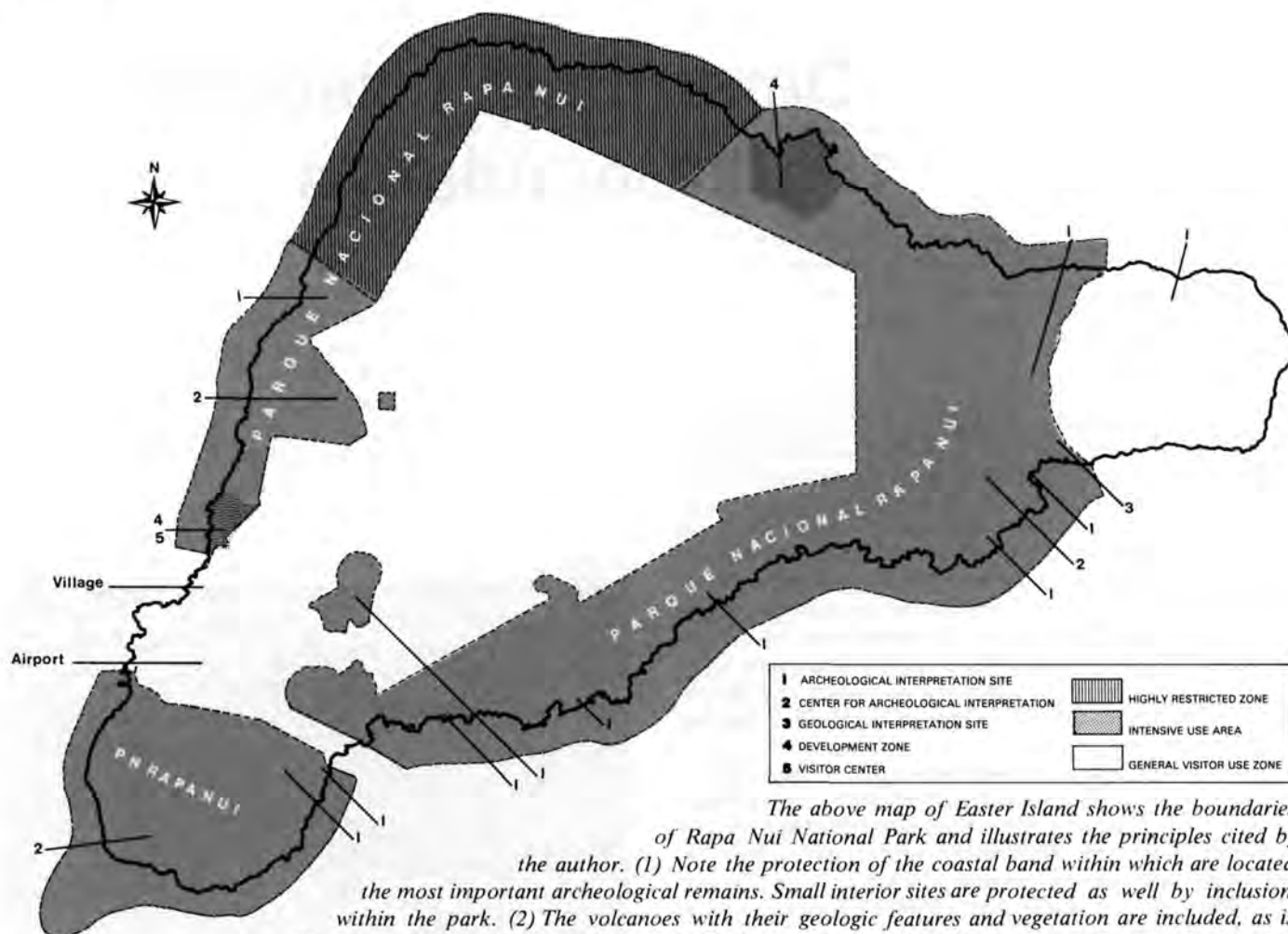
*Certain countries have favored other definitions, such as for example the one adopted by the Organization for African Unity (OAU) at its meeting in Algiers in 1968.



Animals and their needs must be considered carefully when park boundaries are determined. For example, where herd animals migrate to follow the grass, their seasonal routes should be considered for inclusion within the protected area. Photo: V. C. Gilbert

statement of objectives (see *Introduction to Masterplanning*, R.M. Linn, PARKS Vol. 1, No. 1). This statement will be the basis for the first general conclusions as to park size, taking into account natural and cultural resources to be protected, access and visitation, and other purposes. Without a carefully considered statement of objectives, reflecting identification and inventory of biological, physical, and cultural resources, it is most unlikely that adequate park boundaries could be determined. Let us look at the statement of objectives for Chile's Rapa Nui National Park, for example. The management plan for this park, which is located on Easter Island, sets forth six broad objectives to guide the work of planning, development and operation. They are as follows:

1. To protect and enhance its archeological values, along with physiognomical features in their vicinity;
2. To protect and develop its natural, land, and marine values;
3. To encourage and facilitate research into cultural and



The above map of Easter Island shows the boundaries of Rapa Nui National Park and illustrates the principles cited by the author. (1) Note the protection of the coastal band within which are located the most important archeological remains. Small interior sites are protected as well by inclusion within the park. (2) The volcanoes with their geologic features and vegetation are included, as is the surrounding marine environment. (3) The boundaries provide sufficient area adjacent to the principal resources of the park to provide a proper setting, and protection from future undesirable impacts. (4) Space for visitor use facilities is included near the village of Hanga Roa and Rana Kau volcano. These sites are sufficiently removed from archeologically significant features. (5) The volcanoes in the plan are included as protected areas to forestall development and serious alteration of scenic integrity.

natural aspects and those related to managing and interpreting the park's resources;

4. To contribute to enlightening the public about the park's historical, cultural and natural features, within the environment of the park itself;

5. To develop and broaden recreational opportunities in relation to historical interpretation, the land environment and the sea environment, and tourism as well—but all in keeping with the other objectives;

6. To further the island's and the country's economic development by means of activities in the field of tourism in keeping with the other objectives of the park.

All of these objectives would have a bearing on the boundaries eventually chosen. Clearly, the archeological resources must be included. So must their natural setting and the adjoining sea. So must all areas needed for interpretation and access by visitors.

These objectives, then, serve as an overall guide for fixing boundaries.

Basic principles

Certain basic principles can be set out as guideposts for the work:

1. The boundaries should encompass the values or resources that justify establishment of the park.

This principle emphasizes the necessity of having a thorough resource inventory and analysis prior to the preparation of the management plan and establishment of park boundaries. (See *The Resource Information Base for Planning*, Pierre DesMeules, PARKS, Vol. 1, No. 3.)

2. All natural areas that exert a major influence upon protection of the park's resources should be considered for inclusion within the boundaries.

There is considerable variation in the amount of scientific knowledge available for specific countries and particular areas. This, of course, will have a degree of influence on making the best decisions regarding boundaries. For example, in many countries there will be insufficient research to have established wildlife migration patterns, habitat requirement or even inventories of species that would assist the planner. In these instances, it is sometimes necessary to make decisions based on the best information available and initiate needed research and studies as quickly as possible.

Scientists are presently attempting to decide the optimum size and shape of natural reserves based on ecological principles. Although the park planners will usually be faced with many factors other than those which are strictly "ideal" for genetic and species protection, there are interesting theories regarding this important aspect, and park planners should be aware of them.

3. The boundaries should encompass buffer zones to preclude

future use of areas which could pose a threat to the park's integrity.

Careful thought and analysis must be given to what future use of land surrounding a park could or will be made. At times this information may be available through regional planning offices or development plans from other agencies. In other instances, where large portions of presently undisturbed lands are involved, it may be desirable to recommend an alternative use that would be most compatible with the park. For example, a properly managed forest reserve surrounding a national park may serve as a buffer area, while agricultural development might not be compatible.

This points out the need, whenever possible, to establish the park boundary within the context of a larger regional plan. Establishing the National Park can provide a stimulus to other agencies and organizations whose planning will ultimately affect the park, to reach agreement on compatible land use outside the park boundaries.

4. *The boundaries should enclose sufficient area to facilitate infrastructure for administration, visitor use facilities, protection, maintenance, and circulation, even though these areas may in themselves be devoid of interest from the standpoint of conservation.*

If significant development is anticipated within the park boundaries consideration must be given to allowing sufficient space isolated from critical natural or cultural areas to accommodate this planned infrastructure.

The environmental impact of proposed development within the park must be analyzed from the standpoint of what additional land is necessary for initiating development impact.

5. *The boundaries should include any areas which are of themselves the setting for the park's most noteworthy features and which, if left out, might undergo changes or development which would spoil the park's aesthetic values.*

These considerations will include a number of factors such as views to and from the park, potential water pollution from upstream areas, air pollution, noise, and other degrading influences against which there must be protection.

Special problems

In actual practice, efforts to include all the needed land will encounter problems of various kinds. Such problems may stem from such factors as the presence of development projects that already have been built or are being planned for surrounding land, the impossibility of acquiring certain tracts of land, the existence of conflicting land boundaries, and so on. If so, establishing the park's boundaries may entail foregoing, at least in part, some of the basic principles we have outlined. The technical staff in charge of the work must try to achieve the best balance possible between the needs of the areas for which improvement is sought and the outside pressures that tend to reduce the amount of available land.

It is important that the areas included within the park boundary be justified within the plan, and the reasons for inclusion clearly pointed out. This may also necessitate describing what alternative uses of the land proposed for inclusion within the park boundaries might be; for example, forestry production, grazing or agricultural use might also be possible land uses for which there may be pressure and the planner must carefully point out why protection is the highest and best use.

The present use and capacity of areas to be included within the park also need to be carefully evaluated and the social and economic impacts of this change analyzed.

It is not sufficient for park planners to simply say that a certain

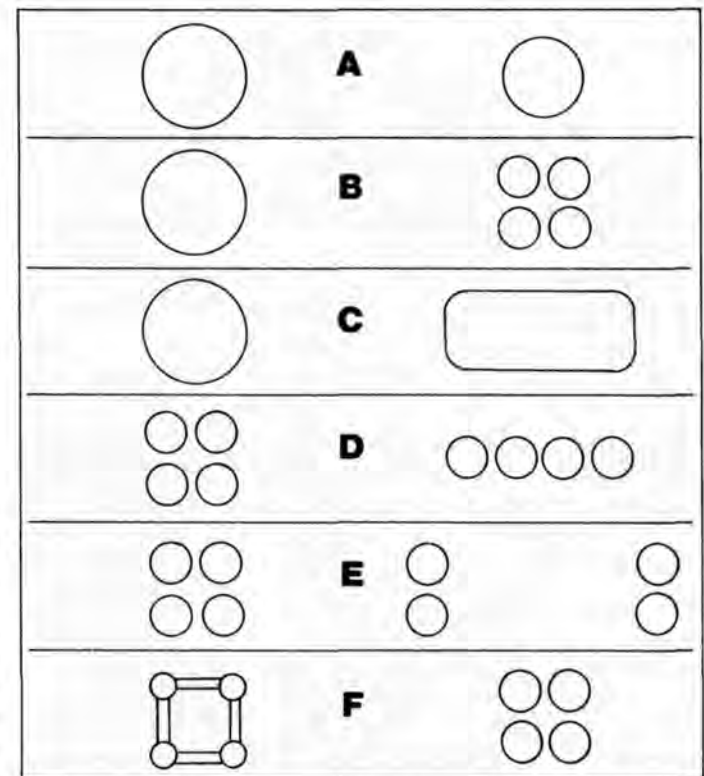
portion of land, for example, an area that is used for agriculture, should be taken for inclusion within the park. Alternatives should be offered. Furthermore, decision makers must be aware of the social and political impact of such alternatives.

Choosing the physical boundaries

In choosing the physical boundaries certain general recommendations are fitting, although the likelihood of being able to apply them will vary in each case. The following recommendations are given as examples:

- The use of important readily identifiable geographic features such as rivers, mountain peaks and ridges.
- The use of highways, roads or other works such as canals, oil pipelines, railway lines, etc., as well as state, provincial or national boundaries, and other similar features.
- The use of coastlines, estuaries, islands, etc.

These features contribute to making the boundaries permanent, easy to identify, and not dependent upon any special devices for their demarcation such as fences, markers or other burdensome installations. The selection of such features, however, will depend upon how well other park requirements are met in the area



There is considerable interest in the relationship of size and shape of game reserves to the animals they protect. This could be important in boundary determinations. Geometric relationships based on biogeographical principles (after J. M. Diamond, 1975; E. O. Wilson and E. O. Willis, 1975) are illustrated by this diagram. Shapes and relationships in the left hand column are always more desirable than those in the right hand column. (A) A large reserve is better than a small one. (B) One large reserve is better than four small ones of equal total area. (C) A circular reserve is better than any other shape. (D) Mutually adjacent areas are better than areas linearly arranged. (E) Close replicate reserves are better than distant ones. (F) Smaller but connected reserves are better than separate but equal area reserves.

itself and also upon the objectives for which the park is intended.

A river may not prove satisfactory for boundary purposes if its basin is of material importance to the park itself or if the outer watershed is subject to development in ways that could be incompatible, or affect the course of the river, or alter the landscape.

Likewise, use of a canal or road may prove unsatisfactory if the area contains fauna that must be free to migrate or move on to areas beyond the park. In certain cases boundaries of this kind constitute ecological barriers that exercise a negative effect upon the park itself. Similar disruptions can occur if in setting up boundaries along beaches or coastlines the existing ecological relationship between the land portion and the water portion—a relationship that may be quite essential for the ecosystem's preservation—is not taken into account.

The survey maps that will be required, and which will be helpful for future technical managerial operations or in connection with any legal actions, have to be prepared after boundaries have been set up, or perhaps simultaneously. In many countries the laws require written verbal descriptions of the boundaries to be established. In that event special care must be taken to give accurately the names of topographic features and to select the most prominent ones so as to avoid any possible errors or ambiguities that may lead to lawsuits.

In graphic representations of boundaries the survey maps used in any earlier studies should be employed as basic material. Existing laws may require that new topographic maps be drawn up. Often there is a tendency to make an extremely precise topographical survey covering an entire area that has been declared a national park. However, this undertaking, which is quite an expensive one, is not required at the outset in every instance, and in most cases a traverse showing the boundaries is sufficient.

Detailed maps showing the areas within the park can be drawn up later on, in keeping with whatever need may actually arise.

Procedure for setting up boundaries

At the time when studies for establishing a park are first undertaken or whenever a plan for managing an already existing one is formulated, the question of the park's boundaries arises.

We already have pointed out certain general criteria that are applicable in establishing a national park's boundaries. The following steps are the most important ones in establishing boundaries in the sequence in which they appear:

1. The gathering of background material on the land in question, including the collection of prior studies of its geology, climate, flora, fauna, cultural features, etc., and the gathering of basic map materials.

2. A study of the particular purposes for which the park is intended, taking into account its features and resources.

3. An analysis of the proposed general area in relation to the areas that surround it. During this stage it will be profitable to look into any development programs for the area that are currently being studied or are already being implemented, and also to give thought to the basic work engaged in by the area's inhabitants and to opinions about the park which they may have expressed either directly or through organizations to which they belong.

4. The analysis of apparent overall boundaries the park may have, in line with management objectives.

5. Establishing in detail the park's boundaries, both on-site and in maps. Any written descriptions of the boundaries that may be required must be prepared.

6. Reproduction of the national park's boundary maps.

Each country has its own laws regarding private land ownership, and as to ownership of property by its states or by the nation itself. Inasmuch as a national park's boundaries will be valid only if they have been established in accordance with existing laws, it is advisable to include a legal advisor on the team to which the work of analyzing and establishing the boundaries is entrusted.

Lastly, let us emphasize that the ultimate aim in setting boundaries is to have a national park that will fulfill completely the purposes of the park is intended, for the full benefit of the nation and its people.

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