An evaluation and documentation of Holistic Resource Management practices on Northern Rocky Mountain ranches
by Charles E Orchard

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Soils
Montana State University

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APPROVAL

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This thesis has been read by each member of the thesis committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

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CHAPTER 1

INTRODUCTION

Despite many successes and high productivity throughout this century, the American agricultural industry has developed severe ecological, social and economic problems. Soil and water are the worlds most vital components for food and fiber production. Protection of these natural resources are paramount for human existence. In the US, soil erosion by wind and water and the associated loss of productivity, continue to be our most serious agricultural and environmental problems (Larsen, et. al., 1990). Erosion causes the world's topsoil to be lost at an estimated 0.7% each year (Brown & Wolf, 1984). Less than 12% of the earth's total land surface is currently cultivated, and little additional arable land is available (Smith and Paul, 1990). According to Napier (1986), in spite of extensive and expensive soil conservation measures for over fifty years, the US may still be losing as much as six billion tons of topsoil a year though erosion. In fact, the Soil Conservation Service

(SCS) estimates that in many parts of the US, soil is being lost faster today than during the dust bowl years.

The Environmental Protection Agency has identified agricultural practices to be the largest non-point source of surface water pollution (NRC, 1989). Bauder et al. (1991) found that widely used dryland crop-fallow systems are associated with increased nitrates in ground water. Pesticides have been detected in ground water for several years in agricultural regions. We are now learning that the spread of agricultural chemicals is greater than previously thought. According to the US Geological Survey, agricultural chemicals, including atrazine and alachlor, attach to water molecules that evaporate from farm fields then return to earth in raindrops sometimes hundreds of miles from their source (Land Stewardship Letter, 1991).

From 1945 to 1975, the largest migration in the history of mankind occurred in the United States when 20 million people left the farms and ranches of this country and looked elsewhere for a job (Bergland, 1993). In the 1940's twenty-three percent of Americans were full time farmers, in 1980 the percentage had dropped to less than three percent (Kirkendall, 1991).

There are a multitude of economic costs associated with agriculture. The costs society must bear focus on environ-

mental reclamation and government farm programs. Economic decisions made by farmers in the early 1970's raised farm debt in the nation from less than $50 billion to over $200 billion by the early 1980's (Kirkendall, 1991). The number of rural communities dependent on farming declined from over 2,000 to about 700 between 1950 and 1970 (Historical statistics, 1975). The small, diverse farms of rural America are mostly gone, swallowed up by the large corporate farms, expanded family farms, or lost in bankruptcy (Cochrane, 1991).

America's social attitude has shifted from an unequivocal support of agriculture to a questioning ambivalence toward, and even fear of, modern agricultural practices. Unfortunately, the vast majority of our society has become far removed from the "roots of agriculture". Few Americans know what is required in living with and from the land to produce the food our nation and world consume. Current agricultural problems reveal how far humans have removed themselves from the basic natural processes of life, the flow of solar energy, the cycling of water and nutrients, and the succession of plants and animals which use nutrients and transform and use energy (Sindelar et al., 1995).

However, Americans are familiar with the environmental and economic costs which lie in the debris of agriculture's swath of production. These anxieties have stimulated several responses. One outcome is the creation of private environmental organizations. While these organizations espouse environmental, social and economic themes, many of their concerns actively question agricultural practices as well.

The environmental, social and economic problems we face are symptoms suggesting dysfunction of the present agricultural system (Heffernan, 1986). In searching for answers, traditional research has, most commonly, relied on the Cartesian, linear method of analysis; separating problems into the smallest pieces and analyzing those pieces in detail. Ultimately, we have turned to technology for the answers, a tool that never comes cheaply. This approach has led to short term solutions and long term ecological, financial and social costs.

An analogy might help in understanding this approach. If one were to study the All-American apple pie, traditional Cartesian methodology would dictate that we analyze it part by part. We would look at the flour, the shortening, apples, cinnamon, nutmeg, lemon rind and juice, salt, vanilla and sugar separately. If we tasted these items separately, we would find: the flour was dry and not at all flavorful; the

shortening, greasy; the apples, tart but good; the cinnamon and nutmeg, strong and bitter; the lemon, tart if not sour; the salt, unpleasant; the vanilla, aromatic but distasteful; and the sugar dry and not at all as pleasant as anticipated. In short the ingredients are distasteful, but when they are combined, cooked, and interconnected, the whole pie is delicious. The idea of holism is interconnection. Albert Einstein once said "The significant problems we are facing... cannot be solved at the same level of thinking we were at when we created them." (Stewart, 1973).

(W)Holism

The concept of holism is not new. Many cultures from around the world have embodied this approach to problem solving as part of their heritage. Holism revolves around the idea that everything is connected and interdependent and that the whole is different from and greater than the sum of its individual parts (Barnhart, 1965). A change or disturbance in one area will cause a response and/or disturbance in other areas as well. The concept of holism destroys the illusion that the world is created of separate unrelated components (Senge, 1990). Holism incorporates the first law of ecology; everything is connected to everything else (Hardin,

1985). Eugene Odum implies a holistic approach is necessary in dealing with complex systems. He advises development of a holo-economics to incorporate cultural and environmental values along with a monetary economy and ecology. Until economics, ecology and ethics are merged, Odum believes we cannot be optimistic about the future of mankind (Odum, 1990).

Galen Bridge (1993), USDA/SCS suggests the SCS has a common goal to balance the short-term and long-term needs of our environment and our economy, and to do it in a manner that respects the people who manage the land. The term Bridge applies is "whole farm planning" or "total resource management" although it could be termed holism. It is a holistic, ecosystem-approach to conservation planning that incorporates air, water, plants and animals and their interconnections into the management.

Holistic Resource Management

Allan Savory (1988) has applied the practical application of holism to a decision making and management process termed Holistic Resource Management (HRM). His HRM model integrates the economic and social components while embodying ecological principles to sustainably manage a farm, ranch, or other piece of land. The HRM model can also be

applied in situations which are not directly land based. It can be used for diagnostic and policy analysis, and in a research orientation mode as well. In order to increase knowledge of HRM, Savory established the Center for Holistic Resource Management (CHRM) as an international nonprofit corporation in 1984. Based in Albuquerque New Mexico, the Center's goal is to improve the human environment and quality of life through better resource management.

Although HRM is being applied more and more by agricultural managers, there is little replicable documentation and evaluation of the processes of change which HRM facilitates in its practitioners and their land resource base. HRM is not yet accepted within the larger community of land managers, scientists and policy makers. A lack of knowledge and confidence among land managers and academicians towards HRM may stand in the way of acceptance and application.

Purpose

The purpose of this study is to: (1)prepare, administer and analyze a survey of farm/ranch managers whom have been using Holistic Resource Management practices for two or more years; (2)describe the processes these holistic managers use to adjust their systems of land , people, and

financial management, and (3)describe the changes these managers have observed since adopting and utilizing HRM.

Research Questions

1) Does adoption and implementation of HRM lead to positive or negative change in happiness for these ranchers, and what kinds of change are there, if any?

2) Does the adoption and implementation of HRM influence the financial satisfaction for these ranchers, and if so, how?

3) What kind of ecological change, if any, is occurring on these ranch lands since adopting and implementing HRM?

4) What are the current motivation levels for these ranchers to continue implementing HRM?

Methods

The intent behind the study was to select participants whom were firmly committed to the concepts of HRM. The preliminary list of potential respondents was gathered via recommendations from HRM consultants and educators for practitioners in the Northern Rocky Mountain region of Montana, Wyoming, and Idaho. Methods suggested by Dillman (1978) were integrated into this study. A telephone conversation with these practitioners introduced the study and asked their

consent to participate. To qualify, two criteria were required: (1) respondent had attended an introductory HRM course and (2) had been implementing the method/process for two years or more. With their consent, a survey packet was mailed. The packet consisted of one questionnaire, one reply sheet, and a self addressed, stamped envelope to return the inform-ation. Approximately 5 days later, the researcher made second contact via telephone asking if they received the questionnaire, and to clarify any questions concerning the survey.

The survey instrument (see Appendix) was designed primarily following the HRM model incorporating eleven areas of emphasis:

1) Goals: This section asks, if the rancher has developed and is following a holistic three-part goal. It also asks about type and frequencies of planning.

2) Communication: This asks what communication levels exist on the ranch, frequency of planning meetings, and what levels of trust and acceptance are present.

3) Satisfaction: This asks about changes in satisfaction regarding happiness, and the types and duration of time off ranch personnel are experiencing. It also asks about employee production incentives.

4) Finances: This section delves into financial aspects of the business. What enterprises are being used, created, and removed? Have there been changes in ranch expenses, income, and profit?

5) Monitoring: Is it taking place, and what specific soil and vegetative changes are being observed?

6) Problem species (plants, rodents, insects): How much time, money, and effort is being expended compared to the past?

7) Wildlife: What is the opinion concerning wildlife? Are there management practices developed and used for them? What changes are being observed regarding numbers and diversity?

8) Livestock management practices: What changes have been implemented? What about disease and medication use? How has performance changed? What changes, if any, in stock density and animal impact are taking place?

9) Off farm inputs (fertilizers and pesticides): What changes have taken place regarding their use?

10) Motivation levels: What level of motivation is present to continue HRM? Are goals being achieved? How much HRM training has taken place? What are advantages and drawbacks of HRM?

11) Background information: This asks about the total ranch income and expenses, ranch size, number of people involved,

ownership, management experience and years managing holistically, etc.

Most of the questions were designed for yes/no replies. Some questions required selection from a seven point Likert scale indicating no change, or degrees of positive or negative change. There were many places for written comments as well. Completion time was estimated at 60-90 minutes.

A pre-survey was conducted using participants from the 1992 annual HRM meeting in Albuquerque. Approximately 15 people filled out the questionnaire and provided answers and comments for improvement. These results and suggestions were used to complete the final survey instrument which was mailed to the current participants in February 1993.

Survey data were received in the mail and entered into a data base. The SPSS statistical package was use to create a descriptive frequency analysis(Huck, et.al., 1974) which determined the number of respondents with similar replies. Using descriptive statistical analysis to summarize the results, the SPSS statistical package ran a frequency analysis to gain distribution data.

CHAPTER 2

INTRODUCTION TO HRM AND THE HRM MODEL

This chapter will provide a summary of Holistic Resource Management (HRM), introduce the HRM model, and describe how this process can apply to agricultural producers.

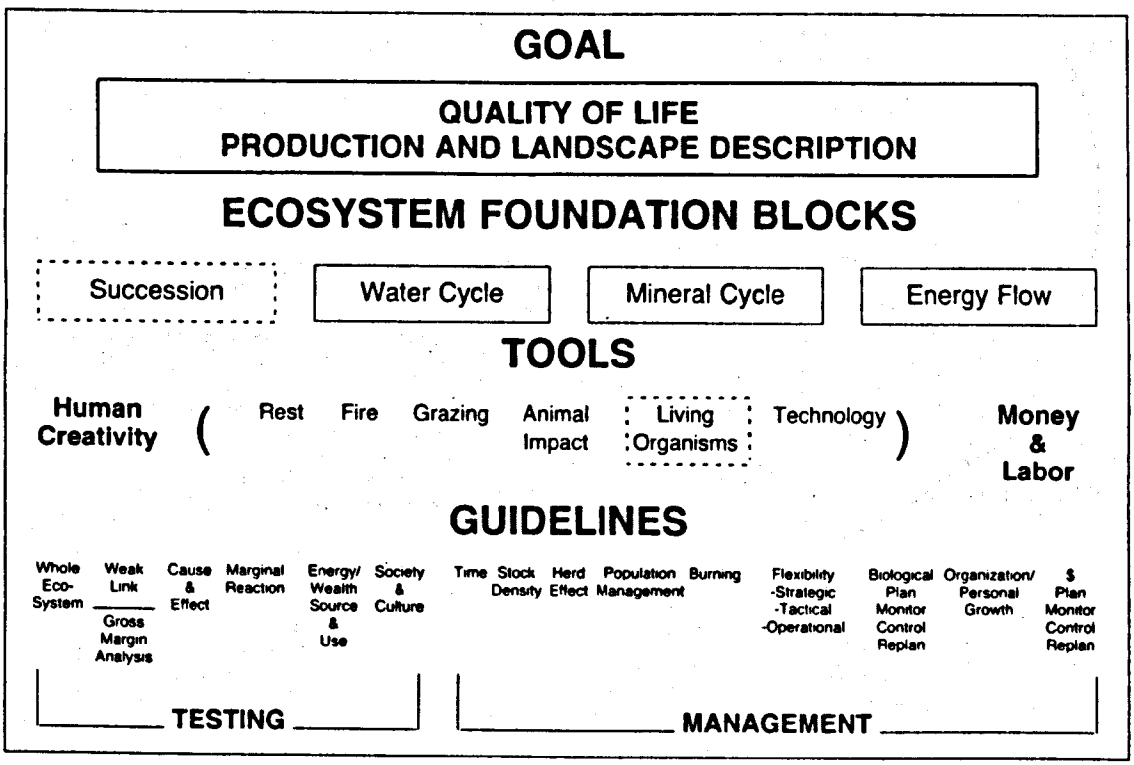
Evolution of Holistic Resource Management

The Theory of Holistic Resource Management is based on a compilation of knowledge from many people (J.C. Smuts, Andre Voisin, Native American teachings, Center For Holistic Resource Management staff, and members). It has been developed primarily by Allan Savory, a game biologist and consultant originally from Zimbabwe, South Africa. He has experienced more than 20 years of game and domestic animal management experiences and observations. Savory has proposed several ecological concepts involving the dynamics of plant and animal relationships. His conclusions indicate an interdependence between plants and animals which is not always obvious using the traditional Cartesian

scientific approach. He began to view ecosystems as functions of four fundamental processes which include: the development of living communities (succession), the cycling of mineral nutrients, and water, and the flow of solar energy.

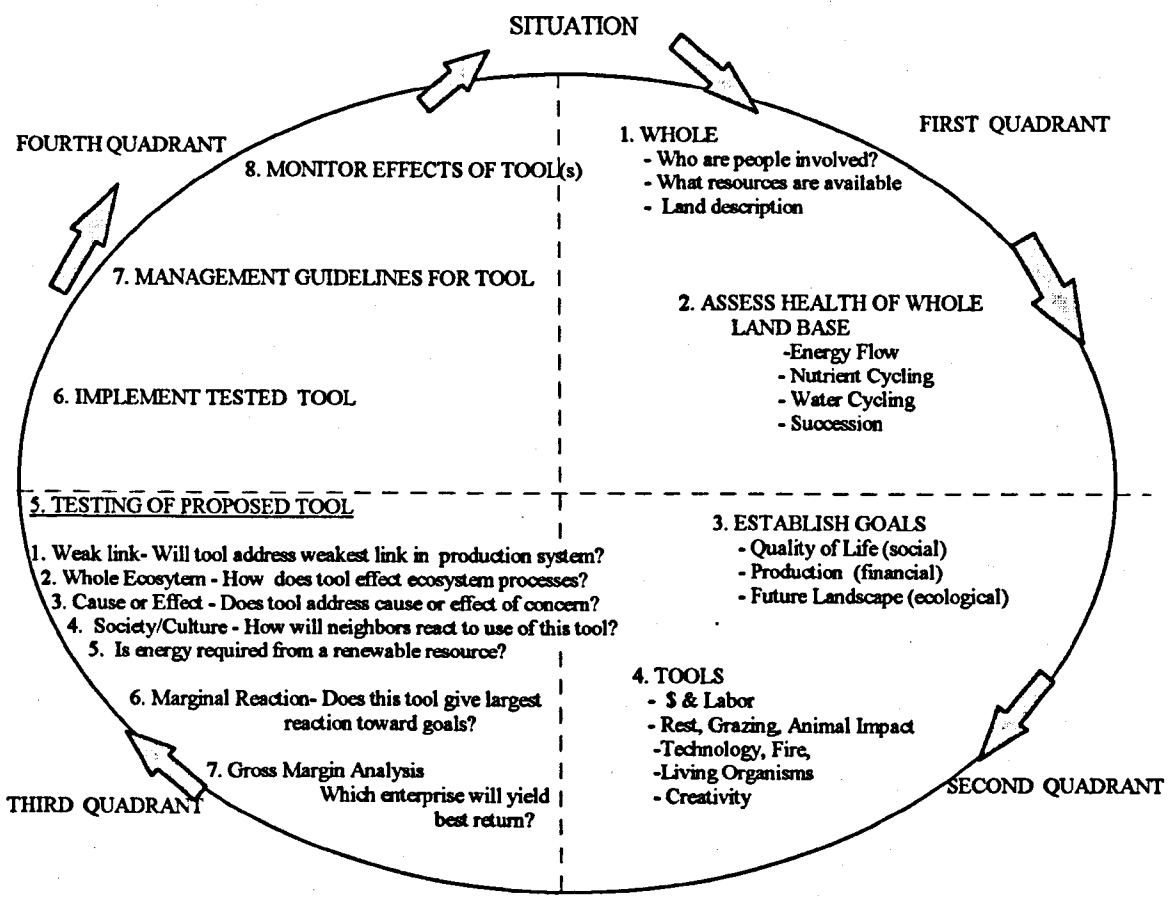
With this information as a foundation Savory began the construction of a strategic planning and decision making model, integrating the concept of (w)holism into its framework (see Fig 2.1). His model allows a resource manager to forecast the outcome of management decisions.

Fig 2.1. HRM decision model (Bingham, 1990)



To simplify the explanation of Savory's model, this paper will use the model configuration Dr. Cliff Montagne (personal communication, 1993) has constructed (fig 2.2). This arrangement is an integration of Kolb's (1986) learning style theory, combined with the concepts and contents of the HRM model Savory completed.

Fig. 2.2 Circular configuration of HRM model (Montagne, 1993)



HRM Model

First Quadrant

Montagne's HRM decision model is structured in a circular manner, followed in a clockwise rotation, and is broken into four quadrants.

Whole. Quadrant one is where the situation is defined: the items of concern are articulated and particular attention is paid to the "*whole under management*". Ideally, the most involved *people* (core team) are included in this step. This group describes or identifies what *resources* are at their disposal (e.g., money, equipment, facilities, livestock, certain individual skills, etc.). Furthermore, some description of the *lands* involved would be desired.

Once the "whole" is described, it is crucial to establish the health of the land base. This would be recognized by assessing the function of the four *fundamental ecological processes.*

Indication of a well functioning ecosystem would be *water* and *minerals* actually *cycling* into the soil quickly and efficiently. Solar *energy* is *flowing* effectively throughout the system, being captured by many forms, and levels, of green plants. The *successional level/community*

dynamics of the plant and animal communities will display a healthy diversity.

Second Quadrant

At this point, the model is designed to guide the ranch team toward the development of a *holistic three-part goal.* During this process it is important to develop the trust and acceptance necessary for open communication. With good communication, the people in the "whole" optimize the chances of forming an effective and collaborative team.

Holistic Three-Part Goal. The *quality of life* section of the goal would imply and describe the values which are important for the team. For example a ranch family might seek to enjoy the work and life on the ranch, attain financial security, have time for a vacation, send their children to college, and eventually pass a successful ranch on to following generations. They might also want to contribute to the health and sustainability of their community.

Achievement of the goal for quality of life is dependent upon various forms of *production.* A family may desire to generate profit from harvesting solar energy through the use of grazing animals, and wildlife. To obtain the desired production, the *future landscape/resource base*

must be envisioned and described. The family might specify this goal by describing the ideal future condition of the four ecological processes.

Tools. In this quadrant all possible tools are considered for achievement of the goal. Creative brainstorming is encouraged. Savory includes all of the tools known and categorizes them accordingly as: technology, grazing, animal impact, fire, rest, and living organisms. Savory considers these tools as functions of money, labor, and human creativity. But before any tool can be implemented, it must be tested.

Third Quadrant

The *testing guidelines* are paramount in the decision process. These tests question what social, financial, and ecological impacts the tool under consideration might produce. Specifically, they assist in asking if the tool or plan would :

1) Strengthen the *weakest link* in the production system which is blocking progress towards the desired objectives.

2) Consider what effect this tool has on the *whole ecosystem*, and its processes.

3) Address the *cause* or just the *effects* of the problem.

4) Be *socially* and *culturally acceptable* for the team and within the community, or larger area.

5) Conserve non-renewable *energy* and create renewable solar *wealth*.

6) Create a large or small *marginal reaction* toward the goals for the time, money and effort required.

In addition, the *gross margin analysis* test is used to select the best combination of revenue generating enterprises which will reach the desired goals.

Fourth Quadrant

This is the quadrant where *implementation* of the tested tool takes place. A series of twelve *management guidelines* encourage effective performance of the tool or plan. Some management guidelines, such as *flexibility* and *organization/personal growth*, apply to almost any situation involving people. Others such as *stock density* and *herd effect*, relate specifically to livestock operations. All management guidelines continually re-focus on the three-part goals. Managing human and environmental aspects is emphasized in these guidelines.

Monitoring. Throughout the process one must accept the possibility of being wrong and recognize that when this happens, re-planning and adjustments must be made.

Ideally, land monitoring should be integrated into the management system. This can identify, to the land manager, small changes in the land either toward or away from the future landscape description. Savory and others devised a land monitoring method (Bingham, 1990) based on permanent monitoring points placed at key locations throughout the landscape. The premise is to measure the ecological health of the land. This method produces photographs and data for the land manager describing the processes of water and nutrient cycling, succession, and energy flow.

Back to the Start

One revolution of the model has been completed bringing the manager back to the beginning of a new situation. What new concerns are facing "our rancher"? With each revolution, time will pass, some concerns may change. The "whole" will transform through time and will be redefined periodically, some of the goals may change, and different tools will be considered and evaluated for making progress toward the goals. Tools passing the guidelines will be used, monitored, and adjusted, taking the manager to the beginning again.

Adult Education

The Center For Holistic Resource Management (CHRM) has provided educational programs for land managers through a variety of short courses. An introductory course which presents general theory and concepts is first recommended. Following courses detail ecological, social, and financial applications. Further information can be gained from the main textbook Holistic Resource Management , 1988, by Allan Savory, and from the Holistic Resource Management Workbook 1990, by Sam Bingham and Allan Savory.

CHAPTER 3

PRACTITIONER PROFILE AND FINDINGS

Practitioner Profile

Of 48 practitioners contacted, 43 (91%) returned completed questionnaires. Forty-nine percent of the ranchers were from Montana, 37% from Wyoming, and 14% from Idaho. All of the respondents were male. Their ages ranged from 17 to over 56 years. (see Table 3.1).

Table 3.1 Age distribution of respondents.

Age	Frequency
12-17 years	2%
26-35 years	23%
36-45 years	42%
46-55 years	21%
over 56 years	12%

Prior Family Ownership

Sixty percent (60%) of the operators reported their ranch had been managed by a prior generation of their family. The length of time they had been managing their ranch varied from 1- 44 years (see Table 3.2).

Table 3.2 Years respondents managed current operation.

Length of Management	Frequency
1-5 years	26%
5-12 years	25%
12-20 years	26%
20-44 years	23%

People Involved

These operations ranged from one to seven families living on the ranch. Most of them (80%) had from one to three families residing. Seventy percent (70%) of the respondents hired at least one employee on a permanent basis. Half of them employed two to six people permanently.

Ranch Enterprises

Ninety-seven percent (97%) of the participants raised cattle in addition to a number of other agricultural business ventures (see Table 3.3). Almost 60% of these ranchers (58%) considered wildlife a business enterprise on their ranch and viewed wildlife as an asset for their operation. Almost one quarter of those responding also had someone in the household employed outside the farm.

Other enterprises mentioned were row crops, timber, swine, fish, goats, guest business (e.g., guest cabins, dude ranching), power fence sales, stock trailer sales, tree and shrub nursery, and native grass seed.

Table 3.3 Most common enterprises on ranches managed holistically.

Enterprise	Frequency
Cattle	98%
Wildlife	58%
Hay	47%
Horses	28%
Sheep	26%
Off Farm	23%
Outfitting	19%

Ranch Size

Ranch sizes varied from 400 acres to more than 50,000 acres. Forty percent (40%) of the ranches ranged from 6000-25,000 acres. Thirty-seven percent (37%) of the ranches were 6000 acres or smaller and 23% were larger than 25,000 acres.

Gross Revenue and Expenses

Managers reported annual gross ranch income ranging from less than $25,000 to more than $500,000 (Table 3.4). Expenses varied across a wide range from less than $25,000 to over $1,000,000 (Table 3.5).

Table 3.4 Gross revenue generated on ranches managed holistically.

Gross Revenue	Percent of Ranches
< $25,000	2%
$25,000- $100,000	12%
$100,000-$175,000	36%
$175,000-$350,000	27%
$350,000-$500,000	10%
> $500,000	20%

Table 3.5 Gross expenses of ranches managed holistically.

Gross Expenses	Percent of Ranches
< $25,000	10%
$25,000 - $100,000	28%
$110,000 - $200,000	22%
$200,000 - $300,000	15%
$350,000 - $450,000	13%
$600,000 - $800,000	10%
> $1,000,000	2%

Why the Switch to HRM?

This question was not asked directly on the questionnaire, but was gathered from telephone interviews with the respondents. The basic reasons these managers chose to manage holistically were:

1) *They had few other options.* Some of the people indicated they were in such a financial bind that they were "willing to try anything". HRM was a "what could they lose" alternative. Facing the possibility of losing the ranch, they could at least try HRM.

2) *Interested in a new grazing method.* Several people indicated they had heard or read something about the grazing aspect of HRM. This generated enough interest for them to take an introductory class.

3) *Offered an alternative approach to resource management.* Some managers indicated they had begun to question their current management approach and were interested in alternatives. HRM offered them an option to conventional management practices.

Training and Education

Learning to manage holistically requires a certain amount of education and understanding. All of the participants have attended an introductory course (3-5 days) which acquainted them with the concepts of HRM. Eighty-eight percent (88%) of these managers have attended additional courses focusing on specific ecological, social, or financial aspects of HRM. Table 3.6 lists additional HRM courses taken by the survey group. Some respondents mentioned other educational programs such as; Bud Williams Stockmanship Schools (low stress stock handling techniques), Stan Parson's Ranching for Profit school (similar concepts of HRM, but less holistic thought, and more emphasis on finances). Another source to gain knowledge is hiring private consultants/educators well grounded in HRM. Almost 1/2 of the respondents (48%) have used a consultant since adopting HRM.

Table 3.6 Additional courses attended by HRM managers.

Course Name	Frequency Distribution
Generating Wealth	58%
Grazing Planning	51%
Land Planning	34%
Leadership Course	21%
Families in Business	16%
Goal Setting	9%

Years Managing Holistically

Ninety-seven percent (97%) of the participants had operated their ranches using a traditional management approach prior to adopting holistic management. One producer bought a ranch and began to manage holistically immediately.

Of those surveyed a small percentage (5%) had been using HRM for more than 10 years. The majority (63%) have been using HRM for five to nine years. The balance (31%) fell into the two to four year category.

Planning and Goals

Holistic Resource Management requires intensive planning and management. If used as intended, the planning procedure follows the organized structure and procedures of the HRM Model. Planning should ideally involve the following; a holistic three-part goal, land planning, grazing planning, monitoring, and financial planning.

Holistic Three Part Goal

As discussed in Chapter 2, goal formation is necessary. "Don't even think of managing resources without a goal" says Savory (Savory, 1988). He encourages a holistic three-part goal which includes the Quality of life, Production, and Future Landscape components. This approach is designed to provide an effective way to structure and define a temporary goal for the business. Strategic long range goals would also be addressed and some tactical objectives may be considered.

Land Planning

With the use of maps, the lands of the ranch are inventoried and analyzed for land use efficiency. Land planning would involve assessment of pasture sizes, configuration, and forage quality and production. Efficiency of the irrigation system would be considered. A formal land monitoring program to evaluate ecosystem health would begin as well.

Planned Grazing

The grazing planning (biological planning of Savory, 1988) is a key element of holistic management when grasslands are involved. This planning helps match nutritional requirements of the stock with growth processes of the

vegetation. It also allows managers to calculate more closely the forage reserves they have on hand. It can be used to plan for critical times involving wildlife, poisonous plants, or other ranch activities. The planning is not easy and is built with flexibility in mind, but can be an effective tool when using the tool of grazing. Further discussion on this topic can be found in Chapter 5.

Monitoring

Recently, there has been a great deal of interest in monitoring land health, especially in conjunction with rangeland and riparian issues. The Montana Grazing Lands Initiative, and Rangeland Reform 94 have contributed to this interest.

As Chapter 2 suggests, monitoring is vital for the holistic resource manager. To use HRM effectively, a manager must monitor for change. Change in the land, in the finances, and in peoples satisfaction. Without this information it is difficult to know whether the goals are being reached.

Financial Planning

Financial planning is another component of HRM. This aspect of the management is often considered the most important since we all live in a world that "uses dollars to

keep score". This planning involves creating yearly budgets and applying gross margin analysis and marginal reaction tests to ranch enterprises. The weak link test would be used to indicate where money should first be spent. These procedures are covered with more detail in Chapter 6, and in the testing and management guidelines of the HRM text book. (Savory, 1988)

Findings

Written Whole and Goals

More than 65% of the managers had some form of documentation describing the people involved, an inventory and assessment of what resources are available (e.g. land, money, equipment, buildings, facilities), and some description of the land involved with the business.

Seventy-nine percent (79%) of the managers have met with the rest of their working team (family members, owners, and/or employees) and established written goals for the future of the people and the ranch. Table 3.7 indicates the most common components of ranch goals.

Table 3.7 Components included in ranch goals.

Goal Components	Frequency of Occurrence
Quality of Life	91%
Production	88%
Future Landscape description	86%
Neighbors/community involvement	55%

Monitoring Goals

One method of monitoring the "people portion" of the business is to involve everyone in the goal review for the ranch. It appeared this process was happening to some degree. Of the people who had established written goals for the business, over one-half (56%) indicated they annually met with team members and reviewed the ranch goals.

Grazing Planning

Eighty-five percent (85%) of these managers plan an annual grazing strategy which is based on knowledge of plant growth cycles and other biological factors. Sixty-five percent (65%) of the survey group was planning and implementing management practices for the wildlife, and 83% reported increased care for riparian areas.

Land Monitoring

When asked how much formal documented land monitoring was taking place on their land, the survey group indicated 60% had a program implemented. Over half of those monitoring are using photos to indicate land changes as well.

Financial Planning

Seventy-eight percent (78%) of the respondents suggested they used an annual documented financial plan and budget on which they based their business and operational decisions.

CHAPTER 4

SOCIAL ASPECTS AND FINDINGS

HRM and Organizational Management

Farmers and ranchers seldom have training involving effective personnel management skills. Holistic Resource Management addresses this concept. The intent is for managers to become more aware of the importance of people within the operation. The "people portion" of HRM emphasizes the point that -- *without people, no work gets accomplished.*

HRM not only helps the manager recognize the value of people on the job, it also focuses on enhancing the employee/employer relationship. The intent is two-fold; make the job experience as pleasurable as possible for the employee, and optimize overall productivity while minimizing costs.

Methods are encouraged to stimulate a work environment conducive to creative thinking, planning, sharing ideas, and promoting a feeling of ownership in the business. Many

of the principles follow the organizational theories of Edward Demming's Total Quality Management (Levine, 1995).

Education and Training

It should come as no surprise that the HRM approach encourages, if not requires, outside training and a continued pursuit of competent management skills. There are several courses taught by professional educators associated with HRM which focus on:

- Team building
- Creating dynamic board/staff partnerships
- Long range planning
- Total quality leadership
- Estate planning

Organizational Development and Personal Growth

The Center for HRM suggests and encourages readings in the fields of organizational development and personal growth. Warren Bennis (1985), John Naisbitt (1985), Thomas Peters (1982), Peter Senge (1990), and Steven Covey (1989) are a few of the recommended authors.

Trust and Acceptance

For people to work together effectively, they must foster true and open communication based on trust and

acceptance. The sharing of life's goals, areas of interests, and other concerns are encouraged among team members. Exercises which stimulate team building and strengthen trust are promoted as well.

Ownership in the Business

Building on the idea that people inherently want to do a good job if they are encouraged and permitted to do so, HRM advocates giving personnel a feeling of ownership. One common example is for owners/managers to invite employees to contribute towards the development, plans, and review of the goals for the ranch. Also, they would be invited to share, and include, their own personal goals during the goal setting or review processes. Production incentives for employees are encouraged as well as delegation of responsibilities for certain ranch enterprises to one or more employees. Hiring spouses or children of employees at particular times can also lead to a feeling of inclusion and ownership within the business.

Commitment from the Employer

Often times a show of good faith by the employer is effective in creating a necessary level of trust within the team. This might take the form of revealing the financial records to those involved with the ranch. This particular

example serves two purposes: (1) it displays trust and commitment of the team by the owner/manager, and (2) it familiarizes everyone with the expenses, income, and the realities of the financial side of the business.

Findings

Manager/Employee Training

Just over one-half (53%) of the managers indicated they had specifically attended leadership development and/or team building training to strengthen their ability to work with team members for the business. Several managers stressed how important it was for them to have team members introduced to the concepts of HRM and/or other management concepts such as team building, goal setting, personal growth, and communication skills. Almost all of the respondents (98%) indicated they encouraged and paid for employees to attend schools, short courses, or seminars for the business.

Planning Meetings

As mentioned previously, planning is paramount in using holistic management. To more effectively run their business, these managers encourage ideas and suggestion from the rest of the ranch team. One effective method is to hold routine ranch planning meetings. Eighty-five percent (85%) of the

managers indicated they held regular (see Table 4.1) meetings with their team to discuss topics such as work issues, group progress, and problems.

Shared Meeting Facilitation. Eighty-one percent (81%) of the ranchers indicated that when the team met, they shared in the responsibility of facilitating these meetings. One persons' comment for this approach:

> We all share in running the ranch meetings because I think it makes everyone have more ownership in this operation and gives my one employee a reason to pay attention and be a part of this business.

Table 4.1 Frequency of planning meetings reported on ranches surveyed.

Meeting frequency	Distribution
Once per week	37%
Once per month	19%
Once per 2 months	30%
Seldom - never	14%

Personal Goals

Sixty percent (60%) of these managers indicated they were aware of their employees own personal goals and areas of improvement they were seeking.

Trust and Acceptance

Among members of these ranch organizations, 67% reported the feeling of trust and acceptance to be moderately high or higher. Seventy percent (70%) reported high cooperation when solving problems, and over 75% indicated a great deal of flexibility allowed for creative approaches to attain their goals. Perhaps more importantly, 74% of these ranchers indicated their current management strategy was effectively meeting the goals of the group. Following are some comments pertaining to this:

> HRM has opened up communication and people now contribute more.
>
> ...and we use more brain power because everyone is involved now.
>
> HRM encourages listening to those people you differ with including family.
>
> We think better, probably more open to any ideas.
>
> This has all created better and stronger relationships.
>
> Less management stress. Makes us better time managers.

Improving trust and communication is sometimes painful as these respondents indicate:

> I had to face up to the defects in my character. I had to realize that I can't please everyone. I had to become willing to change... which is extremely difficult.

> It is becoming painfully clear that I must change some deeply entrenched habits to approach the door to communication and managing holistically.

Time Off

One aspect of ranching, often overlooked, is the amount of regular time employees or managers take away from the job. In today's day and age, a six and one-half to seven day work week is not as acceptable as it once was. These work obligations are still common with ranching and farming today. Almost one-half (45%) of the respondents indicated they now take more time off, and provide more time off for their employees than with their preceding management. Sixty-eight percent (68%) of the managers indicated they regularly take one to two days off during the week. About 75% of this group indicated this practice occurred two to four times per month depending on the season. In addition to taking some time off during the week, 84% of these managers reported they take an annual family vacation away from the business. Length of time varied, but 44% reported a break between four to nine days; 33% indicated a ten day reprieve, and 33% reported two to four weeks taken per year. More than 60% of the managers said they gave employees regular/annual vacations. More than one-half of those receiving vacations were given two weeks of time away. One manager had this response:

> We provide a paid vacation of one week per year of employment up to a maximum of three weeks.

Production Incentives

Production incentives are integrated into the management for the well being of the employees in addition to optimizing production and/or minimizing expenses. These incentives can take many creative avenues. Fifty-eight percent (58%) of the managers indicated they incorporated employee production incentives. These programs ranged from simple profit sharing of net income to employee ownership of the business. Some examples are:

> My employees are given an opportunity to run their own livestock for free spring, summer, and fall. I also give them the freedom to book recreational clients (new to the business), and beef and lamb customers for a percent of the profit.
>
> Employees through estate planning are to inherit the ranch.
>
> Most employees are summer help and they are given incentives for school or internships depending on the situation.
>
> Raises and bonuses are given in cattle. Running expenses for these cattle are charged at actual running costs. This facilitates team members thinking like owners.
>
> Employee bonuses are based on the overall financial growth of the business.
>
> We allow our employees to run their own cattle and they are allowed to run more cattle the longer they remain at the ranch.

We pass on 10% of the ranches gross profit to each employee.

Creative Idea. One manager discussed a cost saving idea which he intended to implement. When a vehicle is purchased for the ranch, the owner or manager assigns the responsibility of care and maintenance to an employee, usually the primary user. The ranch then offers the title of ownership to this person after the truck surpasses some designated mileage, say 60,000 miles. The employee now has a very tangible incentive to care for and properly maintain this vehicle.

Another approach is employing the spouse. Seventy percent (70%) of the managers indicated they employed the wives of their core team during certain periods of the year. Upon seeing the operational goals from one ranch, this researcher noticed that two wives had responsibility of planting and also planning the water system for 1000 trees on the ranch.

Diffusion of Innovation

Diffusion is the process through which (1)an *innovation* (2)is communicated through certain *channels* (3)over *time* (4) among the members of a *society*. An *innovation* is an idea,

practice, or object perceived as new by an individual or other unit of adoption. Many social scientists maintain the most important immediate cause of social change in the rural United States is technological innovations in agriculture. The consequences of agricultural technology, while beneficial to many Americans, are far-reaching and sometimes unpredictable. Rural sociologists have been studying the diffusion of agricultural innovations for over 40 years and have built models which detail this process (Rogers et al. 1988).

Rogers indicates that in order for a new innovation to be accepted by others it must pass five criteria. It must show a (1)*relative advantage* over a prior practice; it must be (2)*compatible* with existing values and needs; (3)it must not be too *complex or difficult* to use; (4)it must show *trialability* (experimented with on a limited basis), and (5)it must produce readily *observable changes* to the receiver and others.

HRM integrates a number of new, non-conventional concepts and practices for the land manager. Technically HRM fits the definition of an innovation. However, most commonly the diffusion process introduces a single new type of machinery or technological process. Since HRM is a complex, whole process, rather than simply a new component

of an on-going process, diffusion may be slower. For this process to be done properly, it requires commitment across the entire farm or ranch.

CHAPTER 5

ECOLOGICAL THEORY AND FINDINGS

This chapter will discuss the ecological theory behind Holistic Resource Management and then explore how 43 holistic ranchers apply this thinking to "on the ground management".

HRM is partially based on managing and monitoring the four fundamental ecosystem processes operating on the earth's surface.

1) Water Cycling
2) Mineral/Nutrient Cycling
3) Energy Flow
4) Succession

Savory bases the management of these processes on four ecological principles he terms missing keys. These principles are:

1) The role of herds and their predators
2) Bio-decay capacity of natural environments (brittleness)

3) The concept of (W)holism

4) The time dimension in soil, plant, and animal relationships

Savory formulated the first two concepts (herds and their predators and brittleness) after more than 20 years observing plant and animal relationships on the dry savannas of southern Africa. The concept of time and grazing is based on the work of Andre Voisin (1961). The fourth concept, holism, is what Savory believes unites the other three concepts.

The Role of Herds and Predators

Most prairie or savannah type ecosystems have developed through the influence of herding animals (prey) and the unique relationship they share with predators. When attacked, the herd's response is a rapid bunching together and fleeing (flight) from the danger. This behavioral response is a natural defensive mechanism for wild herding animals. An immediate result of this stampede-like behavior is a tearing and chipping action on the soil surface. This churning hoof action also incorporates plant material and animal dung and urine into the soil.

In North America this herding response has been observed with bison and elk herds under predation. Early

historical accounts describe how these large migrating herds would bunch and stampede for extended periods of time when attacked. Estimates of total number of bison migrating through the great plains vary from 60-80 million head (Callenbach, 1994).

Predators such as bear, mountain lion, coyotes, wolves, and man could trigger this herd response. There are other factors (e.g., storms, lightening, or fire) which can provoke the flight response as well. Regardless of how it was triggered, it produced significant disturbance to the surface of the soil.

Although the physical churning and tearing of the soil surface appears severe initially, it can produce long term benefits. This action breaks up crusted soil surface layers and incorporates plant material, manure, and urine back into the soil. A roughening of this nature can lower surface bulk density, lead to improved soil moisture infiltration and increased aeration.

Influence of Domestic Livestock

Savory maintains this type of animal behavior was, for the most part, removed with the introduction of domestic livestock. Domestic animals were bred and managed to be more gentle than wild animals, to gain weight, reproduce, and to be sedentary. The herding instinct for domestic

stock is much less prevalent than with the wild herds of the past.

Removal of the Predators

In the eyes of predators, introduction of livestock was welcomed. Domestic animals became a new feed source because of their relative abundance and because they lacked a strong herding instinct. Of course, owners of the livestock were not pleased with predation because it stressed the animals and caused considerable death loss. Soon ranchers "declared war" on predators including wolves, bear, mountain lions, and coyotes, by creating trapping and bounty incentives to eliminate the cause of their problems. They were successful.

By removing these animals, they also removed an integral part of the predator/prey relationship. The instinctual behavior of staying together in mass, or "herding when threatened" was no longer reinforced within consecutive livestock generations because there was nothing to threaten them. The predator/prey response is somewhat apparent in cattle of today, but is far less than the herding behavior of their ancestors.

The Effect of Fencing on Native Vegetation

Fences were put up initially as border markers and later as tools to hold stock within certain areas. Certain native vegetation, which had evolved to withstand and thrive on the periodic severe grazing (grazed and then rested for many months) from migrating herds, was now subject to frequent severe grazing (grazed and re-grazed within days) because the animals were fenced in. This change in grazing dynamics created impacts which were more than many plants could withstand. They were *overgrazed*, became weak, lost vigor and began to diminish (rough fescue Festuca scabrella, basin wild rye Elymus cinereus, blue bunch wheat grass Agropyron spicatum, green needle grass Stipa viridula, and others). Range scientists today refer to these types of plants as *decreasers*.

The livestock herding instinct is much less than it was 100-150 years ago. Although herding behavior is difficult to replicate in the truest sense, the action can be duplicated using certain types of livestock management techniques. Reproducing this herd effect is one of many tools Savory describes as being available for managing ecosystem processes.

Bio-Decay Capacity of Natural Environments (Brittleness)

Savory maintains environments can be grouped within two broad categories by identifying the "rate of bio-decay" or "brittleness". The bio-decay capacity of an environment is a function of whether there is sufficient moisture in the soil surface environment to satisfy microbial decay organisms when temperatures are warm enough to support biological activity (Montagne, 1996). Amount and consistency of humidity, precipitation, and temperature regulate decay rate. Savory refers to this as degree of brittleness and rates an environment's brittleness on a scale from one to ten, with one being non-brittle (fast decay) and ten being brittle (slow decay). Depending on where an ecosystem falls on the brittleness scale, different ecological factors apply to its management (Savory, 1988).

A brittle environment would be one in which the humidity is consistently very low and the bio-decay rate very slow. This environment might receive as little as four inches of annual precipitation, but could receive up to 30"-40" and still be brittle. The key is that precipitation, temperature and humidity are inconsistent throughout the year.

Typically in a brittle environment, large bare patches of soil, possibly crusted, exist between plants. Any

plant material remaining from previous seasons growth (standing dead) turns gray and decays slowly, oxidizing in the air. For this organic material to be effectively returned to the soil surface, some form of physical mashing (weight of snow, stepped on by animals or people, driven upon, harrowed, burned, etc.) is required. Otherwise this material will remain primarily in the air above the soil surface, contributing little to the mineral cycle. Varying degrees of brittle environments can exist around the earth.

A non-brittle environment is the opposite of the above. The environment is consistently moist, humid, and often warm. Plant material is quickly and easily broken down and incorporated into the soil by a variety of organisms. Plants grow close together with little bare or exposed soil. Dead plant material (litter) decays quickly, and returns nutrients to the soil. This leaves the soil surface with high amounts of organic matter, a more granular soil structure and no surface crusting. A rain forest is a good example of a non-brittle environment. Varying degrees of non-brittle environments can exist around the earth.

Concept Of (W)holism

Of these four keys, Savory maintains that holism is the most vital in resource management. The notion that all

things are connected is as old as philosophy, but in the 1920's it was given a name, holism (from the Greek *holos*), and a theoretical base by a South African statesman-scholar Jan Christian Smuts (Savory, 1988).

In his 1926 book Holism and Evolution Smuts challenged the old mechanical viewpoint of science and in particular the notion that there could be no more in the *effect* of something than there was in the *cause* of something. Smuts came to see the world as not substance but flexible, changing patterns. "If you take patterns as the ultimate structure of world, if it is arrangements and not stuff that make up the world" said Smuts, "the new concept leads you to the concept of wholes. Wholes have no stuff, they are arrangements. Science has come round to view that the world consists of patterns, and I construe that to be that the world consists of wholes" (Smuts, 1926).

Savory maintains two points must be considered when managing holistically. First, management must look outward from the standpoint of particular wholes and goals in order to see and understand the pattern and meaning of details. Approaching matters from the other direction, from the specialized study of the details in isolation, leads to confusion because the "parts" have no meaning except in

relationship to the whole, which can never be seen from the perspective of the disciplines.

Second, to manage wholes at any level, people must define them in terms that relate their work properly to the greater and lesser wholes that make up our universe. This is possible because the basic principles governing the ecosystem are universal and equally relevant at all levels (Savory, 1988).

The Time Dimension in Soil, Plant, and Animal Relationships

The importance of the time dimension in environments where large herbivores played a major functional role was not recognized until recently (Savory, 1978; Voisin, 1961). Brief periods of grazing use by herbivores followed by rest from grazing appear necessary for maximum sustained production (Sindelar et al., 1995). For example, the bison and elk herds living and migrating across the Western Great Plains remained together. They grazed, watered, and bedded for the most part in mass. They were frequently on the move, seeking fresh feed and/or moving away from predators. Often, extended periods of time would pass before they would migrate back through a previously grazed area.

Savory incorporated his observations in southern Africa with work from the French researcher Andre' Voisin who had

realized "time" was the key factor in proper grass management. Voisin devoted his research to analyzing plant response to grazing. He concluded that managing the actual *rest period between grazings* (recovery time) and the *amount of forage removed* were the critical links to plant health, vigor and production (Voisin, 1961).

This discovery conflicted with western thinking. In the United States and Canada, range management theories were founded on the principle of controlling the *number of animals* in a pasture and *deferment of early use*, as the key to maintaining optimal range vigor (Heady, 1978. Stottart et al., 1975). The concept of rest period between grazings (recovery time) was not considered.

Time Control Grazing

The idea behind time control grazing is to replicate the grazing use that plants evolved to thrive on; quick periods of grazing (sometimes severe, sometimes light) followed by long periods of rest. Grass needs the stimulation of grazing to remain healthy and productive. Over long periods of time without this stimulation, these plants can become over-rested and decadent. When a grass plant is grazed, many things take place within its system. For a plant to recover from grazing, it must sacrifice stored

energy reserves within its root system to push out new leaves. Once the new leaves are exposed to sunlight and photosynthesis begins, replenishment or "recharge" is initiated for the root reserves. Depending on the time of growing season, this recovery process can range from three to twelve weeks, or more. During fast growth, and depending on grazing severity, some grass plants can recover in as little as fifteen days while during mid summer they might require sixty to ninety days of rest. If they are grazed during the dormant period, little regrowth will take place until spring growth reoccurs.

Furthermore, the rest period is dependent upon how much forage is removed (severity of grazing) from the plant when it is grazed. If the plant is grazed lightly (most of the plant is left), then few root reserves are required to push new leaves out, leading to a faster recovery time. If however, the plant is grazed severely (most of the plant is removed) then large quantities of stored reserves must be sacrificed to create and push out new leaves. An example might clarify this. Envision two green needle grass plants next to each other during fast growth. If one is grazed severely and one lightly the lightly grazed plant could possibly be ready for another grazing in as little as fifteen days, while the severely grazed plant might require