The George Wright

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The George Wright Society

Dedicated to the Protection, Preservation and Management
of Cultural and Natural Parks and Reserves
Through Research and Education

Volume 5 ✦ Number 3

The George Wright Society, Inc. is chartered in the State of Delaware, in accordance with the laws of the State of Delaware and of The United States of America, as a nonprofit educational and scientific organization dedicated to the protection, preservation and management of cultural and natural parks and reserves through research and education.

 The George Wright FORUM is published quarterly. The Editorial Board of The George Wright Society welcomes articles that bear importantly on objectives of the Society, and contributions from readers in the form of letters to the editor. Manuscripts, letters and news items (preferably double spaced typewritten) should be addressed to: Jean Matthews, Editor, The George Wright FORUM, Room 126 Forestry Sciences Lab., Oregon State University, 3200 Jefferson Way, Corvallis, OR 94331.

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The George Wright FORUM

TOWARD THE YEAR 2000
Proceedings from the Conference on Science in the National Parks—1986

Volumes 1 and 2, **The Plenary Sessions** and **Wildlife Management and Habitats,** respectively, representing the first 2 volumes of papers from the 1986 NPS-GWS-sponsored conference on science in the national parks, are now available. Volume 1 has been sent to all conference registrants and Volume 2 is currently being sent (conference registrats should have received it by the time this issue of The George Wright Forum is received). Those who paid a registration fee for the Conference will automatically receive copies—anyone who paid a registration fee and who does not receive a copy of Volumes 1 and 2, please notify us at our P. O. Box (two copies of Volume 1 have been returned to the P. O. Box with the notation "no such address." We'll do our best to locate these two persons...so, if you've changed your address, please let us know).

Included in this issue is an order form, with matching return envelope, enabling recipients of this issue of Forum to order copies of the Proceedings. A listing of the volumes (in-hand and in-the-pipeline) follows:

Volume 1. The Plenary Sessions
Raymond Herrmann and Terri Bostedt-Craig, Eds.

Volume 2. Wildlife Management and Habitats
Francis J. Singer, Ed.

Volume 3. Physical Processes and Water Resources
Marshal Flug, Ed.

Volume 4. Vegetation Change and Historic Landscape Management
Susan Bratton, Ed.

Volume 5. Management of Exotic and Natural Communities
L. K. Thomas, Ed.

Volume 6. The Status of Prescribed Fire Use for Natural Resource Management in National Park Systems
Stephen D. Veirs, Jr., Ed.

Enclosed is an order form for these six volumes of the Proceedings. The price for each volume is $7.50 (US)—this is our break-even cost. We have (or will have) approximately 150-200 copies only of each volume (above those that already have been ordered). Checks, money orders, purchase orders, etc., should be made out to "The George Wright Society" and sent to: P. O. Box 65, Hancock, MI 49930-0065, USA.

Should any volume, for any reason not materialize, a prompt refund will be made.

Third Triennial Meeting of The George Wright Society and Fifth Triennial Conference on Research in the National Parks and Equivalent Reserves

The Third Triennial Meeting of The George Wright Society, and the Fifth Triennial Conference on Research in the National Parks and Equivalent Reserves, will be held in Tucson, Arizona, during the week of November 14, 1988. This international, interagency, interdisciplinary meeting will stress the natural sciences, social sciences, anthropology and history as these sciences pertain to cultural and natural parks and reserves. Proposed features of the meeting include plenary sessions, special sessions, poster sessions, integrated resource management trainee modules, and open public sessions. Section Chairs will be chosen for interpretation, research and resource management sections in the different disciplines. These chairmen and firm dates for the conference will be announced soon. To assist in making this the biggest and best George Wright Society-National Park meeting yet, please send ideas, offers to assist, etc., to:

R. Roy Johnson, Technical Co-Chairman
The George Wright Society
#125 Biological Science East
University of Arizona
Tucson, AZ 85721

OR

Third Triennial Meeting
The George Wright Society
P. O. Box 65
Hancock, MI 49930-0065

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The Future of Science in the National Parks
Positive Directions, New Opportunities

A Report on the 1986 Conference on Science in the National Parks

Raymond Herrmann
Conference Co-Chairman

The 1986 Conference on Science in the National Parks was the fourth in a sequence of conferences co-sponsored by the National Park Service and the George Wright Society. Held on July 13-18, 1986 at Colorado State University, Fort Collins, Colorado, the Conference focused on:

- ✧ The unique role of science in supporting the understanding, management and preservation of park resources;
- ✧ The special relationship between research and resource management and how that relationship must develop to maximize the use of scientific information in the NPS decision-making process; and
- ✧ The short-term issues that are of concern to park managers today and the longer-term issues that are equally, if not more, important.

Through the use of poster presentations, the Conference highlighted the active science programs of the Regions and displayed the results of many effective and well-presented research projects.

Some statistics are available to characterize the Conference. There were over 400 attendees who made 325 poster presentations in 28 symposiums. Two plenary research panels were held to discuss the role of research in the national parks, and 12 plenary presentations were given on topics of importance to park researchers and resource managers. The Conference was attended by NPS directorate, superintendents, researchers (from the natural, cultural and social sciences), resource managers and interpreters. Representatives of universities and other agency research organizations, officials from six other countries, and the general public also attended.

Positive Directions: A Forecast for the Future

Perhaps the real essence of the 1986 Conference on Science in the National Parks extended beyond the usual scientific objectivities and quantifications. Indeed, the prevailing mood of the gathering—among scientists and resource managers alike—was marked by a deep seated, mutual concern about the proper relationship of science to the management decision-making process employed in national park systems. What is so special about this relationship? What is the proper role of science within this relationship? And how can it be improved to meet the park management challenges of the decades ahead, to the year 2000 and beyond?

The Conference served as a catalyst for productive discussions of these questions. Just as significantly, it provided an opportunity for many important discussions and considerations, too long delayed, about the issues and directions we should be addressing. In some areas we have substantial knowledge and must learn how to apply it to our problems, while in others we are ignorant and require new research directions. Most answers lay beyond the Conference, but the seriousness of the dialogue among the attendees was provocative and encouraging. The following represents the perceptions of the author regarding these discussions and is not necessarily a concensus of Conference participants.

Many of the attendees recognized the need to be innovative. They support innovation in science now, as we live in a society where the driving forces are scientific and technological. Accordingly, society at large is beginning to recognize how vulnerable it is to environmental change. Of all government agencies, National Park services everywhere need to ensure a management system based on adequate science, if they are to meet their preservation mandate for future generations.

Some of the issues that emanated from the Conference suggest short-term attention. The recommended solutions to these issues should, by the year 2000, be employed as new principles and understandings affecting park management. Thus, current attention should be applied to the concepts of landscape ecology; better understanding of biogeochemical cycling; visitor expectations and behavior; the preservation of our national heritage, both cultural and natural; the relationships of species within ecosystems; the preservation of genetic diversity; ecosystem functions and processes; parks as a global resource; data management, evaluation and use; methods of long-term research; and global interactions. All of these concepts need to be considered within the realm of the new economic and resource realities as they increasingly become a part of the public's shifting values.

Another concept also worthy of mention—that of the Earth as a system—has immense opportunity for National Park services. Three organizations have programs related to this global Earth science effort which are presently being publicized: the Global Geosciences Program (National Science Foundation); the Earth Systems Science Program (National Aeronautics and Space Administration); and the International Geosphere Biosphere Program (National Academy of Sciences). By pursuing an active role in this global effort, the USNPS can advance from the era of the Leopold Report toward a program incorporating a holistic approach to study and understand the climate, geosphere, hydrosphere, biosphere, and biogeochemical cycles of the Earth; in other words, the study of the Earth as an integrated system to better understand the component parts through an increased knowledge of their roles relative to the whole.

Some thoughts for our consideration as we look towards the future are gleaned from the presentations of the plenary speakers (Herrmann and Craig, Eds., 1987):

William Penn Mott, Jr.:

- ✧ Applying scientific knowledge is full of inherent risk.
- ✧ The scientific programs of natural area management in the US National Park System will always be based on incomplete information. Our job is to push the frontiers of knowledge outward.
- ✧ Our concepts of science in the parks are still evolving and will continue to do so. However, we must hold out for the long view.
- ✧ Parks are forever and we must manage them accordingly.
- ✧ It is not enough for us to gather knowledge. It is not even enough for us to apply that knowledge. It is essential that we share our knowledge with the people of the nation and this world.

George Pring:

- ✧ The great forces that shape our thinking—what are they and what will they be? Understanding these is important in shaping our actions.
- ✧ There are no primary or secondary resources in nature. The first lesson of ecology is that all facets and features of an ecosystem are equivalently important and indispensible because they support one another.
- ✧ Develop and provide more accurate, authoritative information.

Boyd Evison:

- ✧ We must learn about park resources and how park ecosystems function.
- ✧ Look to the long-term and employ all of our knowledge and expertise wherever it exists.
- ✧ Encourage baseline data collection and long-term monitoring and entice researchers to implement **relevant** long-term research.

Theodore W. Sudia:

- ✧ Direct management of resources, or more properly their manipulation, requires a great quantity of detailed information.
- ✧ Even if parks are managed properly they alone will not provide for the protection of genetic diversity.
- ✧ No park is big enough to be a self-sustaining island.

W. James Judge:

- ✧ Research provides the foundation for management and interpretation.
- ✧ Research in the USNPS must include in its planning and thinking
  the cultural resources disciplines (anthropology, archaeology, etc.).
- ✧ For research to be carried out at the public expense, we must define our questions carefully and strive to ensure that the activities are not trivial.

- ✧ Keep the public, as well as long-term research interests, in mind as we undertake the research necessary to enlighten management and interpretation.
- ✧ Identify what we can and move forward with long-term research.
- ✧ Question and seek alternative paths to existing goals, or even offer alternative goals.

Chuck Odegaard:

- ✧ The social needs and political realities of the urban setting require that we develop analytical skills for leisure.
- ✧ Understand carrying capacity in order to manage and to restore.
- ✧ Understand regional-scale influences that affect how we manage our resources (i.e., the Great Lakes).
- ✧ Learn how to restore damaged resources—but first we must understand our healthy or natural resources.
- ✧ We need to organize our leadership to accomplish our preservation goals.
- ✧ Recognize the similarities as well as the differences between our disparate resources.

Tom Lovejoy:

- ✧ The minimum size for a protected area is very much defined by the conservation goal involved.
- ✧ Fragmentation and isolation of once continuous wildlands is a ubiquitous phenomenon with major implications for national parks. Newmark's work on western U.S. national parks shows considerable loss of mammalian species since the parks were established.
- ✧ Studies similar to "the minimum critical size of ecosystems project" in central Amazonia are very much needed in other biomes.
- ✧ When the available pristine habitat is below minimum size, there is every reason to try to protect a larger area to encourage the return of natural vegetation. This could save a lot of the diversity which otherwise might be lost.

Richard Forman:

- ✧ Landscape ecology explores how a heterogeneous combination of ecosystems—such as woods, meadows, marshes, corridors and villages—is structured and how it functions and changes. Some promising guidelines for landscape planning and management emerge for: (1) identifying the spots requiring highest protection priority in any landscape; (2) managing for disturbance and change; (3) managing natural landscapes; (4) managing remnants of natural landscapes; and (5) evaluating a proposed change.
- ✧ Landscape ecology poses different questions and provides different answers than traditional areas of ecology. It is particularly useful in parks, where research and resource management deal explicitly with the assemblages of

ecosystems and with the humans present, and where park interpretation requires a framework readily understood by the public.

John R. Kelly:

- ✧ For understanding we need to deal with fragmentation, information overload and obscurantism. To improve our knowledge base, we need to work toward synthesizing disciplinary efforts and overcoming our tendencies toward disciplinary elitism.
- ✧ Understand our park visitor—who are they, what are they doing, what do they want? Knowledge and understanding of the diversity of visitor expectations and responses can guide how we manage.
- ✧ Keep in touch and keep your eyes open. Sometimes the best observation requires that we follow along for a while to see how acts are linked into activity.

Joseph K. Berry:

- ✧ Emerging computer technology provides advanced analytic capabilities that enable managers and researchers alike to address complex issues in entirely new ways (scales are larger, times are shorter).
- ✧ Changes and improvements in map processing have provided the means to fully integrate spacial information into the decision-making process, thus enhancing resource understanding for management.

Ray Dasmann:

- ✧ Trends require understanding of and involvement in regional issues.
- ✧ As an organization we must continue to learn as well as to teach.
- ✧ We need a concerted effort to learn about species in parks if we wish to protect and maintain biological diversity.
- ✧ Look to the new approaches of other countries—there is much we can learn from them.
- ✧ Fully develop interagency coordination.
- ✧ Conservation is a global issue.

Jay M. Hughes:

- ✧ The US National Park System, as an institutional focus for scientific inquiry, is distinctly larger than that implied by the level of research funding received by the NPS.
- ✧ Pay attention to the training and education needs of new professionals.
- ✧ Pay attention to the development of a sound scientific effort to address troubling management and policy issues.
- ✧ Cooperation between universities and the NPS on research goals has worked, is working and will continue to work with some effort from both sides.

Bob Beeton:

- ✧ The researcher can assist the manager in the process of problem bounding. He may evaluate the problem and generate alternatives and predictive models in which to test the alternatives. The final decision, however, is always owned by the manager. The process must support this model.
- ✧ The most effective and efficient research model is based on solid networking, not a hierarchial chain of command.
- ✧ The research organization (and researcher) has an additional role to play, often neglected, and that is the continued evaluation of our actions to assess whether the response to an action is as expected.

New Opportunities: Improving the Role of Science in the National Park Service

It was proposed by many in attendance at the Conference, from both inside and outside the USNPS, that we need to forge new opportunities—at this time and over the next few years—to greatly improve the scientific basis of national park management.

The history of science in the US National Park Service has been constantly marked by questions concerning its effectiveness and utility to park management. Over the years many park managers have said, "The research programs as they are structured are not meeting our needs." While it is easy to identify deficiencies in a program, it is more difficult to change or restructure it to eliminate the deficiencies **and**, at the same time, increase its capability for producing solutions to perceived needs.

At this point, it might be helpful to reflect on some things that research cannot do:

- ✧ Research does not make NPS policy. But it can support that policy.
- ✧ Research cannot manage. But it can support or not support management decisions (in either case, the research information must be available in an **unbiased** fashion).
- ✧ Research cannot remain unbiased if it is incorporated too closely into the management structure.

Research in the US National Park Service has been accomplished through various ways and means over the years, with mixed results as viewed by management. Often these programs have been reactive rather than proactive. While it is important to be proactive and look toward the future, it is just as important to remind ourselves to look back at what we have done in the past, and note the successes that have been accomplished. These successes include:

- ✧ The development and use of Cooperative Park Studies Units. CPSUs have been an extremely successful and cost-effective means of acquiring research over the years. Some coordination is needed, however, and proper staffing is critical.
- ✧ The development of regional interagency and interinstitutional "clustered research" groups, both in the parks and at universi-

ties, to respond to multiple park needs. The Southern Appalachian Research and Resource Management Cooperative (SARRMC), Rutgers University or University of Wyoming, for example, have been proven very helpful in providing the research, funds and tools needed for success.

- ✧ The development of a few national research units with generic responsibility to support multiple park, regional, and Servicewide research needs. Examples include the Water Resources Field Support Laboratory (now the Applied Research Branch of the Water Resources Division at Colorado State University) and the archaeological research centers, where efficiencies and capabilities are achieved through a single focused support group.
- ✧ The development of regional base science funds—i.e., the "cyclic science program." These funds support park-specific research projects that meet regional priority needs.

Despite these successes, much more still remains to be done. During the Conference, numerous approaches were suggested for restructuring the USNPS organization to improve and optimize the scientific basis of resource management in the parks. In response to these discussions and to those of the two plenary research panels, a three-part process for developing an appropriate, responsive, and well managed research program is suggested to further the debate:

- ✧ First, deal theoretically with the role that research can and should play in the USNPS administrative and management process;
- ✧ Second, reiterate the values of quality research, properly organized (vis-à-vis the physical, biological, social and cultural sciences) to park management; and
- ✧ Third, implement a structure that fits within the management system of the US National Park Service that will directly recognize, utilize and support research.

Four structural issues are identified as important to this discussion: (1) who is responsible for research, (2) the relationship of research to resource management, (3) the nature and structure of resource management, and (4) the organizational role of research.

First, research must be responsible to research. In other words, the principal investigator or field researcher must be responsible to a research organization—this is absolutely necessary for continued project and program support, review and evaluation. This has been reiterated at all levels of government and holds true in the USNPS. As the researcher should be held accountable for project success, so too the research administrator must be held accountable for program success. Thus, research responds to two masters: peer review (a quality research product) and management review (the program must meet NPS needs, both long- and short-term). In short, the USNPS **must** have a responsible and technically qualified research administration. The research administrator would then be responsible to USNPS management at the appropriate level for structuring a program that

meets the information needs of management. Research is not a line function and this relationship (separation of responsibilities) should not be distorted nor forgotton.

Second, it is again stressed that research and resource management are separate and distinct functions. This does not mean that researchers and resource managers cannot talk to one another or work together. But it does mean that research should develop, evaluate and provide information, and offer expert consultation, to both planning and operations. Resource management on the other hand, is a line activity that acts on the information supplied. It follows, then, that both organizations must be technically able and that there will be some overlap and some conflict. This is not necessarily bad; it can be minimized by establishing clearly defined and agreed-to organizational responsibilities. While it is theoretically possible for one person to do both jobs, (research and resource management), this expectation often creates an impossible personal dilemma and should be avoided. (It should be noted that strong individual feelings exist on both sides of this issue.) The present tendency to combine these two functions has too often confused and disrupted both research and resource management activities.

Third, resource management—as a line function—should be structured, staffed and funded to ensure the operational capability to deal with resource issues. The role of research is one of assistance and can be either active or passive. The importance of capable research support is not diminished, however.

Fourth, any redefinition of organization roles is always risky as "someone's turf will probably be stepped upon." Nevertheless, an improved research structure **can** be implemented within the existing USNPS management structure and with minimal organizational disruption or change by establishing:

1. Clear and definitive role and function statements;
2. A clear policy statement on research. Under present conditions, this would require a research group that includes USNPS senior scientists working with top USNPS management and possibly the "Blue Ribbon Panel" to set long-term goals and objectives;
3. A clear-cut separation of research including research budgets from other management activities (this does not absolve responsibility and accountability);
4. A strengthening of the base funding for research (effective research cannot be accomplished with uncertain year-to-year funding);
5. Provide standards for all researchers and research administrators and **enforce them**;
6. Establish functional ties between research levels (to ensure proper direction and evaluation at each level); and
7. Re-establish the Chief Scientist (or equivalent) position in Washington, D.C. This position should consist of a technically

qualified professional research administrator with a knowledge of the USNPS.

If we recognize the realities of the above organizational need, we have an excellent chance to more fully develop a professional, responsive and competent science program for the National Park Service. Such a program will not solve all problems and conflicts, but it will produce scientific products of better quality and credibility—and provide them in a more timely, cost-effective fashion to result in improved resource understanding, management, and interpretation.

Relationship of Research to the US National Park Service 12-Point Plan

The application of scientific information to the US National Park Service's 12-Point Plan (NPS, 1986) was discussed in many settings at the Conference. The following is not meant to be a stand-alone research action plan, although it could certainly serve as the basis to develop one. The format is consistent with and supportive of a number of action items in the 12-Point Plan. Many of the issues identified by the conferees are aggregated into the following 24 actions that relate to each of the 12 points. Much of the discussion of research roles, futures, and strategies can be viewed as supporting the objectives of actions contained in Point 1. A broader view, however, is presented and provides for important research linkages to all 12 points.

Plan **Related Research Action**

1. Develop a Long-Range Strategy to Protect our Natural, Cultural and Recreational Resources.
   a. Develop, design, assess progress, and provide quality control to park resource inventories.
   b. Develop a "national research program plan" to identify the types of research needed by the USNPS as an integral part of the strategic management program in order to obtain resource knowledge and understanding and to develop and implement a long-term research initiative.
   c. Provide data as required to identify and describe hazardous waste problems.
   d. Plan and implement appropriate programs of research to provide the needed data for improved wilderness management research. Provide results in usable form to training, management and interpretation to support the application of ecological principles.
   e. Develop broadly-based cooperative research programs that take advantage of the expertise of other agencies and institutions to strengthen in-house research capabilities.
   f. Include cultural resources research needs in an integrated fashion as a part of USNPS science and research planning.

2. Pursue a Creative, Expanded Land Protection Initiative.
   a. Assist in the development of at-risk criteria (resources-based) for assistance in establishing acquisition priorities.
   b. Assist in land protection reviews.

3. Stimulate and Increase our Interpretive and Visitor Service Activities for Greater Public Impact; and

4. Share Effectively with the Public our Understanding of Critical Resource Issues.
   a. Develop an information transfer and technology transfer program to ensure (a) the public is provided accurate information to assist in understanding the nature of the park resource; (b) the flow of up-to-date, accurate research results to public affairs, interpretation, management and training, in usable form; and (c) the development of an information transfer capability (a new group or emphasis of responsibility) to provide information developed by research in usable form (relates also to #3);

5. Increase Public Understanding of the Role and Function of the National Park Service.
   a. Provide timely research results on the status of park resources in usable format to park management.
   b. Ensure the cooperative development of future cultural, natural and social science research efforts to maximize the utility of information available to managers of diverse park areas.
   c. Develop research that takes advantage of park similarities to reduce redundancy, but does not become too simplistic by not acknowledging individual differences.

6. Expand the Role and Involvement of Citizens and Citizen Groups at all Levels in the National Park Service.
   a. Participate actively and broadly in the NPS Blue Ribbon Panel effort to incorporate the broadest possible consideration of divergent views into these deliberations in order to ensure a positive and improved future role for park research.

7. Seek a Better Balance Between Visitor Use and Resource Management.
   a. Develop a consistent and focused research plan, to be implemented now and followed in the future, that will provide greater understanding of the expectations and behavior of park visitors and assist park management in dealing more positively with the public. (This program must provide more than "visitor use statistics" and should incorporate elements of both applied and basic sociological research.)

b. Provide quality data on all-terrain vehicle (ATV) resource issues and use conflicts, where data is lacking. Make existing data available (relates also to #3 and #4a).

8. Enhance Our Ability to Meet the Diverse Uses that the Public Expects in National Parks.
   a. As an outcome of the President's Commission on Americans Outdoors, develop a future research strategy to respond in a timely fashion to the issues forecast by the Commission.
   b. Provide useful research information for the Service's outreach program, to educate people about parks, park resources and the agency's preservation and conservation philosophy (see also #3, #4a. and #7a.).

9. Expand Career Opportunities for our Employees.
   a. The development of research expertise often works against mobility. However, there are occasions when personnel change is required. We should look at this in a rational fashion. Who are our researchers? What do they do, really? Where are they? How and where can we use their talents to maximum advantage?
   b. There is an established career ladder for researchers in the USNPS. For the most part, the opinion is that the Research Grade Evaluation Process (where in place) is working. There is always room for improvement, however. Issues that need to be dealt with include career crossover opportunities, advancement into research administration, supervision of researchers by persons other than those in the research organization, and the supervision and recruitment of supervisors for researchers and the research organization.

10. Plan, Design, and Maintain Appropriate Park Facilities.
   a. Basic resource inventories need to be provided to planners up-front and the most knowledgable consultation provided. The research organization should develop an up-front link to this process to avoid conflicts in the review of planning documents, environmental assessments (EA), and environmental impact statements (EIS).

11. Develop a Team Relationship Between Concessioners and the National Park Service.
   a. As in #10a., resource data, when made available in the proper form, can assist in formulating management decisions involving critical resources and the location of new facilities. This is an important consultative function of research.

12. Foster and Encourage More Creativity, Efficiency, and Effectiveness in the Management and Administration of the National Park Service.

a. The research organization, as a user and developer of information, must continue to seek innovative ways of handling the current data overload, make available state-of-the-art analytical techniques, and look toward future developments in this area (an example would be to develop an effective program to take advantage of new GIS methodologies).

b. As with any other organization, research should always strive to improve its creativity, efficiency, productivity and effectiveness through the innovating application of new methods, different approaches, and alternative scenarios. Research should also pursue all available avenues for greater information sharing and new cooperative liaisons to develop more accurate forecasts of future information needs. The establishment of a new Forecasting Futures group will assist research with these synthesizing endeavors; it will also share the knowledge gained with other NPS functions to support their strategic planning efforts.

c. The possibility of user fees supporting NPS research activities requires that we clearly identify the nature and scope of our present efforts (personnel, funds, and objectives). In so doing, the program should be articulated and justified to meet our present, and most importantly, our future needs. This effort should be related to resource management, interpretation and other management expenditures as clearly as possible. Costs should be estimated accurately and presented in a straight-forward fashion.

Conclusions

The 1986 Conference on Science in the National Parks focused on many important issues regarding science and its relationship to resource decisions or management in the US National Park Service. The discussions ranged far and wide. They covered research roles; the future of research; new areas of research; newly developed concepts and applications; the nature of a science-based organization; research networks; information transfer and communication of research results; the need for multidisciplinary cooperation in research planning; some concepts for integrating research into future NPS planning; and, current use of available research results.

This presentation only scratches the surface in its attempt to summarize the deliberations that emanated from the Conference. Indeed, the enthusiasm displayed by the conferees—and the seriousness of their dialogue in calling for positive directions and new opportunities for the USNPS science program—should not be overlooked. The Conference's success in focusing discussion on many important science issues should be viewed as an important part of the dialog that will determine the future role of research in supporting the

management and decision-making processes of the National Park Service.

Acknowledgements

Many persons contributed their expertise and thoughts to this report. Particular recognition is given to the 28 symposium leaders, the plenary speakers, and members of the two plenary research panels for their frank, concerned and open discussions which were so important to the success of the Conference and to the development of this manuscript. Thanks are also expressed to our Science Publications Editor, Jim Wood, of the NPS Science Publications Office in Atlanta, Georgia, for editing this report to final form.

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Raymond Herrmann, Geologist-Hydrologist, and Chief of the Applied Research Branch, Water Resources Division, National Park Service, Colorado State University, Fort Collins, CO. ✦

Development of Significant Cultural Resources to Promote Economic Revitalization: A Case Study in Western Pennsylvania

Ronald W. Johnson

In 1985 the US National Park Service (NPS) conducted a reconnaissance survey[1] in the southern Allegheny region of western Pennsylvania. Responding to a 1984 Congressional mandate for such a report, the NPS evaluated natural, scenic, recreational, and cultural resources in this region. The agency found that nationally significant cultural resources could serve as a focal point for a regional tourism framework. The NPS recommended that a combination of local, state, regional, and national interests could collectively promote the development of visitor-oriented programs, interpretive exhibits and waysides, and access to significant sites described in its report.

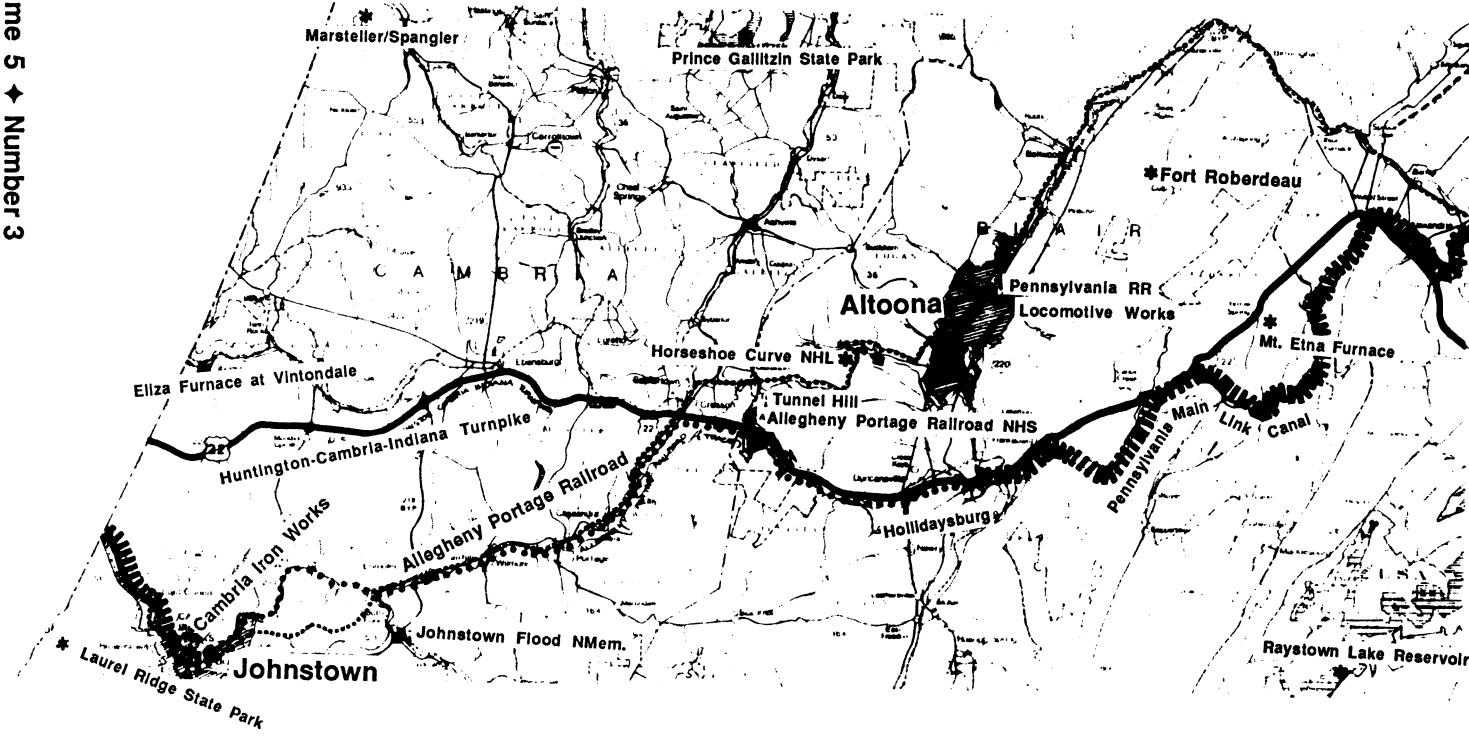
A crucial factor in this area of forested hills and rolling countryside is the rapid change in the local economy. Plagued by double digit unemployment and lack of job opportunities, western Pennsylvania is currently in transition from a primary emphasis on transportation and heavy industry to a more diversified economic base. Population and employment statistics reflect this transition, and the future economic health of western Pennsylvania is contingent upon how well the economic base is diversified. Traditionally, the local economy depended heavily on transportation as well as mineral-based industries such as bituminous coal mining and iron and steel production. Today, heavy industry has given way to growth in the service sector.

Tourism is a major and growing element in the area's economy. Regional and state tourism promotion staffs recognize that visitor dollars are increasingly important to the economy of the southern Allegheny region and to the state as a whole. The Southern Alleghenies Travel Council and other area travel promotion agencies seek to increase tourism and tourist dollars to the area. In 1984 travelers spent nearly $350 million dollars in western Pennsylvania. The total for the state reached 8 billion dollars in 1984, with tourism employing 200,000 workers. These expenditures become important when related to the increases in local/state tax receipts, employment and as an overall local economic stimulus.

Congressman John Murtha (12th district-Pennsylvania) represents an area east of Pittsburgh that contains suburbs, cities, small towns, and rural areas. The congressman, searching for new approaches to resolve the region's economic difficulties, introduced a motion that became incorporated in Public Law 98-473 (October 12, 1984) that, among other things, directed the National Park Service to "study roads in Pennsylvania in the area of Johnstown Flood National Memorial (NM) and Allegheny Portage Railroad National Historic Site (RR NHS) for consideration as Parkways." Congressman Murtha recognized beneficial economic impacts that NPS-managed areas have on local communities in his district and throughout the state and nation. For example, the Allegheny Portage Railroad NHS attracted 70,000 visitors in 1985 and Johnstown Flood NM[2] about 51,000. The 14 National Park Service administered areas in Pennsylvania attracted a total of some 11 million recreational visitors in 1985. On the larger issue of overall tourism impact, the congressman asserted in late 1985:

> *Tourism must be part of our effort at redeveloping the economic base of western Pennsylvania. It is difficult for many people to compare the impact of tourism with the obvious presence of a steel mill or a computer center. But tourism is the third-largest retail business in America, producing $215 billion in economic development and 4-6 million jobs.* [The (Johnstown) Tribune Democrat, November 30, 1985.]

The study team did not receive undue pressures from either agency officials or congress to find "something" significant to promote as a new park. Had the study team not found any nationally significant resources, that would have ended potential NPS involvement other than a minor assistance role.



Area Map of the Study Area in Cambria and Blair Counties in Western Pennsylvania

What evolved during the study process was a purely technical evaluation of natural, cultural, scenic, and recreational resources of the southern Alleghenies. This was done through application of standard NPS criteria for national significance and integrity; analysis of the resources; and recommendations for protecting and making those resources accessible for visitor enjoyment and economic benefits.

A four member Denver Service Center (DSC)[3] study team consisting of a landscape architect, historian, transportation specialist, and community planner worked closely with the superintendent and staff from Allegheny Portage Railroad NHS to produce, in seven months, a *Reconnaissance Survey of Western Pennsylvania Roads and Sites.* The team made its first field trip in March, 1985, and completed the study in late September. The document was released to the public at a press conference chaired by Congressman Murtha on November 29, 1985, and on January 31, 1986, the House of Representatives Appropriations subcommittee on parks and related agencies held field hearings in Johnstown on the plan's findings. Twenty-three representatives from various levels of government, private groups, and trade associations, enthusiastically endorsed the NPS report. The printed testimony supports the observation that western Pennsylvania contains a number of sites that could be developed as tourism magnets.

Initially the DSC team focused on a seven county region in the southern Alleghenies that consists of Bedford, Blair, Cambria, Fulton, Huntingdon, Somerset, and Westmoreland counties. Bonded by cultural and geographical similarities, this region has many historical, natural, and scenic resources and diverse opportunities for year-round outdoor recreation. Visitors enjoy skiing, sight-seeing, boating, swimming, horseback riding, fishing, hiking, camping, and hunting, and there is potential for enhanced tourism. Access to the region from the Pennsylvania Turnpike (I-76) to the south may be gained in less than an hour's driving time by using U.S. highways 220, 219, 119 or historic route 30. Pittsburgh is about 85 miles to the west, and Washington, Philadelphia, and Baltimore about 3-4 hours by car.

The study area included parts of two major North American physiographic provinces—valley and ridge to the east and north and the Appalachian Plateau to the west and north. The highest area that bisects the study area is the Allegheny Front, a formidable mountain ridge during the region's settlement and one that physically separates the region today.

Following fieldwork and data analysis, the team identified a two county core study area (Blair and Cambria) with nationally significant and intact transportation and industrial resources. In addition to natural, scenic, and recreational attributes in the Cambria and Blair county area, the cultural resource base was found to provide the greatest potential for a new tourism focus. The resources of these two counties are linked by geography and man-related activities. The DSC team evaluated two major concentrations of cultural resources in Altoona and Johnstown as well as scattered ancillary resources in outlying areas (Plate 1). The two groupings of resources, if properly

Plate 1: Pennsylvania Railroad Shops, Altoona, PA (Ca. 1889)

managed and promoted, could serve as an integral part of an increased visitor interest in the southern Alleghenies region and provide the foundation for a tourism-oriented approach to economic growth and development. No federal fee acquisition of private property has been recommended; instead a series of options to identify, protect and interpret significant resources, as well as attract more visitors, has been submitted for public scrutiny.

The Resource Base

The southern Alleghenies reflect a rich and diverse history. As with many regions throughout the nation, the historical origins and development of western Pennsylvania were marked by exploration and settlement as well as bloody conflict between Native Americans and the advancing pioneers in the mid-18th century. Although agriculture provided an early mainstay to the local economy, transportation was the original growth industry in western Pennsylvania. This was followed by iron and steel production.

Roads and Canals

The region witnessed improvement from ancient Indian paths to trails and primitive roads, and the construction of frontier tollroads such as the 77-mile-long Huntingdon, Cambria and Indiana Turnpike in the early 1800s. In the 1820s and 1830s the state built the Pennsylvania Main Line Canal, a major east-west corridor through the area. This canal linked Philadelphia with Pittsburgh. In 1831, construction had reached the tiny frontier community of Hollidaysburg, at the eastern side of the steep Allegheny Front. By 1834 the innovative Allegheny Portage Railroad connected Hollidaysburg with Johnstown, 37 miles to the west.

The 37-mile Allegheny Portage Railroad consisted of a series of ten inclined planes—five on one side of Allegheny Mountain and five on the opposite side. Traffic moved upward and downward on both series of planes. Each plane had two tracks with an endless hemp cable moving up one track and down the other, to which the ascending or descending cars were attached. The weight of the ascending cars was balanced against the descending cars on each plane. Steam locomotives moved the cars between the planes. The highest point on the route was 2334 feet above sea level, nearly 1400 feet above the canal basin at Hollidaysburg and about 1150 feet above Johnstown. The horizontal railroad tracks were laid on two rows of stone "sleepers" with metal fasteners set into the rock. The tracks of the planes were iron straps nailed to wooden rails and held in place by wooden cross-ties.

Thus heavy barges were hauled over the steep hills between the two communities. Despite this ingenious system, the Pennsylvania Canal heyday ended quickly. However, while it lasted, it had sparked much growth in the frontier communities astride its path. Hollidaysburg, Johnstown, and Blairsville owed much to its development.

Railroads

By the 1850s the Pennsylvania railroad had reached the Allegheny Front, acting as a stimulus to the formation and development of Altoona. The construction, in 1854, of the Horseshoe Curve[4], just west of the city, permitted trains to ascend the Allegheny Front and cross the mountains. Muleshoe Curve, an equally important construction project on the Allegheny Portage Railroad, was made obsolete along with the entire system when the new railroad began operations. Horseshoe Curve has provided a vital link in east-west rail traffic since the 1850s and this engineering marvel continues to serve Conrail (successor to the Pennsylvania Railroad) as a mainline transportation system.

The Pennsylvania Railroad constructed its support facilities in Altoona. Huge locomotive works known as the Altoona machine shops and Altoona car shops provided stable employment for thousands of workers since the mid-19th century. Altoona attracted the finest

mechanics, engineers, artisans, and craftsmen of the day, and it was a veritable mecca of 19th century railroad technology. A department of physical testing was established in 1874, a chemical laboratory a year later, and a bacteriological laboratory in 1889. By 1889, with demand outpacing capacity to produce, the Pennsylvania Railroad had built the Juniata shops for the construction of locomotives. This complex was located northeast of the Altoona car shops. Buildings and tracks covered an area of 218 acres and according to one historian comprised the "largest group of railroad shops in the world." (Alexander, 1947:133.) This complex employed 11,200 persons at its prime; by the end of World War II, 7,000 locomotives had been built in Altoona (Plate 2).

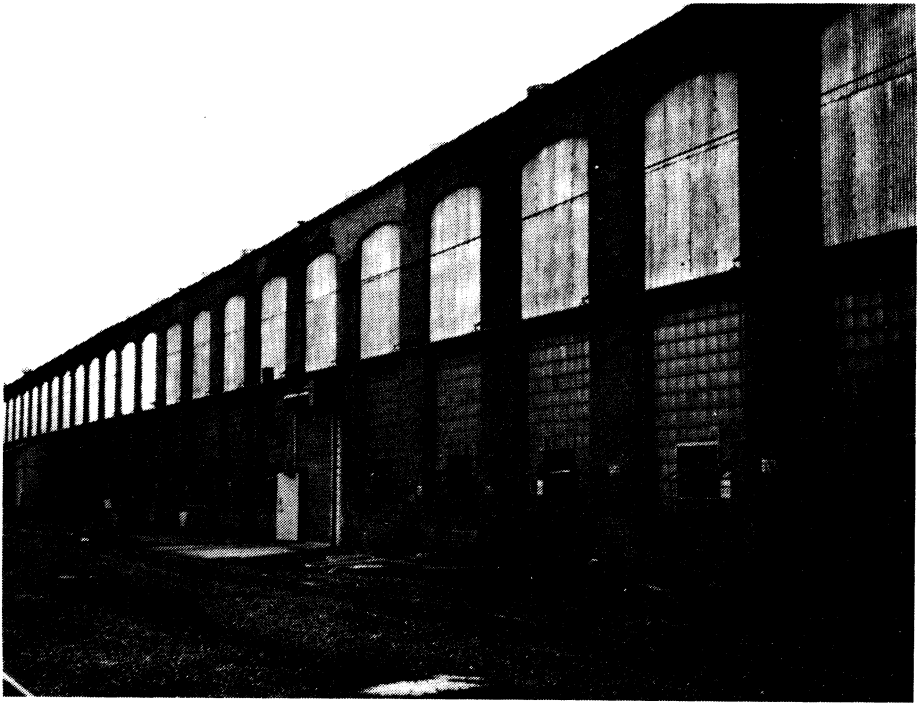


Plate 2: Pennsylvania Railroad Shops, Altoona, PA (Ca. 1889)

In the final decades of the 20th century, changing modes of transportation such as highways and automobiles, trucks, and planes have led to a precipitous decline in the rail industry in Altoona. The once teeming car shops are vacant or turned to other uses by local businessmen. No locomotives are built in Altoon today, although large-scale locomotive rebuilding and repair operations continue at the historic Juniata shops. Giant roundhouses, shops and ancillary

buildings have been demolished to avoid unfavorable taxes on unused plant and equipment.

Although much is known about the history and socioeconomic impact of the Pennsylvania Railroad in Altoona, no actual site surveys or evaluation work has been conducted at the former locomotive works or car shops. Local preservation groups, such as the Railroaders' Memorial Museum are attempting to fund evaluation of extant significant cultural resources before the buildings and equipment are destroyed.

Iron and Steel

Along with the growth of transportation, the iron and steel industry at Johnstown grew to national importance in the mid-19th century. From its early days the iron industry was localized in Pennsylvania and elsewhere throughout the eastern U. S., a local industry with small output and economic impact. For example, a small iron industry prospered in Johnstown in the early and mid-19th century because of the availability of ore, limestone, and wood, along with a good transportation system afforded by the Pennsylvania Canal. On the other side of the Allegheny Front, Juniata Iron became renowned throughout the eastern seaboard for its high quality. But as local raw materials were depleted and the need for additional capital intensified, the iron industry became concentrated, and Johnstown emerged as one of the early centers. Although the giant Carnegie Steel Company and its successor U. S. Steel Corporation in Pittsburgh have garnered the limelight through the years, early technological development in Johnstown helped spark subsequent growth elsewhere.

The Cambria Iron Company began in Johnstown in 1852 and was regarded by its contemporaries as the greatest of the early iron and steel works. By 1860, just prior to the Civil War, the Cambria Iron Company had 1,900 employees on its rolls and was the largest iron-making firm in the nation, and by the late 1880s, it employed 7,000 workers.

Daniel J. Morrell, general manager of the Cambria Iron Company from 1856 to 1884, either brought to Johnsown or kept there the leading metallurgists and technicians of the iron industry. This favorable situation was instrumental in helping introduce the revolutionary Bessemer process (developed in England) of steel making to the United States in the mid-1860s. Experiments with the Kelly converter, considered by many industry authorities as a precursor to the Bessemer converter, also occurred at the Cambria Iron Company between 1857 and 1862. Thus the Cambria Iron Company provided a prime training ground for many technicians who furthered subsequent growth of the steel industry in the Monongahela River valley near Pittsburgh in the mid-1880s.

The most important single innovation of the pre-Civil War years came out of the Cambria plant in 1857—John Fitz's three-high rolling mill. With this breakthrough in rolling iron in mass quantities,

Cambria became the technological leader in producing iron rails for the rapidly expending railroad industry. The production of quality rails established Johnstown as one of the nation's foremost iron and steel centers. By 1876 Cambria's rail production exceeded any other American plant, with 10 percent of the total nationwide rail output.

The Cambria Iron Company also employed other new technology in the 1860s and 1870s, including the open-hearth process of steel production. The celebrated "Cambria Link" barbed wire helped fence the open range of the American west, and a huge output of springs, plow steel, rakes, and harrow teeth, and other agricultural implements flowed from the Cambria Iron Company in the late 19th century.

Despite rapid growth in the steel industry, which resulted in the demolition of many early buildings and equipment, and the disastrous floods that have plagued Johnstown through the years, remnants of the original Cambria Iron Company exist on the grounds of a Bethlehem Steel Company plant in Johnstown[5]. Even though the 1980s' precipitous decline in steel production has led to the razing of many Bethlehem structures in Johnstown, at least six buildings dating from the early Cambria Iron Company remain: an 1854 blacksmith shop, an adjacent office building, a pattern shop/wood shop with a hose tower, a car shop, an iron foundry, and a later-19th century office building in downtown Johnstown that survived the great 1889 flood (plate 3). Similar to the lack of survey and evaluation of the Conrail facility in Altoona, little site specific work has occurred at the Bethlehem plant (Cambria Iron Company) in Johnstown.

While it is true that the two active heavy industrial centers are not presently conducive to preservation activity or visitation, the resolution of certain health and safety issues would fit these complexes for serving the tourist public. Many basic industrial plants throughout the nation are open to public tours. Effective methods must be devised to separate visitors from active industrial processes and to protect visitor safety in touring historic facilities.

Concepts for the Future

Using these nationally significant cultural resources as a foundation, several alternatives for preservation, interpretation, and development associated with the origins and growth of western Pennsylvania seem appropriate. The options offer preliminary guidance on how significant cultural resources in the southern Alleghenies should be treated, and contain several implementation approaches. While the strategies address natural, recreational, and scenic resources, those that present the most potential for attracting new visitors are the cultural resources.

The first alternative, individual site preservation and promotion, emphasizes site-specific preservation of a number of significant cultural resources in Cambria and Blair counties. Preservation activity would be conducted on a site-specific basis by existing organizations without any umbrella coordinating agencies. It entails the structural preservation of:

1. Pennsylvania Canal features
2. Allegheny Portage Railroad NHS
3. Staple Bend Tunnel
4. Horseshoe Curve
5. Pennsylvania Railroad (Conrail) Locomotive Works
6. Cambria Iron Company Buildings
7. Johnstown Flood National Memorial

Visitors would be offered low-key opportunities to learn about specific sites as they relate to the origins and development of western Pennsylvania, especially themes of transportation and basic industrial growth. They could receive interpretive materials and on/off site presentations without any comprehensive interpretation of the interrelationship of the sites listed above. Interpretation would be the responsibislity of local, private, state, and federal agencies or groups without formal coordination or organization.

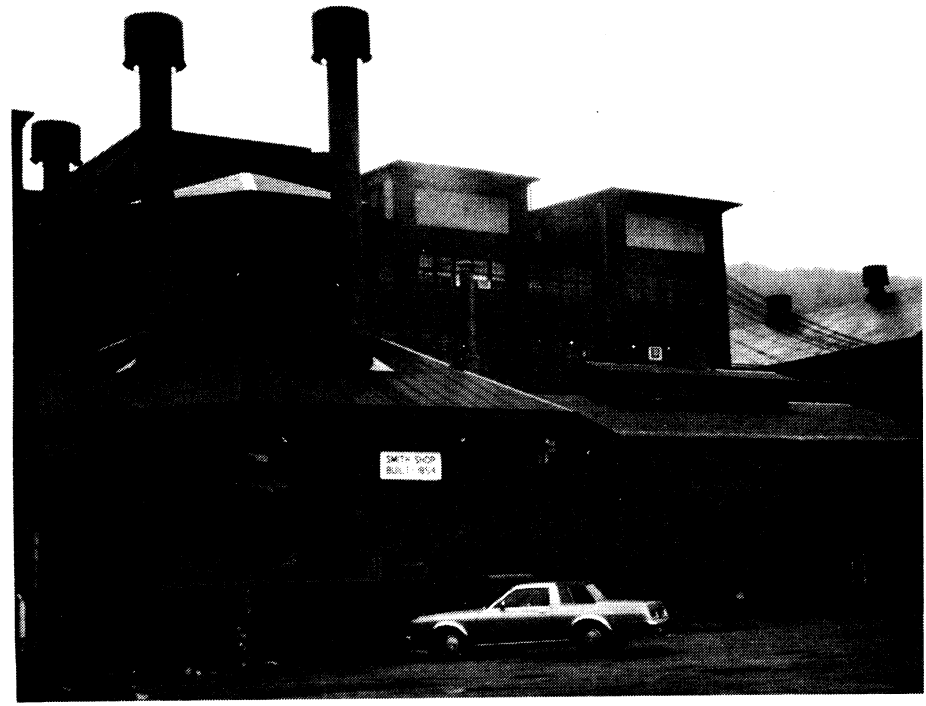


Plate 3: Blacksmith Shop, Cambria Iron Company—1854

The second alternative, individual community development and promotion, emphasizes a comprehensive, community-wide approach to interpreting and promoting two prominant cultural resources

themes—transportation and iron/steel production. Johnstown and Altoona provide the primary focus. The major resources related to transportation include Horseshoe Curve, the locomotive works and private railroad museum in Altoona, the Pennsylvania Canal basins in Hollidaysburg and Johnstown, the Allegheny Portage Railroad NHS, Staple Bend Tunnel, and the Johnstown Inclined Railway[6]. Major resources linked to iron and steel production comprise the six remaining buildings from the Cambria Iron Company as well as Johnstown's Prospect Hill and Westmont neighborhoods. An interpretive/tour route along existing roads would connect these resources and follow the general alignment of the Allegheny Portage Railroad to emphasize an early transportation system. Visitor information and interpretive sites could be established in Altoona and Johnstown.

The main focus of visitor experiences would be to create an understanding for the strategic role this region had in transportation and iron/steel production. This would be accomplished through:

1. Creating an in-depth visitor experience relating to iron and steel themes within the Johnstown area. The Cambria Iron Company complex could provide the principal focus.
2. Providing a comprehensive visitor experience relating to the transportation theme in the Altoona area. The locomotive works and Horseshoe Curve could be the principal sites.
3. Designating and developing a tour route within each community and a link between them to highlight features such as the Allegheny Portage Railroad.
4. Establishing a central visitor facility in each community to provide initial visitor contact, education, and information.

The combination of major cultural resources, undeveloped countryside, and charming communities, could be linked by a tour route to provide an informative and enjoyable visit. Effective preservation, interpretation, and promotion of significant cultural resurces would help visitors understand the transportation and iron/steel stories.

The third alternative, the trans-Allegheny link cooperative community approach, embodies the provisions of the previous strategies and unites several clusters of cultural resources along and adjacent to the Pennsylvania Canal such as the Allegheny Portage Railroad and the route of the Huntingdon, Cambria, and Indiana Turnpike, with Cambria Iron Company remnants and the Altoona locomotive works. A study should be conducted to survey, evaluate, and determine if a feasible existing or new automobile and non-motorized trail route could link primary cultural resources. If an existing route is appropriate, state scenic road designation could be sought.

The designation of a scenic road would entail improvements such as interpretive signing, information kiosks, and turnouts for resting and sightseeing. These improvements would afford visitors opportunities to become acquainted with diverse experiences offered by western Pennsylvania's Alleghenies. The selection of an existing

road for such a designation would be based on aesthetic qualities foremost.

If construction of a new road seemed more appropriate, the possibility of designing and constructing a new parkway would be evaluated. If a parkway concept results, it should not be considered just another road, but instead as a linear park through scenic lands where a road encourages visitor appreciation of the area's rural countryside, farmsteads, and small towns.

The parkway option could upgrade the quality and heighten the range of visitor experience. Its primary purpose would be to dedicate a strip of land for improving aesthetic experiences while uniting nationally significant cultural resources such as the Allegheny Portage Railroad NHS, Johnstown Flood NM, and perhaps portions of the Pennsylvania Main Line Canal.

A scenic road or a newly constructed parkway would link the region's unique resources to promote the area's identity. A scenic road designation, a parkway project, or a more formal designation of existing U.S. 22 as a state scenic highway would promote the idea of a major tour route.

The fourth and last study alternative—regional cooperative development and promotion—highlights a more comprehensive appreciation of cultural and historic sites, and emphasizes their accessibility, use, and protection. Not only would the significant cultural resources at Johnstown's Cambria Iron Company, Altoona's locomotive works, and Horseshoe Curve receive attention, but so would lesser known cultural resources that provide additional education about the region's role in transportation, and the coal, iron, and steel industries.

To expand the transportation theme, certain portions of the Pennsylvania Canal including turning basins, canal locks, and canal traces would be interpreted. The area of interest would be the canal remnants to the east and west of the Allegheny Portage Railroad NHS.

To integrate the history of coal mining with iron production in the region, several locally significant sites that predate the Cambria Iron Company would be interpreted. Early iron producing facilities such as Mt. Etna in Blair County, including workers' cabins, company store, and furnace, would provide a complete ensemble, and at Vintondale in Cambria County, the Eliza Furnace remains extant. Marsteller, in northwestern Cambria County, provides one of the region's best examples of a company coal town. Complete with abandoned mines, tailings piles, housing, and a company store, Marsteller provides a glimpse of the lifestyles and conditions of the coal industry in the early 20th century.

To interpret the rail era, not only would the Altoona locomotive works and the nearby Horseshoe Curve receive attention, but also Muleshoe Curve and the Johnstown rail station. As the area's frontier iron industry evolved into large-scale steel production, the demand for and local availability of iron ore, limestone, clay, and coal was as important as development of the canal and railroad to move finished goods to market.

As discussed in the previous alternatives, a scenic road or parkway would link these resources along with a series of integrated tour routes. Tour routes would utilize existing roads in the region and would be well marked with the appropriate logo or symbol. The establishment of a series of tour routes provides visitor exposure to additional regional themes, attractions, and visitor services and promotes interest in coal mining, local handicrafts, mountain and lake recreational sites, and the rural landscape.

Various cultural resources would be interpreted in a comprehensive visitor experience. To maximize visitor exposure and opportunities, efforts should be made to integrate them into a regionwide tourism promotion:

1. **Visitor information centers.** At strategic regional crossroads, information centers would provide the traveler with brochures and maps about tourism opportunities in the southern Alleghanies. The purpose of any center should be to attract interstate travelers and acquaint them with locally available tourism opportunities.
2. **Johnstown visitor information center.** Johnstown station could be used as the initial stop for visitor information and orientation. Through audiovisual programs, exhibits, maps and handouts, the center would stimulate further investigation of why this community became an early center in American industry.
3. **Cambria Iron Company.** Opportunities to view the remaining six buildings are crucial to the understanding of their significance to the growth of the area's industrial economy.
4. **Cambria Iron Company office building.** To gain an understanding about the historical evolution of iron and steel production in the Conemaugh River valley, the Cambria Iron Company office building in downtown Johnstown could serve as an interpretive center. Historical displays, audiovisual programs, and other materials could provide a link between past and present.
5. **Bethlehem Steel.** No tour or visit to Johnstown would be complete without an understanding of what has evolved in the steel industry, what current technology has accomplished, and what it means to the region and nation. Modern steel-making is an education in the forces that combine energy and raw materials to make consumer goods. Some creative way should be found to allow visitors to observe this process.
6. **Horseshoe Curve.** It is important to interpret the Allegheny Portage Railroad stop by acquainting visitors with the engineering technology that made it obsolete. The NPS could cooperate with the city of Altoona in the development and interpretation of the site.
7. **Hollidaysburg.** This community is an important link in the portage railroad story. Hollidaysburg was the western terminus of the Juniata Division[7] of the Pennsylvania Canal, and here the boats were placed on inclined railroad cars for the journey over

the Allegheny Front. Through an interpretive exhibit or wayside, the visitor could learn how this important system functioned.

8. **Altoona Locomotive Works.** The historically significant complex is currently a part of the Conrail repair works. Visitors could observe locomotive repair work activity and photograph late 19th century industrial structures.

Conclusion

As of this writing, funds have been appropriated for research and planning, and a Draft Action Plan has been prepared. Thus far local reaction has been extremely favorable, but the need for coordinated action remains. A unified approach to publicize significant resources for enhanced visitation and economic development has yet to be implemented. According to a key point made in the 1985 *Central Pennsylvania Tourism Opportunity Analysis* too many small groups are trying to carry out their own tourism promotion programs. For example, in Cambria County three groups and one umbrella organization market their area to the business, family, and group travelers: The Cambria County Tourist Council, the Prince Gallitizin Tourist and Trade Association, the Tourist and Convention Committee of the Greater Johnstown Chamber of Commerce, and the Southern Alleghenies Planning and Development Commission. Each of these groups has its own budget, overhead expenses, and marketing strategy.

To overcome this fragmentation, the **Analysis** states:

> *It would behoove representatives of the county organizations to work with the Matching Fund coordinator of Pennsylvania's Bureau of Travel Development to determine how arrangements for cooperative tourism promotion could be made without jeopardizing existing state matching grants. According to that official, if the county tourist promotion agencies (tpa) in the area organized formally into one regional effort, the new agency would be eligible for matching funds, providing the necessary tpa designation change was made by each county involved. Our office would be willing to assist them in the necessary paperwork that is needed for any tpa merger.* (Central Pennsylvania Tourism Opportunity Analysis, 1985.)

Soon after the NPS released the *Reconnaissance Survey, The* (Johnstown) *Tribune-Democrat* commented:

> *The (NPS) study provides further proof that the region need not be a tourism lightweight. But coordination must replace fragmentation, although that does not necessarily dictate an unbending regional approach to the tourist trade.....*
>
> *At issue now is whether the area will be able to get together to decide on a course of action and who will do what tasks. Or will officials simply stumble along on the basis of suspicions, jealousies, and individual pride.* (Tribune-Democrat, December 4, 1985.)

As has occurred elsewhere, perhaps the creation of a special commission or association comprised of representatives from various levels of government, business, and commercial groups and individuals may work cooperatively to overcome inertia that one finds when a comprehensive organization is not present. At this point the NPS has given Congress and residents of the southern Allegheny region a list of ideas to convert into reality in order to implement a new tourist focus involving the recycling of an outmoded industrial infrastructure.

Precedents for interagency commissions have proven successful elsewhere. The Lowell Historical Preservation Commission was created in Lowel, Massachusetts, in 1978. This organization has presided over the economic revitalization of a decaying milltown. However, success in Lowell with its commission does not insure a similar approach would necessarily work in Johnstown or Altoona. These two communities, although important in their own right, are not in close proximity to a large metropolitan center like Boston with its large high-technical infrastructure and supporting population.

A number of steel and railroad industry preservation efforts are advancing in other areas. Birmingham, Alabama, now manages the historic Sloss Iron Furnaces, a 30-acre site with two 7-story blast furnaces and several ancillary structures. The former iron-producing complex serves as a downtown focus and community center. In spring 1985, U. S. Steel and the National Trust for Historic Preservation commissioned a joint $90,000 marketing study of the 170-acre Joliet works in Joliet, Illinois. According to a National Trust official the "goal of the study is to create jobs and businesses while preserving historical structures." (*Chicago Tribune*, May 28, 1985.) Youngstown, Ohio, has followed a different path. There, plans to preserve a closed steel mill were abandoned several years ago, but the state assisted with a $3.8 million appropriation to construct the Youngstown Industrial Museum. The North Carolina Division of Archives and History is developing a multimillion dollar state transportation museum on the site of the Southern Railroad's nationally significant Spencer shops. Finally, preservation and tourism promotion efforts are advancing in Butte, Montana to utilize the defunct copper industry as a resource base.

Due to its embryonic stage, the western Pennsylvania cultural resource protection and tourism development project has not reached the level of development that several communities elsewhere have achieved. What some observers see as a 10-to-20-year process only began in 1985. The NPS reconnaissance survey calls for research and evaluation to further define national significance by using historians, archeologists, and historical architects, the preparation of National Register of Historic Places nomination forms, and the funding of a detailed management plan for the resources. Another strategy would entail a marketing study to evaluate the feasibility of turning heavy industrial resources into economically viable, functioning attractions. Johnstown and/or Altoona could possibly tie into the National Trust for Historic Preservation Critical Issues Program.

Presently local preservation interests are preparing a proposal for matching National Trust funding for such a study in Johnstown. Congressman Murtha and his staff are preparing a bill to ask for ongoing NPS involvement. Local interests and organizations have banded together to attract funding and organizational support for historic preservation in Johnstown and Altoona and elsewhere in the Southern Alleghenies of western Pennsylvania for nationally significant cultural resources as a means of helping rebuild the local economy.

It will likely take combined efforts at the local, state, and federal levels, involving both the private and public sector, to insure the protection of the region's significant cultural resources and thus provide the needed focus for a major new tourism promotion. While it should not be considered a total panacea, the success of this new effort will help give needed diversity to the region's economy and will bring widespread visitor recognition of the role these significant cultural resources played in the industrial growth of the United States.

Endnotes

1 A reconnaissance survey involves identification and description of an area's resources, evaluation of the significance of those values against standard NPS criteria, and analysis of the need for protection of the area's resources. Rich Giamberdine, Mike Spratt, Keith Dunbar and Ron Johnson prepared this study. Many of the ideas presented herewithin represent the collective ideas of the four planners.

2 Allegheny Portage Railroad NHS commemorates an 1830s trans-Allegheny transportation system and Johnstown Flood NM is the site of an earth dam that failed on May 31, 1889, causing a flood that resulted in $17 million of property damage and that took some 2200 lives.

3 The Denver Service Center provides nationwide planning, design, and construction assistance to the entire NPS. This large central office employs approximately 530 professionals and support staff.

4 Horseshoe Curve is a 2.5 mile-long U-shaped curve with a gentle grade.

5 Bethlehem Steel is the direct corporate descendent of the Cambria Iron Company.

6 The Johnstown Inclined Railway was opened for public use in 1891 to offer effective transportation to newly established neighborhoods on the heights above Johnstown.

7 The Juniata Division connected Harrisburg and Hollidaysburg and the Western Division linked Johnstown and Pittsburgh. The Portage Railroad connected the two.

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Economic Values of Wildlife and Fisheries[1]

—What Importance are Those Values in Decision Making?—

Al Lovaas

These are unusual questions for me to answer. We—or at least I—seldom think of fish and wildlife in National Park System areas in an economic sense. We usually approach natural resource situations and problems from a different perspective, in my opinion, and I'll spend most of the rest of my time trying to explain. Of course, fish and wildlife in National Parks are economically valuable, both directly and indirectly. A direct value is sport fish used for food. And fish, meat and furs taken in Alaskan areas by sport and subsistence users are locally important. But these direct values pale in comparison to indirect values. Fish and wildlife help attract millions of visitors to National Parks each year, generating many millions of dollars in expenditures. Those dollars benefit the travel and tourism industries and trickle or flood through much of the national economy. If I understand what I think I learned from the paper by the economists yesterday[2], I guess those dollars changing hands represent financial values rather than economic values. But the economists also noted fish and wildlife have positive economic values by possessing the essential properties of providing satisfaction and enjoyment to consumers and of being scarce, in that consumers want more than are available. That's deep enough into economic theory for the purposes of my talk. Commercial photographers also cash in on the attractions of

fish and wildlife in national parks and area entrance fees provide Federal income.

Rephrasing the title slightly, (1) does the U.S. National Park Service treat fish and wildlife as special resources because they are economically valuable? My answer is no; (2) are those values important in decision making? My answer is yes, they are very important. If that sounds incongruous, I'll try to explain, taking each question in turn.

The U.S. National Park Service is Congressionally-mandated to provide for enjoyment of its areas while leaving them unimpaird for future generations. We try to protect total natural environments or ecosystems. Only in a few areas are we given special responsibilities for protection of individual species or features. We try to maintain ecological processes and minimize impacts brought about by the actions of people. In Alaska, we are directed by the Alaska National Interest Lands Conservation Act (ANILCA) to protect environmental integrity; and to assure continuation of biological processes unimpaired by adverse human activity. Under such mandates individual parts of the environment, such as fish and wildlife, cannot be singled out for special consideration just because they are more economically valuable than other parts.

Fairly heavy stuff! Now for some examples—consider a moose in a national park. Sighting a moose or other widlife is a highlight for most visitors. But people don't travel thousands of miles and spend hundreds of dollars just to see a moose—even the most rabid mooseophyles among them. If they want to see a moose, they can get a much closer look at a local zoo. They come to the park hoping to see a wild, unfettered moose or other wildlife in natural, unspoiled habitat. The greater the human influence on the scene, the lesser the enjoyment and appreciation of the experience. Would the parks be as attractive without the wildlife? I'd say not nearly as much. That gives greater economic value to the wildlife, but not greater ecologic value.

For further examples of lack of special treatment for economically valuable species, I'll point out some of the things we **don't** do in national parks. We don't manage for sustained yields or multiple use; we don't plant fish to improve fishing; we don't, anymore anyway, kill predators to save Bambies; we don't manipulate habitat to produce more fish and wildlife; we don't fertilize lakes to improve fish production and, in fact, we are planning to remove an out-of-place fish ladder from an Alaskan park, which is almost heresys to some Alaskans. We don't even introduce such magnificent species as Merriam's turkeys to areas where they are not indigenous.

As an enthusiastic hunter and fisherman myself, and I especially miss turkey hunting at this time of the year, I want to explain that I do not believe there is anything intrinsically wrong with use of manipulative practices in fish and wildlife management. That is, if those practices are carried out in appropriate places, which do not include the national parks. The nation obviously needs development of natural resources. But it also needs the less than four percent of its

area which is preserved in the National Park System. That is indicated by millions of annual visitors, making overuse the greatest danger to many parks. Management goals for national park areas are different, not necessarily better or more noble, than goals for most other areas. We do at times manipulate habitat or species, not because they are economically valuable, but only to compensate for disruptions that occurred in the past or unavoidably occur now.

For another example, ANILCA allows subsistence and sport hunting, fishing, and trapping in many national parks in Alaska. But ANILCA emphasizes protection of environmental integrity by requiring maintenance of natural and/or healthy populations of fish and wildlife. It subordinates harvests and yields to that requirement.

To sum up so far, I maintain that fish and wildlife in national parks have economic values; that we do not treat fish and wildlife any differently than any other resources just because they have those values; but rather that we treat fish and wildlife like all other components of natural ecosystems.

Now, for question two. Of what importance are the economic values of fish and wildlife in decision making? I said they are very important and I will try to explain why.

Again, fish and wildlife in national parks are economically valuable because they have special attraction to visitors and other users. Those uses must be balanced against the disruptions they can cause to the natural environment.

For some examples, I'll stick to Alaska this time. Nearly all of our fish and wildlife management here is management of people. How do you manage a humpback whale? Obviously you don't. But, when the endangered whales left Glacier Bay precipitously in the late 1970s the park responded by putting tight restrictions on vessel entries, including cruise ships, and we spent quantities of dollars quickly on whale research. Some of the expenditures were spurred along by members of Congress, newspaper editors, and others of influence. The National Marine Fisheries Service helped us with the research. Our goal was preservation of an endangered species as part of the environment while determining and allowing acceptable use levels. Another example, the increasing sportfishing of rainbow trout in Katmai National Park and Preserve, much of it generated and serviced by commercial guides, led us to fund a study to evaluate the condition and use of the fishery. This study was done cooperatively with the Alaska Department of Fish and Game and the U. S. Fish and Wildlife Service. Our purpose was to determine how to preserve the fishery as a vital part of the ecosystem while allowing its use. Obviously economic activity in the area will suffer if the fishery is damaged but, while we are well aware of that, our primary responsibility is to the total environment. Another example, apprehension about effects of traffic on observability of wildlife along the Denali National Park road led us to a high-priority study which was recently published in *Arctic*. Denali wildlife attracts thousands of viewers. Traffic is restricted and most viewers are required to ride buses to reduce disturbance to the wildlife. The study results reinforced the need for the traffic

restrictions. But by far the greatest expenditures of fish and wildlife research and monitoring dollars in Alaska are on populations consumptively used for sport and subsistence. The purpose is to maintain natural and healthy populations through regulation of human activity, not to develop ways and means to improve or enhance the populations. A final example: bears and sport fishing are prime visitor attractions at Katmai. Based on research and observations, we recommended to the Alaska Board of Fisheries this year that the bag limit for salmon should be reduced at Katmai; for bear protection, not salmon protection. In the recent National Geographic Society TV special on the grizzly were scenes of fishermen and fisherbears elbowing each other for space along the banks of the Brooks. While we can't reduce the fishermen's determination to catch their limits, we can reduce the limits, and thus reduce their periods of most intensive angling concentration and competition with the bears. The result should be safer fishermen, and a more natural bear population.

As a matter of fact, immediate problems, including those with economic considerations, influence decision-making so much that other, just as important but less crisis-oriented research and management, suffer. Consequently, the National Park Service is renewing an initiative for natural resource inventory and long-term monitoring. Inventory and monitoring have been neglected through the years because of the lack of immediate payoff. By inventory we mean acquiring, managing, and analyzing information on resources; including presence, distribution, and condition of plants, animals, water, soils, air, natural features, land cover, and natural processes[3]. By long-term monitoring we mean systematic data collection on the condition of those resources over time, largely to detect natural and man-caused changes; to assess effects of the changes; and to direct appropriate actions[3]. A related effort is protection of genetic diversity. Unfortunately, funding for the short-term is much easier to get than funding for long-term. This time, however, initial funds are available and we have commitment all the way from the top through Director Mott's Twelve-Point Plan for the National Park Service. We believe this initiative holds more promise for management of natural environments than the more crisis-oriented projects which predominate today. For example, for years an unquestioned policy of complete fire suppression was a key management strategy. We would have realized the error of our ways much earlier through natural resource inventory and monitoring. Possibly similar discoveries lie in wait. We are pleased that the draft U. S. Arctic Research Plan, prepared under the Arctic Research and Policy Act, places emphasis on long-term monitoring for all Federal lands in that area.

To sum up again, and finally, fish and wildlife in national parks do not get special treatment because they are economically valuable. But, they **are** economically valuable because they are consumptively and/or nonconsumptively used. That **use** is what is important in decision-making. It can disturb natural environments and ecosystem processes by impacting the fish and wildlife components and thus it results in special treatment.

Nobody—not in the U. S. National Park Service, anyway—ever claimed that maintaining natural environments while providing for their use and enjoyment was easy, or cheap.

Notes:

1 Paper prepared for a panel discussion on "Economic Values of Wildlife" at the 1987 Meeting of the Northwest Section of The Wildlife Society, Juneau, Alaska, March 30-April 2, 1987.

2 Loomis, J. B., G. Peterson, and C. Swanson. 1987. The conceptual foundation for valuing wildlife and fishery resources. Paper presented at the annual meeting of N. W. Section of The Wildlife Society, Juneau, AK, March 30-April 2, 1987.

3 Evison, B. 1987. N. P. S. memorandum to Alaska Region Superintendents: "Action Item, Create usable resource inventories for each park." March 11, 1987.

Al Lovaas, Chief, Division of Natural Resources, National Park Service, Alaska Regional Office, 2525 Gambell Street, Anchorage, AK 99503-2892. ✦

Reviews

El Niño in the Galápagos Islands: The 1982-1983 Event," edited by Gary Robinson and Eugenia M. del Pino. Published by the Charles Darwin Foundation for the Galápagos Islands, Quito, Ecuador, 1985. xxvi + 534pp. [Available, while supply lasts, for US$12.00 plus postage, from Fundación Charles Darwin, Casilla 3891, Quito, Ecuador.] Reviewed by *Lloyd L. Loope.*

This book documents the extreme climatic and biological events that took place in the Galápagos Islands between October 1982 and August 1983. 'El Niño' is a naturally recurring phenomenon (at 3-15 year intervals) in that part of the Pacific that involves failure of SE trade winds, warmer ocean temperatures, less upwelling of nutrient-rich cooler water, heavier than normal precipitation, and stronger than normal waves and tides. Many of us first became aware of the 'El Niño' phenomenon through news reports of the 1972 event which triggered a drastic decline in the Peruvian anchovy fishery, and sent poultry prices up in the United States. The 1982-83 event was also the subject of many news reports—involving flooding on the west coast of the United States, unprecedented drought and destructive fires in Australia, and abandonment of Christmas Island by its huge seabird colonies. During January-March 1983, the period of El Niño's climax in the Galápagos, Hawaii had an unprecendented drought, which thoroughly dried moss-covered logs in Hawaii's rainforests.

The consensus of the book's authors is that the 1982-83 event was the most extreme such event in a 100-year period. In a 12-month period of 1982-83, the Darwin Station on Santa Cruz Island, which normally receives less than 10 inches of annual rainfall, received 130 inches of

rain. Simultaneously, near-surface ocean temperatures rose 2°-5° C and the food supplies of ocean-dwelling animals declined dramatically. The biological effects of this event were striking, with the rough generalization applicable that marine organisms were affected negatively while many terrestrial organisms flourished.

The book is comprised of 30 papers, with 14 in Spanish and 16 in English. Abstracts of all papers are given in both languages. Many of the authors are scientists who happened by chance to be working in the Galápagos at the time of the event. Most of them had data on normal baseline conditions of the populations with which they were working. Others are perceptive local observers. Still others are international experts on the "El Niño" phenomenon. The editors, Gary Robinson (City College of Santa Barbara) and Eugenia M. del Pino (Catholic University, Quito), have done an excellent job of recruiting contributions that complement each other and provide an excellent overview of the event. I will attempt to hit some of th high points from my perspective as a terrestrial plant ecologist interested in plant-animal interactions.

Peter Kramer's foreward to the book calls attention to the value of the story it tells as a "basic conservation lesson." "Populations and biotic communities must be sufficiently protected and large enough to be safe not only when average environmental conditions prevail, but also during times of climatic extremes and stress."

Part I, entitled "Oceanography," provides information on the complex interrelationships among flunctuations in climate, sea level, near surface temperatures, salinity, nutrients, and phytoplankton biomass. A crucial contribution was made by researchers from Duke University and the Ecuadorian Fisheries Institute (Kogelschatz *et al.*) who by chance happened to start a time sequence of detailed monitoring of ocean conditions off Isla Santa Cruz in June 1982 in order to document the "normal" baseline conditions; with 18 months of triweekly sampling at depths of 0, 10, 25, and 60 meters, they were able to document both the "normal" and extreme El Niño conditions. At the height of the El Niño event, inorganic nutrients were greatly depleted in the upper 25 meters of water; phytoplankton biomass was reduced to 30 percent of the normal level. Changes in distribution and density of phytoplankton were readily detectable with satellite-derived color images of the Galápagos Archipelago and adjacent waters.

The article by Godfrey Merlen, which comprises Part II, provides a valuable synthesis of the event from the viewpoint of an experienced local observer. Merlen has long been a resident of Puerto Ayora, Santa Cruz, and was working as a National Park Naturalist Guide during 1982-83. He describes eloquently the heavy rainfall events and accompanying consequences—spectacular lightning, roof leaks, electrical failures, a sharp increase in fire ants, dying marine life, luxuriant verdure of vegetation, etc.

Part III deals with effects on marine life. Gary Robinson provides an excellent overview of this topic, and nine accompanying papers fill in details for particular taxa. Widespread mortality occurred for many

types of corals, many endemic fishes, sessile invertebrates, sea lions, and other species that normally thrive in the relatively cool waters around the Galápagos. Marine iguanas declined by 30-55 percent; flightless cormorants by 45 percent; Galápagos penguins by 78 percent. On the other hand, species characteristic of Pacific warm water areas increased. Robinson suggests that rare events such as the 1982-83 El Niño may have important evolutionary effects through severely depleting and isolating populations, setting the stage for the production of new species.

Effects on the terrestrial fauna and flora are given in Part IV. Ole Hamann's contribution details the spectacularly positive immediate effects of the heavy rainfall on Galápagos vegetation. "When water was no longer a limiting factor for plant growth, a great number of species were able, not only to germinate and grow, but also flower and fruit abundantly, both in arid and in humid vegetation types." However, some species (e.g., *Opuntia* spp. and *Bursera graveolens*) were negatively affected by waterlogging of the soil, which often resulted in physical collapse of root systems. Hamann also makes an interesting point regarding the possible role of extreme El Niño conditions in colonization of the archipelago and individual islands within the archipelago by new plant species through facilitation both of transport and establishment.

The paper by Weber and Beck of the University of Colorado Museum describes devastation to Galápagos lichens and mosses. Crustose, foliose and fruticose lichens were destroyed through physical souring of water and through rotting. Mosses of watercourses and of the forest floor were washed away or covered by flourishing herbs and vines. The most common bryophytes of the highlands thrived so well that they tended to crowd out relatively rare mosses and large foliose lichens.

The paper by P. R. and B. R. Grant on responses of Galápagos finches and their habitat to the heavy rainfall is one of the more definitive in the volume, thanks to intensive documentation of habitat ecology and population dynamics of these birds by the Grants and coworkers on several of the more pristine islands during a decade of study. Several species of plants fed upon by finches underwent an extended flowering season under these conditions. *Croton scouleri*, for example, which normally flowers once or twice a year, was found to flower 5 to 7 times, with a proportional increase of seed production. Insect populations flourished (though they later crashed before the rains ended, perhaps because of a buildup of parasitoids or because of a defensive response of the plants). Feeders on seeds and insects, the finch species studied produced four or more clutches of eggs in a year (*vs.* one clutch in a normal year). The biological potential of the large cactus ground finch under the heavy rainfall conditions was indicated by one highly successful pair that laid 29 eggs in 7 clutches during the 9-month period and fledged 20 young! However, the maximum size attained by the overall breeding population was only 50 percent above levels of the previous year, probably because of high levels of nest desertion and of predation on fledglings by mockingbirds.

Their longevity, slow metabolic rate, and low mortality rate enable the famous Galápagos tortoises to "wait out" extreme environmental conditions, as detailed by Linda Cayot of Syracuse University. They were perhaps the least affected of all Galápagos organisms by the 1982-83 event.

Part V is entitled "Man and the El Niño Event." I must confess that I gathered less detail from this section since all five papers are in Spanish. The heavy rains were disastrous for the major road in the islands, on Santa Cruz from the Baltra ferry to Puerto Ayora, as well as for a newly constructed children's park on San Cristóbal. In both cases, planners grossly underestimated the potential maximum rainfall events of the islands. Unavoidably, the normal cultivated flora around houses in towns of the arid zone suffered from too much moisture. Many fast growing, moisture-loving tropical plants, including fruit trees, thrived around habitations of Puerto Ayora after 10 months of wet weather; a few months after the normal drought conditions returned, they had perished. Agricultural enterprise in the Galápagos is normally favored by rainfall events, yet this El Niño weather provided far too much of a good thing. Rough seas, heavy rains, and lack of sun made for unhappy tourists. The local human population had a higher incidence of disease during the inclement weather.

Kramer is certainly correct in urging consideration of this case history as a basic conservation lesson. It provides a superbly documented example of the potentially overwhelming ecological importance of infrequent meteorological events. I would go further perhaps in suggesting its use as supplementary reading in beginning ecology classes, perhaps even in basic biology college courses, in conjunction with films on the Galápagos. The archipelago has admirably served for well over a century as a conceptual microcosm of evolutionary processes, made famous by Darwin's writings and by David Lack's book, "Darwin's Finches." As is the case with evolutionary interpretations, the low species numbers and relatively simple ecosystems of this isolated archipelago make ecological interactions more understandable. This book is a classic treatise on within-site environmental variation and its effects on organisms.

Lloyd Loope, Haleakala National Park, Makawao, Hawaii. ✦

Letters and Notes

From Javier G. Perez Calvo, Biologist-Independent Researcher, Republica Argentina. 31 July 1987.

We can say with no doubt that information is the main support of land and park management. It is true that park and land managers sometimes research on a certain subject, but the planning and the course of action is based on the previous work of a plethora of authors.

This is the rule for North America and a few other countries. But, what happens in countries like Argentina where nearly no information about basic biology of wild species (no matter animal or vegetal) exists?

To give an idea we may say that Argentina is inhabited by nearly 950 bird species and more than three quarters of them are known by anecdotal information only. A good approach to the state of knowledge for South America's mammal fauna can be found in Special Publication Pymatuning Laboratory of Ecology No. 6 (1982) (see the article written by Mares).

At the moment we all know that if we do not act promptly, natural areas of the world are in serious danger

Let us suppose that after a legal and burocratic fight a national park or any other kind of natural reserve is created. This is very satisfactory but bearing in mind the scarce information about wildlife for the mentioned region, the question is: and now?

I would like to comment on the tendencies I detect in my country—they are:

a) to copy foreign models;
b) develop local research projects

It is not necessary to say that the mere copy of a management model usually finishes in a disaster, but it is difficult to avoid the magnetism of certain well essayed methods. The sequence of reasoning is: the method has proved to be good (but a lot of miles away!!), landscapes seem to be similar, so if it is good there, it must be good here too. No more words...

The second tendency is more convenient, but (there is always a but) some observations can be made about it. When a research project begins, at least in my country, there is no guarantee that the flow of funds will be maintained for enough time. So the most common fact is to find that research work finishes "abruptly" in more or less the middle part of it. So the investigator tries to obtain "results" and "conclusions" without enough field data. This may be understandable, but it has a perjudicious side effect, because lacking data is often replaced with studies made in other regions (U.S.A. for example) and the whole work (with only **half** part of it useful) is used to raise a management decision (and not **half** a decision).

Sometimes foreign investigators come to these regions to begin or conduct a research project. What about this? Well, your body can be in another country, but your ideas probably are still placed in the region

you know better. So, these studies and projects have a foreign profile, because of methods proved to be good (a lot of miles away)...and so on...

At this point, it is important to say that in my country wildlife and land management do not exist as formal bodies of knowledge (they cannot be studied in universities as specialties).

At last, we realize that we are always relying on information coming from other countries. The information can be excellent, but it was generated **for other** environments.

To sum up, some recommendations can be made:

a) Planning and management decisions in such cases (very scarce previous information available) must be made with extreme caution, including broad margins for possible mistakes.
b) It is urgent to avoid the transplantation of models from other regions to "bad known lands."
c) Before applying a technique or methodology in regions where scarce information is available, it must be tested to obtain first a correct idea of its suitability, and solely after concrete results.
d) It is important to remember that research in basic biology of animal and vegetal species is the initial step in planning a good conservation program.

Needless to say that I have exposed my own opinion, but to finish giving the spirit of this brief note I would like to say that when walking through forests, jungles, steppes, mountains or pampas of the "bad known lands" remember that probably they look like.....but they are not the same.

Javier G. Perez Calvo, Olascoaga 1005, 8300 Neuquen, Provincia del Neuquen, Republica Argentina.