

Human Ecology Review

*Winter 2000
Volume 7
Number 2*

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*Anne Kitchell, Willett Kempton, Dorothy Holland
and Danielle Tesch*

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The Phenomenology of Global Warming
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Human Ecology Review (ISSN 1074-4827) is a refereed journal published twice a year by the Society for Human Ecology. The Journal publishes peer-reviewed research and theory on the interaction between humans and the environment (Research in Human Ecology), book reviews (Contemporary Human Ecology), essays and commentary on special topics relevant to human ecology (Human Ecology Forum), and letters, announcements of meetings, awards and other items of interest (Human Ecology Bulletin). Information for contributors to the refereed section is published on the inside back cover. For contributions to the journal, contact Linda Kalof at the above address. Information is also at www.humanecologyreview.org.

Human Ecology Review is indexed or abstracted in **Elsevier Biobase/Current Awareness in Biological Sciences**, **Environment Abstracts**, **Environmental Knowledgebase** (<http://www.iasb.org>), **Environmental Periodicals Bibliography (EPB)**, **Linguistic and Language Behavior Abstracts**, **Social Planning and Policy Abstracts**, **Uncover**, and **Sociological Abstracts**.

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On the Cover

"Lower Falls," Yellowstone National Park, Wyoming, by *Paige Tucker*

Ethologists for the Ethical Treatment of Animals (EETA)

Mission Statement

Marc Bekoff and Jane Goodall would like to form a group to be called "Ethologists for the Ethical Treatment of Animals" (EETA). The purpose of EETA is to develop and to maintain the highest of ethical standards in comparative ethological research that is conducted in the field and in the laboratory. Furthermore, we wish to use the latest developments from research in cognitive ethology and on animal sentience to inform discussion and debate about the practical implications of available data and for the ongoing development of policy. If you are interested, please contact Marc Bekoff at <Marc.Bekoff@Colorado.edu> or at EPO Biology, University of Colorado, Boulder, Colorado 80309-0334 USA.

Identities and Actions within Environmental Groups

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Abstract

Individuals' self-described identities were hypothesized to change as a result of participation in voluntary face-to-face groups engaged in environmental action. Semi-structured interviews and a standard interview test of identity were conducted with 159 members of 20 environmental groups and 2 non-group comparison samples from North Carolina and the Delmarva Peninsula. In agreement with the theoretical literature, interview text suggests that individual identity forms and changes over time — we refer to these transitions as “reformulations.” Definitions of self that prevent the further development of an identity as an environmentalist, or that lead to an unwillingness to perform a particular environmental action, are here called “barriers.” Interviews were coded for identities, reformulations, barriers, and actions taken, revealing significant differences across types of groups. Although some of the variation among groups may be explained by prior individual differences leading a person to join a compatible group, the qualitative interview data suggest that many of the differences come about in the processes of participating in the group and carrying out actions encouraged by the group. This perspective on action, that it leads to identity formation, is in contrast to a traditional view that environmental actions follow from attitudes, values, or knowledge of environmental damage.

Keywords: *environmental groups, identity, new social movements, civic action, identity change*

Introduction

In the years following the emergence of the contemporary environmental movement in the late 1960s, national opinion polls began to reveal strong public sentiment for the movement. By the 1990s, not only did poll respondents say they are in favor of environmental protection, but a majority

said they consider themselves “an environmentalist.”¹ This percentage is important as an index of the high degree of Americans' favorable relationship to the movement and, from the pragmatic viewpoint of an activist, suggests a potential for greater environmental activism by the public. However, it has been difficult to surmise just what people mean when they tell pollsters that they are environmentalists. Respondents could not mean, for example, that they are members of an environmental group, because only 15% of the US population say they belong to environmental groups,² a fraction of the 50-70% who say they are an “environmentalist.”

A recent theoretical approach joins the role-based theory of identity from G. H. Mead with the cultural-historical developmental approaches of L. S. Vygotsky and M. M. Bakhtin, to posit that people form identities over time as they interact with others in relation to a culturally defined sphere of action (Holland et al 1998; Holland 2000; Holland and Lave 2001). Identities are culturally influenced labels that have become personally important in the cognitive and affective organization of self. They are self-understandings that people rely upon to organize their thoughts and feelings about themselves in relation to activities and to the responses received from others. To the extent that the culturally defined sphere of action incorporates widespread cultural values, identities formed in those spheres are an avenue through which values are integrated into daily practice. An identity as a particular type of environmentalist — which may be called a conservationist, a person who cares about the earth, an Earth First!er, or other types — affects the actions that one undertakes and the values that one's actions manifest.³

From our research, we know that “environmentalist” is a personally important label, one that activists deliberate over in making self-labeling decisions. However, as we have studied environmental groups over the past several years, participated in their events, and interviewed their members and leaders, we have found that the label “environmentalist” is

too multiply defined to be treated as a descriptor of equivalent identities. Not surprisingly, given the dynamic development of the environmental movement over the past thirty or so years, there are a variety of discourses of human-environment relations.

Studies such as Brulle (1996) and McLaughlin and Khawaja (2000) distinguish discourses in the movement, but, unlike the current study, they are not based on observing and interviewing these groups directly. For example, Brulle (1996) examines the historical emergence of environmental discourses in philosophy and literature, and analyzes the writings of major environmental organizations. On the basis of these written materials, Brulle identifies six major discourses: conservationism, preservationism, ecocentrism, political ecology, deep ecology, and ecofeminism. The groups that we have studied incorporate and combine some of these discourses and also vary them in response to different contexts of action. Thus, the environmental identities fostered by the groups we study embody such discourses but also are strongly influenced by practice.

When we look at individual environmental groups, we find that members' definition of themselves is consistent with the group's identity, and with the environmental actions that the person does. For example, a member of a national environmental group who lacks experience in a local group may consider herself an environmentalist because she sends a check annually, and because she reads — and gets agitated about — a quarterly newsletter. By contrast, a member of a direct-action group may feel that one must participate in civil disobedience to be so considered, or they may even tell us that "environmentalist" is too ambiguous and they consider themselves "an activist."

Interpretations of human-environment relations are reflected in the groups' models of the sources of environmental damage. Groups "figure" the world of environmental action differently and subscribe to different narratives of blame and responsibility (Holland et al. 1998; Holland 2000). In our study, we have observed that groups out to stop chip mills and asphalt plants are active because their experiences with corporations and government have led them to civic actions — whereas, for a contrasting example, groups oriented to changing lifestyle think much more about millions of individual consumer purchases and disposal acts affecting the environment and are less likely to take civic actions. That is, we expect that concepts of self as an actor and actions taken vary according to the perceived world, which in turn corresponds to the group of participation.

The range of actions our informants consider environmental includes private consumption and disposal actions, passive reception of information, as well as public or civic actions — and our interviews cover all of these. This is in

contrast to most of the social movements literature which focuses on publicly visible political action, although some acknowledge that actors moving toward public actions are also worthy of study (McCarthy and Wolfson 1992).

These considerations have led us to study the link between environmental groups and identity. This paper analyzes identity, changes reported in identity over time, and reported "environmental" actions taken — comparing all of these across a range of environmental groups. In addition to individuals developing environmental identities participating in local environmental groups, environmental groups also develop group identities, reflected in the group's name and self-description, the issues members address, and the type of actions they encourage and endorse. These identity processes, observable through ethnographic study, lead to several questions. Do individuals' understandings of themselves — their self-descriptions — vary by the group to which they belong? How are individuals' environmental actions related to their identities? In terms of the level of activism taken by groups, there are two extremes. At one end of this theoretical continuum are members of direct action groups like Earth First!, at the other end are the public, non-environmental group members, and somewhere in between are the mail-in groups. When we consider other dimensions than just level of action, however, it is clearly not a scale but a branching tree, with groups focusing on actions within the home, protecting a particular resource for extractive use (hunters, fishers), and political action groups — which have different premises, problems, and self-definitions.⁴ Do the types of action and levels of action that individuals engage in vary by the group in which they are involved?

Groups Sampled

We studied in detail 20 groups that include local pro-environmental groups, a mail-in group, resource users, and a wise-use group to represent much of the diversity in a larger sample of 566 environmental groups (including 120 school groups) we have enumerated in North Carolina and the Delmarva Peninsula (Kempton et al. n.d.). We have also included two non-group comparison samples: environmental scientists (mostly from the NC Environmental Protection Agency), as well as a public sample drawn from both Delmarva and NC. We will refer to the 20 environmental groups, plus these two comparison groups as the "22 groups studied." We clustered these 22 groups into 11 type classifications, in order to increase sample sizes and facilitate group comparisons. The 11 group classifications are radical, civic, national, lifestyle, environmental justice, students, conservationists, wise use, fisheries groups, scientists, and the public (please see Figure 1). In this paper, we will refer to the 22

groups as just “groups,” and the 11 clusters of similar groups as “group types.”

We chose to include student environmental groups, resource user groups, and environmental scientists within our study not because we consider them to fit common images of “environmental” organizations, but because we are interested in identity development and its relationship to action among all participants in the environmental movement, not just those who might be considered typical pro-environmental activists. Relatively more civic groups are included in our sample, representing both their greater proportions in our complete enumeration and their diversity. Note that, unlike Brulle (1996)

and related work, we distinguish environmental groups not only on the basis of their discourses but also their members’ actions and identities — resulting in a rather different clustering of groups. For example, we cluster all national groups into one type because, regardless of the groups’ discourses, members take very restricted action (read newsletters and write checks) and members’ identities seem little different regardless of which group they belong to. On the other hand, we distinguish between conservationists, fisheries and wise use groups because, despite similarities in their discourses, members’ identities and actions are very different. We summarize our types briefly here, then give more complete descriptions below.

Figure 1. Organization of Environmental Groups by Group Types

1	Politically Active	Radical	Earth First!, Ruckus Society, Green Delaware
		Civic	DE Nature Society, DE Sierra Club, Nanticoke Watershed Preservation Cmte. HazTrak Coalition, Citizens Unite, Concerned Citizens of Rutherford Cnty
		Environmental Justice	Several NC groups
		Lifestyle	EcoTeam, Earthaven
		National	Environmental Defense (NC & Delmarva)
2	Resource Users	Students	Newark High School Nature Society, Student Environmental Action Coalition
		Conservationist	Ducks Unlimited
		Wise Use	Blue Ridge Gamelands Group
3		Fisheries	Tangier Sound Watermen’s Association, Pamlico Fisherman’s Auxiliary, New River Fishing Association
		Scientists	NC EPA and others
		Public	NC & Delmarva samples

Boxes indicate 11 group types discussed in this paper. All groups are local except for National group type. Radical, civic, and environmental justice group members are active in political sphere, and members of conservation, wise use, and fisheries groups are identified as natural resource users.

1. Traditionally included in literature on environmental organizations
2. Non-traditional environmental groups included within our study
3. Non-group comparison samples

Radical: local; direct action, confrontational; biocentric, sometimes anarchist ideology

Civic: local (sometimes around one community or environmental problem); political action and networking; very diverse issues

National: national; mail-in membership, advocacy by staff

Lifestyle: local; focus on improving members' sustainable living practices and consumer actions

Environmental Justice: collection of several local NC groups that oppose environmental threats to the quality of life of racial minorities or poor people

Students: local; high school and college environmental clubs

Conservationists: local; while allowing some human use, in this sample, a majority are hunters; focus on land conservation and habitat protection

Wise Use: local; resource users; focus on maintaining human use rights

Fisheries Groups: local; commercial fishermen organizations; work to preserve stock but with minimal regulations; equate healthy ecosystem with maintaining healthy fish harvests (this is a specific example of a more general type, a resource user group)

Scientists: EPA environmental professionals and a researcher from University of North Carolina; science training

Public: sample of local population of adults (NC and Delmarva)

The following provides a brief description of each of the individual groups within each classification. All individuals are given pseudonyms, but group names are the true names unless noted otherwise. This description will give the reader a sense of the diversity of environmental groups we have studied, and help in interpreting subsequent tables.

Radical. There were three groups interviewed that we considered "radical": Earth First!, Ruckus Society, and Green Delaware. We chose to include this group type in the study because these members represent the extreme of direct environmental action, and we expect to see major differences in the identity these groups project compared to some of the mainstream groups. Earth First!, nationally known for promoting civil disobedience, is a loosely organized direct action group with a biocentric ideology that seems to materialize in local areas where environmental conflicts are heated. We interviewed members of a particular Earth First! group focused on opposition to new chip mills proposed in western NC and carrying out direct action to block them. The Ruckus Society, formed in 1995, provides training in the skills of non-violent civil disobedience to help environmental and human rights organizations achieve their goals. Our field workers attended a training workshop in order to interview

participants who were members of various direct action groups. Less radical than Earth First! and Ruckus, Green Delaware (GD) is a group formed by several long-time activists, to cooperate on action towards their various personal causes. It organizes demonstrations but not direct action; by its rhetoric, it is considered extreme by some other groups and state government staff.

Civic. The civic environmental groups compose our largest classification and include a combination of local groups opposing a specific facility, an umbrella group, and more broad-based groups. These groups typify participation of the citizen activist at the local/grassroots level within the environmental movement. Members interviewed from these groups were on activist or planning committees and are representative of highly involved levels of participation (unlike those in our national group sample who may have also belonged to a local group, but were not so highly involved). Groups that oppose specific local development include Citizens Unite (CU — a group pseudonym) and Concerned Citizens of Rutherford County (CCRC). CU is a neighborhood group from NC that formed in response to concerns over construction of a nearby asphalt plant. Although CU actions centered on organizing a political campaign against the plant, they, over time, expanded their focus to encompass air and clean water issues within the county and surrounding jurisdictions. Also from the NC area, CCRC is an effort on the grassroots level to fight high-capacity remote wood chip mills. This community-based effort has been ongoing for four years, and the group sees the next several years as the turning point in putting the chip mill issue on the local, state, regional, and national agenda. The HazTrak Coalition is a local political action group in Delmarva that organizes people, individuals and groups to campaign on issues related to groundwater. As an alliance or umbrella group, HazTrak provides training for individuals or groups on how to successfully address environmental problems.

The more broadly based civic groups include the Delaware Nature Society (DNS), Delaware Sierra Club (DSC), and the Nanticoke Watershed Preservation Committee (NWPC). DNS was founded in 1964 as, in their words, a membership organization that "fosters understanding, appreciation, and enjoyment of the natural world through education, preserves ecologically sensitive areas, and advocates stewardship and conservation of natural resources" (DNS 2000). It is Delaware's largest statewide environmental activist and lobbying organization, working with other groups, government agencies and landowners to realize its mission. DSC is a local chapter of the national Sierra Club, a subset of members who meet locally and carry out both educational activities and lobbying. The NWPC is a citizen group that is part of the Nanticoke Watershed Alliance in

Delaware. Their focus is the protection of the Nanticoke River and its associated watershed by petitioning local government, and by increasing awareness through organized activities on the river.

National. To capture mail-in group members, interviews were done with a random sampling of Environmental Defense (ED) — previously known as Environmental Defense Fund — members living in NC and Delmarva. ED is a national organization that combines legal and scientific expertise and works through the courts, legislators, or cooperatively with corporations to solve environmental problems (Brick 1995). Participation in ED activities by members interviewed, unlike involvement in local groups, is limited to financial contributions.

Lifestyle. Earthaven and Global Action Plan EcoTeam were included in this study to represent groups focused on reducing environmental impacts through change in personal consumption behavior, in contrast to political or civic actions. Earthaven, a live-in community based in NC, is a living demonstration of a “neo-tribal ecovillage” dedicated to caring for people and the earth by learning, living and demonstrating holistic, sustainable culture. The Household EcoTeam Program is a local program through Global Action Plan for the Earth. The EcoTeam program was formed in 1989 to promote environmentally sustainable lifestyles by encouraging changes in daily behavior that are environmentally friendly. EcoTeam members meet monthly over an six month period to evaluate prescribed methods to reduce waste, use less water and energy, buy “eco-wise” products and encourage others to get involved.

Environmental Justice. The informants in these interviews were members, mostly leaders, of several local environmental justice groups in NC. Groups vary in formal organization and include loosely organized community associations ranging in activity from protests and rallies, to workshop training and conference organizing, to provisioning of financial and human resources for other groups. They share a focus on environmental threats due to historical racial or economic discrimination. Environmental threats are conceptualized as affecting their quality of life, including the human-constructed and social environment as well as the natural environment.

Student Groups. Often neglected in the literature on environmental groups, students participating in high school and college campus environmental groups were included in this research. The two selected for closer study were Newark High School Nature Society (NHSNS) and the University of Delaware’s Student Environmental Action Coalition (SEAC). NHSNS states their goal as being to help students become involved in environmental activities and show that problems are based on science as well as political and social factors.

SEAC at the University of Delaware (now renamed Students for the Environment but referred to as SEAC in this paper) is affiliated with the national organization of the same name.

Conservation. We have divided resource user groups into conservation, wise use, and fisheries groups. The conservation group we sampled is a Maryland regional chapter of Ducks Unlimited (Ducks). Established in the 1960’s, the mission of Ducks is to raise money to preserve and protect waterfowl habitat and educate the public about wetland and waterfowl management. Most members contribute financially; many but not all are duck hunters. All Ducks Unlimited interviewees also participated in the chapter’s organizational committee.

Wise Use. Although not a self-described wise use group, we categorize the Blue Ridge Gamelands Group (BRGG—a pseudonym for the group) as such because their focus is more about opposing restrictions on hunting privileges rather than habitat protection. This group began as a loosely formed grassroots group of hunters and gameland advocates in western NC protesting the exclusion of hunting rights in their traditional hunting grounds as a result of state park designation. Members agree the property should be protected from development; however, they resist loss of their common and traditional use rights in exchange for increased forest/outdoor recreation tourism. A coalition developed which linked BRGG with other multiple-use advocates (e.g., forest products, rifle/gun clubs) “against environmental advocacy groups such as the Sierra Club.” The group’s enlarged agenda now may be advocacy of hunting rights on all NC State parks.

Fisheries Groups. Another resource user classification we separate from conservation and wise use groups are those that represent the interests of the commercial fishermen. Members of these groups are concerned about the ramifications of government regulations imposed on the fishing industry (Weeks and Packard 1992). Although environmentalists sometimes blame them for declining fish stocks and habitat destruction, members of fisheries groups often support environmental protections (especially restrictions on land-based activities that damage fisheries). Three fisheries groups are included in this study because they address environmental policy and because of their own assertions that they are stewards of the waterways. The New River Fisherman’s Association (NRFA) was established in NC to unite and organize fishermen against the numerous fishing regulations and laws, promote letter-writing campaigns, and unite with other fishermen’s associations. Tangier Sound Waterman’s Association (TSWA) is a social network of watermen from Smith Island, MD. They originally formed as a community trade or occupational association, but over the past few years, they have been forced into political action

after the Chesapeake Bay Society convinced local government that crabbing was the cause of the blue crab decline and had the fishing season stopped. Also included in the study is the Pamlico Fishing Auxiliary (PFA), a group founded by fishers' wives to insure husbands out at sea would have a voice at public hearings and regulatory meetings. The women describe their objective as ensuring that fishermen are treated equitably.

Scientists. This set does not represent an organized association of scientists, rather it is a compilation of interviews with a convenience sample of environmental professionals — mostly researchers working with the US Environmental Protection Agency offices in NC. We use “scientists” as a short label, but actually two informants specialize in administrative or educational functions within the agency. We include them because of their identification with an occupational or professional role in environmental action, and as a contrast to environmental groups *per se*. Although interview quotations will show that the scientists distinguish themselves from “advocates”, all but one reported being involved at some time with at least one local or national environmental group.

Public. To serve as our study’s control group, two public samples, one covering the northern part of the Delmarva Peninsula and the other, the Rutherford and Boone areas of NC, were randomly selected from phone books. This set of 16 interviews was not chosen on the basis of involvement with an environmental group; therefore, it does not represent a local group. Interestingly, 40% of the ten asked from our public sample in fact, had belonged to at least one local environmental group at some point, and 10% had been members of a national group. This level of involvement in local groups is substantially higher than the national average of 15% mentioned earlier. However, group membership within our public sample is still lower than for those selected from groups — the public sample averaged membership in 0.8 environmental groups, compared to 4.5-6.3 range for those selected for being in civic or national environmental groups respectively. As this paper will show, despite group involvement, we see significant differences between the public sample and those selected as group members.

Table 1 shows age, education, and gender characteristics of the 11 group types. Some differences are predictable, lower age for the student group members, higher education for the scientists, no women in the sampled conservation or wise use groups. However, our sample of national group members in NC was oddly high in age, possibly due to an idiosyncrasy of recruiting in this area or, perhaps just a fluke of small samples. Demographic variables have been examined in previous studies of environmental opinion (Mohai and

Twight 1987), and because of irrelevance to our hypotheses, they are not tested for here. Because various groups with similar, but not identical, characteristics were combined into a general group type for analysis, our discussion will note any significant differences among individual groups within a group type.

Table 1 also shows percentages answering affirmatively to the question asked in the Gallup poll, “Do you consider yourself to be an environmentalist, or not?” Although this question is not ideal for our research, it is useful as a comparison to prior national polling. In our study’s groups, we would expect the majority of individuals to respond in the affirmative because they are members of some environmental group. The exception is with the public sample, and here we would expect a similar percentage to respond in the affirmative as is seen in national surveys — about 50% in 1999 (Gallup 1999). What we found, as shown in Table 1, was that the majority of individuals within all group types said they considered themselves environmentalists, ranging between 100% (radical, lifestyle, environmental justice, and national) to 50% (wise use).

For consistency in the paper, we order groups in Table 1 and subsequent tables identically, the ordering based on a combination of group structure and salience of self-identified environmentalist labels.

Methods

For each of the 22 groups described here, detailed semi-structured interviews were conducted with at least five members (plus one to two leaders), and participant observation

Table 1. Affirmative responses to Gallup question and demographics by group types.

Group type (n)	Considers Self an Environmentalist	Age (mean yrs.)	Education (mean yrs.)	Sex (%F)
Radical (16)	100%	41	16	44%
Civic (41)	93%	50	16	63%
National (12)	100%	62 ^b	18	42%
Lifestyle (12)	100%	51	17	83%
Environmental Justice (6)	100%	48	15	33%
Students (15)	87%	19	13	73%
Conservationists (8)	88%	42	15	0%
Wise Use (8)	50%	40	14	0%
Fisheries Groups (20)	75% ^a	47	11	45%
Scientists (5)	60%	48	18	40%
Public (16)	57%	57	15	38%

^a100% of TSWA considered themselves “environmentalists” compared to 71% and 57% of NRFA and PFA members respectively.

^bThere is a distinct age difference between the Delmarva and NC national group sample; mean ages were 46 and 83 respectively.

was carried out with all the local groups (not scientists, public, or national group). The interviews provide insight into personal history and identity formation of individual group members; observations helped confirm reported behaviors.

In the interview, group members are asked to describe their identity, their relationship to the environmental movement, their life history of concern about the environment, group memberships and environmental actions taken in the present. In the first section of the interview, informants are asked to list up to twenty words or phrases answering the question, “Who am I?” — a standard instrument developed by Kuhn and McPartland (1954). The next question asks, duplicating a periodic Gallup Poll question, if they consider themselves “an environmentalist,” and if so, are they a “strong environmentalist?” Then, informants are prompted for a life history narrative describing how their awareness of environmental damage originated and how it developed through time. Next, informants fill in lists of who damages and who benefits the environment, and where they place themselves among those listed. The informant is also asked when and where they got the idea of what being an environmentalist actually means. They are asked to list environmental groups with which they are associated, to describe their image of a typical environmentalist, and to complete a worksheet listing the main actions they personally do to benefit the environment. Answers to these items help capture the intensity and type of the individual’s self-identity as an environmentalist, group member, or activist, and the resulting behavior. These are all self-reported, as with any interview data, but our participant observations with the same groups provides both some validation of the reported environmental behavior and a connection with independently observed group meetings and discourse.

To enable a systematic comparison of groups to supplement our observations and impressions from the qualitative data, we developed a coding scheme. The categories were based partly on the evolving theoretical underpinnings of the project, along with categories that emerged as significant (at least to informants), based on extensive reading of transcripts. A total of 71 variables were coded from the qualitative interview transcripts, but we report only those variables relevant to this paper. For the purpose of exposition in this paper, we divide the data into the following sections: *Who Am I?*, categorization of listed self-identification terms; *Reformulations*, transitions people go through in identifying themselves as part of the environmental movement — many of which enable or encourage their taking action; *Barriers*, concerns or identity issues that seem to limit an individual’s activism; and *Actions*, reported actions specifically for environmental benefits. *Reformulations*, *Barriers*, and *Actions* variables were coded as either present (meaning the interviewee

directly stated them in the text of the interview) or absent (meaning they were not mentioned), while counts were taken for the self-identification variables in the *Who Am I?* section. A count of past or present membership with local, national, and informal environmental groups was also obtained for each interview.

Although the majority of coding was straightforward (either they said it or they did not) categorization of some answers had to be judgment calls of the coders; when in doubt, our guideline was to code only if there was an explicit mention. Two individuals coded interviews by this method (co-authors Kitchell and Tesch). As a check, six interviews were coded by both and compared. Discrepancies were found in less than 7% of the codes — an intercoder reliability of 93% — with no particular variable having high discrepancies. This check also resulted in some clarifications of definitions, so intercoder reliability should be greater than 93% for the bulk of the data.

In interpreting our results, it is important to recall that most of the items coded were volunteered. For example, we would code whether the respondent mentioned they were a member of some local community in the “Who am I?” question, or whether they mentioned voting in the free listing of environmental actions. Thus, in interpreting the results we must keep in mind that absence of a reported item can mean either that is truly absent, or that it is present but the informant did not mention it. If not mentioned, there may be a reason for that as well. For example, we assume that a mem-

Table 2. Example data on self-defined identities given by three informants.

Public (“Bruce”)	Civic (HazTrak-“Linda”)	Radical (Earth First!-“Jim”)
American	wife	an environmentalist
logical	grandmother	a revolutionary
veteran	daughter	an activist
father	sister	direct actionist
fair	friend	radical
demanding	business woman	an EarthFirster
	environmentalist	anarchist
	politician	revolutionary ecologist
	volunteer	anti-capitalist
	writer/poet	enemy of the state
	gardener	hell-raiser
	honest	hippie, pinko, commie scum
	loyal	a human
	passionate	part of real counter-culture
	fighter	nature lover
	member of my church	tree hugger
	shopper	environmental wacko, (proud of it!)
	sensitive	a watermelon (green on outside, red and black on inside)
	angry	

ber of the Green Party would consider voting to be an environmental action. However, if they have lots of other actions to report (protests, lifestyle changes, etc), they may not ever explicitly mention “voting” as an environmental action. Had we asked the individual explicitly whether their Green Party voting was an environmental action, surely they would have replied “yes”. Absence of the report may indicate that voting has lower salience than noisy protests, but, absence of our code is definitely not an indicator that the trait is itself absent. This is of course part of the cost of this type of emergent analysis of qualitative data — we recognized many of the relevant variables only as a result of (and thus, after) the interviews.⁵

Differences Found Among Types of Environmental Groups

Preliminary results are presented as mean summary measures, by group type. For each summary measure (each column) the ANOVA F statistic is computed. F is used here to determine whether the group types are statistically distinct, with the significance of F given on the following line. For example, in Table 3, we observe that environmental groups do not differ significantly in using consumer labels to identify themselves, whereas they differ very significantly in labeling themselves “activists.” We use F for variables that are counts.⁶ For dichotomous variables (present-absent), the nor-

mality assumption of ANOVA is not met so the χ^2 test is used (ANOVA is also computed for dichotomous variables, to provide comparability across measures).

Analysis will be divided into four sections, each section beginning with expectations and theoretical predictions followed by a table and discussion of actual results. An additional section compares evidence that group membership causes identity development, versus resulting from it.

Who Am I?

At the beginning of the ID interview, interviewees were provided a worksheet and asked to fill in twenty blanks to answer the question “Who am I?” — a standard test for salient self-defined identities (Kuhn and McPartland 1954). We hypothesized, based on Holland et al (1998) that identities would be related to participation in environmental groups and experience with environmental action. As an example of the type of data this question yields, Table 2 gives the answers in the order they were written, from one member of the public sample, one from a civic group, and one from a radical group.⁷ These three individuals were selected as illustrative examples of differences in self-identification among these groups, but are not necessarily typical of their group. Bruce’s answers are influenced by his being a veteran and are not typical of others in our public sample, and Jim coded for six environmentalist labels — a statistical outlier for the radical group type, and Jim’s choice of terms suggests

Table 3. Self Identification: Answers to “Who Am I?,” count of times mentioned per individual, averaged per group.

Group type (n)	Kin	Place	National	Ecosystem	Consumer	Conservationist	Environmentalist labels	Other activist labels
Radical (16)	1.2	0.1	0.1	0.5	0.3	0	1.2	1.1
Civic (40)	2.4	0.9	0.1	0.2	0.2	0.1	1.1	0.5 ^d
National (12)	2.4	0.5	0.4	0.6	0.1	0	0.9	0.1
Lifestyle (12)	1.3	0.3	0.1	0.3	0.5	0	0.8	0.6 ^e
Environmental Justice (6)	0.8	0.3	0	0	0	0	0.5	0.8
Students (15)	1.1	0.2	0.1	0.1	0	0	0.5 ^b	0.1
Conservationists (8)	1.9	0	0	0	0.5	0.3	0.6	0.1
Wise Use (8)	1.9	0.5	0.1	0	0.4	0.5	0.3	0
Fisheries Groups (18)	2.6	0.9	0.1	0.1	0.3	0	0.3 ^c	0.1
Scientists (5)	3.0	0.4	0	0.6	0	0.2	1.2	0.8
Public (16)	2.3	1.2 ^a	0.1	0.1	0.1	0	0.1	0.1
ANOVA F value	2.1	2.0	1.0	2.1	1.3	4.7	2.4	4.7
Significance	.03	.04	.42	.03	.25	≤ .0001	.01	≤ .0001

^aThe average number of place identifiers differs considerably between the Delmarva and NC public samples, 0.1 and 2.3 respectively.

^bAn interesting contrast can be seen between the salience or evolution of environmental identities within high school and college level student groups — SEAC, the college group, had a mean value of 0.9 environmentalist labels/person, the high school group averaged 0.1.

^cNRFA was the only fisheries group listing environmental identities (0.8).

^dCivic groups were highly variable in “activist” identities; HazTrak (0.7), DNS (0.8), CCRC (0.2), and NWPC (0.1)

^eIn activist labels, Earthaven (1.0) differs markedly from EcoTeam (0.1); perhaps Earthaven attracts or develops stronger activist identities, either philosophically or due to the live-in-community.

he may be “flaunting” his environmental identity. Nevertheless, a brief comparison of the lists illustrates the stark contrasts in reported self-identification. Note that terms relating to environmentalism, community and political activism come in soon after kinship identifications by the HazTrak member and note the lack of kin terms by the younger Earth First! member.

To systematically compare these diverse identifiers across 159 interviews, identity answers were tallied by counts into 13 categories including: place term (e.g. member of . . . , resident of . . .), national identity (American), position in the ecosystem (human, top of food chain), consumer role (driver, shopper), conservationist (exact term), environmental label (environmentalist, nature lover), and non-specific or other activist label (organizer, activist, anarchist). As a comparison we also tallied kin relations (wife, father, grandmother).

If group membership does influence or reflect salient identity, a central prediction, we would expect distribution of these labels as follows. We expect the members of civic and environmental justice groups to more often self-identify themselves as members of the local community, and the national group members to identify themselves as citizens of the nation. We expect all groups except the public to have environmentalist labels. We would expect members of the radical, civic, and environmental justice group types to have more activist labels. Lifestyle groups are doing environmental action to reduce consumption and disposal, thus members might more often identify themselves as consumers. Students, who are generally younger, have had less time to develop identities as environmentalists and, thus, are expected to have low environmental identities. We expect scientists to have low levels of activist identities due to the ideology that scientists must be objective. Due to the lack of past research on resource user groups, we limit predictions on these groups to low environmental identities, as resource users often oppose environmental policies. Specific mention of “conservationist,” however, is expected due to the stewardship rhetoric and human use philosophy. We expect frequent local or place identifiers for the fisheries groups due to the connection of livelihood to the fishing community. Our comparison variable, family and kin identities, we would expect, because of the pervasive importance of family in US society, to be central identities, and be mentioned most frequently by everyone in the sample and prior to most of the terms we tallied. The number of answers within each category was totaled per individual and a mean of individual tallies was calculated for each group and group type. Thus, a mean value of 1.0 indicates that on average, each individual within that group listed one identity that fit into that category. Table 3 provides results from the *Who Am I?* section.

Place identity terms were statistically different across groups; they were frequent among the civic, fisheries groups, and the public samples, with HazTrak, Tangier Sound Watermen, and NC public especially high at 1.9, 1.7, and 2.3 respectively. As for national identity references, although they were not statistically different, consistent with our expectation the only ones above 0.1 were members of the national mail-in group. Low national identity references for the other groups does not necessarily mean that they do not identify themselves as “Americans,” for example, but that this identity is of lower salience than the up-to-20 terms they wrote down first. Radical group members — many of who have a biocentric philosophy, scientists, and the national groups reported ecosystem labels. We expected higher salience from the radical groups (EF! averaged at least one per member). Although we had no predictions for the scientists, they do see themselves as part of the ecosystem; unexpectedly, so do the national group members. The lifestyle groups reported the most consumer labels, as expected (EcoTeam averaged 0.8).

The term “conservationist” was predominately associated with respondents from the wise use and conservation groups, but absent from the fisheries groups. All group types had at least one member include an environmental label in their “Who Am I?” list; however, despite the majority claiming they were environmentalists in the prior Gallup question, it is apparent that not all groups found “environmentalist” to be a salient identity, especially the fisheries groups and public samples (this is the difference between answering a direct question as to whether you are an environmentalist, versus a free listing identifying important characteristics of yourself). The radical, civic, and scientists group types averaged at least 1.0 environmental label whereas some individual groups averaged over 2.0 (Earth First!, HazTrak). As Table 3 shows, differences in use of the labels conservationist, activist and environmentalist are significant. There was a wide range of values within the civic type (0.7-2.2), probably due to the mixed nature of “civic” groups within our somewhat arbitrary categorization scheme. Members of environmental justice groups reported few environmental identities. By contrast, race related identities, although not reported in Table 3, averaged 0.8 — comparable to kin and activist variables.

We quote from one informant to illustrate how “environmentalist” can become a salient component of one’s identity. In addition to listing both environmentalist and political activist on her “Who Am I?” list, a civic group member whose name is “Alexis,” states that environmental activism has become part of her identity:

. . . now that my children are grown, that I am retired, that I have the time to get involved in the community, it

[environmental activism] is my vocation at this point. It is something that I do. It is something that I identify with very strongly, and that [not being able to do it] would be a terrible loss to me (Alexis, HazTrak).

As expected, the radical groups reported strong activist identities, with the mean value for Earth First! (1.7) substantially higher than that of Green Delaware (0.8). The civic groups were anticipated to report “activist” labels because of the political activity of the groups. But the values were less than those for several other group types. Yet again, we see large variation within the civic groups ranging from an average 0.1 to 0.8 labels/person suggesting that our civic type clusters unlike groups. Members of environmental justice and the scientist groups reported activist labels followed by the lifestyle group type (0.1 for EcoTeam members to an average 1.0 labels/person for Earthaven). Differences among groups in activist labels and “conservationist” were the strongest of the identities analyzed ($F = 4.8, p < .0001$).

Reformulations

Identities as theorized above, are not static. Part of the interview asked about changes in the informant’s environmentalism through time, eliciting an environmental life history. As we have read through these interviews, we have come to recognize a number of transitions that many individuals make in their understanding of environmental action and/or in their own identity. For example, the following is a common reformulation on the way to becoming a local civic activist. Initially, one believes that government will take care of common problems, and one’s civic responsibility is to report problems to the proper authorities. Then, they take this action: They report an environmental atrocity to government, wait, and find that nothing is done; in some variants, later lobbying, agitating, or “fussing” achieves a result. This results in a reformulation that is reported in interviews as a fact about government or about the best strategy.

Examples of this type of government-related reformulation include the following statements from radical, civic, lifestyle, and environmental justice group members. In describing how his views on environmental damage have changed, a member from the radical group recalled taking public action after he realized that the government was not going to solve environmental problems,

Any changes in how I viewed it? Yeah, I thought the government would do something, would be willing to do something, after it got its formal apparatus going. And I was disillusioned because the governor who had all the authority, and still does, appointed all the polluters to what was then called the Water and Air Resources

Commission . . . The big industry controls the government in Delaware. And I guess that was the first real super clear revelation. I felt these guys gotta go . . . I mean, this was a just a betrayal of public trust. The governor was, was not going to affect any change (Jimmy, Green Delaware).

. . . a lot of the agencies just don’t have the ability [to do anything on their own], that citizens can force enforcement by calling up their politicians, by agitating, by making people aware. That’s what we did with the hog farm. It [regulating hog farm] was only because we forced them into doing it (Alexis, HazTrak).

I already had the idea that the government could not be trusted to do the right thing. So you could already assume that if you found out what the right thing was, you would have a battle on your hands (Shalina, Earthaven).

Far from what has always maybe been assumed when we talk about local communities, there is a myth around — and this is what calls people to leave their lives in other folks hands — there is a belief somehow that if the communities had a problem, the EPA would just step in and deal with it. We know it won’t happen like just like that. Not just like that (Conrad, Environmental Justice).

It is not until this transition in thought, this reformulation in the belief about the role that the government plays in environmental policies, that an individual may see themselves as an actor — beyond reporting to authorities — and identify themselves as a participant and initiator of political actions. Janice from a civic group, Citizens Unite, became involved once she realized government wouldn’t solve the problem, “my main concern is that there is not enough concern from our local government officials being placed on environmental issues. And that’s why I am involved in this [asphalt plant fight].”

We coded interviews for the presence or absence of 10 reformulations. Some occurred rarely, so we collapsed them into larger categories; we do not report all of the coded reformulations here. Of particular interest are the aforementioned transformations we call “civic reformulations” relating to understandings of government functioning (“I realized that government won’t solve problems,” “. . . is untrustworthy,” and “I can impact policy”) and changes in environmental identity over time (“then I considered myself an environmentalist” or “. . . an activist”). Marie, from the national group Environmental Defense describes a reformulation of her environmental identity that occurred once she began fighting issues “close to home,”

I've always considered myself to be a promoter of caring about the environment, maybe to a lesser degree even back in college days, but when I had to help protect my local environment is when I felt I earned more that title. I think I understood that term back when I was even a young person, but having gone through the steps, I felt I actually had become one (Marie, ED).

From the civic groups, one individual reports a reformulation while relating that he first considered himself an “environmentalist” when he began fighting construction of an asphalt plant; the other reports his transition to environmental activism in the context of joining a group:

The latter part of February [that's when I accepted the environmentalist label]. That's what everything is going to focus on-on what has happened in the last six months, not what happened before because before I was just not that concerned about it. The fact of the matter is that I thought that people who were environmentalists were crazies because all they do is interrupt . . . So that was my thought process six months ago. Now, I'm educated, and now I know why environmentalists don't allow people to do certain things with their land. Six months ago, I became extremely aware of the environment, and have become more staunch as time goes on, and I'm probably going to become a left-wing radical myself (Ray, CU).

Actually, it was a decision about a year and a half ago that I myself have to do something and so I joined the Sierra Club. And it was the time of that decision that I considered myself to have begun to be an environmental activist (Joe, DNS).

Because we expect active members of local environmental groups to report having gone through more reformulations than those not participating in face-to-face groups, we predict that radical, civic, and environmental justice groups would report more reformulations than the national and public samples. Additionally, we predict the political action groups would have mentioned more transitions relating to the government — civic reformulations — than lifestyle groups that do not partake in political action.

Results are tabulated in Table 4 and are reported by mean values of total reformulations and by combining all civic reformulations (as mentioned) per individual and calculating a group mean under the Civic Reformulations column. Many of these transitions were recorded during the narrative portion of the interview, however a subsequent series of questions about when the interviewee became an environmentalist elucidated some of these reformulations. Note that sample sizes for this particular analysis have changed from pre-

Table 4. Reformulations in identity or in understanding of environmental action

Group type (n)	Total Reformulations (mean)	Civic Reformulations (mean)	Transition to “Environmentalist”	Transition to “Activist”
Radical (16)	4.5	0.5	69%	63% ^c
Civic (41)	4.4	0.7	73% ^b	32% ^d
National (6) ^a	4.8	0.5	100%	33%
Lifestyle (12)	3.1	0.2	58%	17%
Environmental Justice (5)	2.8	0.4	60%	40%
Students (15)	3.9	0	53%	33%
Conservationists (8)	4.8	0.4	63%	0
Wise Use (6)	1.5	0	17%	0
Fisheries Groups (20)	2.6	0.3	35%	0
Scientists (4)	3.4	0	20%	20%
Public (14)	2.4	0.2	19%	6%
ANOVA F (χ^2)	5.1	2.2	3.0 (27)	3.6 (31)
Significance of F (χ^2)	< .0001	.02	.002 (.003)	.0003 (.0006)

^aOnly Delmarva sample was used for reformulation calculations because this particular NC sample was not asked a series of questions that typically elicited notable environmental transitions over time, so we only analyzed the six interviewees from Delmarva who were asked.

^bHazTrak = 100%

^cEF!= 86%

^dHazTrak = 86%, DNS= 42%, DSC= 0

vious and subsequent data analysis due to variation in interview procedures (some questions were not asked by a few interviewers).

We found that the majority of individuals were coded on average for at least three reformulations — environmental justice, wise use, fisheries, and public being exceptions. The national, radical, civic, and conservation group types averaged greater than four; whereas individual groups within radical and civic, especially Earth First! and HazTrak, coding around six reformulations/person. A civic reformulation mean value of 1.0 would indicate that on average, each member reported at least one of the three civic reformulations. As shown in Table 4, the mean for the civic reformulations is highest in civic groups, followed by national and radical groups (0.5) and environmental justice and conservation groups (0.4). All reformulations shown in Table 4 are different across group types at highly significant levels. We note here that the spread within the civic groups, again, is quite high (HazTrak = 2, DNS = 0.1, CU = 1.1, CCRC = 0.4, NWPC = 0.1, DSC = 0.2) maybe due to single-issue groups being more politically active than multiple issue groups. Earth First! has a value of 1.0, Green Delaware 0.2 and Ruckus 0. With the exception of wise use, fisheries, scientists, and public, the majority of informants (100% of national) remembered the point in time when they became an environmentalist. Only the radical group (63%) had a majority

reporting their transition to becoming an “activist,” the next highest was environmental justice (40%).

Do Groups Cultivate Identity or Do Like-Minded Identities Join the Same Group?

The above quotations suggest, and most of our discussion of the quantitative data focuses on, identity and reformulation occurring as a result of group membership and action. This is in opposition to the popular notion among casual observers as well as many social scientists, that pre-existing personal differences lead an individual to join a compatible group. Radicals join radical groups, bird-lovers join bird protection groups, and so on. Although the quantitative differences among groups do not allow us to distinguish between those alternative hypotheses, our qualitative interview data suggest that many of the differences are due to changes in individuals’ self-perceptions formed in the process of group participation and action. The following quotes from a student and civic group are explicit examples of group-mediated identity formation in response to questions about when they first considered themselves to be an “environmentalist”:

I guess when I joined, when I joined SEAC, because we actually tried to do activities which are — you know, we have letter writing campaigns and petitions and things like that, and we’ve gone to protests, and stuff like that. So, that’s when I started thinking of myself as an actual activist (June, SEAC).

When I started meeting with members of my HazTrak Coalition. They explained to me that everything I was doing was basically what an environmentalist is because I care so much about the environment. . . I never put myself in a place as an environmentalist, because I always did care about the environment, but this is the first time I actually fought against something to protect my environment. And with the members of my HazTrak Coalition, they help me classify myself as an environmentalist (Linda, HazTrak).

Other examples abound in the interviews. Timothy from Citizens Unite states that he became a political activist “when I joined CU — it wasn’t until then” and Tyler, from NHSNS, first thought of himself as a active environmentalist during participation with his high school’s club, “When I was in the Nature Society. I realized, you know, I’m going out there and I’m doing things — ‘Wow, I guess I’m an environmental activist!’ ”

It is clear that some individuals come to define their environmental identity based on the type of environmentalism projected by the group of membership. However, we do

not mean to suggest that all group members interviewed lack prior history within the movement, nor do we claim that prior individual identities play no role in initially choosing groups. In fact, we did have statements that environmental identity formed before group membership was established such as the case with Alexis from HazTrak who became an environmentalist “the day I was born,” or Kelly from the Nanticoke Watershed Preservation Committee, “when I first started teaching.” In the ethnographic research, we noted the effects on group characteristics as new members entered and old ones left. Some interviewees made similar observations, for example, a college student described the annual fluctuation of her group’s characteristics due to the type of personalities changing with the annual turnover of participating members,

. . . I think what makes a group is the type of people that tend to get involved with it. And if you get the people that are more up in arms about things, and raring to do something, then yes, the group is going to tend to be more radical, if that’s where it’s carried to be. And if you get people that are more wanting to discuss and communicate, even though sometimes that may not be the best way to get action, then that’s the way the group is going to tend to go too (Ruby, SEAC).⁸

Additionally, some individuals report seeking groups that matched their identities; two radical group members reported joining groups for the direct activist philosophy rather than for the group’s mission — either environmental or humanitarian goals — though assimilation of the group’s values eventually occurred. Osprey describes how he became involved with an Oregon-based Earth First! group without previous involvement in a group focused purely on environmental issues:

. . . my level of activism then when we moved to Eugene, Oregon became more directly environmental because the heavy activism there was around forest issues. And so we became involved with forest activities there and with people who were involved in Earth First! and I became a lot more aware of forest issues through that time (Osprey, EF!).

Another activist recalls why he joined a group after leaving Oregon. This quote describes group experience prior to his involvement with a radical environmental group. It is also an example of an individual explicitly joining a group based on a pre-existing self-identity as a radical, rather than an identity forming within the context of group membership,

So I got out of jail there, went to San Francisco. Along the way, I asked who was the most radical group in San Francisco. Everybody from there to Eugene said,

“Food, Not Bombs” — they were giving away free food to people. You get the most hard-core radical and they’re giving away free food! Sure enough, I got down there and I had met people who had been arrested 30 times for the crime of giving away free food. So, I jumped on board . . . (Joshua, EF!)

Our claim is that group participation interrelates with prior orientation to cultivate environmental identities, which may have been in formative stages already. For neophytes to the movement or to a new strand of the movement, the effects of the first group experience can be very powerful.

Barriers

Why do some people who say they are concerned about the environment nevertheless take little action? Why do some environmental group members limit their actions to a particular type (i.e. check writing, consumer actions, or political actions)? Through the text of the interview, when the interviewee is narrating their environmental awareness history, they often mentioned issues or identities we felt would impair them from performing certain environmental actions. We refer to these as barriers. We recognize that there are various sorts of barriers to action, such as the physical constraint imposed on recycling by the absence of recycling bins (Guagnano et al. 1995) — we noted TSWA members reporting similar barriers to oil recycling. Although physical barriers may be important, we instead focus here on barriers related to identity and actions perceived to go with an identity. We expect members of the public, the national group, and the resource users to have more barriers to environmental action, and members of the radical and civic groups to have fewer. This is because the former are less involved with local environmental actions, or so we anticipated. (As it turned out, many of the members in our national group sample also belonged to local groups.)

We coded for eight variables; those of interest include believing some actions are too extreme, not wanting to be thought of as a radical, or not being the “type” who joins a group or performs certain actions. For example, a fisheries group member says below that although she is an environmentalist, she does not support fisheries regulations that could detract from the fishermen’s livelihood.

Now, I believe in taking care of the environment, but I believe in taking care of man first. I think he is the most important thing on this planet. He has to have the environment to live so he should take care of it as best he can. But, if it got to push and shove, as far as I’m concerned, the man would be the last to go. And he has to make a living, and he has to have something to live with (Edna, PFA).

Because they consider actions negatively affecting humans as “too extreme,” we consider this a barrier to performing certain civic or direct actions.

Some members may agree in principle with certain environmental actions, that is, they do not consider them “too extreme,” but they will not perform them for fear of being labeled a “radical” by others. For example, Claire, a college student involved with SEAC, says she does not fully participate because she doesn’t “want to be thought of as one of these people that is crazy or eccentric.” Molly, a scientist, describes why she does not display environmental pins or bumper stickers:

I don’t advertise my political affiliations because then you set yourself up in one position . . . they’d say, “Oh, just another liberal. Oh, just a nuke freak, just another dumb crunching moron. Just another fashion monkey.” You know, particularly in Texas, it’s a very conservative place, so you don’t want to incite — you don’t want to put people off before you make your case. You want them to take you as a human, not as an advocate or symbol. And I don’t want to be a walking symbol (Molly, Scientist).

Some individuals displayed a combination of both barriers. Celeste, another SEAC member, not only feels that other group members express more extreme beliefs, but she is also concerned about how association with them makes her look — “we have differences of opinion that makes me not want to have other people think of me as being like they are.” Some individuals were coded as being not the type to join a group or perform a particular type of action. Jimmy — who often “dips in and out” of involvement with the radical group Green Delaware — in response to whether he was a member of any other environmental group — replies, “No, no. No. I have no, I’m not much of a joiner.” Cole, a Tangier Sound Waterman who says he is an environmentalist, clarifies his level of participation, “As far as goin’ out there and being something that gonna, you know, patch up the [ozone] hole. You know, I’m not that type. I’ll tell ya I’m not capable of that . . . I can contribute in little ways.” Gloria, a self-identified non-environmentalist from the public says,

I’m more of conservation[ist], you know, conserve water and just don’t be wasteful. I’m more of that type of attitude in my own personal life, rather than any of the big issues. I don’t get involved in those (Gloria, public).

Each barrier was coded as either present or absent, so we report, in Table 5, percentages per group of those barriers that were mentioned more frequently, as well as the total number of barriers mentioned. The first column of Table 5 shows that conservation, fisheries groups, and the public sample report more barriers than the other group types; environmental jus-

Table 5. Barriers to taking environmental action.

Group (n)	Total barriers (mean)	Belief or action of others is too extreme	Do not	
			want self to be labeled "radical"	Not the type to join/participate
Radical (16)	0.5	19%	0	6%
Civic (41)	0.6	20%	10%	8%
National (12)	0.5	25%	8%	8%
Lifestyle (12)	0.7	33% ^a	8%	0
Environmental Justice (6)	0	0	0	0
Students (15)	0.6	13%	20%	27%
Conservationists (8)	0.9	13%	38%	0
Wise Use (8)	0.6	38%	13%	0
Fisheries Groups (20)	1.4	50% ^b	5%	30%
Scientists (5)	0.6	20%	20%	20%
Public (16)	1.0	19%	25%	25%
ANOVA F (χ^2)	2.3	1.3 (13)	1.3 (14)	1.8 (17)
Significance of F (χ^2)	.02	.21 (.21)	.21 (.21)	.06 (.07)

^aEcoTeam (67%) differed from Earthaven.

^bFisheries groups were highly variable: New River Fishers Association = 14.3%, Pamlico Fishermen's Auxiliary = 57.1%, and Tangier Sound Watermen's Association = 83%.

tice members reported none. The total number of barriers is significantly different across groups.

Of all the barrier variables coded, only one showed a interesting pattern among groups, and that was of members showing resistance to actions that were thought to be extreme, "asshole stunts" according to one public member or because "man comes first no matter what." Although the differences are not statistically significant, they differ among groups in a predictable way. With the exception of the radical and environmental justice groups, not wanting to be labeled by others as a radical environmentalist was reported

across all group types; 20-38% of conservationists, student groups, scientists, and the public mentioned this concern. In particular, one of the lifestyle groups (EcoTeam) reported this barrier, which makes sense given their internal focus on sustainable living practices. Interestingly, an EarthFirst! member also mentioned this barrier in the context of explaining how she disagreed with some animal rights people that were going "too far out there." Individuals who said they were not the "type" to join groups or perform particular actions were mostly concentrated in the fisheries groups, students, and public sample.

Most individual barriers were infrequently mentioned (Table 5 shows the most frequent ones) and are not so different across groups. Because barriers were not explicitly elicited in the interview, but they seemed important for those interviewees who brought it up, we will elicit barriers with specific questions in subsequent research.

Actions

Environmental actions were collected throughout the interview whenever reported by the interviewee, but most examples were given in response to our worksheet specifically asking the informant to list his or her actions. This was recorded in two ways. First, the total number of actions mentioned throughout the interview was recorded as a total count (column 1 in Table 6). Additionally, for 16 categories of specific actions (e.g. choosing a product for environmental reasons, writing a politician) a 1 was coded if one or more instances were reported, 0 if none. As a way of grouping different types of actions, the presence/absence variables were also added together, making a sum of civic versus lifestyle actions, as follows:

Table 6. Actions: mean totals per group and percent present per group

Group (n)	Count of Actions ^a (mean)	Civic Actions (mean)	Consumer Actions (mean)	Major Lifestyle Change			
				Consumer Choice	Organize	Financial Support	Organize
Radical (16)	11	1.6	1.6	75%	57%	75%	25%
Civic (41)	9.8	1.3	1.8	39%	34%	34%	29%
National (12)	9.4	0.5	2.3	83%	8%	17%	83%
Lifestyle (12)	9.5	0.5	1.8	92%	33%	8%	33%
Environmental Justice (6)	8.3	1.0	1.8	100%	0%	33%	0%
Students (15)	9.5	0.5	2.1	73%	53%	13%	7%
Conservationists (8)	9.3	0.3	2.3	50%	13%	13%	88%
Wise Use (8)	5.6	0.3	1.4	38%	0	0	25%
Fisheries Groups (20)	3.8	0.1	1.3	15%	0	10%	5%
Scientists (5)	11	0	1.8	100%	40%	20%	40%
Public (16)	4.5	0.1	1.8	50%	6%	0	13%
ANOVA F (χ^2)	11	11	1.6	4.9 (38)	4.6 (34)	6.2 (39)	5.3 (35)
Significance of F (Significance of χ^2)	≤ .0001	≤ .0001	.10	≤ .0001 (≤ .0001)	≤ .0001 (.0002)	≤ .0001 (≤ .0001)	≤ .0001 (≤ .0001)

^aNote this is an actual count, whereas civic and lifestyle actions are sums of presence/absence variables.

- Civic actions: voting, writing letters or visiting a politician, attending a public hearing
- Lifestyle actions: not littering, recycling, maintaining automobile properly, and consumer choice (efficient use of electricity/water/driving and conscious purchasing)

Additional environmental actions recorded for presence/absence were lifestyle changes, including major changes in lifestyle (become a vegetarian, change jobs), and changing habits at work (new fishing nets, farming practices); participatory actions, including organizing or leading an environmental group, joining or sending cash to environmental groups (if explicitly mentioned as an environmental action), attending environmental group meetings, and other actions including watching or reading environmental news, discussing environmental politics with friends, and teaching about the environment. Of this list, we report below on the presence/absence variables that show larger differences among groups.

It was expected that the radical, civic, lifestyle and student groups would have more actions than the national, resource users, and the public. Additionally, we predicted that civic-type actions would be seen predominantly in radical, civic, and environmental justice while mostly the lifestyle groups and public sample would report lifestyle and consumer choice actions. Also, we expected national group members who participate in those groups predominately through check writing to explicitly claim financial support as a significant environmental action.

Table 6 presents the mean environmental actions per group, the counts of civic and lifestyle actions (as detailed above), and percentage reporting four specific action variables: consumer choice, making major life style changes, organizing or leading an environmental activity, and cash contributions. Reported actions are dramatically different across group types with every action, save lifestyle actions, showing significance levels better than 0.0001 (Table 6). The radical groups and the scientists averaged 11 actions per person, both listing more than twice as many environmental actions as the public, wise use, and fisheries groups. Some of the marked difference in total number of activities between the public sample (our control sample), and the other group types, comes from the low level of civic actions reported by the public sample. Civic groups, in contrast, report some of the highest levels of civic actions, as do the radical and environmental justice groups, in our sample. The high prevalence of civic action among the radical groups might not be consistent with the public image of Earth First! (promoted by some of their own rhetoric) that they are operating outside the system — but it is consistent with our observations that the particular groups we followed are all trying to affect decisions in the public sector.⁹ Lifestyle actions range from 1.3 (fish-

eries) to 2.3 (national and conservationists) and do not show significant differences between groups mainly due to the common practices of recycling and non-littering behavior. However, looking at consumer choice actions and major lifestyle changes specifically, we see highly significant differences across group types. Fifty percent or less of the civic groups, resource users, and the public report performing consumer choice activities compared to 100% of the environmental justice members and scientists reporting these activities. Lifestyle groups have the second highest consumer choice percentage (92%). Radical groups and students are making major lifestyle changes for the environment (Earth First!, 86%), yet, on average, only 33% of EcoTeam and Earthaven members are reporting major lifestyle changes. We found that members of student environmental groups are choosing colleges, degrees, and careers for environmental purposes — we considered this as “major lifestyle change.” Most radicals reported being leaders or organizers of environmental activities (likely an artifact of interviewee selection), followed by environmental justice and civic. As expected, the majority of members in the national and conservation group listed financial contributions as an environmental action they took.

Conclusion

Starting in 1990, when the Gallup Poll first posed the question “Do you consider yourself an environmentalist, or not?” they have obtained the surprising result that 50% - 70% of the US public answers in the affirmative. In our study we have refined considerably what this (environmentalist) means. By asking informants to answer “Who am I?” and looking for answers of “environmentalist” or “activist” among other identity labels, we have a more sensitive and multi-dimensional measure of environmental (and other) identity.¹⁰

Any single question about whether one is “an environmentalist” glosses over the considerable variation in the qualities and textures of environmental identities. In particular, those claiming the identity “environmentalist” are differentially oriented to arenas of action (e.g., civic, consumer, or financial contribution), have undergone varying numbers and types of reformulations in their understandings of themselves and the world of environmental action, and have different sorts of barriers or limits on their own behavior when it comes to action.

We examined reformulations and barriers, seeing them as keys to development, or arresting of development, of identities and views of the world that lead to environmental actions. This is in contrast to a traditional view that environmental actions follow from attitudes, values, or knowledge of

environmental damage. Instead theories of identity lead us to expect that qualitative differences in identity result in different types and levels of action; these qualities can be related to the practices in which identities are formed.

In many ways, environmental action is the most important variable in relation to our hypothesis of the importance of identity development. Given the limits of self-reporting, we want to know whether identity is related to the environmental actions that people carry out. We expected those who were participating in local environmental groups, more so than those who were not, to have salient environmental identities. We expected non-members and especially those with little prior participation in local groups to report relatively few environmental actions.¹¹

Despite reported involvement, environmental identities of the public sampled were least salient and their number of actions lowest of all the groups save for the fisheries and wise use groups whose environmentalism is partly in opposition to mainstream forms of environmentalism. In fact, fisheries and wise use groups were low like the public samples in environmental identities, barriers, and reformulations leading us to suggest that their environmental or stewardship rhetoric, an earnest response to criticism from other environmentalists, may not have translated into a salient part of their identity. Differences between conservation and wise use groups were seen in the Gallup question, environmental identities, actions, and reformulations, yet further research is needed to fully describe their role within the environmental movement. It is evident from the measures developed in this study that the environmental movement is broader than just the radical, civic, and national organizations traditionally conceived of as “environmental” groups.

The student groups, conservationists, and environmental scientists included in this study, often reported environmental identities, reformulations, and actions as much as the traditional environmental group members did. For example, more than half of the students reported making “environmentalist” transitions and they matched civic and national members in “activist” transitions. Along with the radicals, environmental scientists listed more environmental identities than any other group, and the college group SEAC reported these identities as often as national group members. In total actions, very little difference is seen between students, environmental scientists, and the traditional groups; the majority of conservationists reported making financial contributions, and most strikingly, students and scientists reported making more major lifestyle changes to benefit the environment than any other group except the radicals.

Considering the importance of social interaction to identity development we reasoned that local face-to-face environmental groups are an important source of environmental

action and thus an important place where people develop identities as environmentalists. Comparison across the types of environmental groups studied in our project has shown statistically significant differences in self-assigned identities, types of reported reformulations, number of barriers to action, and reported actions. Table 7 highlights major differences among the group types we have discussed. Reformulations that would lead to civic actions were common among radical groups, civic groups, and with particularly active groups — Earth First! and HazTrak having the highest. In identity, most of the environmental groups show reformulations to an environmental identity, with greater numbers among the more active groups. Activist transitions were again most frequent among Earth First! and HazTrak members. Barriers were reported less frequently, but they, too, showed a consistent pattern, with the most active groups reporting the fewest barriers, the moderate groups reporting not wanting to be “radical” or take extreme actions, and the less directly environmental groups saying they weren’t the type to join.

We had anticipated that our random samples of the public (drawn from phone books), scientists, and members of national groups would have relatively low participation in local groups yet this proved to be only partially accurate. Seventy per cent of national group members were involved in at least one local group either currently or in the past, which may help explain the high number of actions listed by what we expected to be “check writers” only. The expectation about national group members is that they are less active than members of local groups — Brick described them as “the checkbook activists who sent \$25 to \$35 to a national environmental organization every year” (1995:40). In our sample of ED national members, their participation in local groups seems to vitiate this image, although we do not know if they bring the same passive approach to local groups as they do to the national ones. Conversely, 46% of respondents from local groups (radical, civic, environmental justice, lifestyle, conservationists, fisheries, and students) reported membership in at least one national, mail in group — this ranged from 0% (environmental justice) to 100% (conservationists). Forty percent of the public sample, and all but one of the scientists, reported involvement with either local or national environmental groups.

It is clear that activism is multi-dimensional and people engage in more than one kind. Types of actions reported could be expected to fit with the group types we have clustered the groups into and, as discussed above, for the most part, they do. Except for some surprises (for example, EF! reporting more major lifestyle changes than lifestyle groups), the actions are structured according to group type, and the differences are highly significant.

Table 7. Summary of data by group types

(Group (n))	Self Identification	Reformulations in Beliefs	Barriers to Action	Reported Environmental Actions	Summary of Findings
Radical (16) Earth First! Ruckus Society Green Delaware	<ul style="list-style-type: none"> • Strong activist and environmental labels (equal to kin terms in frequency); substantially higher in EF! • EF! has strong ecosystem identity 	<ul style="list-style-type: none"> • EF! strong civic reformulations • Majority reported “environmentalist” and “activist” reformulations 	No significant pattern	<ul style="list-style-type: none"> • Over twice as many as public • Strong influence of civic and consumer actions • Majority made major lifestyle changes • Majority organize groups or actions 	Members see themselves as part of the environment and have highly developed, self-reported environmental and activist identities. Stereotyped by others and self-reported to be extremists working outside the bounds of the political system; however, we find high levels of participation in and organizing of civic actions. Green Delaware is not of the same intensity as Earth First!
Civic (41) HazTrak, Delaware Nature Society, Delaware Sierra Club, Citizens Unite, Concerned Citizens of Rutherford County, Nanticoke Watershed Protection Committee	<ul style="list-style-type: none"> • Strong place and environmental labels • Moderate citizen labels • HazTrak strong activist labels (CCRC and NWPC weak) 	<ul style="list-style-type: none"> • HazTrak strong civic and “activist” transitions • Majority reported environmentalist reformulations 	No significant pattern	<ul style="list-style-type: none"> • Twice as many as public • Strong civic component • Some organize groups or actions 	Though this type comprises a variety of organizations, members are typically politically involved. Single-issue group members may be more vocal about civil actions. HazTrak differs from the other groups, and it seems clear that participation in civic groups influences the environmental identities of members.
National (12) Environmental Defense (DE/MD & NC)	<ul style="list-style-type: none"> • Moderate place and ecosystem roles • Strong environmental labels • Strong national roles (highest among groups) 	<ul style="list-style-type: none"> • Moderate reporting of civic reformulations (same as radicals) • Majority reported “environmentalist” reformulations 	Few barriers, though 1/4 reported distaste for extreme environmental actions	<ul style="list-style-type: none"> • Weak in civic actions • One of the highest in reporting lifestyle, and consumer choice actions • Strong majority reported making financial contributions 	Stereotyped as check writers, these members had a strong sense of environmentalism, few barriers, and reported more activity than expected. 70% were involved in at least one local group at some point in time. Typically weak in civic actions and emphasized financial contributions. We found large differences between our DE and NC samples.
Lifestyles (12) Earthaven EcoTeam	<ul style="list-style-type: none"> • Moderate consumer label and environmental label (EcoTeam weak) • Earthaven strong activist labels 	<ul style="list-style-type: none"> • Very weak civic reformulations • Moderate “environmentalist” reformulations 	EcoTeam majority reported distaste for extreme environmental actions	<ul style="list-style-type: none"> • Not strongest on consumer actions among groups • Few making major lifestyle changes • Weak majority reporting civic actions • Almost no reporting of participatory actions 	It is not apparent that, EcoTeam especially, these groups promote strong activism outside of the home. This is not surprising, as goals are internally focused on self-improvement and incorporating sustainable living practices into daily routines.
Environmental Justice (6) NC groups	<ul style="list-style-type: none"> • Moderate environmental label • Strong activist labels (equal to kin terms in frequency) • Weaker place terms than expected 	<ul style="list-style-type: none"> • Majority report transition to “environmentalist” • Second highest in reporting transition to “Activist” 	No barriers reported	<ul style="list-style-type: none"> • Follows radical and civic in reporting of civic actions • All doing consumer choice activities • None making major lifestyle changes or cash contributions 	All say they are environmentalists, but self-described environmental identities not as salient as race, kin relations, and activist labels (all 0.8). Some report civic based reformulations, strong in civic actions. Definition of environment and involvement in movement diverges from other environmental organizations.
Student (15) Newark High School Nature Society, Students Environmental Action Coalition	<ul style="list-style-type: none"> • Moderate environmental label (strong in SEAC, weak in NHSNS) • Almost no activist labels 	<ul style="list-style-type: none"> • no civic reformulations • Weak majority reporting “environmentalist” reformulations • Equivalent to civic and national groups in 1/3 reporting transition to “activist” 	<ul style="list-style-type: none"> • 1/4 reported not being type to join group or do particular actions • 20% did not want to be labeled a “radical” (mostly SEAC) 	<ul style="list-style-type: none"> • Weak in civic actions • Strong lifestyle actions • Majority reported performing consumer choice actions, and second only to radicals in making major lifestyle changes 	Majority says they are environmentalists, though many recognize higher level of activism they need to reach as they mature. Evolution in salience of environmental identities, actions and reformulations from high school to college groups. Characterized by making major lifestyle changes such as choosing college programs, degree paths, and careers based on environmental values.

Table 7. Summary of data by group types

(Group (n))	Self Identification	Reformulations in Beliefs	Barriers to Action	Reported Environmental Actions	Summary of Findings
Conservationists (8) Ducks Unlimited	<ul style="list-style-type: none"> Moderate consumer and environmental label No activist labels Weak conservation label 	<ul style="list-style-type: none"> Most number of reformulations (with national) Weak civic reformulations Majority report transition to “environmentalist” No “activist” transitions reported 	Over 1/3 reported fear of being labeled as a “radical”	<ul style="list-style-type: none"> Very weak reporting of civic actions; strongest of all group types in reported lifestyle actions Majority reported financial contributions 1/2 doing consumer choice actions while very few making lifestyle changes 	Not always categorized as “environmental,” focus on conserving resources for human use. Most members feel they are environmentalists, but there is a strong undercurrent that humans come first. Participation comes in the form of financial support. Differs significantly from wise use in reformulations
Wise Use (8) Blue Ridge Gamelands Group	<ul style="list-style-type: none"> Next to kin relations, place and “conservationists” terms are strongest Very weak environmental identities; similar to public and fisheries 	<ul style="list-style-type: none"> No civic reformulations Less than 1/4 report “environmentalist” reformulation No activist transitions 	Over 1/3 report believing some actions or beliefs are too extreme	<ul style="list-style-type: none"> Few actions reported similar to fisheries and public Almost no civic actions Over 1/3 reporting consumer choice, 1/4 send cash, none making lifestyle changes 	Despite environmental rhetoric and narrow focus on opposing restrictive regulations, only 50% claim to be environmentalists. Few political activist identities, reformulations, or reported actions emerge from the data. Participation in environmental arena differs from conservationists and other groups, and more closely resembles fisheries and general public.
Fisheries Groups (20) Pamlico Fishermens Auxiliary, New River Fishers Association, Tangier Sound Watermen Association	<ul style="list-style-type: none"> Strong place terms Weak consumer, enviro. and activist labels 	<ul style="list-style-type: none"> Few reported reformulations (lowest among groups) 	<ul style="list-style-type: none"> Most barriers reported across group types Majority (PFA & TSWA) reported distaste for extreme actions 1/3 not type to join or participate 	<ul style="list-style-type: none"> Few actions reported (lowest among groups) Almost zero civic actions reported Mostly no littering and oil recycling 	These groups have taken on the environmental label as a defense against environmental attack. As fishermen, they connect the success of their lifestyle with a healthy environment, claim they are stewards of the resource, and should not be blamed for damage. They report few environmental actions other than recycling, not littering, and gear changes.
Scientists (5) EPA and others	<ul style="list-style-type: none"> Strong enviro. and activists labels Moderate ecosystem labels (highest among groups) 	<ul style="list-style-type: none"> No civic reformulations 	No significant pattern	<ul style="list-style-type: none"> Lots of actions reported Zero civic actions reported 	Strong environmental identities, ecosystem perspectives, and focus on regulatory role in environmental protection; however no civic actions reported perhaps because of professional conflicts.
Public (8) DE/MD & NC components	<ul style="list-style-type: none"> Strong place identities (NC component) Almost zero environmentalist, consumer, and activist labels 	<ul style="list-style-type: none"> Fewest reformulations, excepting wise use, among group types Almost zero civic reformulations Very few “environmentalist” or “activist” reforms reported 	<ul style="list-style-type: none"> Second highest in reporting barriers (DE component average 1.0 per person) 1/4 Not want to be seen as radical 1/4 Not type to join a group 	<ul style="list-style-type: none"> Few actions reported Almost zero civic actions, major lifestyle changes, and organizing of environmental activities report consumer choice actions 1/2 report consumer’s choice actions 	Despite 57% responding affirmatively to Gallup question and 40 % having been involved with at least one environmental group at some time, majority reported almost no environmental and activism identities. Second highest among group types in reporting barriers to environmental action.

Acknowledgments

We are grateful to Katherine Bunting-Howarth for discussions and insights as the analysis progressed, and to the dozen interviewers and field workers and scores of people who gave their time for the interviews. This work was improved by detailed comments from Ben G. Blount, anonymous reviewers at HER, and participants in the session "New social movements and the local: Developing environmental identities and structures for action" at the 1999 American Anthropological Association Meetings. This research is supported by the National Science Foundation's Anthropology Program under grants SBR-9602016 and SBR-9615505, W. Kempton and D. Holland, principal investigators.

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Endnotes

1. In an April 1999 Gallup Poll, 50% of a national US sample answered "yes" to the question: "Do you consider yourself to be an environmentalist, or not?" This figure fluctuates and has been as high as 73% in 1990.
2. A 2000 national sample by Gallup asked four specific questions about movement participation. Gallup found that 16% called themselves "active participant(s) in the environmental movement," and 15% said they had in the past year "been active in a group or organization that works to protect the environment." Distinguishing national and local groups for the first time, the survey reports that 5% said they belonged to "large national or international environmental organizations," and 9% said they belong to "environmental groups or organizations in your local community, region or state" (Gallup 2000). We summarize these four questions by saying that 15% of the US public are members of environmental groups.
3. See also Aronson's 1993 study of career environmental activists, which uses a related approach.
4. Stern et al. (1999), differentiating core activists from supporters, present a "value-belief-norm" theory of the personal bases of action supportive to the environmental movement and survey data testing it. Although there are many points to be made in comparing the two models, a general difference is that Stern et al. consider participation in an environmental group to be an outcome of holding consistent beliefs, values and personal norms rather than participation shaping values and subsequent environmental actions. Kempton, Boster and Hartly (1996) similarly suggest values as a causal variable in environmental action. The extent to which these two conceptual models are alternative and competing versus complementary theories of the same phenomena requires additional research.
5. Fortunately, anticipating this, a subsequent fixed-question national survey is built into the research design and funding.
6. Technically, F assumes an underlying continuous distribution. But is fairly robust and often used for counts, as we use it here.

7. Responses to the question typically include a range of terms from might be considered names for institutional roles (e.g., writer, mother, politician) to personality types and personality descriptors (e.g., hell-raiser, passionate, sensitive, demanding). To the extent that these are labels for self-understandings that have become personally important in the cognitive and affective organization of behavior, they fit the definition of identity given above.
8. Arguably, SEAC could have been considered a radical group for this study. Their direct actions included dumping cans all over the University President's lawn to force campus recycling, supportive collaboration with Green Delaware, and administrative sit-ins. However, during our interview process, the group was in a transition away from the "radical" image and has since severed ties to the national SEAC organization and renamed itself Students for the Environment.
9. This variation across group types may have been even greater had we achieved a closer matching of groups within each type — for example, large differences between activist identities and actions between HazTrak and the Delaware Sierra Club resulted in mediocre type analysis of the civic group.
10. The "Who am I?" question generates at least one environmentalist label per person for 56% of members of conventional environmental groups (radical, civic, national, environmental justice, and lifestyle groups), 39% of the others, and only 6% of the public sample. This is a more sensitive instrument to having a salient environmental identity than the percentages of affirmative responses to the Gallup question, which for these three groupings are 96%, 75%, and 57%, respectively.
11. "Relatively few" because some actions such as recycling have become pervasive.

Grassroots Leadership, Personality, and Urban Neighborhood Environments: A Case Study in New Jersey

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Abstract

Grassroots leaders are crucial in stabilizing and improving neighborhood quality. But who are they? What are their demographic and personality characteristics? How do they perceive their neighborhood environments? A survey was conducted of 35 neighborhood leaders and 250 other respondents who chose them. The leaders participated in twice as many types of neighborhood activities as the people who selected them. The leaders were more optimistic, felt that they had considerable control over what goes on in the neighborhood, and coped with neighborhood problems using a multiplicity of outreach methods. Notably they were less reliant on television and radio for neighborhood information. Leaders also trusted the office of the mayor and officials elected to represent them in the state legislature, although much more so in high quality than in poor quality neighborhoods. Leaders were not markedly different from other respondents with regard to demographic characteristics such as age, race/ethnicity, education and perceptions of their neighborhoods.

Keywords: urban neighborhood, grassroots leadership, civic activities, personality

Introduction

Neighborhood planning in the older cities and industrial suburbs in the United States is a problematic endeavor. The national government's policies toward neighborhoods have been disjointed, tending toward extremes and lacking predictability (e.g., helping people vs. helping places; mandating public involvement in decisions vs. ignoring it; building public housing vs. trying to emasculate it and HUD, the Department responsible for it) (Anderson 1964; Bayor 1982; Boger and Wegner 1996; Fainstein and Markusen 1993; Gale 1984; Greenberg 1999a; Keating and Krumholz 1999; Moynihan 1969; Peterson and Lewis 1986; Rich 1993; Rusk 1999; Squires 1989). With a few exceptions, state govern-

ment policy has mirrored unpredictable national government policy (Greenberg 1999a; Orfield 1997; Rusk 1999).

The literature literally contains an alphabet soup of case studies (Atlanta, Baltimore, Camden, Detroit, East Saint Louis, ...) demonstrating how national and state policies have deliberately or unwittingly helped developers and local governments target neighborhoods for money-making schemes (sports complexes, hotels), gentrification by upper middle class people, or for locally unwanted land uses (incinerators, highways) (Carmon 1990; Kotlowitz 1991; Kozol 1991; Lang 1982; Logan and Molotch 1987; Mier 1993; Mollenkopf 1983; Nelson 1988; Pennsylvania Economy League 1988; Saltman 1990; Smith and Wilson 1986). Sometimes the neighborhoods help undermine adjacent neighborhoods by joining political coalitions attacking vulnerable neighborhoods (Keating and Krumholz 1999).

Local grassroots leaders are the main reason why some urban neighborhoods are not parking lots, highway exchanges, or altered in other ways opposed by residents. Urban neighborhood grassroots leaders are people who assume leadership in support of an issue and/or a place without holding a formal government position. Urban grassroots leaders are not mayors, councilpersons, or agency heads. Some may be elected or become employed in a position in government or a non-profit organization that provides them with leadership potential by virtue of their position. But while they are grassroots leaders, they are identifiable by their issues and followers, not by a position of authority.

Books, articles and media stories profile grassroots leaders (Brown and Mikkelsen 1990; Edelstein 1988; Freudenberg and Steinsapir 1991; Greenberg 1999a). The W. K. Kellogg Foundation has made major investments in grassroots leaders. The Foundation reports that grassroots leaders have roots in their communities, are motivated by passion for their community rather than money; and their personalities differ from those who become elected officials or corporate leaders. Yet a recent Kellogg report (1999) describes these observations as "impressions" rather than measured assessments. In fact, despite the importance of grassroots leaders

and the many profiles written about them, I can find no systematic assessment of who they are. The purpose of the research presented in this paper was to test some hypotheses about the people called grassroots leaders. This purpose requires the answers to three research questions:

1. Are residents able to identify their neighborhood grassroots leaders?
2. Are neighborhood leaders different from their counterparts in age, race/ethnicity, education, other demographic characteristics and personality attributes?
3. Are neighborhood leaders more attuned to specific types of neighborhood attributes (e.g., high rates of crime, physical decay, poor schools)?

Previous Research and Research Expectations

A great deal has been written about leadership, in general, and a small amount about neighborhood leaders. This literature led the author to expectations about the answers to the three research questions stated above. Regarding the first question (can people identify their neighborhood leaders), there is no single definition of a leader (Burns 1978; Gardner 1995; Paige 1977). But a common characteristic of leaders is the ability to mobilize others around objectives shared by leaders and their followers. In the neighborhood context, if urban people cannot identify their neighborhood leaders, then the very idea of relying on grassroots leaders is questionable. The literature reports that community groups typically are born around a single issue and die when that issue is no longer present (Miller, Rein and Levitt 1990; Edelstein 1988; Freudenberg and Steinsapir 1991; Halpern 1995; Pew 1999b). Putnam (1996) reports that civic involvement in general has been declining and attributes much of the decline to television watching. Hence, urban neighborhood leaders may come and go and only be identifiable with a single issue.

Yet Putnam's assertions have been questioned (Ladd 1996; Pew 1999b). And we know that the number of grassroots groups have grown substantially since 1970 (Freudenberg and Steinsapir 1991; Miller, Rein and Levitt 1990). Furthermore, the small literature on urban neighborhood leaders suggests that there are leaders, even if neighborhood organizations disappear. For example, in New York City, Leavitt and Saegert (1988) found that older African American females were the leaders. While not well-educated through formal schooling, they valued their neighborhood and schooled themselves about the neighborhood and trained themselves to protect it. They were neighborhood lifers and were clearly identifiable. In a study of public housing projects in two inner-city areas, Greenberg (1998) found residents identified as neighborhood leaders on the basis of

engaging in multiple neighborhood-related activities, including in almost every case working with other community residents. The weight of the evidence suggests that people are able to identify their neighborhood leaders.

Regarding the second research question (attributes of leaders), scholars have profiled and studied U.S. Presidents, mayors, and business leaders (Barber 1972; Burns 1978; Gardner 1995; Halberstam 1969; Holli 1999; Jones 1989; Paige 1977). This literature suggests that leaders are likely to be more educated and affluent, possess a sense of efficacy, desire to control their environment, have the ability to respond to stressful situations with multiple options, and be optimistic. Yet the literature also found that these personality traits were not always predictive — that is, some might be associated with success of research scientists and others more with business leaders. Research also suggests that certain kinds of personalities and leadership styles fit particular circumstances better than others. A successful leader during a financial crisis might be ineffective coping with a racial/ethnic crisis. And the most effective leader during a crisis might be ineffective when there is no crisis.

The variety of leaders examined in the literature is so broad that it would be naive to assume that it directly transfers to expectations for urban neighborhood leaders. Nevertheless, regarding demographic characteristics, the author expected long term and invested residents were the most likely to be leaders. In other words, the leaders would be those who are older, lived in their neighborhoods for at least a decade, own their homes, and have had an opportunity to gain more information about the neighborhood and have a stake in its future. People with more formal education are more likely to be leaders than people with less education. But education about the neighborhood through long-term residence in the neighborhood is more important, I expected, than graduating from high school or college.

The literature shows that Caucasians are more likely to be involved in positions of power than African, Asian, and Latino Americans, and Asian and Latino Americans are the least likely to demonstrate civic participation through voting (Flynn, Slovic, and Mertz 1994; Pew 1999a). Hence, the author expected more Caucasians to be identified as neighborhood leaders than other racial/nationality groups. Males are much more likely to be in positions of leadership in business and government. But neighborhood studies often report women as leaders (Greenberg 1998; Jones and Dunlap 1992; Kanagy, Humphrey and Firebaugh 1994; Leavitt and Saegert 1988; Van Liere and Dunlap 1980). Hence, the author did not expect a disproportionate number of male leaders.

Regarding personality, I expected urban neighborhood leaders to be more optimistic than those who selected them. At the neighborhood scale, a leader has to be able to reach out

to neighbors and local officials. So the author expected leaders to reach out to multiple sources, using personal contacts, secular and religious organizations, and government organizations, and just about every other source. I also expected them to feel that they have more control over neighborhood activities than their non-leader counterparts.

The most uncertain expectation was the relationship between leadership, neighborhood engagement, and trust of authority. In general there is not a consistent relationship between civic engagement and trust of authority (Pew 1999b). But that general observation, the author believes, is confounded for neighborhood leadership by the way residents perceive their neighborhoods. Those who live in poor quality neighborhoods stressed by crime, physical decay, and pollution were expected to mistrust their local officials, whereas those who live in good quality neighborhoods with few problems were more likely to trust their elected officials (Greenberg 1999b). Hence, I expected mixed results with regard to leadership and trust of authority.

Lastly, regarding the third research question (neighborhood awareness), leaders were expected to be more aware of problems in their neighborhood, especially crime and physical decay, which are the major stressors to residents (Greenberg 1999b; Ross and Mirowsky 1999). Despite the expectation that leaders would be more aware of problems, we were expecting neighborhood leaders to rate the quality of their neighborhoods about the same as followers. This expectation rests on the hypothesis that leaders would be more optimistic and optimists tend to understate the severity of conditions (Weinstein 1984).

Data and Methods

The study was designed to allow residents at least 18 years old to identify people they considered grassroots leaders in their neighborhoods and then to compare the leaders and those who identified them. The design was implemented with a convenience sampling approach. Thirty-five Rutgers University students were identified who lived in New Jersey communities and were willing to administer the survey in their neighborhoods. These students lived in a wide variety of New Jersey cities and suburbs. Briefly, the political jurisdictions ranged in population size from 6,000 to 275,000 with a median of 43,000. Median family income in 1989 ranged from \$22,000 to \$65,000, and the median of \$43,400 was two percent higher than New Jersey's as a whole.

The 35 students were asked to gather between 7 and 10 surveys from their neighborhoods. Each was taught how to administer the survey. The students were deliberately asked not to select people randomly. Rather they were asked to speak to people they already knew and hence were likely to

have the same neighborhood definition and selection of neighborhood leader. A key element of the survey methodology was explaining to the respondents that the survey was voluntary, confidential and that they should not place any identifiers on the survey instrument. Respondents were also asked to nominate a neighborhood grassroots leader to the surveyor. The student was then asked to interview the neighborhood leader most frequently nominated who was willing to be interviewed. Hereafter, those who selected the "leaders" are called "selectors" or "followers." Summarizing, this is a convenience sample comparing non-randomly selected selectors and leaders they chose, which means that the results need to be interpreted with due caution.

The use of students or other community members in this fashion is obviously different from the typical mail or random-digit-dial phone survey methods that we teach in survey research classes. In this case, none of the orthodox sampling methods would have worked because of the design. In addition, however, unorthodox sampling methods are increasingly going to be needed to reach otherwise hard to sample populations and to implement innovative research design protocols.

Sampling size was determined by the number of expected resident neighborhood actions. A series of other studies using five neighborhood actions found an average of 1.4 activities per person (Greenberg 1998, 1999b). The goal was to determine if the selectors interviewed in this study had a relatively similar level of neighborhood activity because it was important to avoid or at least know if the selectors were themselves atypical in their neighborhood involvement practices. In statistics, "power" is the probability that a test rejects the null hypothesis at a specified significance level. I wanted a sample size with a power of at least 95 percent and a two-tailed alpha error of 0.05 to distinguish sample mean results of 1.1 to 1.7 from 1.4 neighborhood actions. A sample of 240 has a power of 95 percent of detecting the targeted differences. The goal of the survey was to obtain at least 240 surveys from followers.

Survey Instrument

The 74 questions in the survey instrument were based on survey items used in previous research on neighborhood quality (Greenberg 1998, 1999b). The survey began by listing 20 potentially stressful neighborhood land uses and activities. Respondents were asked if these conditions existed in their neighborhood (scored 0 if it did not). If the characteristic existed and bothered the respondent, the characteristic was scored as a 1. If it bothered them so much that they "want to leave," it was scored as a 2. The 20 potential problems included land uses such as hazardous waste sites, junk-

yards, and odors and smoke from these and factories; physical deterioration, including abandoned buildings, inadequate street lighting, and behavioral problems such as crime, vandalism, and homeless persons/panhandling. It also asked if costly housing, poor quality schools, and absence of recreation were bothersome.

The second section of the instrument asked how respondents rated their neighborhood quality on a four-point scale, where 1 indicated "excellent," 2 was "good," 3 was "fair" and 4 indicated "poor." That question was immediately followed by one which asked that they compare the quality of their present and previous neighborhood. The choices offered were "better," "the same," or "worse."

Section three asked 11 questions that measured resident trust of authority and desire for control of neighborhood activities. For example, respondents were asked to indicate how much they trusted people they meet in the neighborhood, the mayor and officials elected to represent them in the state legislature, and their trust of science and technology to protect them and future generations. They were also asked to indicate how much control they believed they had over what goes on in the neighborhood and if they desired more control. Each of these questions was scaled 1 to 5, where 1 indicated "strong agreement" with the statement, 3 was "neutral," and 5 was strong "disagreement" with the statement.

The fourth set of questions asked about respondent's age, gender, education, and race/ethnicity. These were followed by inquiries about the respondent's length of residence in the neighborhood and type of residence (own, rent, other). Next, respondents were asked to indicate if they had engaged in nine activities during the last two years. These included attending a meeting about the neighborhood, calling the police, and four other activities associated with neighborhood participation. In order to separate neighborhood activism from other activities, which may not be focused in the neighborhood, respondents were asked if they voted in an election, became involved in a political campaign, and joined a group to discuss books, gardening, or other activities of mutual interest. These activities are not necessarily neighborhood-oriented.

The next 11 questions asked respondents to indicate the sources of information they relied on for "accurate" information about their neighborhoods. The 11 included mass media sources (television, radio, newspapers), and personal contacts (friends, peers, secular organizations, religious-based organizations).

The final 15 questions focused on personality. The Life Orientation Test (LOT) measures optimism-pessimism. LOT consists of 12 questions, (eight measure optimism-pessimism; four are filler questions) which measure optimism along a five point scale (strongly agree to strongly disagree).

The scores from the eight questions are summed to produce a score ranging from 0 (pessimist) to 32 (optimist) (Scheier and Carver 1985). Studies typically report average scores of 19 to 22 in the United States (O'Brien, VanEgeren, and Mumby 1995). The last set of questions asked how people respond to stressful neighborhood events. Measured on the same five point scale, respondents were asked if they reached out to family members, neighbors, and local officials (Stone and Neale 1984).

Statistical Analysis

To evaluate the first research question (Are people able to identify their local leaders?), I compared the number of different neighborhood activities engaged in by followers and the people they nominated as their leaders. Regarding the second and third questions (How do leaders and followers differ from their counterparts in demographic and personality characteristics and their perception of the neighborhood environment?), I compared the leaders and their selectors. Depending upon the form of the data, these bivariate tests were done with Chi-square tests of cross-tabulated data or t-tests of means.

Bivariate analyses have the limitation of potentially obscuring interrelationships among intercorrelated attributes. In this case, I used multivariate analyses to explore differences between leaders and selectors with regard to demographic and personality characteristics, as well as environmental perception. Specifically, two methods, stepwise discriminant analysis and stepwise binary logistic regression analysis were used. The results were almost identical using both methods. The discriminant analysis results are presented here because the author finds them easier to understand.

Results

A total of 250 non-leader and 35 leader responses were gathered during the months February and March 2000. It is difficult to precisely compare the demographic characteristics of respondents to the State of New Jersey as a whole because the only comparable data for the state are drawn from the U.S. Census taken in 1990. With that caveat in mind, the respondents as a group were more highly educated than the 1990 New Jersey population. Almost 34 percent of the followers had graduated from college compared to 25 percent of New Jersey residents. Forty-two percent of followers were home owners compared to 65 percent of New Jersey residents in 1990. Twenty-six percent of respondents self-identified as Black American, 12 percent as Asian American, and 14 percent as Hispanic Americans compared to 13, 4, 10 percent of New Jersey residents, respectively. Sixty-six per-

cent were female. In short, the follower respondents were more likely to be female, have more formal education, be Black, Asian and Hispanic, and be renters than residents of the State of New Jersey as measured by the 1990 U.S. Census.

While the selectors were different from the State of New Jersey with regard to the above demographic characteristics, notably, these 250 had an average of 1.54 activities (out of 5), which was not significantly different ($p < .05$) from the 1.4 observed in previous studies. With regard to number of neighborhood activities the followers are similar to groups studied previously.

A final preliminary calculation was to determine if the LOT scale (optimism-pessimism) was a single reliable scale. A Cronbach's alpha test was run on the data with a reliability score of 0.81. Scores of 0.80 or more are considered evidence of excellent reliability.

Were leaders more involved in neighborhood activities than their selectors? Leaders were more likely to be involved in all six neighborhood civic activities (see Table 1). Sixty percent or more had attended a public meeting, called the police, and volunteered for a civic, church, or school function in the neighborhood at least once during the last two years. Forty to 59 percent had contacted an elected official, organized a neighborhood function, and helped neighborhood children with academic work or sports. In other words, neighborhood leaders chosen by the selectors obviously were more involved in different types of neighborhood activities.

The 35 leaders were also more likely to have been involved in a political campaign, voted in an election and joined a group of people to discuss books, gardening, or other activities of mutual interest. But of the three, only becoming

involved in a political campaign was a statistically significant difference ($p < .05$).

A total of 58 bivariate tests were made between followers and leaders. Thirteen (22%) were significantly different at $p < .05$ (Table 2). By chance, only 3 ($0.05 \times 58 = 2.9$) would have been expected. Regarding neighborhood conditions, the leaders had higher problem scores than their selectors for 19 of the 20 potential problems. But only the score for three of the 19 were significantly different. As predicted, one of these was crime. The others were related to environmental contamination. In addition, as hypothesized, leaders' ratings of their neighborhood and assessment of whether their present neighborhood was the same, better or worse than their previous neighborhood was almost exactly the same as their corresponding followers. For example, 29 percent of leaders and 29 percent of their counterparts rated their neighborhoods as fair or poor quality.

As expected, leaders were older (average age 31) than their followers (average age 26); they were more likely to be home owners (51%) than their selectors (42%); and had lived in the neighborhood longer than them (54% vs. 50% for more than a decade). Leaders were more likely to be White (57% vs. 44%) and less likely to be Asian (5.7% vs. 11.6%). The only two significant demographic differences were that leaders tended to be male (53% vs. 34%) and were less likely to be Hispanic (2.9% vs. 14.4%). While males were more likely to be leaders than their selectors, in fact, the male propor-

Table 1. Comparison of Neighborhood Activities of Leaders and Selectors

Activity	Leaders (n=35)	Selectors (n=250)
Attended a public meeting (0,1)	0.60*	0.36
Contacted an elected official (0,1)	0.57*	0.22
Called the police (0,1)	0.69*	0.43
Volunteered for a civic, church, or school function (0,1)	0.71*	0.43
Organized a neighborhood function (0,1)	0.40*	0.10
Helped neighborhood children with academic work or sports (0,1)	0.49*	0.23
Total neighborhood activities (0-6)	3.45**	1.77
Joined a group of people to discuss books, gardening, or other activity of mutual interest (0,1)	0.26	0.20
Voted in an election (0,1)	0.69	0.54
Became involved in a political campaign (0,1)	0.29*	0.10

* Statistically significant difference at $p < .05$, z-test of proportions.

**Statistically significant difference at $p < .05$, t-test of difference of means.

Table 2. Bivariate Comparisons of Leaders and Selectors: Demographic, Personality, and Neighborhood Characteristics

(Only differences significantly different at $p < .05$ are shown in the table)

Characteristic	Leaders (n=35)	Selectors (n=250)
Respondent is male (1,0)	0.53	0.34
Respondent is Hispanic (1,0)	0.03	0.14
Odors, smoke from factories a problem (0,1,2)	0.23	0.10
Hazardous waste sites a problem (0,1,2)	0.23	0.08
Crime a problem (0,1,2)	0.40	0.22
Have control over what goes on in the neighborhood, (% agree and strongly agree)	60	28
Trust elected officials elected to represent neighborhood in state legislature (% agree and strongly agree)	47	20
Pessimism-Optimism (0-32)	23.6	20.3
Coped with neighborhood stress by reaching out to neighbors, (% agree and strongly agree)	52	36
Coped with neighborhood stress by reaching out to local officials, (% agree and strongly agree)	47	22
Always or frequently rely on following source for accurate and reliable information about neighborhood, %:		
Community (secular) organizations	44	27
Religious organizations	33	24
Government information	38	12

tion of leaders (53%) is not notably different from the male population of the United States. In short, the demographic results were in the expected direction, but not as strong as expected.

By far, the biggest differences between leaders and followers were in measures of personality (8 of the 13 statistically significant differences, or 62% of significant differences compared to only 45% of indicators). Sixty percent of leaders felt that they had control over what goes on in the neighborhood compared to only 28 percent of followers. Almost half of leaders trusted elected officials to represent the neighborhood in the State legislature compared to only 20 percent of their selectors. They also were more optimistic (average 23.6 vs. 20.3; range is 0 to 32) and coped with neighborhood stresses by reaching out to neighbors, local officials, and they also used information from secular, religious organizations, and from the government. In short, they were many-source information seekers, as expected.

Discriminant analysis is a systematic way to capture associations among multiple neighborhood characteristics, respondent characteristics and leadership. The method chooses the indicators that most strongly discriminate between leaders and followers.

Initial bivariate analyses using cross-tabulations and means described above reduced the number of potential dis-

criminating variables to a manageable number. Additional variables were eliminated after the initial set of discriminant analyses showed that they did not make a statistically significant contribution to explaining variation in neighborhood quality. The ability of potential discriminating variables to make a contribution is judged by the F statistic. A high value of the F statistic means that the among-group variance is greater than the within-group variance, which means that the independent variable discriminates leaders from followers. Overall, 11 of the 26 personality variables (42%) and only 4 of the 32 (13%) demographic were significant discriminators.

Table 3 displays the discriminant analysis run. A discriminant analysis produces discriminant functions which are linear combinations of the original independent variables. The method produces one less discriminant function than the number of categories of the dependent variables, in this case, one discriminant function for the binary category leader-selector.

There are two ways of assessing the statistical success of a discriminant analysis. One is to examine the canonical correlation of the function with the dependent variable. The canonical correlation is the correlation of the function with the binary dependent variable. The correlation was 0.503 ($p < .001$), which is a moderately high correlation. The second way of assessing the strength of the results is to use the dis-

Table 3. Discriminant Analysis of Leaders and Selectors Differences (Variables with a correlation of > 0.1 with the function are shown.)

Discriminating Variable (Value for an individual respondent)	Leader, mean values	Selectors, mean values	F-value	Correlation with Function 1: Leader/vs. selector
Optimism (0,1,...32)	23.6	20.3	9.1**	0.389
You have control over what goes on in the neighborhood (0,1,...5)	3.4	2.7	8.1**	0.380
I rely on government agencies (publications, meetings, presentations) for accurate information about neighborhoods (1,2,...5)	3.0	2.2	8.1**	0.436
I rely on television for accurate information about neighborhoods (1,2,...5)	3.1	3.5	7.4**	-0.331
I rely on religious groups (local church, youth groups) for accurate information about neighborhoods (1,2,...5)	2.9	2.4	5.9*	0.276
Costly housing is a neighborhood problem (0,1,2)	0.29	0.44	5.6*	-0.282
I rely on community groups (community/civic, local university/college, local library, continuing education) for accurate information about neighborhoods (1,2,...5)	3.2	2.7	4.6*	0.202
Trust officials elected to represent this neighborhood in our state legislature (1,2,...5)	3.2	2.8	4.1*	0.258
The mayor's office really cares about this neighborhood (1,2,...5)	3.1	2.8	3.2	0.137
Respondent is Hispanic (0,1)	0.03	0.14	2.3	-0.138
Respond to neighborhood stress by reaching out to local officials (1,2,...5)	2.0	1.5	2.2	0.192
Rely on personal contacts (Friends, family, peers) for accurate information about neighborhoods (1,2,...5)	4.1	3.8	1.7	0.202
Total problems score (0,1,...38)	5.8	4.2	2.6	0.174
Respondent self-identifies as White (0,1)	0.57	0.44	1.8	0.169
Respond to neighborhood stress by reaching out to neighbors (0,1, ...5)	2.0	1.5	1.3	0.140

**Predictor is significant discriminator at $p < .01$

*Predictor is significant discriminator at $p < .05$

criminant model to predict a leadership (yes or no) category for each respondent and to compare that predicted rating with the actual one. The mathematical model created by discriminant analysis accurately classified 80 percent of the respondents' ratings of their neighborhoods. More specifically, 73 percent (24 of 33) of identified leaders were correctly classified, as were 81 percent (173 of 214) of followers. In short, the independent variables were moderately effective at capturing underlying correlates of leaders.

The leader-selector function is dominated by personality variables. The first five discriminating variables (measured by their F values) are optimism ($r = 0.389$), having a feeling of control over what goes on in the neighborhood ($r = 0.380$), relying on government agencies ($r = 0.436$) and religious groups for accurate information about the neighborhood ($r = 0.276$), and not relying on television ($r = -0.331$). These five variables capture the essence of the difference between the leaders and followers: optimism, a sense of control, and willingness to rely on a variety of sources rather than digested mass media reports on television and the radio.

The importance of personality variables is highlighted by two other discriminant analysis runs. In one, the strongest demographic and neighborhood variables were inserted into the model and the personality variables were excluded. This analysis accurately classified 60 percent of respondents. A second run was done in which only the optimism-pessimism score and the response to the question about feeling of control over events in the neighborhood were entered. These two variables alone accurately classified 65 percent of responses, that is, more than all the demographic and neighborhood perception characteristics.

The bivariate and discriminant analyses found that only one of the seven trust variables significantly discriminated between leaders and followers. In the literature presentation, the inconsistent relationship of trust and neighborhood participation was noted, and the author suggested that neighborhood quality was a confounding variable. As a follow-up, differences in neighborhood activity and trust were explored among the 35 leaders controlling for neighborhood quality. Ten of the 35 respondents rated their neighborhood as "fair" or "poor" quality and 25 rated it as "excellent" or "good" quality. The 25 respondents who rated their neighborhood high quality engaged in an average of 3.5 neighborhood activities and their counterparts in the poorer quality neighborhood averaged 3.3 neighborhood activities, an insignificant difference. With regard to trust, a consistent difference was observed. The 10 leaders from the poorer quality neighborhoods were less trusting than their counterparts. Six trusted people they meet in their neighborhood, 6 felt that local residents should have the authority to close a facility in the neighborhood that they think is not run properly, only 2

believed the mayor's office really cares about the neighborhood; and only 4 trusted officials elected to represent the neighborhood in the state legislature; and 4 believed their friends and neighborhoods. The levels of trust were higher for every one of the leaders in neighborhoods classified as excellent or good quality.

Discussion

Before discussing the results, it is important to reiterate that this was a convenience sample that is not representative of the residents of the State of New Jersey. Accordingly, the implications of the results should be interpreted with caution. I regard this as a small step toward understanding urban neighborhood grassroots leaders through survey research rather than relying solely on anecdotal information drawn from case studies. Clearly, additional studies are required to determine if the findings for these 285 people hold in other locations. For example, our research center has begun further studies in the context of the national government's brownfields redevelopment program. Brownfields are unused or underutilized parcels of land that are contaminated or perceived to be so. We are currently studying the role of neighborhood leaders in 60 cities that were the first to have received funding from the National government to remediate the sites and return them to productive use. Have they really played an important role in the brownfields remediation process?

With the data caveat noted, the analysis shows notable differences, especially in personality attributes of neighborhood leaders and other people. Leaders are more optimistic and have a stronger sense of efficacy about their ability to influence activities in their neighborhood. The findings of the Kellogg Foundation that grassroots leaders are committed to working with others is evident in the finding in this study that urban neighborhood grassroots leaders reach out to local officials, neighbors and family members, and they use a wide variety of sources to keep informed about the neighborhood. In fact, the only sources they rely on less than followers are television and radio. In short, leaders are identified mostly by personality. Some demographic characteristics, notably those related to investment, such as long-term residence in the neighborhood and home ownership were associated with leadership. But demographic attributes, in general, were much less powerful flags of urban neighborhood leaders than personality indicators. Lastly, as expected, leaders were more aware than their counterparts of neighborhood problems, but their rating of their neighborhood quality was almost identical to others, which I think is attributable to their optimism.

The implications of these findings are salient in the context of U.S. policies toward places. Senator Daniel Patrick

Moynihan (D-NY) (1996) concludes that the problems confronting the United States are difficult to resolve because they are about values. As with environmental pollution, abortion, gun control, smoking, health care, and other public policy issues, Americans' collective value of neighborhood preservation and redevelopment has changed. For example, in 1973, when national urban policies were being dismantled, 42 percent of respondents to a Roper poll felt that too little was spent on solving city problems. This proportion shrank to 35 percent in 1987. But as crime, drugs, and severe poverty increased and have been reported in the mass media, public support for government intervention increased, reaching 55 percent in 1994 (Roper Reports 1994). Strauss and Howe (1991) and Howe and Strauss (1993) suggest that our past is our future — that is, there are cycles in American history and policy. If so, the United States will galvanize around civic-minded goals that include stabilizing and redeveloping stressed city and older suburban neighborhoods within 25 years. However, while we wait for this cycle to reappear, if it ever does, the reality is that grassroots leaders, sometimes assisted by non-profit organizations, appear to be the only reliable defense neighborhoods have against depletion by being resource-starved by government and private investors, or being the next parking lot for a baseball team's new stadium, conference center for a university, or county incinerator site.

This paper shows that grassroots leaders are known to their neighbors. It also shows that they are involved in multiple issues, and so grassroots leaders are available to be focal points of neighborhood interaction. Even as civic participation grows and declines, if elected officials, businesses and non-governmental organizations in addition to the W. K. Kellogg and Annie E. Casey are truly interested in residents' values, views, and suggestions for improving their neighborhoods, it appears that there is a group of people who should not be difficult to find. The findings of this research flatly reject the idea that it is a bad idea to invest in urban neighborhoods because there is no one there who cares enough about the neighborhood to fight for them.

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Natural Amenities and Population Growth in the Greater Yellowstone Region

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Abstract

Much of the recent growth in population, jobs and income in the Greater Yellowstone Region, as well as other parts of the rural West, has been driven by ecological and social amenities, in contrast to the historical dependence on resource extractive industries and agriculture. This shift has been fueled by an increase in service occupations, retirement and investment income. Using the states of Idaho, Montana, and Wyoming, and the Greater Yellowstone Region as examples, statistical tests were conducted to test the relative influence of ecological, amenity, social and economic variables on rural population growth. The results indicate that ecological and amenity variables are necessary conditions for growth, but they are not sufficient. An educated workforce and access to larger markets via air travel are also important.

Keywords: *rural development, amenities, Greater Yellowstone.*

Introduction

The role of amenities is an increasingly important research topic for geographers, economists, demographers and sociologists seeking to explain the relatively recent phenomena of human population growth in rural counties of the Western United States. Resource extractive industries and agriculture have been the backbone of rural economies, yet their performance in the last two decades has been poor. Why then are some rural counties growing? What role do environmental factors play? How important are amenities in peo-

ple's decisions to move to rural areas, and moreover, which amenities are important? And, if amenities are important, how do they stack up when compared to socioeconomic factors? In this paper we attempt to answer these questions, using the Greater Yellowstone area as a case study. If we knew whether a relationship between amenities and development exists, we would be able to shed some light on a new approach to economic development, where the land would be treated as more than a repository for raw materials to be extracted and exported to distant markets. Rather, the land — and the amenities they hold — would be considered an economic asset that attracts and holds people and business. From a research perspective an equally important finding might emerge; that geographers, economists, demographers, and sociologists should join forces with the ecological scientists in order to gain a better understanding of the role of the landscape in human development.

The Greater Yellowstone Ecosystem has long been a fruitful area for research for those seeking insight on how to balance economic growth and environmental protection. It is a complicated landscape, with multiple jurisdictions and a wide variety of competing resource uses, including mining, grazing, forestry, recreation, and it is valued for its many non-use values, such as scenery and wildlife. Federal lands make up the bulk of the ecosystem: 2.5 million acres of Yellowstone National Park and Grand Teton National Park, more than 11 million acres on seven national forests adjacent to the parks, and approximately 89,000 acres of national wildlife refuges and small parcels administered by the Bureau of Land Management. Because federal lands make up the bulk of the Greater Yellowstone Ecosystem, much of the attention of researchers, land managers and conservation-

ists has focussed on balancing the multiple uses on these lands (Glick et al. 1991; Rasker et al. 1992; Rasker 1993). Private lands, which some today consider the most vulnerable component of the ecosystem, consist of about 3 million acres.

Recent trends in economic growth in the West, particular the phenomena of amenity-driven growth, has changed much of the Western landscape (Cromartie and Wardell 1999), putting pressure on private lands, which are converted from agricultural production to residential development, thereby adversely impacting habitat for fish and wildlife (Ingram and Lewandrowski 1999). The Greater Yellowstone Ecosystem is a prime example of this type of habitat conversion.

This paper begins with a brief review of a growing body of literature which states that natural amenities are important considerations for people who migrate to the rural West. Using the Greater Yellowstone Region as an example, we explore which combination of ecological, social, and economic factors are closely associated with population growth in the last 25 years. We first determine whether a relationship exists between population growth and the ecological characteristics of the land by comparing county population growth rates in the states of Idaho, Wyoming and Montana. Once it was established which variables are significantly correlated with growth, a finer scale model was developed for the counties of Idaho, Wyoming, and Montana that lie either inside or adjacent to the Greater Yellowstone Ecosystem. At this scale — referred to as the Greater Yellowstone Region — ecological, economic, and social variables were compared and tested against one another to test which had the highest relative power for explaining population growth.

We used this two-tiered approach to test two hypotheses: First, that variation in county population growth can be established, in part, by the presence of certain environmental characteristics (used interchangeably in this paper as ecological and amenity characteristics) and second, that in the Greater Yellowstone Region, ecological and amenity characteristics are important, but so are certain social and economic factors. In other words, we wanted to test the hypothesis that amenities matter, but only in relation to certain socioeconomic conditions.

Natural Amenities and Rural Development

Previous research on the economy of the Greater Yellowstone Region was motivated by a need for a solution to the “jobs versus the environment” debate regarding the management of public lands of the ecosystem. Commonly held beliefs dictated that the backbone of the rural communities of the region were the jobs produced by the extractive industries operating on the seven national forests surrounding

Yellowstone National Park (U.S. Forest Service 1985); that only resource extractive industries constitute the “base” of the economy (Polzin 1990); and that because the region has historically been dependent on resource extraction, its future must necessarily be like the past (Corporation for Enterprise Development 1989, Montana Ambassadors Association 1989). Several researchers, including Power (1991), Rasker (1991), and Rasker et al. (1992) discovered that the economy of the Greater Yellowstone is diverse and growing, with the bulk — over 95 percent — of the existing and new jobs in industries other than resource extraction. The “base” has broadened to include employment in a variety of business and producer services, such as finance, insurance, real estate, telecommunications, software development, research, and management consulting. Many of these are “footloose,” in the sense that the owners of these businesses are often not tied to a particular locale and therefore able to locate to areas with a desirable lifestyle (Rasker and Glick 1994).

Much of growth in the Greater Yellowstone Region, however, is not immediately obvious (i.e. does not appear in the form of new stores on main street). For example, 51 percent of the growth in real personal income the last 25 years has been driven by non-labor income, such as retirement or earnings from past investments (US Department of Commerce 1997). Power (1991, 403) summarized the sentiment of the “jobs versus the environment” debate in Greater Yellowstone when he wrote: “the residents of the [Greater Yellowstone] area do not face some tragic choice between sacrificing the unique natural systems and landscape in which they live or facing ongoing impoverishment due to lack of economic opportunity. During the last two decades the opposite has been the case.”

This research has helped uncover a new paradigm for economic development in the West: protection of the wild and scenic character of the landscape and the quality of life in local communities serves as a magnet to attract and retain local people and their businesses. These qualities are a vital part of the economic well-being of local residents, and help insulate communities from the out-migration that is all too common for the rest of rural America (Power 1991; Rasker 1994; Rasker et al. 1992; Rasker and Glick 1994; Johnson and Rasker 1995; Glick et al. 1991).

To test the hypothesis that amenities draw business Johnson and Rasker (1995) conducted a telephone survey of 500 business owners and managers in the Northern portion of the Greater Yellowstone Region: Madison, Gallatin and Park Counties. The purpose of the survey was to determine which variables influence an entrepreneur’s business location decision, including “amenities” such as the community setting, natural environment, and recreational opportunities, as well as traditional factors such as the tax structure, cost of labor

and raw materials and the proximity to markets. Another objective was to add some refinement to the findings of previous survey research which indicated that “amenities” are important to immigration, without much differentiation between different forms of amenities. The results showed

that amenities were relatively more important than traditional “profit maximizing” reasons, both as a draw for new businesses who relocated to the area, as well as a magnet for retaining existing businesses. The relative importance to fifteen business location variables revealed that the highest

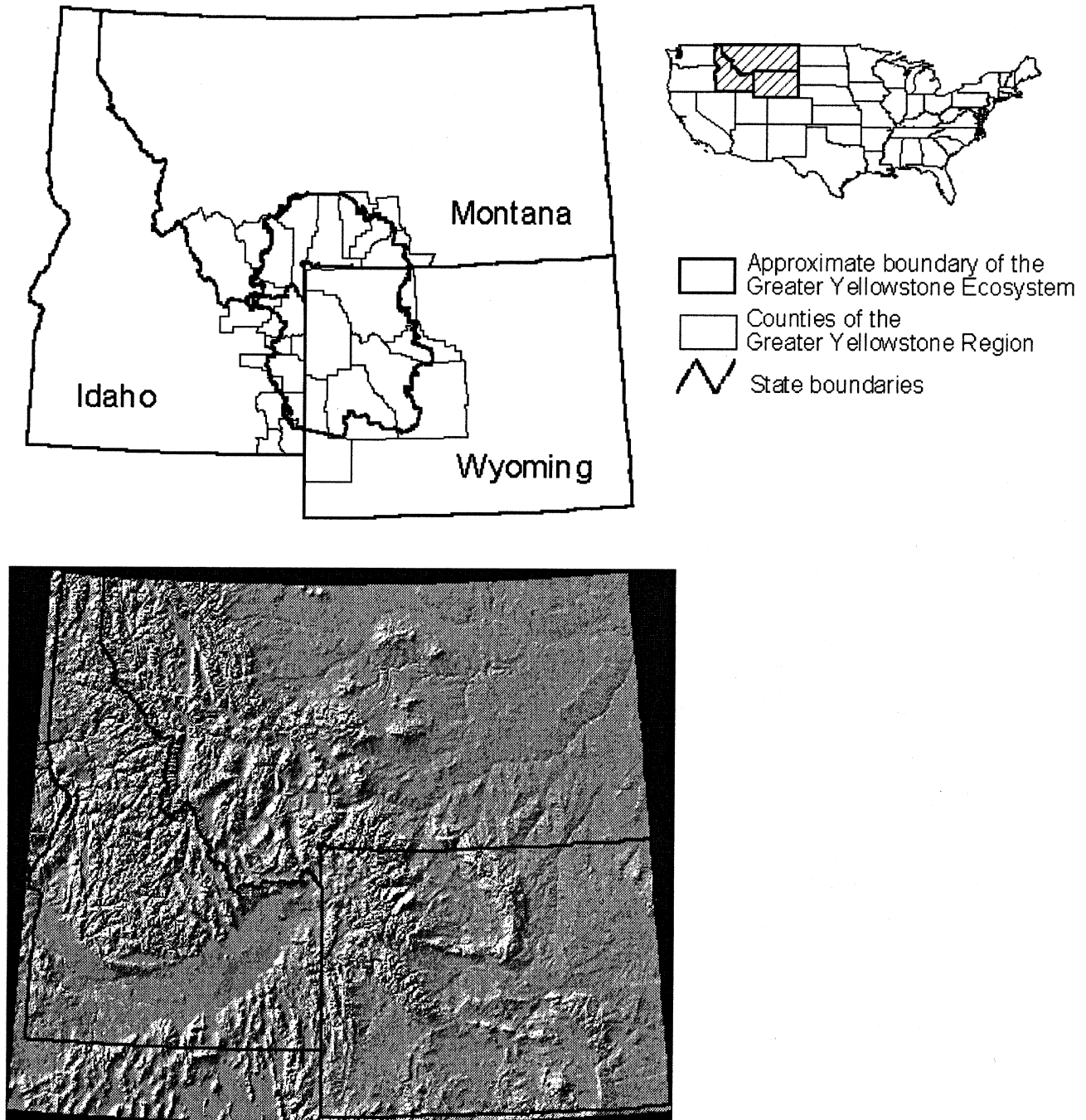


Figure 1. Idaho, Montana, Wyoming; the Greater Yellowstone Ecosystem; and the Counties of the Greater Yellowstone Region.

Table 1. Percent Change in Population from 1970 to 1997 for the Counties of the Greater Yellowstone Region.

Counties of the Greater Yellowstone Region	Percent Population Change 1970 to 1997
IDAHO	
Bear Lake	13%
Bonneville	52%
Caribou	12%
Clark	11%
Franklin	47%
Fremont	34%
Madison	72%
Teton	124%
MONTANA	
Carbon	33%
Gallatin	87%
Madison	36%
Stillwater	68%
Sweet Grass	14%
Park	42%
WYOMING	
Fremont	27%
Hot Springs	-6%
Lincoln	58%
Park	44%
Sublette	51%
Teton	185%

Source: U.S. Department of Commerce, 1997. Regional Economic Information System, Bureau of Economic Analysis, Washington, D.C.

ranking variable was “scenic beauty” (1st), followed by “quality environment” (2nd), “a good place to raise a family” (3rd), “desire to live in a rural setting” (4th), “small town atmosphere” (5th), and various other “amenities” related to recreation, plus a “low crime rate.” A major finding from the study was a more precise definition of the term “amenity” to include social, cultural and recreational values.

Further analysis of the same data by Snepenger et al. (1995) revealed that 4 out of 10 business owners interviewed first experienced the region as a business or pleasure traveler and later chose to locate their business in the area. The implication is that the impact of tourism extends beyond measuring their expenditures — some come back to stay, adding to the local economy in more permanent ways.

These results — that environmental amenities are closely tied to migration and business development in rural areas — are consistent with that of other researchers. Rudzitis (1999, 9-13) recently summarized several surveys he conducted of migrants to the rural West by stating: “More people are moving to the West for reasons that have nothing to do with employment,” and “Development strategies need to recognize the importance of place attachments, the value of good neighbors, social interactions, and the values people

place on their social/physical environments.” The link between environmental amenities and economic and population growth is now widely studied (Beyers 1994; Beyers and Nelson 1997; Nelson 1997; Cromartie and Wardwell 1999). A recent study by McGranahan (1999) boldly proclaimed its findings in the title of the article “Natural Amenities Drive Population Change.”

The importance of amenities to business location was recently tested nationwide by Beyers et al. (1995). They surveyed business owners in 44 states and classified them according to three categories: “Lone Eagles,” or export-oriented proprietors; “High Fliers,” or export-oriented business owners who employ others; and “other firms,” oriented primarily to local markets. The study was significant in that it explicitly separated export-producing services from locally oriented services. The most frequently cited reasons for locating their export-oriented business in a rural setting were “quality of life” (73 percent for Lone Eagles, 66 percent for High Fliers) and “residence nearby” (82 percent for Lone Eagles, 56 percent for High Fliers). In contrast, fewer than two percent of respondents felt traditional economic reasons (“lower local tax rates,” “presence of low-cost labor,” “lower and/energy/occupation costs,” “government assistance”) were important considerations for business location.

In light of the growing body of literature on this topic the authors felt it was appropriate to revisit the Greater Yellowstone Region to determine the relative relationship of ecological, amenity, social and economic variables to population growth in the rural counties of the region.

The Study Area

This study was conducted at two geographical scales: the states of Idaho, Montana and Wyoming, and the rural counties of these states that lie within or adjacent of the Greater Yellowstone Ecosystem (GYE) (see Figure 1 and Table 1). Counties were used as the unit of analysis because published statistics on long-term economic, social and demographic trends are readily available at the county level. The choice of counties is admittedly somewhat arbitrary. Previous studies have identified 20 counties as being part of the Greater Yellowstone Region (Power 1991, Rasker et al. 1992). These counties represent ones where a significant portion of the land lies within the ecosystem; fifty-eight percent of the counties’ land base is in federal land, and in four of the counties over 70 percent of the land is federally managed (Rasker 1993). As Figure 1 illustrates, the Greater Yellowstone Ecosystem (dotted line) is a subset of the larger Greater Yellowstone Region. While the ecosystem is approximately 18 million acres in size (Glick et al. 1991), the Greater Yellowstone Region consists of 33.9 million acres

(Rasker et al. 1992). An estimated 355,000 people live in the counties of the Greater Yellowstone Region.

Methods

The overall method for this paper was to test first whether ecological, or amenity variables explain variation in population growth, and if they do, how they compare to the explanatory power of social and economic variables. Because the authors are interested in the relative influence of amenities on rural development, only counties with a small population and not adjacent to metropolitan areas were used.

Beale code definitions were used to categorize the counties of Idaho, Wyoming, and Montana into two categories: Urban and Rural. The Beale code was developed by the Economic Research Service, U.S. Department of Agriculture and they are defined in Table 2. Codes 0 through 6 and 8 are defined in this study as Urban. Codes 7 and 9 are called Rural. The purpose of this classification scheme is to differentiate between two types of counties based on whether the county has a metropolitan area, or is within commuting distance to a metropolitan area. Beale code 8 is included in the Urban category because, even though it consists of rural counties with a small population they are adjacent to metropolitan areas and therefore part of the commuter-shed. Beale codes 7 and 9 includes counties with a population of less than 20,000 as well as “completely rural” counties, with neither

category including counties adjacent to a metropolitan area.

We felt this classification was necessary because we were interested only on the relative influence of amenities on rural population growth. By focussing only on counties with Beale codes 7 and 9 we were able to eliminate the influence of larger population centers of over 20,000 people, including the possibility for people to commute to adjacent counties with larger populations. The use of the term “rural” to describe these counties is admittedly somewhat arbitrary, and perhaps a better description would be “populations of 19,000 or less and remote.” The term “rural” is used merely as a shorthand³.

To test which variables are related to county population growth, two hypothesis were developed:

Hypothesis One — Certain ecological and amenity variables explain a significant portion of the variation in population growth among rural counties.

This was tested at a larger geographic scale than the Greater Yellowstone Region, using the states of Idaho, Montana, and Wyoming. A database was developed that contained as the dependent variable the percent change in population from 1970 to 1997 for the rural counties, ecological characteristics of each county. A correlation matrix was developed to determine which variables explain variation among county population growth rates. The definition of each variable, and the resulting correlations, are presented in Table 3. The variables were chosen to characterize the biophysical attributes of the counties including climate, topography, hydrology, vegetation, and land use. The variable NATR represents the percent of the county in nature preserves, such as Congressionally designated wilderness, national parks, or wildlife refuges. It is used as a proxy for outdoor recreational opportunities.

Hypothesis Two — Ecological, social and economic variables all explain significant variation in population growth of rural counties in the Greater Yellowstone Region

This was tested by using the statistically significant variables from the test for Hypothesis One, and testing these against social and economic variables for the rural counties of the Greater Yellowstone Region. The definition of the variables, and the resulting correlation when tested against population growth are represented in Table 4. Once it was determined which variables, at both geographic scales, are correlated with population growth in rural counties, a model was developed for the Greater Yellowstone Region that incorporates all of the statistically significant variables (at the 95 percent and 99 percent confidence levels). Using the statistical program SPSS, a linear regression best-fit model was applied using the backward elimination technique⁴. (An inspection of

Table 2. Beale Code Definitions.

Code	Definition
<i>Metropolitan Counties</i>	
0	Central counties of metropolitan areas of 1 million population or more
1	Fringe counties of metropolitan areas of 1 million population or more
2	Counties in metropolitan areas of 250,000 - 1,000,000 population
3	Counties in metropolitan areas of less than 250,000 population
<i>Nonmetropolitan counties</i>	
4	Urban population of 20,000 or more, adjacent to a metropolitan area
5	Urban population of 20,000 or more, not adjacent to a metropolitan area
6	Urban population of 2,500 - 19,999, adjacent to a metropolitan area
7	Urban population of 2,500 - 19,999, not adjacent to a metropolitan area
8	Completely rural (no places with a population of 2,500 or more) adjacent to a metropolitan area
9	Completely rural (no places with a population of 2,500 or more) not adjacent to a metropolitan area

Source: Economic Research Service, U.S. Department of Agriculture. (<http://www.econ.ag.gov/epubs/other/typolog/index.htm>)

Table 3. Correlation Coefficients and Definition of Ecological and Amenity Variables Used to Test the Correlation Between County Population Change, 1970 to 1997, for the States of Idaho, Montana, and Wyoming.

Variable	Correlation with Percent County Population Change, 1970 to 1997 Pearson Correlation (N=88)	Definition (all units correspond to counties)
FORAR	.312**	Percent area in forest cover
STR	-.004	Total length of streams
LAKER	.100	Percent of area in lakes
ELEVSTD	.256*	Standard deviation of mean elevation
PREMIN	-.017	Annual minimum precipitation (1961-1990)
PREMAX	.244*	Annual maximum precipitation (1961-1990)
PRECP	.179	Annual mean precipitation (1961-1990)
TEMP	-.189	Annual mean temperature
NATR	.302**	Percent area in nature preserves (Congressional designated wilderness, National Park, or wildlife refuge).

* Correlation is significant at the .05 level (2-tailed).

** Correlation is significant at the .01 level (2-tailed).

Sources: US Geological Service EROS Data Center — Distributed Active Archive Center; Land Cover Characteristics database (http://edcdaac.usgs.gov/glcc/tab Lambert_na.html);

Prairie to Mountain Explorer version 2.0 (files region/reaches.shp, region/lakes.shp and region/fedland.shp);

Natural Resources Conservation Service, Water and Climate Center, NRCS National Cartography and Geospatial Center, National Climatic Data Center, PRISM Model, Oregon Climate Service at OSU (www.ocs.orst.edu/prism/prism_products.html and [www.ocs.orst.edu /data-restricted/](http://www.ocs.orst.edu/data-restricted/));

Natural Resources and Conservation Service, Water and Climate Center, NRCS National Cartography and Geospatial Center, National Climatic Data Center, PRISM Model, Oregon Climate Service at OSU (www.ocs.orst.edu/prism/prism_products.html)

the residuals of population increase at the 3-state level and at the GYE level revealed that both data sets were reasonably normally distributed with constant variance.)

An additional variable, called AIR, was added the model. AIR is a discrete variable representing whether or not a county is within 60 miles from an airport with daily scheduled commercial airline service. (No correlations were run for this variable since it is not possible to run a Pearson's Correlation on a discrete variable). Data for this variable were derived from the *Atlas of the New West* (Riebsame 1997). Several researchers, including Nelson (1997), Beyers and Lindahl (1996), and Pulver (1987) have stated that one of the important variables determining rural development is ready access to transportation. For example, in their survey of producer service firms Beyers and Lindahl (1996) found that over 75 percent conducted business outside the area, needing to travel to their clients, in part, via air travel.

We also attempted to determine whether the type of economy predominant in the county had any influence on predicting population growth. We did this by developing a set of dummy variables for each of the rural counties of the Greater Yellowstone Region using the classification scheme developed by the Economic Research Service (ERS). The ERS of the U.S. Department of agriculture has developed a typology to categorize counties in the United States under six mutually exclusive economic types and five over-lapping

rural policy relevant types. The economic types are classified as farming, mining, manufacturing, government, and services-dependent. There is also a category for nonspecialized counties, which could have combination of the five classifications, as well as one for recreation counties, developed separately by Beale and Johnson (1998). The policy types are non mutually exclusive: retirement-destination, Federal lands, persistent poverty, commuting, and transfers-dependent. ERS typologies are based on counties that in 1993 were classified as non-metro. Each variable, including one for Beale and Johnson's (1998) "recreation" counties, was individually added and withdrawn from the best-fit model (Table 5) to test if they had any impact on the adjusted R-square value.

A Word About the Term Amenities

In this paper amenities refer both to physical or ecological variables, such as climate, topography or land cover, and they also refer to the proximity of protected natural areas, such as wilderness, national parks and wildlife refuges.

Findings and Discussion

Population growth in the rural counties of Idaho, Montana, and Wyoming is significantly correlated with variables that describe the mountainous portions of these states:

Table 4. Correlation Coefficients and Definition of Variables Used to Test the Correlation Between County Population Change, 1970 to 1997, for the Rural Counties of the Greater Yellowstone Region.

Variable	Correlation with Percent County Population Change, 1970 to 1997 Pearson Correlation (N=16)	Definition (all units correspond to counties)
<i>Ecological variables</i>		
FORAR	.612*	Percent in forest cover
STR	.067	Total length of streams
LAKER	.255	Percent of area in lakes
ELEVSTD	-.302	Standard deviation of elevation (i.e. topography)
PREMIN	.517*	Annual minimum precipitation (1961-1990)
PREMAX	.356	Annual maximum precipitation (1961-1990)
PRECP	.538*	Annual mean precipitation (1961-1990)
TEMP	-.419	Annual mean temperature
NATR	.585*	Percent in nature preserves (Congressional designated wilderness, National Park, or wildlife refuge).
<i>Social variables</i>		
COLL	.610**	Percent of population over 18 years old with a college degree, 1990
CLGUNV	.086	Number of colleges and universities in the county
CRIME	.419	Serious crimes known to police per 100,000 in 1991
<i>Economic variables</i>		
PROD	.668**	Counties where over 15 percent of personal income is earned in producer services in 1995 ⁱ
BUSPER	.686**	Percent of total employment in business services, 1995
HOSBED	-.210	Community hospital beds per 100,000 in 1991
HOTPER	.430	Percent of total employment in hotels and lodging, 1995
RLTPER	-.117	Percent of total employment in real estate
HEAPER	-.075	Percent of total employment in health services

* Correlation is significant at the .05 level (2-tailed).

** Correlation is significant at the .01 level (2-tailed).

Sources: Ecological variables same sources as in Table 4. Social and economic variables from: Bureau of the Census. 1997. Decennial Census of Population and Housing (CD-ROM STF1A). U.S. Department of Commerce, Washington, DC; Bureau of the Census. 1992. *County Business Patterns*. U.S. Department of Commerce, Washington, DC.; U.S. Department of Commerce. 1997. Regional Economic Information System (REIS CD-ROM), Bureau of Economic Analysis, Washington, D.C.

ⁱ Producer services are defined as in Beyers (1991) to include those services that are part of goods production and they include some of the higher paying sectors, such as finance, insurance, real estate, legal and business services, membership organizations, and engineering and management services.

forest cover (FORAR), high variation in topography (ELEVSTD), maximum precipitation (PREMAX); and the degree to which the land is in some form of protected status (NATR). The correlations described in Table 3 lend credibility to the hypothesis that population growth can be attributed, at least in part, to ecological and amenity variables. Any model of population growth in the rural West should therefore include variables that account for differences in these characteristics.

The fact that the variable NATR (percent of county in nature preserves) explains 30 percent of the variation in population growth in these states is consistent with the findings of others. During the 1960s, counties containing federally designated wilderness areas had population increases three times greater than other nonmetropolitan counties (Rudzitis 1993). In the 1970s, they grew at a rate twice that of nonmetropolitan areas, and in the 1980s, their population increased 24 percent — six times more than the national aver-

age of four percent for nonmetropolitan areas and almost twice as much as counties in the rural West (Rudzitis 1993). Lorah (1996) also discovered that counties in the West containing designated wilderness or national parks and refuges added jobs at more than twice the rate of non-wilderness counties. Rasker and Hackman (1996) compared economic performance of counties with a high degree of land in protected status versus those without such protections in Western Montana, and found that “wilderness” counties outpaced others in terms of having higher growth in employment and real personal income, and lower levels of unemployment. Rudzitis and Johansen (1991) surveyed 11,000 randomly selected migrants and residents in 15 wilderness counties in the West and found that 60 percent said the presence of designated wilderness was an important reason for why they moved, and 81 percent felt wilderness areas were important to their counties. The most significant reasons for locating in a wilderness county were the environmental and ecological

Table 5. Results of a Best-Fit Regression Model to Test the Relative Explanatory Power of Ecological, Amenity, Social and Economic Variables to Population Growth, 1970 to 1997, in the Rural Counties of the Greater Yellowstone Region.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.903 ^a	.815	.445	.35489
2	.903 ^b	.815	.538	.32403
3	.903 ^c	.815	.603	.30012
4	.903 ^d	.815	.652	.28099
5	.902 ^e	.814	.689	.26564
6	.902 ^f	.813	.719	.25248
7	.901 ^g	.812	.743	.24136
8	.888 ^h	.789	.736	.24476

Dependent Variable: percent change in county population, 1970 to 1997.

^aPredictors: (Constant), AIR, PREMIN, PREMAX, PROD, ELEVSTD, COLL, FORAR, BUSPER, PRECP, NATR

^bPredictors: (Constant), AIR, PREMIN, PROD, ELEVSTD, COLL, FORAR, BUSPER, PRECP, NATR

^cPredictors: (Constant), AIR, PREMIN, PROD, ELEVSTD, COLL, BUSPER, PRECP, NATR

^dPredictors: (Constant), AIR, PREMIN, PROD, ELEVSTD, COLL, BUSPER, PRECP

^ePredictors: (Constant), AIR, PREMIN, ELEVSTD, COLL, BUSPER, PRECP

^fPredictors: (Constant), AIR, PREMIN, ELEVSTD, COLL, PRECP

^gPredictors: (Constant), AIR, PREMIN, ELEVSTD, COLL

^hPredictors: (Constant), AIR, ELEVSTD, COLL

amenities, the scenery, outdoor recreation, and the pace of life.

Population growth in the rural counties of the Greater Yellowstone Region is also correlated with forest cover (FORAR) and the percent of the county in nature preserves (NATR). Population growth is also correlated with mean and minimum precipitation, suggesting that growth is slowest in the driest counties. In contrast to the state-level findings, the variation in topography (ELEVSTD) was negatively correlated with population growth. Counties that were primarily mountainous had lower variation in topography than counties that included extensive areas of plains as well as mountains. The more mountainous counties had higher population growth rates than those with extensive areas of plains. These findings suggest that population growth in the GYE is associated with mountainous areas with extensive forests, high precipitation and high access to nature reserves.

In terms of social and economic variables, those that correlated the strongest with population growth from 1970 to 1997 in the rural portions of the Greater Yellowstone were: the percentage of the population over 18 years of age with a college degree (COLL), counties where over 15 percent of personal income in 1995 was earned in producer services (PROD), and the percent of total employment in 1995 in business services (BUSPER). Both PROD and BUSPER are

measures of a component of the services sector that are relatively high wage. These include engineers, architects, software programmers, business consultants, and accountants — occupations most likely to be “footloose;” able to move to desirable locations in part due to technological innovations and delivery services (e.g., Federal Express and United Parcel Service).

Carnevale and Rose (1998), Reich (1991), Drucker (1993), Thurow (1993), Silvestri and Lukasiewicz (1989) and others have identified education as an important component in determining a high-wage service industry. This may explain why the variable COLL is highly correlated with population growth; either entrepreneurs flock to an area because it has an educated workforce, or else the measure is an indication that those who have migrated to the Greater Yellowstone area are relatively educated. The later notion is supported by research by Nelson (1999), who found that areas in the West with high levels of natural amenities have enjoyed growing populations and income levels during the 1990s, and that “Much of this growth has come from immigration of people with income from self-employment or investments. These new migrants are usually well-educated and often work as executives or professionals or in such industries as finance, insurance and real estate or business services.” The presence of relatively higher paying service industries and the education of the population are highly correlated: correlation coefficients between COLL and PROD and BUSPER are .573 and .603, respectively.

The model with the best fit (with the highest adjusted R-square value at .743 and a confidence level of over 99 percent) incorporated the following variables: whether there was access to an airport (AIR); counties that are, on average, wetter (PREMIN); counties with high variation in topography (ELEVSTD); and counties with a relatively high percentage of the population over 18 years of age with a college degree (COLL). (If the variable AIR is taken out of the model, then the adjusted R-square drops to .701, and the variable BUSPER (percent of total population employed in business services) enters the model. The results of the test for best-fit model are presented in Table 5. Analysis of variance and t-test of coefficients of the best-fit model are presented in Tables 6 and 7.

At the three-state level, the high degree of correlation between rural population growth and the presence of mountains is consistent with the findings of McGranahan (1999) who conducted a nationwide study on the relationship between amenities and rural population growth and found that “people are attracted to the West for its varied topography.” A somewhat surprising finding was that at the level of the Greater Yellowstone the variable ELEVSTD (topography) showed a negative correlation coefficient (Table 4), and in the

Table 6. Analysis of Variance for Best-Fit Model (7)

	Sum of Squares	Degrees of freedom	Mean Square	F	Significance Level
Regression	2.766	4	.691	11.870	.001
Residual	.641	11	5.826E-02		
Total	3.407	15			

Dependent Variable: percent change in county population, 1970 to 1997.

Predictors: (Constant), AIR, PREMIN, ELEVSTD, COLL

best-fit model it was the only coefficient with a negative sign (Table 7). Here's why: in the Greater Yellowstone Region the counties with the highest variation in elevation are a few very large counties in Wyoming, and these extend from the mountainous portion of the Greater Yellowstone Ecosystem far to the eastern half of the state, where the topography is much flatter and the elevation low. A closer look at each of the counties in the Greater Yellowstone Region revealed that the fastest population growth occurred the most mountainous counties, a finding consistent with the three-state analysis and with those of McGranahan (1999). This finding underscores one of the difficulties in using counties as a unit of analysis; in some Western states the counties are so large that they can encompass a variety of landscapes. This point also underscores the difficulty in pinning down a precise definition for the term amenity.

A study by Cromartie and Wardell (1999) illustrates another reason why the definition of an amenity is so illusive. They examined the changing populations patterns in the non-metro West since the 1970s and found that during the later part of the 1990s rural counties not adjacent to metropolitan counties grew at rates equal to those of counties adjacent to metro areas. They note that during the 1980s net migration to rural areas of the West were highly correlated with natural amenities, including topographic variation. In the 1990s, however, they found that the highest rates of migration occurred in counties with second highest ranking in amenities. This may be an indication that perhaps the most desirable places have already been discovered, and that at a certain

Table 7. t-Test for Best-Fit Model

	Unstandardized Coefficients		Standardized Coefficients		Significance Level
	B	Standard Error	Beta	t	
(Constant)	7.137E-03	.458		.016	.988
COLL	5.555	1.575	.572	3.527	.005
ELEVSTD	-2.382E-03	.001	-.618	-3.311	.007
PREMIN	3.129E-02	.027	.194	1.158	.271
AIR	.534	.195	.452	2.743	.019

Dependent Variable: percent change in county population, 1970 to 1997.

point real estate and other costs of living enter into the consideration of whether people move into the most desirable locations. For the Greater Yellowstone Region, Jackson Hole (Teton County, Wyoming) offers such as an example, with many new migrants choosing to live in the more affordable neighboring community of Driggs (Teton County, Idaho) (Beyers and Nelson 1997).

Testing the Influence of Other Economic Variables

Adding and withdrawing each of the ERS typology variables we did not find a variable that improved the fit of the model. These results are consistent with the findings of both similar studies by McGranahan (1999) and Cromartie and Wardell (1999) who found that most of the variation in rural population growth could be explained by amenity variables. We expected to at least find that adding variables to describe "retirement-destination," and "recreation" counties would add to the fit of the model. However, as McGranahan (1999) discovered, counties classified this way do not always correlate highly with growth. Part of the explanation, according to the author, has to do with the seasonal nature of these counties. They may have amenities but that does not necessarily translate into a population growth because cold winters may discourage retirement, and the seasonal nature of recreation and tourism employment translates into fluctuations in population, a fact not taken into account by the population census figures.

Conclusions

The evidence presented in this paper support both hypothesis tested: certain ecological, and amenity variables explain a significant portion of the variation in population growth among rural counties of Idaho, Montana, and Wyoming; and in the Greater Yellowstone Region population growth in rural counties can be explained by a mix of ecological, amenity, social and economic variables. These findings have an important implication: any model for rural population growth and policies designed to aid rural development in the West should take into consideration the role that amenities play in attracting and retaining people (and their businesses). Stated differently, an informed rural economic development strategy should have as one important element the protection of the natural environment.

Which variables to choose for a study on the role of amenities is largely dependent on the location. The variables used in this study are similar to ones used in other studies and the results are consistent with previous findings: topography, climate, the presence of protected areas, and land cover are all important in varying degrees. However, in other parts of the country different proxies may be used for environmental

amenities; in the Intermountain West topography and proximity to wilderness may be more important than a warm climate, while on the West coast warm climates and access to beaches may be more accurate predictors. In either case, both statistical tests for correlations, as well as survey of migrants and business owners indicate that amenities, variously measured, play a role in rural development.

While it is tempting to conclude that rural, isolated counties with amenities will be able to grow in spite of downturns in the resource extractive sectors on which they have been traditionally dependent, the fact is that access to larger markets is an important consideration. The “footloose” owners of a service businesses, such as an engineers, architects, or software programmers, need access to their clients and larger markets via air travel. This study illustrates that population growth in the rural portions of the Greater Yellowstone is closely related to the availability of an airport with daily scheduled commercial airline service. In other words, amenities may be a necessary condition for growth for some counties, but they are not necessarily sufficient.

If reliable measures become available, further research should include measured differences in access to high-speed telecommunications infrastructure. An attempt was made in this study to differentiate counties this way, and we discovered that reliable statistics are difficult to come by, and in counties where they do exist, there is a high degree of variation within the county. Some parts of the county have access to modern telecommunications facilities, while others do not. Again, this underscores one of the problems in using counties as the level of analysis. Nevertheless, it would be interesting to understand whether the Internet has played a role in rural population growth.

Finally, the results of this study indicate a high degree of correlation between the education of the population and the percentage of people employed in the business and producer services. Combining this fact with the importance of amenities and access to larger population centers via air travel, the logical conclusion for the Greater Yellowstone Region, and perhaps for the West in general, is: rural, isolated counties with a comparative advantage will be those with natural amenities, an educated workforce, and reliable airline travel. The likely type of growth from this strategy will be in the relatively higher paying service industries. And, as indicated by Cromartie and Wardell (1999), although not tested for in this paper, these characteristics will also attract an aging population looking for a comfortable place to retire.

Because recent growth has placed pressure on private lands, which are being converted from open space and agricultural lands to residential development, research on the Greater Yellowstone has broadened in the last few years to include a desire to understand the causes and consequences

of amenity driven growth. It is hoped that the results of this paper can add to a growing body of literature that attempts to explain why some rural, isolated counties in the West have been growing, and that researchers, land managers, and conservationists in the Greater Yellowstone Region can advance one step further to understanding the link between a quality environment and development. One way to do this, as demonstrated in this paper, is to combine the efforts of researchers from the social and ecological sciences.

Acknowledgements

This study was funded by the NASA Land Cover Land Use Change Program. We also thank Ute Langner for compiling ecological data and for preparing Figure 1.

Endnotes

- 1 ray@sonoran.org
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- 3 For Hypothesis One, 36 counties were removed from the database because they were classified as “urban” and adjacent to metropolitan counties. The total sample size for all three states was 88 counties. For Hypothesis Two, the following counties were eliminated from the database because they were classified as “urban:” Bonneville, Idaho; Carbon, Gallatin and Stillwater, Montana. The total sample size for the Greater Yellowstone Region was 16 counties.
- 4 Backward elimination is a variable selection procedure in which all variables are entered into the equation and then sequentially removed. The variable with the smallest partial correlation with the dependent variable is considered first for removal. If it meets the criterion for elimination, it is removed. After the first variable is removed, the variable remaining in the equation with the smallest partial correlation is considered next. The procedure stops when there are no variables in the equation that satisfy the removal criteria.

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Cockroach is Good for Asthma: Zootherapeutic Practices in Northeastern Brazil

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Abstract

This paper deals with the use of 34 animals that are prescribed as folk medicines, cosmetics, and charms in the county of Tanquinho, Northeastern of the State of Bahia, Brazil. Data were obtained by performing semi-structured interviews with local residents from Tanquinho community. The animal-based medicines come from insects, arachnids, amphibians, reptiles, birds, and mammals. These resources provide 46 raw materials that are recommended to treat a wide range of common illnesses and injuries. The results show how important this ethnozoological phenomenon is, and indicate that traditional knowledge on zotherapy is to be studied in order to lead to the discovery of new sources of drugs.

Keywords: *ethnozoology, folk medicine, zotherapy, sustainability, Brazil*

Introduction

“Potions that call for toadstools plucked from a graveyard or the blood of a black rooster may indeed have some scientific basis beyond superstition.” (McGirk 1998:24-25)

Human beings have been using animal resources for therapeutic purposes since ancient times (Weiss 1947; Rosner 1992; Souza-Dias 1995; Unnikrishnan 1998), where folk remedies were elaborated from parts of the animal body, from products of its metabolism, such as corporal secretions and excrements, or from non-animal materials such as nests and cocoons. This ethnozoological interaction has been recorded both in indigenous and Western societies throughout the world (Gudger 1925; Branch and Silva 1983; Conconi and Pino 1988; Begossi and Braga 1992; Antonio 1994; van Huis

1996). Both wild and domesticated animals are useful for therapeutic purposes. The latter are used especially through pet therapies, such as the employment of dogs, cats, and horses for the treatment and improvement of different kinds of pathological conditions, as for example mental deficiencies (Silveira 1998). The ample geographical distribution of zotherapy has been such that Marques (1994) states that all human cultures that show a developed medical system will utilize animals as medicines. Such a statement forms the basis of what he has called a ‘zootherapeutic universality hypothesis.’ In this regard, this paper corroborates the hypothesis by recording medicinal animals in northeastern Brazil.

Although surveys centered on medicinal plants are still on the top, the phenomenon of zotherapy has aroused the interest of many researchers from different branches of science who have recorded folk medical systems and sought compounds with pharmacological action (Werner 1970; But, Tam and Lung 1991; Bisset 1991; Amato 1992; Lazarus and Atilla 1993; Chen and Akre 1994; Rodrigues and West 1995). But this interest goes farther when one takes into consideration the benefits that animal-derived compounds give in terms of monetary value and human welfare. In 1995 the estimated market value of pharmaceutical derivatives from biological resources was US \$43 billion worldwide (Blakeney 1999). For example angiotensin I, an antihypertensive derived from the Brazilian arrowhead viper *Bothrops jararaca*, brings the Squibb Company US \$1.3 billion a year in sales and contributes to the well-being and longevity of millions of peoples (Lovejoy 1997). Today from 252 essential chemicals that have been selected by the World Health Organization, 11.1% have plant origins, while 8.7% come from animals (Marques 1997). According to Oldfield (1989), more than 41% of all 1973 over-the-counter prescriptions in the United States contained an active ingredient derived from wild or cultivated fauna and flora. As she points out, traditional knowledge of medicinal compounds from biota is still one of the most

important means for discovery of unknown natural drug resources.

In Brazil, animal species have been medicinally used by indigenous society for millennia and by descendants of the European settlers for the last four centuries. An amazing number of about 300 species have been recorded and these can be easily found as commercial items sold by herbalists and healers in market places all over the country (Marques, personal communication 1996). Considering the State of Bahia, knowledge of medicinal animals and their uses has persisted in many areas today. Bandeira (1972) has recorded the use of 13 animals by the Kiriri Indians from Mirandela county; Rêgo (1994) has found the use of six marine species by the fishermen from Velha Boipeba Island; Pacheco (1998) has recorded six medicinal species in the city of Correntina; Costa-Neto has recorded the use of 22 species in the area of the Chapada Diamantina National Park (1996), 49 species in the county of Glória (1999a), 16 species in the city of Feira de Santana (1999b), and 55 species in the county of Conde (1998); Costa-Neto and Melo (1998) have recorded the use of 16 insect folk species in the county of Matinha dos Pretos; Melo (1999) has found the use of 15 animal species in the city of Feira de Santana; Pereira and Souto (1999) have found the use of 36 species by the fishermen from Acupe; and Souto, Andrade and Souza (1999) have recorded 50 animals in the city of Andaraí. We could attest that Bahia's usage of medicinal animals has been facilitated over many generations because of the fostered wisdom within the communities as part of the local cultures.

Unfortunately, the Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA 1989) records that many of the zootherapeutic resources include threatened species. In addition to hunting and deforestation of their habitats, some ordinary species, such as giant anteater (*Myrmecophaga tridactyla*), tapir (*Tapirus terrestris*), and giant armadillo (*Prionomys maximus*) are now rare or under risk of extinction. Hence, studies aimed towards traditional knowledge on animal use and its significance to human beings should be undertaken in order to lead to better ways of exploiting the natural resources, thus, their conservation, so that future generations may know and manage them.

In order to increase the number of ethnoscientific studies dealing with a human/animal connection of a medicinal type, this paper discusses the folk use of 34 ethnospecies in the county of Tanquinho, Northeastern of Bahia State, Brazil. This is the first time that such a survey has been done in this area. Farther studies are requested not only to confirm the presence of bioactive compounds in these traditional remedies, but also to lead to a more sustainable use of these resources. In addition, it is important to record this vanishing knowledge before it is eroded by the western culture.

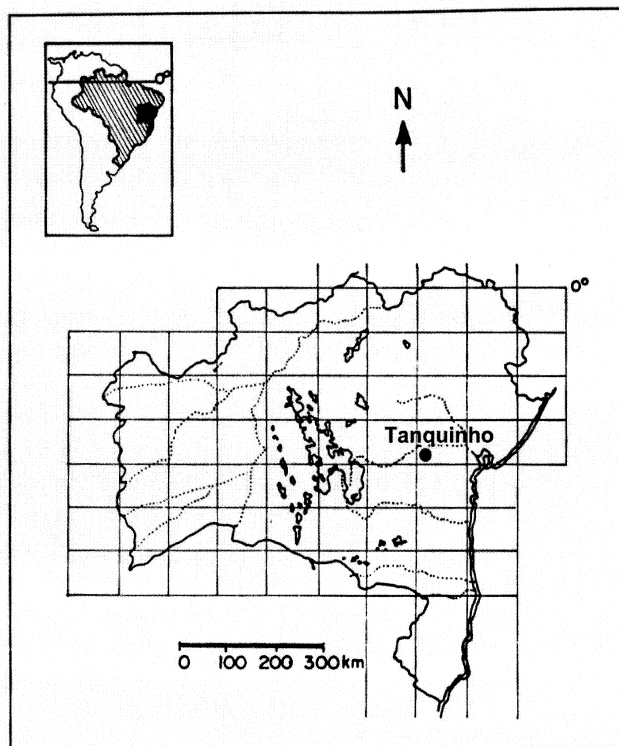


Figure 1. Map showing the location of the county of Tanquinho within the state of Bahia, Brazil.

The Studied Community

Bahia State has a territorial extension of 567.295.3 km². This Brazilian region presents both a biological and cultural diversity. A varied number of ethnic groups ranging from indigenous to Afro-Brazilian societies, peasant communities, and fishing villages live there. These groups have developed a wide range of interactions with their environment.

The county of Tanquinho has an area of 93 km² and is located in the Northeastern of the state of Bahia. It lies between 11° 58' South latitude and 39° 06' West longitude (Figure 1). This Brazilian region is mainly characterized by a semi-arid climate with deciduous, woody vegetation dominated by thorny phanerogamous, leafless cacti and bromeliad species comprising what is traditionally called "caatinga" ('white forest' in the Tupi indigenous language). In general terms, the Brazilian semi-arid has very poorly soils which tends to the salinization and intermittent rivers (Mendes 1997). In this geographical area human populations have adapted to very severe drought periods ranging from five to nine months annually. Drought years are common and severe droughts lasting three to five years have occurred every three to four decades (Sampaio 1995).

Tanquinho is totally included in the “caatinga” dominion, where the mean annual temperature is about 24.6°C and rainfall about 600 to 1000 mm per year (Centro de Estatística e Informação 1994). Most of its 7,465 inhabitants correspond to the typical Brazilian racial profile of composite people of European and African descent, Indians, and various mixtures of these groups, living integrated with the other members of the society of which it is a part. In contrast to other parts of the state, illiteracy is relatively low, while the mean life span and migration rate are high. Both men and women make their living by planting and raising cattle. The main crops are maize, bean, and manioc, cultivated both for home consumption and for market exchange. Due to their limited access to official medicines and proper medical care, most of the Tanquinho’s people hold a traditional knowledge related to the use of natural resources as medicines (Costa-Neto and Oliveira 2000). This knowledge has been transmitted from generation to generation mainly through the oral tradition.

Methodology

Tanquinho, which is a rural community, has been chosen for this study because the author is from there and because “caatinga” woods are still present in this region.

Data were obtained through fieldwork conducted from March to June 1998 by performing semi-structured interviews with nine men and five women, whose ages ranged from 26 to 74 years old. These were local healers, herbalists, elders, farmers, and midwives, who were all from Afro-Brazilian ancestry living both in rural and urban areas of the community. They were selected as informants because they were identified by local people as experts, knowledgeable members concerning folk medicine. According to them, their knowledge of medicinal animals was acquired mainly through parental heritage, or because they have experienced folk medicines to heal their kin or themselves.

We asked the informants whether they knew about remedies made from animals and whether they used them in their healing practices. We also asked them questions about what those animal remedies were prescribed for and how the medicines were administered. Special attention was paid to the modes of preparation, since this kind of information indicates how a given folk medicine can be therapeutically efficient in terms of the right ingredients, the proper dose, and the right length of preparation. It is interesting to note that zootherapy, except for the herbalists and healers, is not the informants’ primary occupation. Herbalists only commercialize medicinal materials other than animal products, and healers are remunerated for their therapeutic services.

An emic approach has guided our research since we wanted to record the informants’ utilitarian knowledge

(Toledo 1991) regarding faunistic resources used locally as medicines. By using this kind of approach, ethnobiologists record the native’s knowledge in just the way the local culture organizes, perceives, and uses its universe, not by imposing a Western understanding (Posey 1986).

Medicinal raw materials were purchased when and where possible. They were catalogued and are deposited at Feira de Santana State University together with other ethnobiology collections. Specimens were identified by one of the authors by using zoological references (Pough, Heiser and McFarland 1993; Sick 1997), since these were species known in this part of the country.

The Zootherapeutics

The first survey on medicinal animals in Tanquinho revealed 34 ethnospecies referred to as having medicinal properties for a variety of purposes. The faunistic resources come from both vertebrates and invertebrates, and they are represented by five scientific taxonomic categories. These are mammals (32%), birds (24%), insects (24%), reptiles (11%), arachnids (6%), and amphibians (3%). According to their habitat, these resources can be divided into three major categories. The first category, domiciliar, is comprised of those animals which are found living inside human habitations, such as cockroaches, flies, and dogs. Those animals reared as livestock or that can be found near human settlements comprise the second category, which we might call the “peri-domiciliar.” Examples of these are crickets, leaf-cutting ants, bird-eating spiders, scorpions, toads, chicken, sheep, pig, ox, and donkey. The third category or wild species is comprised by those animals living in the woods, such as stingless bees, turtles, lizards, snakes, greater rhea, peccaries, giant anteater, fox, brocket deer, ground-dove, red-winged tinamou, southern lapwing, tinamous, white-bellied nothura, yellow-legged tinamou, and porcupine.

The zootherapeutic species provide 46 raw materials, which are turned into medicines² and prescribed for treating locally diagnosed ailments (see Table 1). These raw materials range from parts of the bodies, such as leg, hair, hide, fat, feather, penis, blood, bones, meat, and heart to products of their metabolism, such as honey, milk, egg, and feces, and non-animal materials, such as arapuá’s scutellum.³ Whole animals are also used. The extraction of these medicinal raw materials occur through manual gathering of small specimens, slaughtering of the livestock, or through hunting of wild species. The modes of preparation and administration of the animal-based remedies are described in Appendix 1, which also provides English and Portuguese animal names as well as their taxonomic identification.

Of 34 ethnospecies cited, eight have multiple uses, that is, the same source provides more than one raw material that

Table 1. Folk medicinal use of animals in the county of Tanquinho, State of Bahia, Brazil. Uses other than medicinal are also included.

Animal		Percentage of citation	Part used	Indications
English name	Species			
Insects				
Cockroach	<i>Periplaneta americana</i>	92%	Whole	Asthma
Cricket	<i>Achaeta sp.</i> ¹	36%	Hind legs	Diuretic
House fly	<i>Musca domestica</i>	36%	Whole	Baldness, immature furuncles
Leaf-cutting ant	<i>Atta spp.</i>	72%	Whole	Tendinitis
Stingless bee	<i>Tetragonisca sp.</i>	72%	Honey	Cataract, glaucoma, cough
Stingless bee	<i>Melipona cf. scutellaris</i>	72%	Honey	Fortifier
Stingless bee	<i>Melipona sp.</i>	72%	Honey	Fortifier
Stingless bee	<i>Trigona spinipes</i>	72%	Honey Scutellum	Throat inflammation Acne, influenza, stroke
Arachnids				
Bird-eating spider	<i>Theraphosidae</i>	7%	Hairs	Magic rituals
Scorpion	<i>Tytilus sp.</i>	72%	Whole	To treat its own sting
Amphibians				
Toad	<i>Bufo sp.</i>	72%	Bones Hide Venom ² Whole	To prevent oral diseases Acne Magic rituals Urinary retention
Reptiles				
Lizard	<i>Tropidurus torquatus</i>	36%	Whole	Chicken pox
Neotropical rattlesnake	<i>Crotalus durissus</i>	72%	Fat Meat	Rheumatism Rheumatism
Toad-headed turtle	<i>Phrynops sp.</i>	36%	Fat	Rheumatism
Tortoise	<i>Geochelone cf. carbonaria</i>	72%	Blood Heart Whole	Erysipelas To stop the sensation of getting thirsty Erysipelas
Birds				
Chicken	<i>Gallus domesticus</i>	72%	Fat White of the egg	Nasal congestion To stop bleeding, dysentery
Greater rhea	<i>Rhea americana</i>	72%	Fat Feathers	Rheumatism Stroke
Ground-dove	<i>Leptotila sp.</i>	72%	Feathers	Stroke
Red-winged tinamou	<i>Rhynchotus sp.</i>	36%	Feathers	Stroke
Southern lapwing	<i>Vanellus chilensis</i>	36%	Heart	To stay awake
Tinamous	<i>Crypturellus sp.</i>	36%	Feathers	Stroke
White-bellied nothura	<i>Nothura boraquira</i>	36%	Feathers	Stroke
Yellow-legged tinamou	<i>Crypturellus noctivagus zabele</i>	36%	Feathers	Stroke
Mammals				
Brocket deer	<i>Mazama cf. americana</i>	36%	Hide Femur	Stroke To make a child walk sooner
Collared peccary	<i>Tayassu tajacu</i>	36%	Hide	Stroke
Dog	<i>Canis familiares</i>	72%	Feces	Chicken pox
Donkey	<i>Equus asinus</i>	36%	Milk	Whooping cough
Fox	<i>Dusicyon sp.</i>	36%	Fat	Rheumatism
Giant anteater	<i>Myrmecophaga tridactyla</i>	72%	Hide	Stroke
Ox	<i>Bos taurus</i>	36%	Feces Medulla Penis	To make mosquitoes go away Baldness Sexual impotence
Porcupine	<i>Coendou cf. prehensilis</i>	72%	Hide	Stroke
Pig	<i>Sus scrofa domesticus</i>	36%	Fat	Furuncles, tumors
Sheep	<i>Ovis aries</i>	36%	Fat	Torsion
White-lipped peccary	<i>Tayassu pecari</i>	36%	Hide	Stroke

¹ "sp." means species after the genus to which it belongs; "cf." is used when a species is to be confirmed² Toad's venom used in magic rituals has been cited by only one informant (7%).

is used for the treatment of two or more diseases (see Table 1). Such is the case with toad (*Bufo* sp.), whose bones of its members are used to pick the teeth and, thus, preventing caries, or when a live toad is opened and then put on the abdomen of patients suffering from urinary retention. Most of the zootherapeutic species, however, provide only one raw material that is used to the elaboration of folk medicines prescribed for the treatment of specific ailments (e.g., dog's sundried feces used for chicken pox).

As can be seen in Table 1, medicinal knowledge of cockroaches seems to be very persistent in the community of Tanquinho since 92% (N = 13) of the informants have cited the use of these insects for the treatment of asthma. About 72% (N = 10) of the respondents have mentioned the use of dog, porcupine, giant anteater, greater rhea, tortoise, scorpion, toad, bees, rattlesnake, ground-dove, chicken, and leaf-cutting ant. Thirty-six per cent (N = 5) have mentioned the medicinal use of the other insects, reptiles, mammals, and birds. Only one informant has reported the involvement of animals in magic rituals. In Afro-Brazilian rituals, Umbanda's believers make use of the bird-eating spider (Theraphosidae) whose toasted, powdered hairs are mixed with chalk in order to make a *pemba*,⁴ which is used to make dead people (obsessor spirits) go away or to cause the death of the living. The secretion extracted from a toad's parotid glands has the same use. Although these resources are used in a magical way they can be considered as medicines since they alleviate people's mental health condition.

It was observed that stroke was the most cited disease, followed by rheumatism and dermatological problems. The application of animal-based medicines varies according both to the nature of the ailment and the ingredients that are used during their preparation. Many of the medicines are administered as teas, which are made using mostly the powder produced by grinding the toasted parts of the body of the animals (e.g., crickets) or the whole toasted animal (e.g., cockroaches). Such teas are prescribed and drunk for the treatment of asthma, stroke, bronchitis, urinary retention, and sexual impotence. Drinking the water in which whole animals or their parts have been cooked is also recommended for curing some illnesses. For example, the water in which a lizard (*Tropidurus torquatus*) has been cooked is drunk for curing chicken pox in its beginning stages, while the water in which the penis of an ox (*Bos taurus*) has been cooked is recommended to treat male impotence. Honey of the stingless bee (*meliponins*) is eaten both as food and as a fortifier, or it is used as an eyedropper to treat sight problems. Such is the case with "jataf" (*Tetragonisca* sp.), whose honey is used for the treatment of glaucoma and cataracts. Informants have also cited the use of living animals, such as tortoise (*Geochelone* cf. *carbonaria*). This reptile is reared as a pet in

order to prevent people from developing erysipelas. In the county of Conde, northeastern Bahia State, traditional fishermen also rear this species as a pet to cure bronchitis (Costa-Neto 1998).

The interviewees mentioned the medicinal effects of the fat of some animals. Such is the case with fat of Neotropical rattlesnake (*Crotalus durissus*), which is used for rheumatism, of chicken (*Gallus domesticus*), which is used for nasal congestion, of toad-headed turtle (*Phrynops* sp.), which is also used for rheumatism, of a virgin pig (*Sus scrofa domesticus*), which is massaged on furuncles and tumors in order to mature them, and of a castrated sheep (*Ovis aries*), which is recommended for treatment of torsion. Parts of other animals are also employed as therapeutic resources. Such is the case with feathers of greater rhea (*Rhea americana*), which are used against stroke, the hide of giant anteater (*Myrmecophaga tridactyla*), which is recommended to treat stroke, the scutellum of arapuaá (*T. spinipes*), which is toasted and the smoke is breathed for the treatment of stroke. See Appendix 1 for a description of how these medicines are made. Very few treatments require eating specific foodstuffs. For example the rattlesnake (*C. durissus*), which cooked meat is eaten to treat rheumatism, and the southern lapwing (*Vanellus chilensis*), the heart of which is eaten in order to stay awake.

Folk uses other than medicinal and magical were also recorded. As cosmetics, informants have mentioned that rubbing the head with a mass of crushed houseflies (*Musca domestica*), or by using the oil extracted from the medulla of an ox's femur treats baldness. Informants have stated that spines are treated by washing the face with the infusion made from the arapuaá's scutellum as well as by putting a piece of the hide of a toad (*Bufo* sp.) on them.

The persistent use of animal-based medicines means that substances of therapeutic value not yet known by science may be present. Paraphrasing Oldfield (1989), folk knowledge of medicinal resources is still one of the most important means for discovery of unknown biotic drug sources. As stated by Marques (1999), there is scientific evidence for the medicinal use of animals in Brazil. Both Western and traditional medical systems have much to offer medicinally, economically, and culturally. In this way, public health care practitioners should try to integrate them instead of attempting to replace one by another.

The Importance of Animal-based Medicines

Although considered by many as superstition, the pertinence of traditional medicine based on animals cannot be denied since they have been methodically tested by pharmaceutical companies as sources of drugs to the modern medical

science (Launet 1993). As Kunin and Lawton (1996, 292) argue, "The investigation of folk medicine has proven a valuable tool in the developing art of bioprospecting for pharmaceutical compounds." Many studies have confirmed what people have known and employed for centuries. According to McGirk (1998), Brazilian scientists are studying a type of frog that is used to cure intestinal illnesses by members of the Yawanawa Indian tribes on the banks of the Rio Grande. Indeed, amphibians have provided compounds capable of being turned to therapeutic advantage. Peptides extracted from the scraped secretions of *Phyllomedusa bicolor*, for instance, are used in the treatment of depression, stroke, seizures and cognitive loss in ailments such as Alzheimer's disease (Amato 1992). Some of these compounds are important tools for biochemical research or as new leads for the development of anticancer or antiviral drugs (Lazarus and Attila 1993).

Several other animal-derived compounds of proven efficacy have also been found as observed by Zhang, Guo and Wang (1992), who have studied therapeutic uses of earthworms and found that these animals possess antipyretic, antispasmodic, diuretic, detoxic, antiasthmatic, antihypertensive, and antiallergenic effects. From the plasma of the European hedgehog, Mebs, Omori-Satoh, Yamakawa and Nagaoka (1996) have isolated erinacin, which is an antihemorrhagic factor. In addition to this, Oldfield (1989) records that about 4% of the extracts evaluated in the 1970s from 800 species of terrestrial arthropods (insects, crustaceans, spiders, millipedes, and centipedes) showed some anticancer activity.

Even lethal, natural substances can become medicines. The study of viperid, crotalid and elapid venoms has shown the presence of analgesic activity, which, in the case of serpent venoms, is stronger than morphine and, therefore, of use in cases of terminal cancer (Bisset 1991). A more recent development is the introduction of captopril and related substances in the treatment of hypertension (Ferreira 1993).

Regarding fish, several compounds have been extracted and these are employed as remedies in the official medicine (Hamada and Nagai 1995). Finkl (in Cousteau 1984), for example, refers to *Eptatretus stoutii*, *Dasyatis sabina*, and *Taricha* sp. as sources of cardiac stimulants, antitumors, and analgesic, respectively. Oily fish, like cod, herring, salmon, and turbot, have a great medicinal value to human beings due to a polyunsaturated compound known as OMEGA-3. This substance helps the prevention of arthritis (Adeodato 1997). The presence of an anticoagulant system in the plasma of Atlantic salmon (*Salmo salar* L.) and rainbow trout (*Oncorhynchus mykiss* Walbaun) has been confirmed, what supports similarities with the protein C anticoagulant system in mammals (Salte, Norberg and Odegaard 1996).

Tetrodotoxin (TTX), a water-soluble guanidinium derivative, is an example of a bioactive compound produced by marine organisms such as puffer fish "that resembles procaine in its ability to inhibit transmission of nerve cells" (Colwell 1997). When diluted it acts as an extraordinary narcotic and analgesic (Bisset 1991).

The Sustainable Use of Animal Resources

In Tanquinho, people usually do not know that some of the wild animal resources they regularly use are endangered species.⁵ Although their hunting, slaughtering, and trading have been prohibited by Federal law since 1967, wild populations continue to be used both nutritionally and medicinally in a clandestine way. Of the total of species recorded, 24 (71%) are not under extinction risk. On the other hand, *Myrmecophaga tridactyla*, *Coendou* cf. *prehensilis*, *Dusicyon* sp., *Mazama* cf. *americana*, *Rhea americana*, and *Crypturellus noctivagus zabele*, which are officially considered as threatened species by IBAMA (1989), were found among the set of faunistic resources prescribed as medicines at the time of this research. At least three species are insufficiently known and thus they are referred as threatened. These include peccaries (*Tayassu tajacu* and *T. pecari*) and tortoise (*Geochelone* cf. *carbonaria*). Finally, *Phrynos* is a little known genus that is believed to include threatened species. These animals have become charms and remedies used not only in Tanquinho but also throughout the country. Apparently, these species have not become endangered because of their perceived therapeutic value. Instead, "caatinga" woods have experienced much deforestation over the centuries resulting from a disordered exploitation of the natural resources due to wood extraction and itinerant cattle-breeding practices. This has decreased the vegetal covering and also the number of wild populations (Costa-Neto 1999a).

The record of 34 medicinal animals in Tanquinho, along with other studies conducted within the state of Bahia and elsewhere in Brazil, represents strong evidence of the traditional use of wildlife resources. According to Silva and Marques (1996), the phenomenon of zootherapy is relevant because it implies additional pressure over critical wild populations. Oldfield (1989) argues that many animal species have been overexploited as sources of medicines for the folk medicine trade. In addition, she also attests that animal populations have become depleted or endangered as a result of their use as experimental subjects or animal models. For this reason, sustainability is now required as the guiding principle for biological conservation. According to the IUCN draft *Guidelines* (Glowka, Burherme-Guilmin and Synge 1994), the exploitation of a given species is likely to be sustainable if:

- it does not reduce the future use potential of the target population or impair its long-term viability;
- it is compatible with maintenance of the long-term viability of supporting and dependent ecosystems; and
- it does not reduce the future use potential or impair the long-term viability of other species.

Zootherapeutic activity, if properly managed, can be compatible with an environmental conservation program in which the use of natural resources can and must occur in such a way that human needs and protection of biodiversity are guaranteed (Andriguetto-Filho, Krüger and Lange 1998). For this reason, zootherapy should be viewed within its cultural dimension (Costa-Neto 1999b). This cultural perspective includes the way people perceive, use, allocate, transfer, and manage their natural resources (Johannes 1993). Since people have been using animals for a long time, suppression of use will not save them from extinction. In accordance with Kunin and Lawton (1996), those species directly involved in traditional medicines should be among the highest priorities for conservation. These authors argue that some of the species are endangered precisely because they are of value to us. Since a basic principle governing the use of natural resources is that the extraction rate of a renewable resource should not exceed the renovation rate of that same resource, perhaps a suitable alternative for the diminishment of wild resources from overexploitation would be through the localization of natural compounds that have been successfully tested for pharmacological action. Thus, the production of artificial substitutes in the laboratories would displace human dependency on animal medicines (Oldfield 1989). In connection to this, we have to realize that the negative impacts on biological diversity should not be restricted only to the traditional users, but should be extended to the use by the pharmaceutical industries (Marques 1997).

Another alternative for the recovery of endangered species is to turn them into manageable resources in the way of traditional farming systems,⁶ where they would be reared using both folk and scientific techniques (Costa-Neto 1999b). Meanwhile, some conservation measures based on the community's reality should be taken, such as: rotational use of hunting; taboos on hunting or harvesting certain species; limitations on *caatinga* clearance; and use of particular agricultural techniques which lower the impact of the use or even increase biological diversity.⁷

When discussing how to conserve the biological resources we face two general antithetical approaches:⁸ one that deals with the extrinsic values of species and another that views diversity as having an intrinsic good for its own sake (Buchdahl and Raper 1998). Those who follow the first approach claim that biodiversity must be preserved because

doing otherwise would harm humanity (anthropocentric view). Thus, diversity in nature is of some instrumental value in advancing human interests and well-being, either now or in the future (Costanza and Daly 1995; Kunin and Lawton 1996). The second approach debates the issue of biodiversity from a moral point of view by arguing that diversity of life on Earth is to be protected independent of any utilitarian reasons (ethical view). Ehrlich and Ehrlich (1992) point out that biotic diversity should be valued for four general reasons: ethical, esthetical, direct economic, and indirect economic.

One may ask, "Could the zootherapeutics from Tanquinho be viewed from a less anthropocentric perspective and seen as having intrinsic value?" In this regard, we agree with Swanson's statement (in Oksanen 1997, 542) that the protection of biodiversity results from the right use of its resources.

Concluding Remarks

According to Marques (1999), researchers carrying out studies on zootherapy should pay attention to three ethical issues. The first deals with the intellectual property rights of the primary owners of the folk knowledge. As stated by McGirk (1998), the Convention on Biological Diversity recognizes that indigenous and traditional people should receive some reward if a drug company or an agribusiness firm develops a product based on traditional resources or knowledge. The second issue regards the well-being of the useful animals. And the third one deals with the sustainability of the implied resources. In recent years a growing body of literature recognizes that the cultural perspectives should also be taken into account in every debate focused on sustainable development (Morin-Labatut and Akhtar 1992; Agrawal 1995). These cultural perspectives include the way people perceive, use, allocate, transfer, and manage their environment (Johannes 1993). Thus, discussing zootherapy within the multidimensionality of the sustainable development turns out to be as one of the key elements in order to achieve the sustainability of the medicinal faunistic resources (Celso 1992). Since people constitute an essential component of the landscape and their activities are fundamental for its long-term compatible use, biological conservation policy should be built upon both anthropocentric and nonanthropocentric bases.

Endnotes

- 1 E-mail: eraldont@uefs.br
- 2 This term is used here in its broad sense and refers to all substances that have the property of helping humans get rid of any physical or mental disturbance. It includes charms and spiritual healing.

- 3 Scutellum refers to the part of a stingless bee's hive locally called as "arapuá" (*Trigona spinipes*). This is a hard mass comprised of resin, dead bees, and other detritus.
- 4 *Pemba* is a kind of chalk of different colors that is used mainly by Umbanda's representatives to draw symbolical, invocatory risks on the floor. Umbanda refers to a kind of Afro-Brazilian religion.
- 5 An anonymous reviewer noted that, "At the individual level of analysis, specific animals, whether they belong to endangered species or not, are themselves endangered and sacrificed as the result of their zootherapeutic utilization."
- 6 Examples of caatinga wild species already farmed are: *Rhea americana americana*, *Kerodon rupestris*, *Dasyprocta agouti*, *Galea spixii spixii*, *Tayassu tajacu*, *Tupinambis teguixin*, and stingless bee of the genera *Melipona* and *Trigona* (according to Mendes 1997).
- 7 Modified from Glowka, Burherme-Guilmin and Syngé 1994.
- 8 We consider these two approaches as complementary.

Acknowledgements

We are very grateful to Miguel Alexiades of the New York Botanical Garden, who reviewed the English of an earlier version of this paper, and to the two anonymous referees for their useful criticisms and suggestions. In this regard, we thank an anonymous reviewer for the quotation written in footnote 4. We would like to thank all informants from Tanquinho for their kind cooperation and for allowing reproducing their traditional wisdom. Without their collaboration this work would not have been possible.

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Appendix 1. *Modes of preparation and administration of animal-based medicines. Uses other than medicinal are also included.*
INSECTS

Cockroach (*Periplaneta americana*), “Barata”, one use.

The whole toasted insect is turned into a tea, which is drunk three times a day to treat asthma.

Cricket (*Achaeta* sp. ?), “Grilo”, one use.

Make a tea from the powdered toasted hind leg, and drink it as a diuretic. This remedy should be taken in the morning. If a child, it should be taken two teaspoon per day. If an adult, he/she should take two tablespoon per day.

Housefly (*Musca domestica*), “Mosca”, two uses.

Crush a bunch of flies and put the mass on immature furuncles.

Rubbing the head with a mass of crushed houseflies treats baldness.

Leaf-cutting ant (*Atta* spp.), “Tanajura”, one use.

Put about 100 ants in 100 ml of alcohol, and massage this on tendinitis whenever one wants to.

Stingless bee (*Tetragonisca* sp. ?), “Jataí”, two uses.

Use honey as an eyedropper to treat cataract and glaucoma. It is just one drop of honey.

It is also eaten to heal cough.

Stingless bee (*Melipona* cf. *scutellaris*), “Uruçu”, one use.

Eat honey as a fortifier.

Stingless bee (*Melipona* sp. ?), “Mandassaia”, one use.

Idem

Stingless bee (*Trigona spinies*), “Arapuá”, four uses.

The scutellum (nest part) in infusion is recommended to treat acne by washing the face with it.

It is also drunk in cases of influenza.

Eat honey for curing throat inflammation.

Get the scutellum, toast it, and breathe the smoke for treating stroke (“mal do tempo”). Patients should breathe the smoke seven times during a week.

ARACHNIDS

Bird-eating spider (*Theraphosidae*), “Caranguejeira”, one use.

Its hairs are used in magic rituals such as to make dead people (obsessor spirits) go away or to cause the death of the living. Its toasted, powdered hairs are mixed with chalk in order to make a kind of chalk known as “pemba”.

Scorpion (*Tytilus* spp.), “Escorpião”, one use.

The whole scorpion is crushed, and the mass is put on the area that was stung by it.

AMPHIBIANS

Toad (*Bufo* sp.), “Sapo”, five uses.

Get a piece of its hide and put it on acne.

A live toad is opened and put on the abdomen in cases of urinary retention.

The bones of the members are used to pick the teeth as well as to prevent oral diseases, such as caries.

The secretion of its parotid glands is used in magic rituals such as to make dead people (obsessor spirits) go away or to cause the death of the living. Mix it with a black chalk in order to make a “pemba”.

REPTILES

Tortoise (*Geochelone* cf. *carbonaria*), “Jabuti”, three uses.

Massage warmed blood on erysipelas.

This turtle is to be reared as a pet in order to prevent people from developing erysipelas.

The heart is eaten in order to stop the sensation of getting thirsty.

Toad-headed turtle (*Phrynops* sp.), “Cágado-d’água”, one use.

Massage fat on rheumatism.

Lizard (*Tropidurus torquatus*), “Lagartixa-de-lajedo”, one use.

Drink the water in which a live lizard has been cooked for curing withdrawn chicken pox. Patients should drink just one glass of water.

Neotropical rattlesnake (*Crotalus durissus*), “Cascavel”, one use.

Massage fat on rheumatic areas.

Cook the meat and eat it to treat rheumatism.

BIRDS

Ground-dove (*Leptotila* sp.), “Juriti”, one use.

Burn its feathers and breathe the smoke for curing stroke (“mal do tempo”).

Yellow-legged tinamou (*Crypturellus noctivagus zabele*), “Zabelê”, one use.

Idem

Red-winged tinamou (*Rhynchotus* sp.), “Perdiz”, one use.

Idem

White-bellied nothura (*Nothura boraquira*), “Codorna”, one use.

Idem

Tinamous (*Crypturellus* sp.), “Nambu”, one use.

Idem

Greater rhea (*Rhea americana*), “Ema”, two uses.

Massage fat on rheumatism. Burn its feathers and breathe the smoke for curing stroke.

Chicken (*Gallus domesticus*), “Galinha”, three uses.

Use warmed fat in cases of nasal congestion.

Put white of egg over scars to stop bleeding. Shake a white of egg very slightly, add sugar and a glass of water, and take this against dysentery.

Southern lapwing (*Vanellus chilensis*), “Quero-quero”, one use.

The heart is eaten in order to stay awake.

MAMMALS

Sheep (*Ovis aries*), “Carneiro”, one use.

Massage fat of a castrated sheep on torsion.

Pig (*Sus scrofa domesticus*), “Porco”, two uses.

Massage warmed fat of a virgin pig on furuncles and tumors in order to mature them.

Ox (*Bos taurus*), “Boi”, three uses.

The water in which its penis has been cooked is drunk as an aphrodisiac in cases of male sexual impotence.

Get the medulla of the femur, cook it, and use the oil as a cosmetic to prevent baldness.

The dried feces are burnt in order to make mosquitoes go away. Maybe this practice prevents people from falling ill with dengue fever (a potentially life-threatening viral illness transmitted by the bite of infective *Aedes aegypti* mosquitoes) as well as other illnesses transmitted by dipterans.

Donkey (*Equus asinus*), “Jumenta”, one use.

Drink its milk in cases of weaknesses, especially for curing whooping cough.

Brocket deer (*Mazama* cf. *americana*), “Veado”, two uses.

Burn its hide and breathe the smoke to heal stroke.

Add the powdered femur to the meal or make a tea from it; this is believed to make an infant child walk sooner.

Dog (*Canis familiaris*), “Cachorro”, one use.

Get some sun-dried feces, boil them, and then put the mass on chicken pox.

Collared peccary (*Tayassu tajacu*), “Caititu”, one use.

Burn its hide and breathe the smoke to heal stroke.

White-lipped peccary (*Tayassu pecari*), “Queixada”, one use.

Idem

Giant anteater (*Myrmecophagus tridactyla*), “Tamanduá-bandeira”, one use.

Idem

Porcupine (*Coendou* cf. *prehensilis*), “Ouriço-cacheiro”, one use.

Idem

Fox (*Dusicyon* sp.), “Raposa”, two uses.

Mix fat with a glass of white rum, and drink it in the morning for treating rheumatism.

Massage fat on rheumatic areas.

Note: “Idem” is substituted for information that is the same as the information immediately prior.

Fishing and Niche Dimension for Food Consumption of *Caiçaras* from Ponta do Almada (Brazil)

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Abstract

In this research we analyze the diet of the caiçara population in Ponta do Almada (Brazil), regarding the items of animal origin such as fish, and its connection to local fishing activities. Observations of fishing activities and diet were made every two months during 1995-6. Diet data were collected from a total of 436 meals of 12 randomly selected families and 89 fishing trips. Fish was the main animal protein consumed, but there was no direct relationship between fish catches and fish consumed per month, even though some of the most frequently caught species were observed in the diet. Niche breadth for animal protein consumed was larger for families of full time fishermen. The reduction of traditional occupations (such as fisheries and small-scale agriculture) and the increasing dependence on urban centers and on activities related to tourism may result in changes in the dietary patterns of caiçaras.

Keywords: diet, fishing, *caiçaras*, Atlantic Rain Forest, Brazil

Introduction

Studies on the diet of human populations are helpful to understand their relations with natural resources (Messer 1984), and also reflect adjustments to changing environments (Kunhlein 1992; Pelto and Vargas 1992). Human diet can also be viewed as one of the many features included in a 'livelihood approach.' As proposed by Soussan et al. (1999), the

'livelihood approach' is useful to analyze the social security of a given population. It is related to the concept of sustainability, since the modes of production, consumption, and distribution of goods are among the basic societal processes related to local sustainability (Becker et al. 1997). In a human ecological point of view, an analysis of human diet, using ecological concepts such as diversity and niche, can reflect aspects of use of resources by a given population and its interactions with local sustainability.

In ecology, the abstract concept of niche brings together all of the environmental conditions and resources needed by an organism (Begon et al. 1996). Levins (1968) suggested the use of diversity indices (such as Shannon-Wiener and Simpson) (Magurran 1988, Krebs 1989) to estimate niche breadth. Even though a theoretical niche may have great number of environmental dimensions (Hutchinson 1981), the differences in a particular dimension (e.g. food) within various human groups can be used as a tool to understand their interaction with the environment (Hardesty 1975). The concept of ecological niche applied to human populations was also used to analyze the competition between groups of fishermen of Lake Erie (Berkes 1984) and at the Grande River (Castro and Begossi 1996).

The consumption of food items of animal origin in *caiçara* communities was studied by Begossi and Richerson (1992, 1993) and Begossi (1995a) on Búzios Island and at Puruba Beach. *Caiçaras* are native inhabitants of the Atlantic Forest region of Brazilian Southeast coast, whose subsistence is based on small-scale agriculture and artisanal fishing. They are descendants of native Indians and Portuguese colonists

with influences from African culture (Marcílio 1986; Mussolini 1980). Diegues (1983) defined artisanal fishing as being practiced by autonomous fishermen, alone or in partnerships, using relatively simple technology. Although production has proportionally decreased in relation to industrial fishing, artisanal fishing is still significant in Brazil, especially in fresh water environments (Petrere 1988, 1995).

In recent decades marine communities have been affected by external factors such as the replacement of local authorities, demographic and technological changes, urbanization, modernization and economic development (Ruddle 1993). For example, according to Ruddle (1993) in the Cook Islands the traditional authority was undermined by the imposition of a British legal and administrative code. On the southeastern Brazilian coast, changes in the lifestyle of *caiçaras* were affected by the adoption of motor boats, construction of new roads during the 1970's, intensified industrial fishing, land speculation, and tourism (Silva 1993). The establishment of protected areas in the Atlantic Rain Forest region also created conflicts because environmental legislation, in spite of local decisions, has imposed restrictions on the subsistence of populations that live inside or close to these areas (Begossi 1995b; Cunha 1989; Diegues 1996; Fletcher 1990).

The objective of this study is to analyze the diet of a *caiçara* population, concerning the items of animal origin, such as fish, and its relation to local fish catches. We examine if there is a correlation between fish production and consumption, and the trends toward changes in the food consumption of *caiçaras* from Ponta do Almada (Brazil).

Study Site

Ponta do Almada is located in the local district of Ubatuba on the northern coast of the State of São Paulo (Brazil) (see Figure 1). The settlement consists of 31 houses of native inhabitants including about 125 residents, most of which (87%) are native *caiçaras* or come from close neighborhoods. Tourism is important in the area, and some *caiçaras* have houses they rent in the summer and on holidays. The main local economic activities are related to artisanal fishing (76% of the interviewed men) and tourism (64% of the interviewed inhabitants) (Hanazaki et al. 1996).

With pressures from growing tourism and land speculation, at the end of the 1970's and beginning of the 1980's many *caiçaras* were compelled to sell their land and houses. By this time, the majority of Ponta do Almada's fishermen were agriculturists too, who produced their own cassava flour, a typical staple among *caiçaras* (Diegues 1983; Smith 1958).

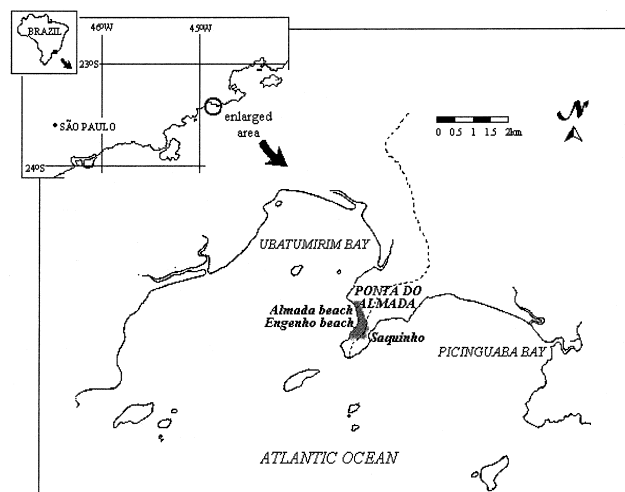


Figure 1. Study site. The local houses are located in the grey area. Fishing landings were observed at Almada Beach, Engenho Beach, and Saquinho. The dotted line shows the boundaries of the Serra do Mar State Park.

Ponta do Almada is located at the western boundary of the Núcleo Picinguaba of the Serra do Mar State Park, although most of the houses are outside the park limits. The region is also part of the Atlantic Rain Forest Biosphere Reserve (Lino 1992).

Methods

Data on fish landings and on the local diet were collected during a 3 to 4 day period every two months between August/1995 and July/1996. The data obtained from fishing trips included time spent fishing, species caught and gear used. Fish specimens were collected for identification. Identifications were based on keys by Collette and Nauer (1983), Figueiredo (1977), Figueiredo and Menezes (1978, 1980), Menezes and Figueiredo (1980, 1985), and Robins and Ray (1986). J. L. Figueiredo verified the identified species, which are placed at the Zoology Museum of the University of the São Paulo State (MZUSP).

In the diet study, 12 families were randomly picked among the 31 living in Ponta do Almada. During each visit they were interviewed about the two most recent meals (lunch and dinner).

Diversity measures including species' richness, rarefaction curves, and Simpson index (Hurlbert 1971; Krebs 1989; Magurran 1988) were used for the species caught on fishing trips. The indices were calculated based on the weight of each species caught. The same diversity measures were calculated for the animal protein consumption, using the frequency of

each species in the meals. The total number of animal food items consumed by each family gives the richness of the animal protein consumed. The niche breadth is given by the Simpson index, or $D = 1/\sum p_i^2$, where $p_i = q_i/N$, N = total number of quotations of each kind of animal food (richness), and q_i = number of quotations for the i^{th} animal food item. Rarefaction is given by the calculation of $E(S)$ for a sequence of n , or:

$$E(S) = \sum \left\{ 1 - \left[\frac{\binom{N-N_i}{n}}{\binom{N}{n}} \right] \right\}$$

where $E(S)$ = expected richness in the rarefacted sample with a given n , n = standard size of the sample, N = total number of quotations of each kind of animal food, and N_i = number of meals with the i^{th} animal food item.

The relationships between species caught and consumed, as well as between *per capita* income and diversity indices were assessed using the calculation of a Spearman's correlation coefficient (Zar 1996).

A preliminary quantitative survey was carried out to estimate the caloric and protein contents of meals ($n=22$). On these occasions, the person who prepared the meals was interviewed about the amount of each kind of food. Most of the food was estimated by volume (in milliliters), with the help of measuring glasses; or weighed (in grams), with the help of scales of 1.5kg and 2.5kg. The nutritional content was estimated through literature data (FAO 1970; Franco 1992; IBGE 1985).

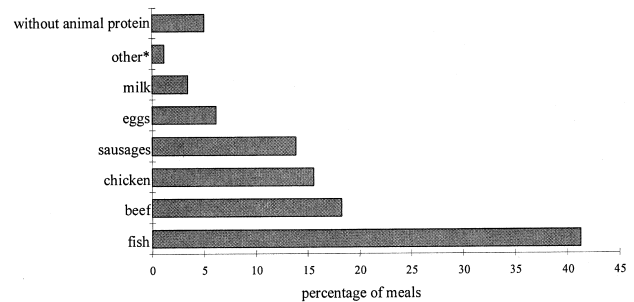
Results and Discussion

Animal Protein Consumption

Apart from the 44 occasions on which families did not take meals or were absent, 436 lunches and dinners were registered. The typical meal for the *caiçara* from Ponta do Almada consists of white rice, beans and *mistura*, frequently accompanied by pasta and salad. The majority of the families often consume cassava flour, but it has been replaced by rice as the main staple. *Mistura* refers to animal origin food such as fish, beef, chicken or eggs.

Animal protein was not consumed in only 5% of the meals (see Figure 2). Fish was present in 42% of the meals (44% of the animal protein consumed). Other sources of animal protein, such as beef and chicken were consumed in 59% of the meals. For July 1994 Hanazaki et al. (1996) observed that fish was present in 60% of the meals in Ponta do Almada which may indicate a trend toward changes in the consumption of animal food items, with beef and chicken gradually replacing fish.

At Puruba Beach, fish represents 52% of the animal protein consumed (Begossi 1995a). Among *caiçara* islanders



* "other" includes pork, turkey, jerk and tripe stew

Figure 2. Presence of animal protein on meals observed in Ponta do Almada, between August/1995 and June/1996.

this percentage was higher. At Búzios Island fish represented 68% of the meals from animal origin (Begossi and Richerson 1993), and at Gamboa (Itacuruçá Island) and Calhaus (Jaguanum Island), 65% (Begossi 1995b).

The niche breadth for animal protein consumed in Ponta do Almada is similar to the one obtained at Búzios Island by Begossi and Richerson (1993) but it is narrower than the one obtained by Hanazaki et al. (1996) in Ponta do Almada (Table 1). Both Ponta do Almada and Búzios Island, when compared to Puruba Beach, have wider niches. Begossi (1995a) considers that these differences may be related to the proximity of urban centers for people on Puruba beach when compared to the insular people at Búzios, and the same trend may have occurred in Ponta do Almada. The change in the food niche breadth from 1994 to 1995/96 may have arisen due to three interconnected factors: the increase of tourist related activities in the area as a source of income; the drop in dependency of fishing activities; and better transportation to urban centers to purchase food. Tourism leads to a higher and predictable income, when compared to fishing. As tourist related activities increases, fishing activities decrease, and less fish is available to local consumption. By the other hand, it is easiest to go to the city to purchase other food items.

Table 1. Niche breadth for the frequency of animal protein consumption (given by the average of the Simpson index per month, all families included).

Community	Number of meals	Richness	Niche breadth	Period sampled
Ponta do Almada	436	41	7.48	1 year (1995-1996)
Ponta do Almada ¹	252	28	10.85	15 days (winter 1994)
Búzios Island ²	1,241	65	8.47	1 year (1986-1997)
Puruba Beach ³	1,311	43	5.76	6 months (1991-1993)

¹ from Hanazaki et al. 1996

² from Begossi and Richerson 1993

³ from Begossi 1995a

Data from Fishing

Eighty-nine fishing trip landings were gathered, corresponding to 461kg of fish caught. The average catch per trip was 5kg. On 33% of the trips no fish were caught. Fishing trips were performed by one to three fishermen, depending on the type of fishing gear used, with paddled canoes. The most frequently used gear included set gillnets (used in 51% of the fishing trips), hook and line (31%), encircling nets (8%), beach draw nets (7%), ripper jigs (7%), small encircling nets (6%), harpoons (3%) and drift nets (3%).

When analyzing the weight of fish caught in each month, we observed that the coldest months (August, June, and October) showed smaller averages of kilograms of fish per fishing trip (Table 2). This may be related to the more adverse environmental conditions of fishing during the winter, such as winds and cold. The average production was higher in the hot months. Except for February, the standard deviation was higher than the average catch of each trip, thus showing the uncertainty of the fishing activity (see Table 2).

Table 2. Weight of fish caught in each month sampled (data from 89 fishing trips)

Month	Fish production per fishing trip (in kg) average	standard deviation
August	4.80	5.25
October	4.94	7.41
December	7.15	12.11
February	6.97	5.46
April	8.96	12.39
June	2.81	3.94

Sixty-six different fish species were caught. Comparing the most frequently captured species with the most widely consumed ones, we can identify frequently captured fish species which are part of the diet, such as croaker (*Micropogonias furnieri*), Spanish mackerel (*Scomberomorus brasiliensis*), southern kingfish (*Menticirrhus americanus*) and mojarra (*Eucinostomus melanopterus*) (see Figure 3).

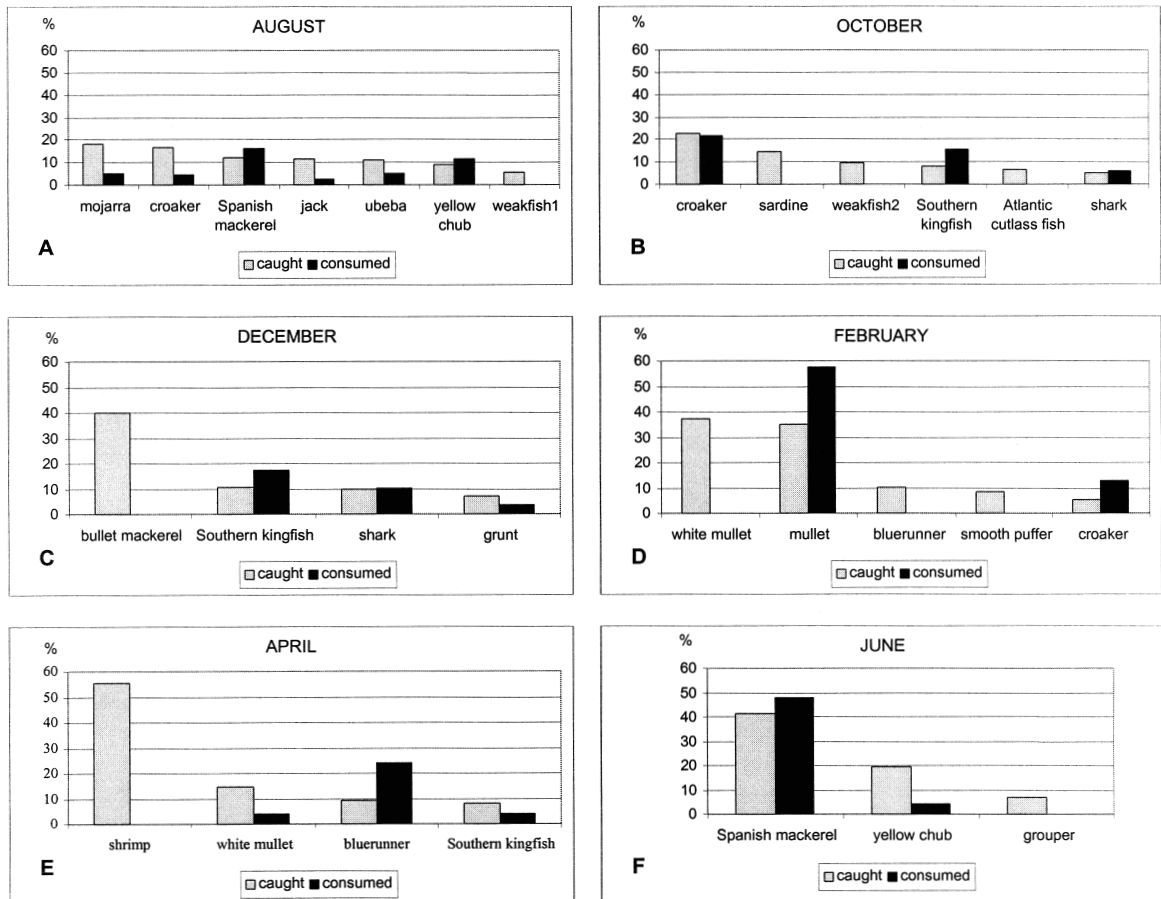


Figure 3. Caught and consumed species of fish in each month in Ponta do Almada, only for species present in 5% of the fishing trips at least. Values in percentage. a) August; b) October; c) December; d) February; e) April; f) June. See scientific names in Appendix 2.

Mullet and southern kingfish were the most consumed fish found in the diet of the people from Ponta do Almada. The higher frequency of consumption of certain species must be related to its environmental availability, as well as to factors such as food preferences and avoidances (Begossi 1992, 1998).

Food Preferences

When analyzing the food preferences of the residents of Ponta do Almada, Hanazaki et al. (1996) found that mullet was the most frequently mentioned species, and also the most preferred. Croaker and southern kingfish were also quite frequently mentioned in the interviews. On the other hand, bullet mackerel is as a taboo fish or avoided species, which explains why it was not consumed, despite a large catch in December (see Figure 3c). Tabooed fish are those species that are not recommended for consumption, or "heavy" fish. From the emic point of view (Harris 1976) bullet mackerel is avoided by pregnant women and ill people (corresponding to Colding's (1995) segmentary taboos) because of it being fatty and bloody.

The shrimp (*Xiphopenaeus kroyerii*) caught in April was totally directed to sales (and not included in meals) because shrimp is highly valued merchandise (Figure 3e). For artisanal fishermen from Rio Grande, Castro (1992) also observed that the high valued fish were kept for sale and were not consumed.

We observed no remarkable differences in the richness of the consumption of animal protein per month. We found that even if there is a relationship between caught and consumed fish during the year (Spearman $r_s=0.627$, $p<0.001$), relationships within seasons are weak ($r_{sAug}=0.243$, $r_{sOct}=0.330$, $r_{sDec}=0.282$, $r_{sFeb}=-0.190$, $r_{sApr}=-0.338$, $r_{sJun}=0.124$, all $p>0.05$).

Many factors can contribute to the absence of a correlation between caught and consumed fish per month. Once fishermen sell part of the catch, this correlation is difficult to evaluate (Begossi and Richerson 1993). Before selling or giving the other inhabitants part of the catch, the fishermen keep their favorite species and the ones with lower commercial value for themselves. Moreover, the possibility of stocking fish in freezers may influence the diversity of animal protein items consumed.

Variation Among Families

Fish was the most frequently consumed animal protein source for 9 of the 12 families researched (Appendix 1). For families 1 and 6 the most frequent animal protein source was chicken, and for family 2 it was beef.

The optimal foraging theory predicts that a higher abundance of food should lead to higher specialization. When

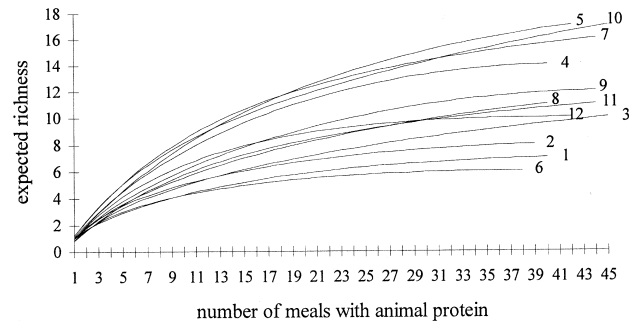


Figure 4. Rarefaction curves for animal protein items consumed by each family in Ponta do Almada. Numbers 1-12 point out the families.

there is scarcity of resources, the niche should expand, to include items of lower ranking, or less preferred items. When resources are abundant, the niche should retract, because preferred items are easily found (MacArthur and Pianka 1966; Smith 1983; Stephen and Krebs 1986).

The breadth of the feeding niche for animal protein measured by the Simpson index was larger for families 5, 7, 10 and 4. Analyzing the richness curves (Figure 4), it is possible to divide the families in two groups: the families 5, 7, 10 and 4, who consumed a greater diversity of animal protein items, and the families 9, 8, 11, 12, 3, 2, 1 and 6 with a lower diversity.

The large niche (high diversity) of families 4, 5 and 10 might be related to the fact that these families include full time fishermen. Fishermen usually have access to a high diversity of fish, when compared to the non-fisherman families (such as 8, 9, 11 and 12). In the case of family 7, the head of the family is a public worker, who has not given up his fishing activities, and two of his grown up sons are part-time fishermen. However, according to the optimal foraging theory, a high diversity of available fish could lead to a high specialization of items consumed and to the narrow niches: but the opposite was observed here.

Other factors could be influencing the breadth of the animal protein niche among families in Ponta do Almada. The non-fisherman families usually acquire and stock frozen fish in great quantities. Stocking fish reduces the environmental uncertainties of food availability, and should result in the contraction of the niche breadth of animal protein.

Begossi and Richerson (1993) argued that since income can be a way of measuring resource availability, the ecological theory suggests that families with higher *per capita* incomes should have the narrowest niches, focusing their consumption on more preferred items. The same was observed in Ponta do Almada: richer families showed narrow niches. However, there was no correlation between the average income *per capita* of each family and the diversity of

consumed animal protein (Spearman $r_s = 0.256$, $p > 0.05$ for correlation with richness).

Among the families in Ponta do Almada, when the fishing activities are replaced by activities related to tourism there is a tendency for the food niche to contract. A reduction in the diversity of natural resources used (followed by a reduction of niche breadth) could be environmentally interesting, because the natural resources will be used less intensively. However, this trend toward changes in the dietary habits must be carefully analyzed, because it can influence the nutritional intake of this human population.

Nutritional Features

The calculation of the daily needs was based on the NRC/CDA (1980) recommendations for the consumption of calories and protein by adults (averages for men and women) and children, weighted by the number of adults and children in each family. It resulted in a recommended daily intake of 2261.2 calories and 49.4g of protein *per capita*. In our estimate of daily calories and protein consumption the average *per capita* consumption was estimated to be 1875.7 calories and 68.5 g of protein. Comparing the consumed values with the daily recommended needs, on one hand the diet of the *caiçaras* population of Ponta do Almada does not reach the recommended intake for calories. However, on the other hand it is similar to the lowest values for average energy needs according to FAO (1996), which are between 1721 to 1960 daily calories *per capita*. Also, once we quantified the raw food, we could not take into account some items that could have contributed to the calorie intake, added during or after the cooking, such as the cassava flour.

Restrictions on subsistence agriculture can have reduced the amount of calories available. Traditionally, *caiçaras* depended on crops of cassava, sweet potato, and sometimes rice, as their main caloric sources. With the prohibitions on local agricultural activities, all these items now have to be purchased.

In a broad sense, the daily intake *per capita* of calories and proteins in Ponta do Almada is well within the recommended limits. Nevertheless, a variation occurs in the energetic and protein intake among families throughout the year and within each family.

Livelihood and Niche

The possible interactions among variables that could be influencing *caiçaras'* livelihood, and its relations with the food niche, are illustrated in Figure 5. Similarly with other Brazilian native groups, there are external influences that affect *caiçaras'* livelihood. For example, the decreasing of local activities (small-scale agriculture and artisanal fishing) is influenced by the environmental agencies which imposes restrictions towards these activities. In Brazil, protected areas

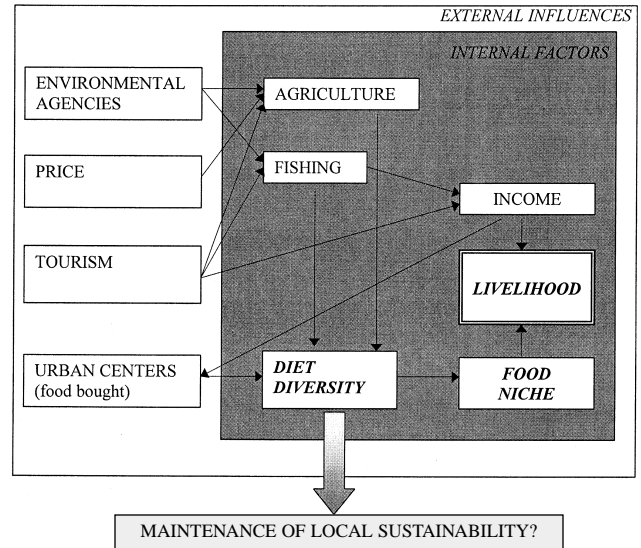


Figure 5. Possible interactions among variables influencing the livelihood at Ponta do Almada, related to food niche.

for nature conservancy were created following the original American model of “untouched nature” (Diegues 1996), ignoring the presence of local inhabitants. Restrictions on local activities were set in accordance with this model of protected areas. Also, as the price of agricultural goods decreases, local agricultural activities decrease (see Figure 5). The increasing tourism in the region pushes fishers to substitute fishing activities with more rentals to tourists. As tourism increases, fishing decreases and income increases. As fishing decreases, diet diversity decreases. We observed an increasing dependence on the urban centers in order to purchase food. Changes in local activities do influence livelihoods through the contraction of niche breadth: less diversity of food items such as fish caught, and concentration on purchased items such as chicken and beef. At Ponta do Almada, the effects of these changes can be positive: *caiçaras* may have a more predictable source of income from tourist activities than from fishing and/or agricultural activities. Nevertheless, local sustainability will be threatened if the new source of income from tourism do not benefit all families. Other negative consequence is the loss of accumulated knowledge about local activities such as fishing and agriculture.

Conclusions

Animal protein was consumed during most of the *caiçaras'* meals in Ponta do Almada. There appeared to be slightly less dependency on fish as a protein source, when compared to *caiçara* communities on islands where the access to purchased items is more difficult.

Some fish species were frequently caught and consumed, such as croaker, Spanish mackerel, southern kingfish, and mojarra. There is little correlation among fish caught and consumed in each month, because fishermen sell or store part of the catch. The consumption of some species may be related to food preferences and avoidances. Despite a high catch, bullet mackerel was considered a taboo fish, and it was not consumed.

Changes caused by the increase of tourist activities and by restrictions on traditional activities such as subsistence agriculture and artisanal fishing can result in changes in the connection with the natural resources used by native populations. The break down of local agriculture, in part due to restrictive laws, also has a role in the changes in the *caiçara*'s diet. Agricultural goods once grown locally now have to be purchased, and cash is needed for this. The increase in cash received from tourist activities instead of from fishing activities has contributed to the abandonment of artisanal fishing activities. A reduction in fishing activities can be environmentally interesting, however, it can lead to a contraction of niche breadth of animal protein consumed.

As the subsistence activities decrease, the dependence on urban centers will increase. These trends towards changes in the relations with natural resources should affect dietary patterns and local sustainability. Positively, *caiçaras* may have a more predictable source of income and a more predictable amount of animal protein. Negatively, the accumulated knowledge about local activities such as fishing and agriculture can be lost. Finally, these trends toward changes in the dietary habits must be carefully analyzed, because they can influence the nutritional intake of *caiçara*'s population.

Endnote

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Acknowledgments

An earlier version of this paper was presented at X International Conference of the Society for Human Ecology, Montréal, Canada. N. Hanazaki thanks to the Brazilian agencies FAPESP for the Master scholarship grant (95/1659-6), Doctoral scholarship grant (97/3668-8) and for financial support for fieldwork (92/1390-9 and 94/6258-7) and CNPq for financial aid for fieldwork (400366/92.4). A. Begossi thanks the research productivity scholarship to CNPq and FAPESP grants (1992 and 1994). Thanks to N. Nordi and M. C. M. Amorozo for helpful comments on an earlier draft of this manuscript; to J. L. Figueiredo for reviewed fish identification; and to the anonymous referees. Above all, our special thanks to people from Ponta do Almada for their kind cooperation, especially to Maria Aparecida and Nilo, and Maria and Antonio for their hospitality.

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Appendix 1. Frequency of Animal Protein Items Consumed per Family. (Numbers 1 to 12 show the sampled families.)

	1	2	3	4	5	6	7	8	9	10	11	12	total
Non-Fish Items													
beef		13	10	2	2	8	5	4	12	6	5	12	79
chicken	19	8	9	3		11	4	3	2	2	6	2	69
sausages	3	5		11	1	3	14	5	6	3	6	4	61
eggs	5	2	3	1	2		3			6	3	2	27
milk								15			1		16
tripe stew								2				2	4
pork						2							2
jerk											2		2
turkey										1			1
Fish Items													
mullet		4	4	2	2	4	2	1	4	5			28
southern kingfish	4			3	1		1		2	8		2	21
Spanish mackerel	1			2	3		6	1	3	2	1		19
croaker sp. 1		2	1						2	2	2	6	15
mojarra sp. 1	1		2	2	5							2	12
sardine			3	2			2		1		1		9
catfish		2						2				4	8
bluerunner					3		4			1			8
Atlantic cutlass fish				4		2						2	8
shark							1	1		5			7
white mullet	1		1		5								7
“ubeba”							2			5			7
guachanche					2				3	1			6
yellow chub				2	4								6
croaker sp. 2			1		3								4
squid					1			1	2				4
shrimp			1								2		3
redfin parrotfish							2						2
mojarra sp. 2				2									2
croaker sp. 3				2									2
Atlantic bonito					1								1
mojarra sp. 3					1								1
king mackerel										1			1
Jack										1			1
Florida pompano										1			1
weakfish sp. 1							1						1
leatherjacket					1								1
sardine (canned)					1								1
Grunt								1					1
lane snapper							1						1
Total	34	36	35	38	38	30	48	36	37	50	29	38	449
Richness	7	8	10	14	17	6	16	11	12	17	11	10	41
Simpson	2.89	3.99	4.85	8.64	12.41	3.62	11.37	4.68	5.59	9.8	7.56	7.12	12.01
average per capita													
income (in US\$)	82.50	50.00	- ¹	94.10	60.00	25.00	91.60	175.00	112.50	41.67	126.00	37.50	81.44

¹ unavailable data

Appendix 2 Local Names, English Names¹ and Scientific Identification of Fish Caught and Consumed in Ponta do Almada.

FAMILY		
Species name	local name	English name
ARIIDAE		
<i>Notarius grandicassis</i> (Valenciennes)	bagre	catfish
<i>Sciadeichthys luniscutis</i> (Valenciennes)	bagre amarelo	catfish
<i>Netuma barba</i> (Lacépède)	bagre cumbaca	catfish
BALISTIDAE		
<i>Balistes capriscus</i> Gmelin	porco	leatherjacket
CARANGIDAE		
<i>Caranx crysos</i> (Mitchill)	carapau	bluerunner
<i>Oligoplites saurus</i> (Bloch & Schneider)	guarivira	jack
<i>Trachinotus carolinus</i> (Linnaeus)	pampo	Florida pompano
CARCHARHINIDAE		
<i>Rhizoprionodon porosus</i> (Poey)	cação	shark
CLUPEIDAE		
<i>Harengula clupeola</i> (Cuvier)	sardinha cascuda	sardine
<i>Sardinella brasiliensis</i> (Steindachner)	sardinha maromba	sardine
<i>Pellona harroweri</i> (Fowler)	sardinha mole	sardine
<i>Opisthonema oglinum</i> (Lesueur)	sardinha savelha, s. verde, s. chata	sardine
ENGRAULIDIDAE		
<i>Lycengraulis grossidens</i> (Agassiz)	sardinha arenga	sardine
<i>Cetengraulis edentulus</i> (Cuvier)	sardinha arenga	sardine
GERREIDAE		
<i>Eucinostomus melanopterus</i> (Bleeker)	carapicu	mojarra sp.1
<i>Diapterus rhombeus</i> (Cuvier)	carapeva	mojarra sp.2
<i>Diapterus olisthostomus</i> (Goode & Bean)	caratinga	mojarra sp.3
HAEMULIDAE		
<i>Haemulon steindachneri</i> (Jordan & Gilbert)	sargo	grunt
KYPHOSIDAE		
<i>Kyphosus sectatrix</i> (Linnaeus)	piragica	yellow chub
LUTJANIDAE		
<i>Lutjanus synagris</i> (Linnaeus)	vermelho	lane snapper
MUGILIDAE		
<i>Mugil curema</i> Valenciennes	parati	white mullet
<i>Mugil platanus</i> Günther	tainha	mullet
RHINOBATIDAE		
<i>Rhinobatos</i> spp	cação viola	guitar fish

Appendix 2 (continued)

FAMILY		
Species name	local name	English name
SCARIDAE		
<i>Sparisoma rubripinne</i> Valenciennes	budião	redfin parrotfish
SCIAENIDAE		
<i>Micropogonias furnieri</i> (Desmarest)	corvina	croaker sp.1
<i>Stellifer brasiliensis</i> (Schultz)	cabeçudo	croaker sp.2
<i>Stellifer rastrifer</i> (Jordan)	cabeçudo	croaker sp.2
<i>Menticirrhus americanus</i> (Linnaeus)	imbetara	southern kingfish
<i>Umbrina coroides</i> (Cuvier)	mancevada	croaker sp.3
<i>Cynoscion virescens</i> (Cuvier)	pescada	weakfish sp.1
<i>Isopisthus parvipinnis</i> (Cuvier)	maria mole	weakfish sp.2
<i>Larimus breviceps</i> (Cuvier)	ubeva	-
SCOMBRIDAE		
<i>Sarda sarda</i> (Bloch)	baquara	Atlantic bonito
<i>Auxis rochei</i> (Risso)	bonito	bullet mackerel
<i>Scomberomorus cavalla</i> Cuvier	cavala	king mackerel
<i>Scomberomorus brasiliensis</i> Collette, Russo & Zavala-Camin	sororoca	Spanish mackerel
SERRANIDAE		
<i>Epinephelus marginatus</i> (Linnaeus)	garoupa	grouper
SPHYRAENIDAE		
<i>Sphyræna guachancho</i> Cuvier	bicuda	guachanche
SQUATINIDAE		
<i>Squatina</i> sp.	cação anjo	angel shark
TETRAODONTIDAE		
<i>Lagocephalus laevigatus</i> (Linnaeus)	baiacú	smooth puffer
TRICHIURIDAE		
<i>Trichiurus lepturus</i> Linnaeus	espada	Atlantic cutlass fish
Mollusca - Cephalopoda		
<i>Loligo sanpaulensis</i> Brackoniecki	lula	squid
Crustacea - Decapoda		
<i>Xiphopenaeus kroyeri</i> Heller	camarão	shrimp

¹English names were based upon Suzuki (1986) and Audubon Society (1983)

The Phenomenology of Global Warming: The Role of Proposed Solutions as Competitive Factors in the Public Arenas of Discourse

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Abstract

Even in the face of growing evidence that global warming is a very real threat to human social systems, global warming has received relatively little media coverage. From a phenomenological perspective this paper explores the possibility that one reason for this limited coverage may be that on an experiential level, proposed solutions offered for global warming have not provided closure to the loss of taken-for-grantedness associated with the problematic disturbance of the everyday life-world brought about by the initial problem claim. To address this issue the public arenas model of social problems (Hilgartner and Bosk 1988) is extended through a discussion of social action and typification drawn from the phenomenology of Alfred Schütz. A content analysis of UPI wire reports, Readers Guide articles, and Science articles from 1976 to 1998 suggests that the types of proposed solutions to global warming in these sources have largely not permitted the taken-for-grantedness of the life-world to be maintained. As a result media coverage of global warming has declined over the last twenty years and counter claims have become a significant part of the discourse.

Keywords: *phenomenology, global warming, environmental problems*

Introduction

Debate over the last twenty years concerning the nature, extent, and impact of global warming has served to illustrate that media representations of social problems are never simple reflections of “objective” conditions. Rather, they are social agreements or understandings. Researchers have pointed out that objective conditions do not by themselves determine the extent of public interest and media coverage that a social problem will receive (Hilgartner and Bosk 1988, 54; Spector and Kitsuse 1977). Disagreement exists, however, about why coverage of environmental problems varies

over time. Downs (1972) and Dunlap (1992, 90-91) for example, argue for a “natural history” of environmental problems in which environmental problems come to widespread attention and then decline from public view as part of their natural life-course. Mazur (1998), on the other hand, argues for what has been called a “linear transmission model” of social problems where media sources “set the agenda” for public and political interest in environmental problems. Lastly, Hilgartner and Bosk (1988) provide a rhetorical model of social problems they call the public arenas model. Rhetorical models describe the rise and decline of media coverage of social problems as a dialogue between cultural contexts, the needs of the audience, competition in the media, actions of powerful political actors, and the nature of the environmental problems themselves. For discussions of the rhetorical approach see Hilgartner and Bosk (1998), Wilmoth and Ball (1995), Williams and Frey (1997), and Williams (1998).

Rhetorical models of social problems offer the most robust explanations for the rise and particularly the decline of environmental problems in the media. That is, both natural history and linear transmission models are flawed. Addressing the shortcomings of natural history models Mazur (1998, 470) points out “much sociological research has focused on how issues gain attention of the press, but little has examined why real problems fall from the news — beyond the cliché that they have become ‘stale’.” However, Mazur’s linear transmission explanation for public interest in global environmental problems provides even a less satisfying answer for falling coverage. He suggests that individual decisions, and personnel reassignments in major news organizations might have caused the decline. “Perhaps most American news organizations dropped the global environment after 1991 because their flagship, *The New York Times*, tired of the story. About that time the *Times*’s activist environmental reporter, Philip Shabecoff, left the paper, and the *Times* did indeed diminish its coverage, but I am unable to say if it was acting as a leader or a follower of other news

organization" (Mazur 1998, 469). This explanation ignores very important, real world and rhetorical issues that impact media coverage. The public arenas model of social problems, on the other hand, embraces the complexity of media claims about social problems. This model suggests that social problem packages must compete for attention in the limited space provided by various public arenas (Hilgartner and Bosk 1988). Competition in the media, then, is a central feature of the public arenas model.

As Hilgartner and Bosk (1988) point out, it is appropriate to ask what factors enable this competition. That is, what factors enable a social problem such as global warming to better compete for media coverage? Recent research has discussed many of these factors such as: real world events, the dramatic potential of global warming as a social problem, the complexity of the problem and existing political realities (Ungar 1992, 483; Mazur and Lee 1993, 981; Williams and Frey 1997). For example, in regard to global warming and ozone depletion, Ungar (1998) argues that such competitive factors lead to a "hot crisis" that favored ozone depletion over global warming in the media. In addition, Wilmoth and Ball (1995, 318) suggest, in an examination of the population problem, that proposed solutions to a social problem may also be an important competitive factor.

... we argue that a social problem is a collective definition of a social phenomenon as bad. Merely identifying badness, however, does not make a social problem worthy of public attention: In order to compete for attention in the various public arenas, a plan of action is needed. Proposing a solution to the badness, and linking the solution to the cessation or melioration of the badness, helps badness claims cohere as a social problem that can be used to mobilize a collective response (Wilmoth and Ball 1995, 320).

Proposed solutions, then, are thought to make a social problem "cohere" in public consciousness after initial claims are made in the media.¹ This claim, however, requires closer examination and questioning. Specifically, why do proposed solutions help an environmental-social problem gain public attention? Further, do all proposed solutions serve this purpose? The current environmental literature has failed to address this issue. Far from detached theoretical questions, answers to these questions provide important insight into the ways environmental problems might be packaged in order to gain public attention, a requirement if the realistic remediation of large-scale environmental problems such as global warming is ever possible.

This analysis explores the role of proposed solutions to global warming over the last twenty years. Media reports from

United Press International wire reports, *Science*, and citations from the *Readers Guide to Periodical Literature* are examined. It is argued that proposed solutions to global warming have not resonated well with existing cultural themes, and that for this reason they have not provided an antidote to the loss of taken-for-grantedness caused by the claim "global warming." As a result, media interest in global warming has declined over the last ten years and counter claims have become a significant part of the ongoing media discourse.

The Problem

Global warming came to widespread public attention in the late 1980's. This rise in coverage has been linked to record global temperatures (Mazur and Lee 1993; Ungar 1992; Ungar 1998), and to its similarity to previously identified global environmental problems such as ozone depletion (Mazur 1998). Little attention, however has been paid to the reasons that global warming coverage fell in later years, and no analyses have addressed the role proposed solutions might have played in this decline. This is an important oversight. As part of the widespread media attention to global warming in the late 1980's, a small number of proposed solutions to the problem were suggested. Importantly for this analysis, these solutions were curious in nature. That is, they all seemed somewhat far-fetched, impractical, and technological. Such remedies included the so-called "Geritol fix," and the use of mirror satellites positioned around the globe to deflect solar energy. What all of these solutions to global warming shared was a resonance with existing cultural themes of modernism, they were then "packageable." This requires further discussion.

Packageable solutions are those that square with common sense understandings of the world. These solutions allow us to bundle complicated social problems claims such as global warming into an understandable and taken-for-granted form. On the other hand, nonpackageable solutions are solutions that do not provide the ready conceptual packages that packageable solutions do. Technological solutions to global warming follow in the footsteps of other technological solutions to historically high profile social problems. During the last 100 years technology has been used to effectively address disease epidemics, inadequate public sanitation, and unsafe food (Goodman and Redclift 1991). Therefore, technological remedies to emerging environmental problems such as global warming resonated well with this preexisting cultural theme. Early in the discourse about global warming (1987-1989) this resonance was evident (See Figure 3). These technological solutions provided a way to package early claims about global warming in the media (Wilmoth and Ball 1995). But this technological packaging only lasted a short time.

After 1989 calls for the reduced use of fossil fuels and the need for international political cooperation came to dominate media discussions of proposed solutions. While these proposed solutions were more realistic, solutions to global warming, they nonetheless were dismissed in the media as not politically or socially feasible. In short, these solutions were not packageable and in the end were ineffective at gar-

nering public consensus about global warming. Shortly following this period of peaked interest in global warming, media coverage dropped dramatically and never again became a salient issue in the media. In the following section a theoretical explanation is offered that explains how proposed solutions to global warming address the collective insecurity that social problem claims cause.

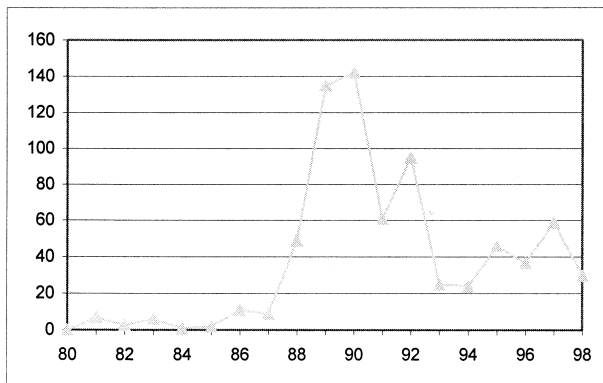
Theoretical discussion

When considering what constitutes an environmental-social problem, it seems reasonable to consider against what background we formulate such a claim. To say that something is “problematic” is to presuppose that there is an “unproblematic” state. Environmental-social problem claims, then, identify “badness” and the “disorder” of what is perceived to be a “normal,” orderly world.² The basis for this sense of orderliness (the realm of the unproblematic) requires further explanation.

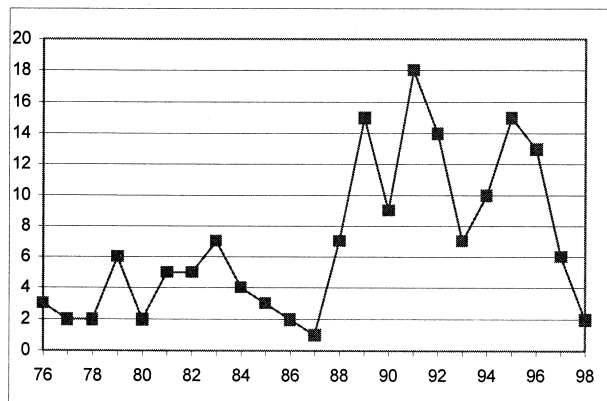
The realm of the unproblematic has been characterized by Schutz and Luckmann (1973, 3) as the “everyday life-world.” Through our immersion in the life-world we plan, act, go about our affairs, and eventually die. The hallmark characteristic of the life-world is that it is “taken-for-granted.” As Schutz and Luckmann (1973, 3-4) put it:

“The everyday life-world is to be understood as that province of reality which the wide-awake and normal adult simply takes for granted in the attitude of common sense. By this taken-for-grantedness, we designate everything which we experience as unquestionable; every state of affairs is for us unproblematic until further notice.”

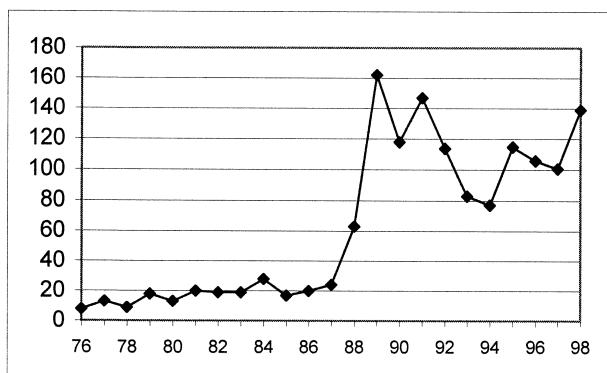
To make the observation that humans exist in a state of taken-for-grantedness, however, only describes the final outcome of the complicated world building process through which humans construct order with social institutions and other social arrangements. Taken-for-grantedness is an empirical phenomenon for sure, but it only exists as a consequence of the ongoing process of social world building. While it is impossible to discuss all of the considerably important issues involved here, it is important to note that humans exist in a “relative position of world openness” (Berger and Luckmann 1966, 47). That is, humans do not enter a world that is biologically defined for them by instinct. In short, humans enter a world that must be ordered by social institutions and cultural constructions. The end result of this structuring of social life is the taken-for-grantedness characterized by what we have earlier called the life-world. Under normal, unproblematic circumstances reality of all sorts (social, natural, etc.) appears to the social actor to be self-evidently real and taken-for-granted - “that’s just the way it is.”³



United Press International (UPI) 1980-1998



Science 1976-1998



Readers Guide 1976-1998

Figure 1. Annual number of articles about global warming.

Thomason (1982) points out that the taken-for-grantedness of the life-world takes on a central significance in an individual's ability to understand and effectively operate in daily life. Without the structure of the social world and its symptomatic taken-for-grantedness, the individual would be confronted with and overwhelmed by the chaos of everyday life, reality would be a paralyzing cacophony of competing sensory stimuli.⁴ In this sense, the social order and its institutions can be thought of as "nomic instrumentalities," the instruments of individual and collective sanity (Berger 1966; Thomason 1982). This realization suggests an issue of central importance to our discussion of the role of proposed solutions to environmental-social problems and the ability of global warming to compete in the media. That is, environmental-social problem claims threaten the taken-for-grantedness of the life-world in a profound fashion. Such a threat, if the taken-for-grantedness and sanity of the social world is to be maintained, must be resolved in some way. Specifically, social action in the form of a proposed solution must be conceived, planned, or taken.

The central point to be made here is that environmental-social problem claims invite action in the form of proposed solutions in order to resolve the problem of the loss of taken-for-grantedness they create. Because proposed solutions resolve this loss of taken-for-grantedness they help a social problem such as global warming to compete for attention in the media. The manner in which proposed solutions allow taken-for-grantedness to be regained is a matter to which we now turn.

Reclaiming Taken-for-Grantedness

Taken-for-grantedness can be regained in three potential ways. The first is to retypify the newly identified problem as "problematic until further notice." In such cases the social problem is left in an indeterminate status, that is, it is unresolved, and taken-for-granted as problematic. While this approach is at least possible, it is nevertheless unlikely. Social problems that are typified as "problematic until further notice" do not fully address the element of action always implied in any social problem claim. Such a lack of resolution ultimately has the effect of interfering with the taken-for-grantedness of the life-world. Retypifications of problematic circumstances, if they are to be effective antidotes to the loss of taken-for-grantedness instigated by social problem claims, must contain a clear statement of what must be done (a solution).

The second approach to regain taken-for-grantedness is by at least conceptualizing a socially viable solution to the environmental-social problem at hand. Such a conceptualization allows the problem to be "packaged" in a way that makes the situation a matter of common sense and at the

same time resolves our orientation to the problem in terms of action - "it tells us what we must do." It is important to note, however, that what is central to this process is not necessarily the realistic solution of the problem (though this can be the case as well) or a commitment to act, but rather the resolution of the loss of taken-for-grantedness associated with the social problem claim. As Schutz (1967) has pointed out, the world of everyday life is not primarily concerned with such theoretical formulations, rather the life-world is the domain of common sense; it is "pretheoretical". What Schutz suggests here is that in everyday life we take an unthinking approach toward daily life and its concerns, thus favoring those courses of action and conceptual formulations that resonate with our existing, socially held stock of knowledge and its taken-for-granted realities. To the extent that proposed solutions to social problems resonate with these themes and provide a solution to the action element instigated by the problem claim, they can be seen as "packageable solutions." That is, they provide a ready antidote to the loss of taken-for-grantedness associated with the original social problem claim.

The third approach that may be taken to remedy the loss of taken-for-grantedness associated with a social problem claim and its related action element does not involve retypification as such, but rather a reassertion of prior typifications and rejection of the social problem claim. In essence, "counter claims" can be made that dispute the social problem claim therefore rendering proposed social problems unworthy of attention. This inattention enables an unmodified version of the existing stock of knowledge to be maintained with its inherent taken-for-grantedness. In this way the social problem claim is made unproblematic.

It perhaps goes without saying that the later two of these three means of reconfiguring the problematic might well be related. That is, in the absence of packageable solutions to social problems in the media it is likely that the number of counter claims will increase. Wilmoth and Ball (1995, 321) in fact, mention this expectation. They state, "The presence of a socially feasible solution in an issue culture will tend to reduce the incidence of articles that advance contradictory packages; conversely, the absence of such a solution will tend to increase the incidence of articles that employ contradictory packages."

Of these three approaches to reconfiguring the problematic, then, only two appear likely as they apply to a discussion of global warming if they are to solve the problem of loss of taken-for-grantedness: the presentation of a social problem with a packageable solution, or in the absence of such packages the emergence of counter claims. Guided by these theoretical insights, it will be suggested in the following analysis that media interest in global warming has declined over the last ten years, that proposed solutions have in fact made

up a very small portion of these media reports, that these solutions have been primarily of a “nonpackageable” nature, and that as a result counter claims have become a significant part of the ongoing media discourse.

Data and Methods

Media coverage concerning global warming is analyzed from three media sources: *The Readers Guide to Periodical Literature*, United Press International (UPI) wire reports, and *Science*. These sources were selected in order to address the content of a wide variety of media discourse and also because these sources have, at least to some extent, distinct and different audiences. The period of concern for this proposed research is 1976 through 1998. This period was selected because it begins with what has been argued to be the first public attention given to global warming (Ungar 1992). In order to assess the impact of proposed solutions upon the ability of global warming to compete for attention in the media both the quantity and nature of coverage was considered.

Several units of analysis are commonly used in content analysis including paragraphs, sentences, or even words (Weber 1990). However, because the articles and wire reports under consideration were generally written to express one central idea, it is possible to treat each article or wire report as a consistent and distinct unit of analysis. The unit of analysis for this research, then, is simply individual articles or wire reports.

Data were collected and identified for the study period with the aid of computer databases of citation references and abstracts in addition to hard copy references for years not available in a database. Citations from the *Readers Guide to Periodical Literature* were not used for substantive analysis but were instead counted by incidence for each year of the study period. This approach was taken because of the large number of articles to be found in *Readers Guide*. Once collected, data were coded according to four concerns: (1) the quantity of overall coverage, (2) the quantity of coverage devoted to proposed solutions, (3) the type of these proposed solutions, and the (4) substantive nature of claims made about global warming. These categories are further elaborated in Table 1.⁵

All coding categories are ostensibly new measures of unknown validity, but appear to have a great deal of face validity. The reliability of these measures was addressed through a test coding of a sample of articles and wire reports. Two coders coded a number of articles and wire reports. Systematic differences in coding results were resolved through a further refinement of the coding system. In the end, the coding system proved to be quite reliable. The

Table 1. Content analysis coding categories.

The Quantity of Global Warming Coverage: Refers to the quantity of coverage given to global warming in the three media sources under consideration.

The Number of Proposed Solutions: Refers to the number of articles and wire reports from *Science* and United Press International with a primary focus upon solutions to global warming.

The Type of Proposed Solutions: Refers to the substantive nature of proposed solutions about global warming in both *Science* and United Press International wire reports. Packageable solutions are those that easily resonate with the existing cultural themes of modernity and progress and include biological solutions (planting trees, etc.) and technological solutions. Non-packageable solutions on the other hand include political, and economic solutions, or calls for social action. These types of solutions are categorized as nonpackageable because they generally leave solutions to global warming unresolved. That is, on a social-cultural level, these sorts of proposed solutions are seen to be less effective and more contentious than biological and technological proposed solutions. Such solutions do not provide the same taken-for-grantedness provided by packageable solutions.

The Substantive Nature of Claims about Global Warming: Refers to the nature of claims made about global warming. Claims refer to articles and wire reports that point to global warming as a real and significant problem. Counter claims refer to articles and wire reports describing global warming as an insignificant or nonexistent problem. Neutral articles refer to those articles and wire reports primarily concerned with the science of global warming thus making no claims or counter claim about the status of global warming.

two coders were able to agree about how an article should be coded nearly 90% of the time.

Analysis and Discussion

The Quantity of Global Warming Coverage

The total coverage given to global warming in the three arenas of public discourse have followed a similar path over the last twenty years (see Figure 1). From the period 1976 to 1987 very little attention was given to global warming. This was particularly true of the *Readers Guide to Periodical Literature* and United Press International. *Science* also devoted little attention to global warming but more than *Readers Guide* and United Press International. For example, six articles were written in 1979 and again in 1983. The attention given in *Science* is understandable because it was during this time that claims were being assembled in scientific terms. That is, science often leads the way in the original articulation of environmental claims (Taylor and Buttel 1992).

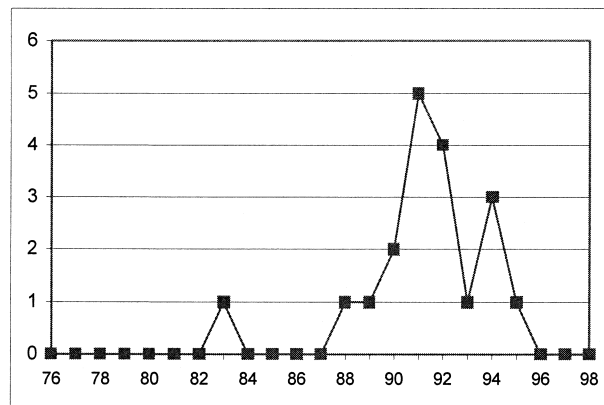
Beginning in 1988 all three discourses became more interested in global warming. As earlier mentioned this was in part the result of record temperatures and pervasive drought in the United States. Coverage escalated thereafter

peaking in all three sources in the years 1989 through 1991. After this peak coverage rapidly declined to a level higher than the pre 1988 levels yet significantly lower than the 1989 through 1991 levels.

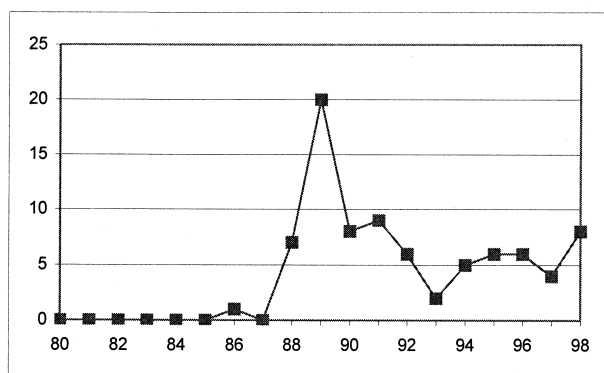
Curiously, interest again increased in 1995 and 1997 in all three sources (Figure 1). This was a result of three factors. First was the increased public interest in the IPCC (Intergovernmental Panel on Climate Change) report that had long been in preparation through the United Nations (IPCC 1995). Words about conflicts over the final report became public knowledge at this time and were disseminated in the media. The second reason media interest was revived in 1995 and 1996 is because this period of time coincided with a presidential election year in the United States. As Figure 3 indicates the rise in proposed solutions to global warming during this period was entirely due to political and economic discourse. Democrats offered global warming as an issue in the 1996 campaign and sought to differentiate themselves from Republicans who historically had shown pessimism about global warming. For example, in February of 1996 President Clinton addressed flood victims in Pennsylvania and vowed that while global warming has not been proven to be the cause of the floods we should do 'everything we can' to combat it (UPI 1996). A similar increase in political interest in global warming was noted during the 1992 election where a large share of the dialog about global warming was of a political nature (see Figure 3) (Williams and Frey 1997). The third reason for the increase in media coverage had to do with the preparations for the forthcoming Kyoto conference on global warming in December of 1997. Stemming from the United Nations Framework on Climate and Change, major industrialized nations agreed at Kyoto to cut greenhouse gas emissions by more than 5 percent from their 1990 levels.

The Number of Proposed Solutions

Substantive analysis of the content from *Science* and United Press International Wire Reports show that coverage concerning proposed solutions to global warming made up only a very small portion of the overall discourse. For example, of the total UPI wire reports for the year 1989, only 20 made reference to a proposed solution (14%) (See Figure 2). Results were similar in *Science*. In 1991 only 27% of all articles discussed solutions to global warming. In regard to the total number of proposed solutions to global warming made over the twenty-year period, it is clear that they have followed a similar path of increase and decline as the overall coverage previously discussed. Of most interest for this analysis, however, is the observation that proposed solutions have made up a very small portion of the overall debate about global warming in the media.



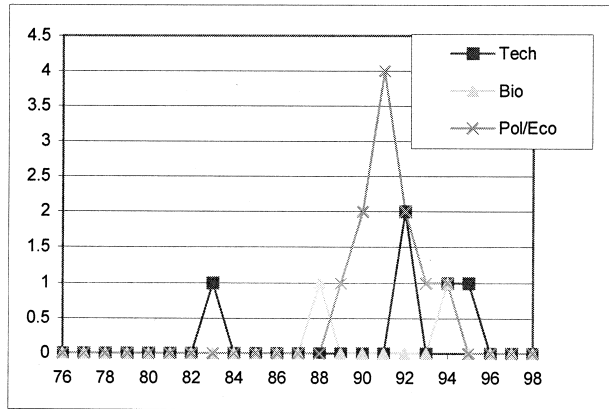
Science 1976-1998



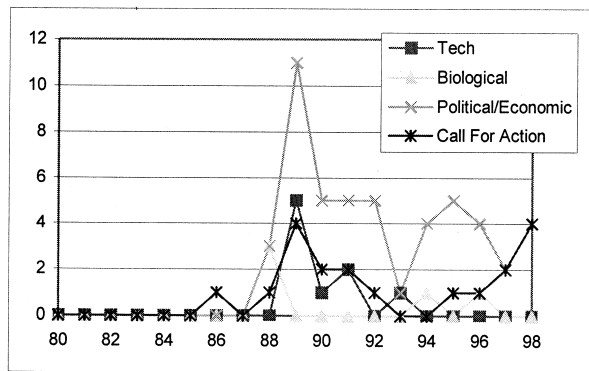
United Press International (UPI) 1980-1998

Figure 2. Annual number of proposed solutions to global warming.

Proposed solutions to global warming were found to be of four general types: technological, biological, political economic, and call for action (Figure 3). Political economic solutions were by far the most common type of proposed solution. Political economic proposed solutions were characterized by coverage of national and global treaties, resolutions to implement carbon taxes, and coverage of proposed regulation of industries linked to the production of greenhouse gasses. Calls for action were also noted and include calls for attention to global warming by political and scientific leaders. Biological proposed solutions include solutions such as planting trees to increase the uptake of carbon dioxide. Coverage of technological proposed solutions, on the other hand, involved actions such as positioning satellite mirrors in space, and the so-called Geritol fix, a process where iron oxide is spread across the ocean surface, therefore increasing the amount of algae and the rate at which carbon



Science 1976-1998



United Press International (UPI) 1980-1998

Figure 3. Annual number of proposed solutions to global warming by category.

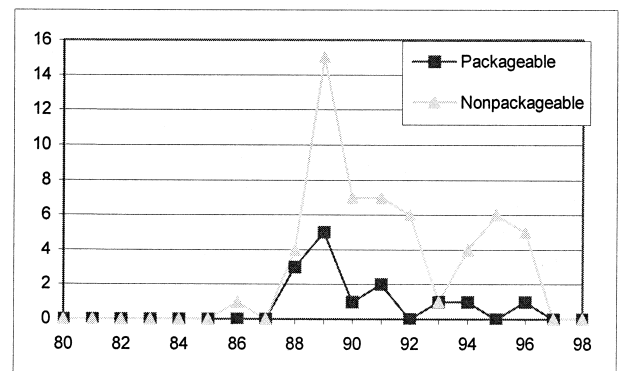
dioxide is absorbed. Also include in this category are proposed solutions such as the use of electric cars, nuclear power, and cleaner burning fuels.

These four types of solutions: political economic, call for action, biological, and technological were further collapsed into two general types: packageable and nonpackageable solutions (Figure 4). Political economic and calls for action were categorized as nonpackageable because they generally leave global warming as a social problem in an unresolved state. That is, on a social-cultural level, these sorts of proposed solutions are seen to be less effective and more contentious than biological and technological proposed solutions. On the level of taken-for-grantedness, biological and technological solutions better resonate with existing cultural understandings of modernity and progress. To state this in terms we have already mentioned, nonpackageable solutions do not allow the taken-for-grantedness lost with the original social problem claim to be regained. Rather, the social problem claim “global warming” remained “problematic until fur-

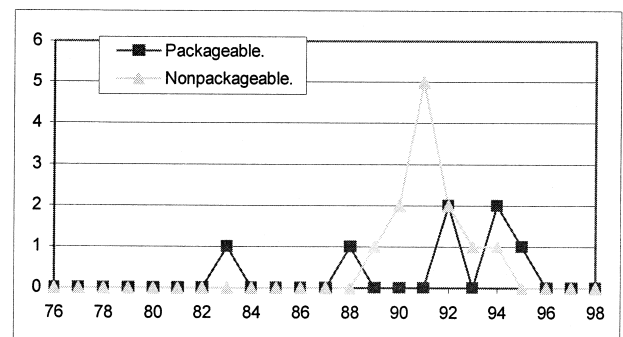
ther notice.” Packageable solutions, on the other hand, resonate with the preexisting cultural themes of modernity and progress and, therefore, offer conceptual packages easily understood by the intended audience, thus allowing global warming to be typified in such a way that it can, again, become unproblematic and taken-for-granted. As indicated in Figure 4 non-packageable solutions have consistently far outnumbered packageable solutions to global warming. This is especially true of the proposed solutions found in United Press International, but also in *Science*. It is important to point out, as we shall see, that this realization may have had an important consequence for the nature of claims made about global warming.

The Nature of Claims About Global Warming

As argued earlier, in the face of a large number of non-packageable solutions to global warming and the inadequate antidote to the loss of taken-for-grantedness that they provide, the nature of claims made about global warming were



United Press International (UPI) 1980-1998



Science 1976-1998

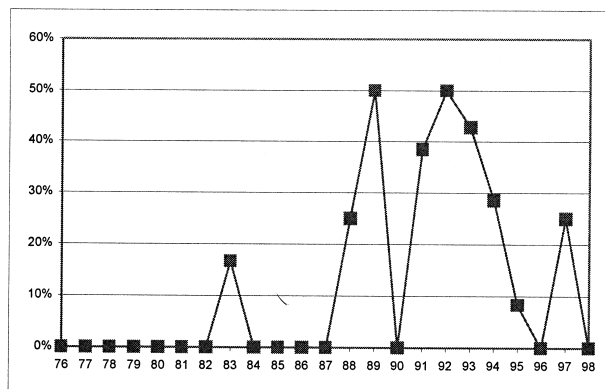
Figure 4. Annual number of packageable solutions to global warming by category.

expected to include a number of counter claims. Counter claims, it should be remembered, also provide an antidote to the loss of taken-for-grantedness. That is, “counter claims” serve to dispute the social problem claim therefore rendering proposed social problems unworthy of attention. This inattention enables an unmodified version of the stock of knowledge to be maintained including an attitude of taken-for-grantedness. In this way the social problem claim is made unproblematic.

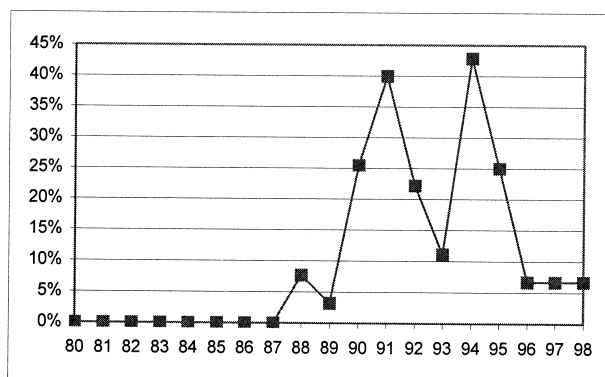
The majority of counter claims made about global warming during this period were based upon the “uncertainty of global warming science.” This is not surprising. It has been pointed out that scientific arguments about environmental problems are inherently prone to uncertainty (Harper 1995, 134). Taylor and Buttel (1992) suggest that environmental, scientific issues are by nature subject to deconstruction. They state, “science-centered environmentalism is, however, vulnerable to deconstruction. Environmental problems, almost by definition, involve multiple, interacting causes, allowing scientists to question the definitions and procedures of other scientists, promote alternative explanations and cast doubt on the certainty of predictions” (Taylor and Buttel 1992, 405-406). Robert Balling (1992), for example, argues, that while carbon dioxide does seem to be increasing in the atmosphere, projected increases in global temperature seem to be overstated. Much of this overstatement, say other critics, involves the lack of consideration given to certain “feedback mechanisms” in global climate such as the role of the oceans in carbon dioxide absorption (Joos et al. 1999, 464), the reflectivity of polar ice, and the role of clouds (Kerr 1997, 1040).

Not surprisingly, counter claims about global warming which exploit scientific uncertainty have been frequently disseminated by industry sponsored environmental groups centered around global warming. The Western Fuels Association (1997), for example, reprints, and distributes articles that express uncertainty about specific scientific issues related to global warming suggesting that such limited uncertainty should invalidate the overall public concern for global warming as an environmental-social problem. This uncertainty when combined with concerns about the economic cost of the remediation of global warming (Wildavsky 1992) has provided the central theme for most counter claims.

Figure 5 describes the percentage of counter claims in relation to both neutral statements and claims made about global warming in *Science* and UPI. These figures clearly show that counter claims made up only a small portion of the discourse prior to 1988 and 1989. This period apparently represented a “honeymoon period” for claims about global warming. After this period, however, counter claims came to represent forty (UPI 1991) to fifty (*Science* 1989) percent of



Science 1976-1998



United Press International (UPI) 1980-1998

Figure 5. Annual percentage of counter claims about global warming.

all claims made about global warming. In addition, it also appears that this increase in counter claims is related to the increase in nonpackageable solutions. That is, the increase in counter claims seems to parallel the rapid increase in the number of nonpackageable solutions. While it is impossible to draw definite causal conclusions about this relationship, in terms of our earlier discussions about reconfiguring problematic circumstances, it is a plausible explanation for these events.

Conclusion

This analysis has explored the relationship between the nature and extent of proposed solutions to global warming and the ability of global warming to compete for attention in the media. By framing global warming in the phenomenology of everyday life, a better understanding of media coverage of environmental problems was presented. Without this

phenomenological context the role proposed solutions play in the framing of environmental problems is not understandable. As relates to global warming this is certainly the case.

Because the claim “global warming” disrupted the necessary taken-for-grantedness of everyday life, proposed solutions to global warming were necessary (Wilmoth and Ball 1995). Not all proposed solutions, however, helped to remedy the loss of taken-for-grantedness. This analysis demonstrates that in the absence of packageable solutions to global warming the ability of global warming to compete in the media was impaired. The majority of proposed solutions to global warming during the study period were of a nonpackageable nature thus not resonating with existing cultural themes. As a result, media interest in global warming both declined over the last ten years, and increasingly came to be composed of counter claims.

Solutions to global warming will likely remain contested issues for many years. The relative prominence of counter claims stemming from a lack of packageable solutions to global warming is disturbing. The most important and certain solution to global warming is the reduction of fossil fuel use (de Sa 1998). But as has been demonstrated, political initiatives, scientific calls for action, and global treaties to curb fossil fuel use may themselves be responsible for the rise in counter claims making activities in the media. The findings reported here offer no simple way around this dilemma. This analysis is a preliminary excurses into the phenomenology of environmental problems. Comparative analyses of the proposed solutions to global warming and other large-scale environmental problems such as stratospheric ozone depletion might yield important findings. In the end, strategies for packaging large-scale environmental problems with solutions in the media might be developed that better enable realistic solutions to be pursued.

Endnotes

1. Proposed solutions always logically follow initial periods of claims making. That is, a problem must first be presented before solutions can be considered.
2. This is not to say that the “normal” orderly world is one that is normal and orderly only that in what ever state the environment is thought to be that it is taken as a matter of common sense - “that is just the way it is!”
3. Thomason (1982) refers to the process by which individuals experience the world as real and unquestionably given as reification. Reification is literally, to “thing-a-fy,” to make a product of consciousness thing like.
4. It should be pointed out that Zen Buddhism is a tradition that attempts to deconstruct (dereify) and break through taken-for-grantedness. For an excellent discussion of dereification and Zen Buddhism see (Moore 1995). Existential philosophy is also a dereif-

ing perspective that emphasizes the unique decision making potential of the individual. See Berger (1963) for a discussion of existentialism in sociology.

5. The coding categories provided in Table 1 were deductively selected for this analysis based upon the current theoretical discussion. Given the parameters provided by this perspective, these categories are reasonable. It is important to note, however, that this is not the only coding scheme possible for these data. Other theoretical perspectives would certainly require other coding categories.

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Contested Landscape: The Politics of Wilderness in Utah and the West

By Doug Goodman and Daniel McCool

The University of Utah Press, 1999

Salt Lake City, UT

ISBN 0874806046

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Wilderness means many things to many people across the United States, but in Utah it is only a slight exaggeration to say that it means one thing to almost everybody: political warfare. If the impression conveyed by this multi-authored history of the wilderness debate in Utah is correct, the controversy over how much of the state's millions of acres of unspoiled public lands should receive wilderness designation from Congress is more of a contest between political ideologies than a debate over the wild character of this vast labyrinth of rugged canyons and soaring sandstone mesas.

If the reader is looking for a political history of the long, drawn out, vitriolic battles that have highlighted a 30-year policy war, *Contested Landscape* is the primer. Fourteen clear, concise chapters expose the political anatomy of the key issues constituting the *corpus* of opposing political strategies regarding the designation of wilderness areas in Utah's expansive public lands administered by the U.S. Department of the Interior's Bureau of Land Management (BLM). Nowhere else could a curious reader find intelligible explanations of the tactics that have generated the convoluted rhetoric and resulting animosity that define this wilderness debate. The authors address arcane issues such as the demographics of public opinion-shaping; "hard" vs. "soft" release language that would open to development lands not designated as wilderness; the relationship between mining claims and wilderness study areas; facts and figures regarding livestock grazing; and the complexities introduced by the interspersed of BLM and State Trust Lands. Each chapter lays out one aspect of the debate in crisp prose, and the relevant statutes and legal precedents are clearly referenced. The book also explains how opposing political interests have exploited the intricacies of federal wilderness policy to draft a succession

of opposing wilderness bills, none of which has yet garnered enough support to break the political logjam in Washington or Salt Lake City. *Contested Landscape* is a great book for wilderness scholars and newcomers to the Utah political scene. It should help battle-weary wilderness advocates and their opponents avoid the repetition of past failures and smooth the path to more productive debate in the future.

If the reader is looking for information on the contested landscapes themselves, however, she will be largely disappointed. This political history of Utah wilderness, it turns out, has little to do with the wilderness itself. Spare mention is given to specific places, although interesting analyses of roads and mining issues are more grounded. The lack of specifics about the wilderness study areas themselves suggests that the wilderness debate no longer focuses on the evaluation of lands and recommendations for their disposition. Instead, wilderness designation has become a political contest that pits local communities against conservation groups and states rights advocates against federal land managers.

The authors address issues emanating from the differing ways that humans experience, value, and conceive of wilderness. However the cultural divide separating interest groups could be discussed in more detail, especially because Utah's unique history of European settlement has much to do with the seemingly irreconcilable differences in the wilderness debate. The tightly knit rural communities of southern Utah, mostly founded by persecuted Mormon pioneers, developed resource-based economies that nourish perspectives on land use and the purpose of nature that are defiantly different from the preservationist views of many recent settlers and observers from outside the region. Does the primary value of wild places still lie in the natural resources that are extracted to support human communities, or does greater value lie in their very wildness and the outstanding opportunities for solitude and recreation? This question, the authors suggest, is pivotal in the debate about wilderness designation, *per se*, but the perennial issue of state vs. federal authority in setting policy for public land management lurks menacingly in the shadows.

Strangely absent from *Contested Landscapes* is a detailed analysis of national perspectives, political strategies, and public opinion, despite the fact that the political impasse has turned Utah wilderness into a national issue. The authors do address many of the national political issues resulting from the legislative action, such as Congressional wrangling over guidelines for the reviews of roadless areas undertaken in the 1980's, but their analyses might have benefited from a more detailed look at the role of national organizations that are weighing in with increasing political leverage.

Environmental groups feature Utah wilderness issues on their national web sites, while fax machines in the Washington offices of anti-wilderness organizations launch press releases decrying “wilderness land grabs” across the West. Members of Congress from eastern states introduce wilderness-friendly bills, while the Utah delegation counters with subtly different bills with vastly different intent. With the battle lines drawn nationally, it is difficult to see how the resolution of bitter local disputes would lead to a broader political consensus on Utah wilderness. The debate over BLM wilderness in Utah might have been resolved many years ago if the political contest had not been so fiercely polarized within the state. However, the lack of progress over a 25-year period has raised the stakes considerably and invited much broader participation. This may no longer be a question of community or state-wide consensus, but rather a national contest in which the rural communities of southern Utah become pawns, rather than the focus of the debate. In the end, the contest is about jurisdiction over federally-administered public lands, not over the characteristics of wilderness or the human ecology of the canyon country. Resolution is unlikely until there is some healing of the wounds inflicted by battles between state and federal government over the management of public lands and resources, a battle that has polarized virtually every aspect of rural life in the intermountain West, from water rights to strip mining, from education to grazing.

The federal vs. state conflict has been etched, as if in stone, through the wilderness debate in Utah. Is it reasonable to hope that the cultural and political divisions might fuse into a new consensus, cracking the policy impasse the way the roots of an ancient juniper tree fracture the red Utah sandstone in which it grows? The editors of *Contested Landscape* advocate a hopeful, community-based process for conflict resolution, guided by a national Wilderness Management

Commission, a multi-agency, multi-state organization that would “take some of the politics out of the decision-making process.” This admirable goal, which the authors suggest might include new economic incentives for rural Utahns adversely affected by wilderness designation, is developed in some detail in the book’s concluding chapter, but the potential pitfalls of regionalizing the bitter, polarized debate are not considered, and it is unclear how trust might be established among factions that have battled for almost three decades.

In the end, the swelling inflow of newcomers, drawn from other regions by the natural beauty and new economic opportunities related to expanding tourism, may swamp the opposition of rural communities to wilderness designation. The traditional rural West, comprised of communities struggling to sustain economies dependent on agriculture and resource extraction, may be overwhelmed at the ballot box and on the tax rolls. If the editors’ hopes for community-based solutions are not realized soon, demographic and economic trends may soon tip the balance against rural communities, in favor of the tourism and service-based economy of the “New West.” Can both wilderness and rural communities be conserved in southern Utah? Ironically, the answer to this question may be determined by how many people see these pristine wildlands. As Utah’s natural wonders are appreciated by more Americans, there will be an increased demand for the legal protection that political contests have stalled. *Contested Landscape* suggests that the fate of both wildlands and rural communities hinges on whether the people who care most about the region remain locked in the myopic political contests that have precluded resolution of the wilderness debate, or whether they will be able to identify a shared vision of the future, then demand the support of state and national public servants to help realize that vision.

Ecological Economics and the Ecology of Economics

By Herman E. Daly

Edward Elgar Publishers, 2000

ISBN 1840641096

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This book should be on many people's secondary reading list as an example of how intelligent and otherwise well-informed, educated people miss the point. It is obvious that Professor Daly is well read in the field of economics and in the area of environmental economics. His references to both historical and current authors attests to his broad reading, however his comments and conclusions can lead one to the judgment that he either reads selectively, or doesn't fully understand some of his readings. His acceptance of the trendy economic concept of "sustainability", coupled with his embarrassing use of the biologist's notion of "carrying capacity", leads him to the conclusion that doom is just around the corner. Doom has always been just around the corner. Throughout history, soothsayers, fortune-tellers, and prophets have performed various forms of entrail-readings to reach conclusions similar to those of Professor Daly.

Professor Daly weaves his solutions to the predicted doom through-out the book which have a ring similar to utopia peddlers of the past. Sharing the wealth or redistribution of resources is repeatedly suggested. A steady state economy with no growth is advocated as if an optimal level of happiness can be determined. He doesn't bother to inform us how society will solve the incentive problem of production if wealth is distributed on some method other than production, or how the level of optimal happiness will be established. In fact, his examples, when thought through, reveal his weak logic. Consider his discussion and preferences concerning growth and development where he equates growth with quantity increases and development with quality increases. Standard economic jargon agrees with these where growth is equated with more, while development equates with better. However when he employs a library to demonstrate that economic development and not growth should be the goal, his logic for his preferences does not hold up. Daly suggests that the library (a model of the economy) should be "constant but not static" in a developing but not growing state. That is, the total number of books would not change while the composition would be in perpetual motion through time, constantly replacing books with better ones. Who decides which ones are the "better" books? Does this mean

that through time the library would eventually replace the Greek classics as better books come along? One shudders to think of the book burnings that would result.

Searching for the "optimal size" of the economy occupies much of Professor Daly's thoughts as he ponders the lack of such a concept in economic theory on the macroeconomic side of the discipline, as is found within microeconomics. Perhaps he did not get to the end of the intermediate microeconomics text-book which explores the subject of general equilibrium. As resources become scarce (a relative term indicated by relative price) their price increases and hence less will be demanded in the market. This process of increased relative scarcity sends incredibly strong signals to both sides of the market to search for substitutes. In the production arena, the marginal rates of substitution (MRS) determine the rate at which one input can replace another. These rate schedules can be considered fixed in the short run, or while holding constant a particular level of technology and scientific understanding. However, as price pressures caused by scarcity build, the MRS schedules can dramatically change as the human mind modifies these MRS schedules via new scientific and technological advancements. In the consumption arena, relative scarcity works through the invisible hand via price cross elasticities as consumers substitute goods or services for those that are become relatively scarce. As these forces are brought to bear on a particular input (e.g., the environment which can be thought of as being "part of the loop") then limits are included in the model. Scale limits, which Professor Daly is overly concerned with, are thereby determined for particular resources used in the economy; however, the overall economy is not limited as it perpetually attempts to generate greater levels of consumer satisfaction. It's a mystery why this point is lost on Professor Daly. Of course there is a scale limit to particular inputs or whole group of inputs as their relative scarcity increases. However, an attempt to limit the overall level of goods and services that generate consumer satisfaction by an economy is a concept that economist have, as a group, not pursued. Most find no fault with mainstream economists avoiding this topic.

It is amusing to read the terms "empty world" and "full world" to describe the economy. Neither capital nor "nature" is a limiting factor for the economy. Rather, for a particular production process given a given set of technology, one or the other will most likely be more difficult to replace with some substitute. However, again, as knowledge increases, these rates of substitution can change. Attempting to label broad categories of inputs for the entire economy as either substitutes or complements seems a futile effort. This is especially true when one starts with an incorrect premise as does Professor Daly: "If man-made capital were a near perfect substitute for natural capital, then natural capital would be a

near perfect substitute for man-made capital.” There is no *a priori* reason why substitutability in either production or consumption must be the same both ways especially when one allows for differences in production or consumption. In fact, it would be unlikely that the rates of substitution measured either by the price cross elasticity or the MRS would be the same. In addition one can think of production processes where one input would substitute for another in one process, but would not substitute at all in a different process. Substitution is a microeconomic concept and does not lend itself to macro-analysis because it is generally assumed that the economy is perpetually moving toward general equilibrium in the numerous micro-markets.

Julian Simon, the author of *Ultimate Resource 2*, (one of the most important economic books published in our times) has passed on. Professor Daly has directed a pointed criticism at one part of his work. This may be the proper place to offer a rebuttal for Professor Simon. In particular, Professor Simon observed that as a whole, mankind builds more than he destroys. With more people, the chances of more creativity in all forms increases, and hence we can expect a higher likelihood of seeing another Einstein or Mozart in the near future

with more people. Professor Daly counters that an increased population would also increase the probability of getting another Hitler or Caligula. Again he missed the point. On NET, mankind is a builder, and the rate that man will build will be greater with more people. Even a casual observer of history would grant the number of builders that lived in the past millennium as been greater than the number of “destroyers.” As evidence, notice that the two examples of builders both lived in the latter half of the past millennium while Daly’s second example of an infamous destroyer came from the first millennium.

As a closing thought, consider Professor Daly in an early society, one in which stone tools constituted the current technology. Would he have cautioned against the rate at which the tribe was mining the supply of flint that made the best projectile points? Given his current thinking, it would be easy to see him insisting that the rate of extraction should be limited in order to provide for the tribe’s descendants into perpetuity. Less flint would have been extracted and fewer arrowheads produced meaning that less meat would have been available. The tribe might not have grown, maybe not even survived, however, the flint mine would have been preserved.

Devil's Bargains: Tourism in the Twentieth-Century American West

By Hal K. Rothman

University Press of Kansas: Lawrence, KS, 1998

ISBN 0-7006-0910-5

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Tourism is viewed by many people, including many community leaders and international development specialists, as an effective strategy for promoting sustainable economic development among peoples and communities whose economies are in need of development. Tourism offers the lure of economic prosperity without the environmental costs associated with extractive and manufacturing economies. In addition, two specific types of tourism — heritage tourism and ecotourism — promote conservation. Heritage tourism increases the profitability of conserving historical resources while ecotourism promotes the preservation of natural resources by turning them into marketable commodities whose value is based on their preservation rather than their consumption. However, in this lucid and insightful analysis of the development of tourism in the American West, Hal Rothman, a professor of western and environmental history at the University of Nevada at Las Vegas, offers a cautionary tale about too readily accepting tourism as a panacea for community development. Tourism, he argues, is in reality a “devil’s bargain” in which local communities gain economic development, but only through the loss of their soul, that is, the loss of what makes them a community. Rothman maintains that local community leaders are myopic in believing that they can use tourism as a way of preserving the integrity of their communities. He argues instead that tourism functions as a form of colonialism through which local communities and places become transformed aesthetically into marketable caricatures of themselves. At the same time, native inhabitants become marginalized in their own communities as these become transformed into constructed environments that serve the interests of outsiders over natives. Indeed, Rothman, perceives tourism as “the most colonial of colonial economies” (p.11).

Rothman provides interesting, provocative and highly readable accounts of the development of several major tourist destinations in the American West, including the Grand Canyon, Santa Fe, Jackson Hole, Aspen, Vail, Sun Valley and Las Vegas. Together, these case studies illustrate a recurring evolutionary pattern. Local communities in need of income and employment accept the new economic opportunity pre-

sented by “neonatives”, those individuals who, while being outsiders to a local community, consider themselves more enlightened in defining the significance of the local place than the locals who live there and better resourced to promote their newly adopted locale as a tourist destination. In the end, however, both the locals and the neonatives lose out. As the local tourist economy develops, they become displaced by outside capital and large bureaucratic enterprises that define the local community or place in increasingly non-local terms and are even more responsive to external market conditions. Ultimately, both the natives and neonatives become victims of the very market forces they themselves had hoped to exploit. While Rothman specifically examines the development of tourism in the American West, his analysis suggests that the American experience is not unique. Rather, inasmuch as the developments he outlines are a product of tourism itself, they should emerge wherever tourism occurs.

The power of tourism to transform local communities, according to Rothman, lies in the very nature of what, borrowing Edward Abbey’s phrase, he defines as “industrial tourism.” Industrial tourism in Rothman’s analysis is a distinctly postindustrial activity created by the wealth and leisure that has accompanied industrialization. In postindustrial societies, experience has emerged as *the* commodity to be packaged and marketed to those who have replaced the accumulation of wealth with the possession of experience. The industrial tourist, according to Rothman, gains self-fulfillment as the member of the right crowd, of being intellectually and morally above other tourists. Rothman sees this “conceit” as common among elites concerned to maintain their distinct status, academics and environmentalist included, and as one of the more important force driving the competitive marketing of tourist destinations.

The devil’s bargain associated with industrial tourism is that, by catering to outsiders who bring outside values and resources to the community, local communities and places are transformed from first to third nature as defined by William Cronon, that is, from a world of authentic ecological and social relations through which individuals and communities gain sustenance and survival into a world in which “nature” and “community” are created in order to serve as a source of identity and emotional fulfillment. In the process, communities and locales replace their authenticity with “constructed” or “bottled” authenticity as they become economically dependent on outsiders and external marketing strategies that not only define the community differently than local residents, but which repeatedly modify the definition of a locality in response to changing consumer demand.

Living, according to Rothman, is replaced by “lifestyle” as one tourist community after another transforms itself into the mythic perception that outsiders have of the town or

place. Locals must increasingly fit visitors' definition of "authentic". In the process, distinct functioning local communities are replaced by carbon-copy, pseudo-villages. Local buildings are replaced with faux Victorian houses or faux Pueblo architecture, quaint winding streets and increasingly upscale businesses that cater almost exclusively to outsiders. As Rothman illustrates in great detail, Aspen, Sun Valley, Santa Fe, Jackson Hole and other tourist destinations throughout the American West, including even the Grand Canyon and other national parks, have repeatedly remade themselves in response to changing external economic, social and cultural forces. Aspen transformed itself from a former mining town containing many local skiers into a pseudo-community that serves skiers from the eastern U.S. and elsewhere in the same way and for the same reasons that Santa Fe changed from a remote and poor territorial capital into a quaint and colorful multi-ethnic festival.

Even the Grand Canyon has undergone a series of makovers. Over time it has served as a repository of the positive spiritual values associated with American imperial grandeur and destiny, as well as a symbol of the wilderness experience and of an environmentalist ethic. Moreover, in an attempt to promote and market the Canyon as a place of mythic grandeur, the Fred Harvey Company has exercised considerable editorial control over the very definition of authenticity associated with the Canyon. The Company, for example, has reduced the visibility of those Indians, such as the Havasupai, that don't measure up to the image it wishes to project while promoting the visibility of those peoples, such as the Hopi, that do, even though the former have a much stronger claim to being indigenous to the Canyon than do the latter.

However, the tourist-induced changes that take place are not just aesthetic; they are also social, political and economic. Locals have not only had to accommodate tourist aesthetic expectations, they have also had to accept the economic and political control of their communities by outside interests. In many cases, due to rising real estate costs and the predominance of low paying service jobs, local inhabitants have even lost the ability to continue to live in their own towns. In the end, Aspen and Vail have become up-scale, tourist-oriented shopping centers with faux Victorian architecture, while Santa Fe has become an up-scale tourist-oriented shopping center with faux Pueblo architecture. Few businesses remain in any of these towns that serve local needs. In fact, major conflicts have developed between tourists and locals throughout the West as the locals who work in the tourist towns press their interests, such as the recent conflict over affordable housing in Vail and the anti-tourist backlash that led to the election of Debbie Jaramillo in 1994 as the mayor of Santa Fe.

Rothman dispels the notion, however, that the negative effects of tourism on local peoples and communities can simply be attributed to the greed of distant corporations or of local businesses. The effects of tourism, he argues, are the social and ecological consequences of industrial tourism itself. As Rothman so eloquently states, "we are all industrial tourists. Physically we can take only pictures and leave only footprints. Psychically, socially, culturally, economically, and environmentally, we inexorably change all we touch. (p. 377)." Anyone who visits Aspen, Vail, Jackson Hole, Grand Canyon or Grand Teton National Parks, the Amboseli National Game Reserve in Kenya or the Costa Rican rain forest are tourists and contribute to the impact that tourism brings. Even those who hike or river-raft into the Grand Canyon or who backpack into the Bob Marshall Wilderness are, by definition, tourists and have an impact. Indeed, even those who pay tens of thousands of dollars to ascend the K2 are, according to Rothman, tourists. All tourists participate in the transformation.

Tourism is, thus, a powerful social force with far reaching economic and political implications. It may be seen as a new form of global colonialism through which those with disposable incomes seeking experience impact the lives of those throughout the world who are under economic pressure to perform the services that tourists demand and expect in return for the money they spend. We, thus, have Maasai warriors resentfully dressing up and performing "traditional dances" for international tourists for the same reason that many Native Americans put aside those parts of their lives that would not be considered "native" to outsiders in order to produce "indigenous wares" and perform "traditional dances" for the tens of thousands of tourists who overrun the Southwest every summer in order to see "authentic" American Indians. We thus have the ultimate "devil's bargain" associated with tourism, according to Rothman: those with money control the lives and communities of those without money. Through their purchasing power, tourists control the behavior of the locals and the public definition of local culture.

Rothman's analysis raises important issues regarding the public perception of tourism, most notably the generally accepted view that tourism is a benign and even desirable vehicle of economic development. The issues he raises are important given that such perceptions underlay public policy, as evidenced by the widespread promotion of both cultural tourism and ecotourism domestically and internationally. Rothman effectively raises questions in the reader's mind regarding the extent to which the development of tourist economies truly serves the interests of local communities rather than the interests of the outsiders who promote tourism as a strategy of development.

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References

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