Hello There!

It has been over a year since the last newsletter went out—it’s been a busy time!

The last year has seen our projects move along. The monitoring has been going along well. Information and follow-up on the Grasspatch, the Baker Burn and the Grassbanker’s home ranches continues to come in. After 3 years of work and waiting for the right conditions, the Maverick Burn went off well. The frog project and the jaguar sighting have continued to keep us very busy.

We have two new members of the Board of Directors following the March annual meeting. Matt Magoffin and Warner Glenn are now board members. Past board members, Tom Peterson and Ross Humphreys, have continued to be involved and we appreciate their support as advisors.

We want to thank all of the people who have visited the projects, supported us with donations, and those that have inquired for information. We appreciate your interest financial support and the letters you send.

The MBG office continues to be in the Malpai Ranch house, sharing space with the ranch and the Glenn’s personal office. The need for database storage, fireproof file cabinets, room for more than one person to work at one time, and all the MBG office work and equipment in it’s own separate area has shown us that our present quarters in a ranch bedroom are too small. We have made the commitment to eliminate the congestion and build an office/meeting room. We are now in the planning stages for this undertaking.

We appreciate everyone who has helped here with the office work. Mary McDonald, Sarah McDonald, Kelly Glenn-Kimbro and Lisa Schneidt working in the office has made it possible for us to move forward. A big thank you goes out to all others that have helped in any way.

Wendy Glenn, Coordinator

THE MEETINGS

Board Meetings are held bimonthly, with the board members and advisors taking care of business. Greater Board meetings include the science board, committee members, agency cooperators, and guests. Public meetings have been held involving beef marketing, and other programs. In January, in Rodeo, New Mexico, the meeting featured a program by Dr. Jim Brown, showing the effects of rats and mice on grasslands.

Dr. Brown has maintained a project near Portal, Arizona since 1977 that studies these effects in large enclosures and exclosures. His work documents a threefold increase in woody perennial shrubs. This increase is identical inside the plots where cattle are excluded and outside where cattle graze.

Dr. Brown is an ecologist at the University of New Mexico, a member of the MBG Science Advisory Board, and is currently president of the Ecological Society of America.

THE PROJECTS

Grassbanks

There have been many inquiries about the MBG grassbanking concept. It is a new way to improve rangeland without selling off the base cow herd, and to rest an entire ranch from grazing.

Update: The grassbank is in it’s third year. Three of the ranchers are preparing to go off of the pasture on the Gray Ranch and return their cattle to the rested pastures on their home ranches. Some of the ranchers have new water improvements and fences that they, the MBG, and some agencies have cost shared.

Where it has rained, the landscape looks good.

Ranchers’ Endangered Species Program

Update: Frogs

This year, the project to protect and propagate the Chiricahua Leopard Frog continues with the addition of classroom aquariums at the high school where Hans Bodenhamer, a teacher in the Douglas High School has worked the frog project into the activities of the
Douglas High School Environmental Club. At the existing Magoffin wetland project, a new well, pipeline, drinkers and ponds have been installed. The Arizona Game and Fish Department (AZGFD), the MBG, and USDA Consolidated Farm Service Agency helped the Magoffins with the project. The Magoffin family did most of the labor and built a beautiful pond to supplement the water from rain runoff. (No rain runoff yet) (More about Frogs on page 11)

Dr. Cecil Schwalbe and Phil Rosen from the U. of Arizona are working with other local ranchers to census additional frog populations and locations. If potential frog habitat areas are surveyed and appropriate conservation actions are implemented in some areas, the U.S. Fish and Wildlife Service (USFWS) has indicated they would consider exempting portions of the range of the of the Chiricahua leopard frog from federal listing

Update: Jaguar

A new endangered species on the list is the Mexican jaguar. Since the sighting last year in the MBG area, the jaguar has been listed federally as endangered in the U.S. This came as a result of several lawsuits that have been filed through the last 6 years.

A court decision in March of 1997 required the USFWS to make the decision as to whether or not to list the big cat in the U.S. It has been listed in Mexico, Central America, and South America for years. The Service chose to list but not to declare critical habitat for the jaguar. The habitat that the jaguar is using in the U.S. is not critical for the survival of the species. The intermittent use of U.S. territory by jaguars has been going on since records have been kept in the late 1800's. There has been no resident population found here at this time.

The MBG had hoped that the Arizona and New Mexico Game and Fish Departments' Conservation Agreement for the jaguar would be the way the jaguar would be protected in the U.S. We worked hard to keep it from being listed federally, thinking that local support would be a better way to protect the animal. Cooperation among all the agencies and private parties involved has been very positive. The work and information in the conservation agreement will be available to the USFWS, for their future planning.

Research: Jaguar

Alan Rabinowitz, Director of Science, Wildlife Conservation Society, International Programs, Bronx Zoo, Bronx, New York, came to Arizona to survey the jaguar situation here in the MBG area. He had been in Sonora, and the area near Tucson where another jaguar was sighted and photographed in August 1996.

Involved residents were very impressed with his professionalism. We learned a lot about jaguars, their habitat and the relationship of the ESA to the jaguar. Alan's report is available from the AZGFD, Non-Game Division and the MBG office.

There are some jaguar research projects also going forward in Mexico at this time. This is important, since the jaguar lives there and only visits here occasionally. Without more research and understanding of the jaguar in Mexico, we have no way of knowing where they are coming from, where they are going, and why.

More Research: Several "trip cameras" supplied by the Arizona Game and Fish Department and maintained by MBG area residents are being used to monitor wildlife in the canyons used by the jaguar. So far, there have been photos of fox, mountain lions, javelina, skunks, coati mundi, bobcat and turkeys. There are trip cameras set up near Tucson, also, where the other jaguar was photographed.

Update: Jaguar Fund

The MBG Jaguar Fund is growing from donations and a portion of the proceeds from the jaguar book, Eyes of Fire, by Warner Glenn.

The fund will be used to compensate livestock owners for confirmed predation by jaguars, to protect the habitat of jaguars and other native mammals, and toward other wildlife projects.

More information about the fund and the book is available from the MBG office.
Fire Plan and Prescription

Update: Maverick Burn

According to Larry Allen, USFS, "The Maverick Burn was our second attempt to use prescribed fire to restore the vegetation on the Peloncillo Mountains. Like the Baker Burn, this was a tremendous success and all objectives were met or exceeded. By using what we learned on the previous project we were able to cut the costs almost in half and we remain optimistic that we can continue to use fire as a very economical tool. The cooperation with other agencies and the Malpai Group was fantastic."

In the Peloncillo Mountains in southern Arizona and New Mexico, the Maverick Burn began June 23, 1997 at 9:00 AM after being postponed from the summer of 1996. Ignition was completed by the evening of June 25, 1997 at 5:00 PM. The fire was monitored and managed through July 5th, at which time it became necessary to "mop it up and put it to bed."

Objectives of the fire were met, all slop-overs were ecologically beneficial, even though at times they required direct attention to respect neighbors' wishes, and to be sensitive to administrative constraints. In Cottonwood Basin, Cowboy Flats, Estes, Wood and Sycamore Canyons a total of 12,506 acres were treated, with 7,200 acres (58%) actually burned. The project cost approximately $40,000. to implement, which equals $3.20 per treated acre. The project included treating 3,520 acres (28% of the total treated acres) of state and private land, of which 1,080 acres were actually burned. The MBG cost shared the project with the US Forest Service.

The areas have since had some rains which have made lots of grass. The last rain in October, was especially hard, with lots of hail. This did considerable damage to the pastive growth. In time, the benefits of the moisture from this will overcome the short term damage that was done.

Update: Fire Map

The 1997 fire map went out to the participants and the agencies in April. There are 26 ranches that are participating. The map helps the neighbors and agencies to be able to see how the individual rancher wants to manage fire on his property if a fire breaks out. It has been a help to the ranchers to be able to make their own choices and have access to this information. There have been very few natural fires this season in the MBG area.

Brush Removal, Seeding, & Restoration

The brush removal projects are being monitored for all sorts of information. The lack of rain has not helped in some areas, but there is still substantial grass growing and birds, mice, rats, deer and other wildlife are doing well in the project areas.

Science and Research

The MBG Science Advisory Committee, working with agencies has developed a uniform monitoring procedure so all the work done is in the same format. Normally there is confusion as several formats can be used in science based studies. By monitoring the area using the same format, all information is relative and can be used in any of our programs.

Update: Monitoring

Monitoring on the grasslands, ranches and additional projects continues. The ranchers are finding the scientists are interesting and hard working people. Work is ongoing by Carl Edminster of the Rocky Mountain Forest and Range Experiment Station, on several plots. The work had been delayed at times due to weather and paperwork demands. The archaeological and environmental assessments have been completed and the projects are moving forward.

Update: Easements

On the ranches with easements held by the MBG, Sam Smith has completed compilation of all monitoring information into one report for each easement for the use of the individual rancher and for the MBG. Often in the past, when research has been done in the ranching community, the rancher has no knowledge or easy access to the information from his own ranch. This has caused some of the misunderstanding between the landowners and lessors and the scientists. We have found that working together has enlightened all of the involved parties.
Because rodents play such a major role as primary seed consumers and dispersers they may have serious impacts on the success of grassland restoration efforts. Most of the rodents in this region are either entirely granivorous (seed-eaters) or consume some seeds as part of their diet. This seed consumption may have masked effects on re-seeding efforts. Kangaroo rats not only consume grass seeds, they also gather and cache mesquite seeds in their burrows. Not all of these cached seeds are recovered and consumed, therefore kangaroo rats may aid mesquite seed dispersal and germination. Furthermore, it may be possible to use some species as indicators of grassland quality. For instance the northern pygmy mouse (Baiomys taylori) and cotton rats (Sigmodon spp.) are grassland-dependent and are generally only found in areas with substantial grass cover. Whereas, Merriam’s kangaroo rats (Dipodomys merriami) prefer areas with open ground, scattered shrubs, and minimal grass cover. It may be necessary to incorporate rodent monitoring into restoration projects if management objectives are to be realized.

1. List of species captured
   1. Merriam’s kangaroo rat (Dipodomys merriami)
   2. Ord’s kangaroo rat (Dipodomys ordii)
   3. Banner-tailed kangaroo rat (Dipodomys spectabilis)
   4. Bailey’s pocket mouse (Cleithrodes baileyi)
   5. Desert pocket mouse (Chaetodipus penicillatus)
   6. Rock pocket mouse (Chaetodipus intermedius)
   7. Silky pocket mouse (Perognathus flavus)
   8. Hispid pocket mouse (Perognathus hispidus)
   9. White-footed mouse (Peromyscus leucopus)
   10. Deer mouse (Peromyscus maniculatus)
   11. Cactus mouse (Peromyscus eremicus)
   12. Northern grasshopper mouse (Onychomys leucogaster)
   13. Southern grasshopper mouse (Onychomys torridus)
   14. Western harvest mouse (Reithrodonotomys megalotis)
   15. Fulvous harvest mouse (Reithrodonotomys fulvescens)
   16. Northern pygmy mouse (Baiomys taylori)
   17. Yellow-nosed cotton rat (Sigmodon ochrognathus)
19. White-tailed woodrat (Neotoma albigula)
20. Spotted ground squirrel (Spermophilus spilosoma)
21. Harris' antelope squirrel
   (Ammospermophilus harrissi)
   * Also trapped the fulvous cotton rat (Sigmodon
   hispidus) on SBNWR, but that was not included in
   the mechanical brush-control study.
   ** Other species known to inhabit the area include:
   - Mearns' grasshopper mouse (Onychomys arenicola
     Mearns)
   - House mouse (Mus musculus)
   - Brush mouse (Peromyscus boylii)
   - Plains harvest mouse (Reithrodontomys montanus)
   - Bottia's pocket gopher (Thomomys bottae)
   - Round-tailed ground squirrel (Spermophilus
     tereticaudus)

Chris Fitzgerald was born in Rochester, New York. He received a BS in Natural Resources at Cornell University and is working on an MS in Wildlife and Fisheries Sciences at the University of Arizona. He plans to pursue a Ph.D. in wildlife ecology or zoology after completing his work at U of A. He is primarily focused on mammalian ecology and conservation, but is interested in all facets of applied and theoretical ecology.

More Science

On the Maverick Burn, Andrew Holycross has been doing herpetology work, and has reported that the Arizona Game and Fish Dept. camp in the Pilotillas was burglarized. Taken were 2 rattlesnakes. There is a reward offered for information that leads to recovery of these snakes.

Rattlesnakes were captured, and 12 were fitted with tiny transmitters inserted under the skin, then released where they were found. When the Maverick burn was over, they found that 1 rock rattlesnake was burned in a hot spot in the burn. The other 11 rattlesnakes had made it just fine. The monitoring is continuing. More snakes have been found in the old burn area than where there have not been burns.

Beef Marketing

The beef marketing project has been moving forward with some information gathering. Reese Wooding and his beef marketing committee, consisting of Ben and Crystal Brown, Ed Roos, Seth Hadley, Mary Winkler and Anna Maupin have coordinated a beef marketing project. The 11 ranchers that decided to take part in the program have sent some of their calves to a feed lot in Texas. There are 69 steers in 2 pens they went in May and will come out of the feedlot in October and November. The participating ranchers will have individual carcass information for each of the steers. A control group of steers is grazing on local grass. We have had no death losses in the steers at the feed lot. Lightning has taken two of the control group.

After the initial committee planning, and implementation of the project, Reese has kept everyone informed with the progress in the feedlot. Reese has traveled to the feedlot to see the cattle and he reports back to the group monthly. He just returned from the packer with statistics on how the first lot that was slaughtered did. The Cattlemen's Carcass Data Service at West Texas A&M University collected the carcass data for us. Most of us have not had a chance to see our cattle do after they leave the ranch. With this project, we will find out.

THE AWARDS

Since the last newsletter, the MBG and some of the board have received additional recognition, and awards.

1996
   Society for Conservation Biology
   Distinguished Achievement Award

1997
   U.S. Forest Service
   National Rural Community Assistance Award

Southwest Parks and Monuments Association
   Emil Haury Award awarded to Ray Turner in recognition of outstanding contribution to scientific research in the national parks and monuments of the Southwest.
COMMUNICATIONS AND PRESS
We have been fortunate to have many people in the media cover the group and Warner Glenn’s jaguar sighting. We have been featured in several magazines and newspapers. Some of them are listed below. We thank the writers and editors of most of these articles for working closely with us and checking facts with us before publication. Some of the writers have waited for months to be able to come to the Borderlands to do their story on our schedule. We thank them for their patience.

COWBOY MAGAZINE

RANGE MAGAZINE
Summer 1995, page 14, "From Adversaries To Allies:" about the Animas Foundation, the MBG & The Nature Conservancy.
Winter 1996, page 6, "Crossing Borders"

AUDUBON MAGAZINE
September-October 1995 Cover story, page 35, "Good News In The Bad Lands"
September-October 1997 Notebook, "El Tigre Comes North"

NATURE CONSERVANCY
July-August 1995, cover story, page 16, "New Ways in the Old West"
September-October, i997, page 24, "The Naked Frog": the Magoffins and the frogs on page 26

LIVESTOCK MARKET DIGEST
November 13 through 19th, 1995 Cover article, page 1, "A Change For The Better"

UNESCO COURIER
November 1995, page 38, "America's New Breed of Rancher"

ENDANGERED SPECIES BULLETIN

FARM JOURNAL
January 1996, page 24, "Ranchers to the Rescue"

THE NEW YORK TIMES
September 24, 1996, Science Times Section page B1, B7, B8 "Ranchers Ride to the Defense of Mountaintop 'Sky Islands'"

SMITHSONIAN MAGAZINE
June 1997, Cover story, page 50, "Ranchers Form a Radical Center to Protect Wide Open Spaces"

SOCIETY FOR CONSERVATION BIOLOGY NEWSLETTER

ARIZONA WILDLIFE VIEWS
June 1997 page 4, "Badlands-Good People"

WILDLIFE CONSERVATION
October 1997, page 24, "Home On The Range"

WHOLE EARTH
NO. 90, Summer 1997, page 70, "Co-Evolution of Ranching and Conservation Communities"

TELEVISION
1995-96 PBS The Desert Speaks programs
1996-PBS The Jim Lehrer News Show
1997-CBS Morning Show

WE GET LETTERS:
These are excerpts from letters we have received:
"Although we have been in Cochise County only since 1983, our plans to retire here date back to the early the early '70s. It is folks like you, your life in Cochise County, and your obvious love for the land and your way of life here that makes me proud to now call Arizona my home. Having seen the many extreme sides during my tour on the Planning and Zoning Commission, I have come to embrace the moderate view. Our American traditions of hard work, the free enterprise system, and awareness of our natural resources lead me to conclude that: 1. The resources have sustained us for 200 + years. 2. The resources are
becoming stressed, to a degree; 3. We are smart enough to know that to continue for another 200 years we must strike a balance. 4. That balance is: Preserve our logging, mining, forestry, cattle growing (etc.) industries, while acknowledging the effect on the resources - and, take action to balance it.

You can be proud of the work you are doing with the Malpai Borderlands Group. In these days if conflicting interests (developers vs. environmentalists vs. livestock growers, etc.), it's great to see folks working toward the middle ground. Folks from all persuasions can live together, I'm sure.

(T. C. - Arizona)

I know it's been tough ranching the last few years, but it will get better again. The large private holdings protect vast acreage from development ensuring many critters a home. To know of jaguars roaming border regions again proves most Americans are good land stewards and ethical hunters.

(T. S. - Colorado)

(The MBG) is a strong success story and a reminder of all of the people that are essential to conservation efforts.* (E. F. - California)

"Thank you for all you are doing both for the ranchers and wildlife in Southeast Arizona."

(D. B. - Washington DC)

"I appreciate your attitude towards wildlife-livestock and ecosystems. I know through 30 years of experience in Arizona, New Mexico, and Nevada that livestock grazing and wildlife can exist together. It can and is being done in many places. I have designed some of these systems myself. Your enlightened attitude is refreshing these days.

(D. & C. S. - Arizona)

"I think what you are doing on behalf of the Malpai Group, to preserve land and a way of life on the land, is absolutely heroic. It's an inspiration, and I thank you for your great work."

(S. McC. - California)

"The pictures (of the jaguar) just gave me goosebumps, thinking that a wild jaguar can roam in the United States. It gives us hope for the land, and it is the land that gives meaning, value and quality to our lives. Congratulations on the jaguar sightings and the photographs. The presence of this animal speaks well for the way this region is being managed."

(M. B. - Virginia)

This came out of the Rural Life Chairman newsletter by Rev. Norm White. (author unknown)

A Lesson from the Geese

As each bird flaps its wings, it creates an 'uplift' for the bird following. By flying in a "V" formation, the whole flock adds 71 per cent flying range than if each bird flew alone.

Lesson: People who share a common direction and sense of community can get where they are going quicker and easier because they are traveling on the thrust of one another.

Whenever a goose falls out of formation, it suddenly feels the drag and resistance of trying to fly alone, and quickly gets back into formation to take advantage of the 'lifting power' of the bird immediately in front.

Lesson: If we have as much sense as a goose, we will stay in formation with those who are headed where we want to go.

When the lead goose gets tired, it rotates back into the formation and another goose flies at the point position.

Lesson: It pays to take turns doing the hard tasks, and sharing leadership - with people, as with geese, interdependent with each other.

The geese in formation honk from behind to encourage those up front to keep up their speed.

Lesson: We need to make sure our honking from behind is encouraging - not something less helpful.

When a goose gets sick or wounded or shot down, two geese drop out of formation and follow him down to help and protect him. They stay with him until he is either able to fly again or dies. Then they launch out on their own, with another formation, or catch up with the flock.

Lesson: If we have as much sense as the geese, we'll stand by each other like that!
THE GIFTS:
The MBG thanks the following for their help and gifts which are sincerely appreciated by all of us!

We continue to use the GMC truck that was donated by General Motors. It has been a great convenience to the MBG to have this pickup.

The Printing Corner, in El Paso, owners George and Vicki Drennan have helped on every printing project, donating the time that is involved in printing our materials and supplies. They also donate, or secure donations of paper for some of the orders they do for us. If there is a big order of material for the MBG, they drive from El Paso and deliver it personally, at no charge.

Jay Dusard has donated time, taken photos and donated his photographs for the use of the group, including the MBG Working Wilderness poster that the Drennans have printed for us to use as a fund raiser. These are a beautiful limited edition signed and numbered photographs of open space grassland in the MBG area.

Sanset Graphics donated the laser doutine separations for the poster.
There are some limited edition Working Wilderness posters available at the MBG office. They are $20.00 each plus $5.00 for shipping and handling. The money goes to the MBG for general expenses.
THE FOUNDATIONS:
The foundations are very important to us. From the first grant to the latest, we thank them for their help. Several of the foundation officers have come to visit our project. We could not accomplish what we have without these very supportive grants. For us, they add a new perspective to the word generosity. They are:

Animas Foundation
Arizona Cattlegrowers Foundation
Liz Claiborne/Art Ortenberg Foundation
Clark Family Foundation
General Motors Corporation
Hewlett Foundation
Mildred Andrews Fund
McCune Foundation
Meriah Fund Inc.
National Cattlemen's Association
National Fish & Wildlife Foundation
Orvis Company
Orvis-Perkins Foundation
Public Lands Council
Thaw Charitable Trust
Tides Foundation
Wallace Genetic Foundation
Nadalyin Conway Trust

THE VISITORS:
We have had many visitors come look at our projects, discuss our goals and find out for themselves what we are doing. This is very time consuming for the ranchers and advisors but we are glad to do it when we can. Many of the ranchers have given time to show these visitors the projects on their places.

There have been "Rides on the Mountain" with agency personnel, guests, writers, conservationists and other interested parties from all over the U.S. These rides show the open landscape, the fire results and area wildlife, and give the overall picture in a way that talking about it never could.

Occasionally, we have been able to fly interested people over the project areas also.

THE COOPERATORS
Private Sector:
Cooperating ranchers in Arizona, New Mexico, and Mexico.
Other private interested individuals.
Public Sector:
U.S. Department of Agriculture:
Forest Service, Coronado National Forest
Forest Service, Rocky Mountain Forest and Range
Experiment Station
Natural Resource Conservation Service,
Arizona and New Mexico
Nidahgo Soil and Water Conservation District
Whitewater Draw Natural Resource Conservation District
U.S. Department of Interior:
Bureau of Land Management, Las Cruces and Safford Districts
Fish and Wildlife Service
Ecological Services, Fish and Wildlife Service
New Mexico State Land Department
Arizona State Land Department
University of Arizona's Desert Laboratory
University of New Mexico
New Mexico State University
New Mexico Department of Game and Fish
Arizona Game and Fish Department
Non-Profit Organizations:
The Animas Foundation
The Nature Conservancy

SPEECHES AND CONFERENCES
Several people involved with MBG have been invited to talk to different groups and conferences. Whenever possible, one of our representatives goes and takes part. Because of the tight schedule many of us have with ranch work, family business jobs, and visitors here in the borderlands, we regret we are not able to accept all the invitations. We are glad to go whenever possible.

"The mind is a wonderful thing, it starts working the minute you're born and never stops until you get up to speak in public." (Rocoxoe Drum mond)
A student from The Baldwin School, in Pennsylvania, came to visit the MBG and Malpai Ranch as an intern for her high school senior project. She wrote a letter about her feelings regarding what she observed. Since these are often expressed in various communications to the group, we felt we should share her letter.

"Firstly, I want to thank you for having me stay in your home and work as an intern on your ranch. I had a wonderful time, particularly because Malpai Ranch is not a normal ranch, but rather the hub of an intricate operation. When I arrived there, I was not sure of what to expect. I think I thought that this would be the stereotypical ranch that is always seen in movies and on TV. Instead I found that, besides being a successful ranching operation, there is also a huge conservation effort taking place. I was amazed at the rate of success you've had and the amount of publicity that has followed. The Malpai Borderlands Group is a wonderful example of people, who historically disagree, setting their differences aside to achieve common goals.

I was amazed at the amount of work that is devoted to these conservation projects. I watched each of the work for hours on projects such as land burns and the jaguar fund to better the projects. I was horrified to see that often when a rancher finds an endangered species on their ranch, they often do not report it for fear of losing their ranch. - And nobody can blame them - It is a shame that people don't realize that ranching is part of the land and is not responsible for the degradation of it's surroundings. I commend Warrer for reporting the jaguar he so beautifully caught on film. I also commended the MBG for doing all in it's power to help conserve the jaguar's habitat, but also to help conserve the ranches near the jaguar sightings. It is important that the government realize that cohabitation is not impossible. The fact that a jaguar was seen can only show that the ranchers must be doing something right.

I also would like to comment on the level of government involvement versus their knowledge of the area and it's habitat. It is my belief that the government tends to make judgments and pass legislation on lands and areas that they know relatively little about. I think that it is necessary for the officials that are making these laws to visit the land that the laws are affecting. I think that they need to realize that ranching is an American institution and that IT needs to be preserved. The wildlife has obviously survived with the ranches. Perhaps they only survived because ranchers provide water for them in those dry areas. Otherwise, there would be no water. The government needs to take notice of the fact that ranches help rather than hurt their environment and make it possible for animals to live there.

Thanks again for having me. I've had a truly enlightening experience and I hope that you and the MBG see more success.

Shanna Brownstein, Philadelphia, PA

Tadpoles and Teenagers: Partner in Metamorphosis - A Reluctant Induction
by Hans Bodenheimer (written in July, 1997 for the MBG)

When Matt Magoffin first approached me in March of 1995 with the idea of having my students at Douglas High School (DHS) raise Chiricahua Leopard Frogs, a sensitive species which is currently being considered for listing as an Endangered Species, I was a little reluctant. To me, the combination of teenagers and tadpoles seemed unproductive and possibly disastrous. All teenagers, as a matter of simple observation, are at least rambunctious. My students have been observed in this state. In fact, since I only teach freshman remedial science classes, it might not be too unfair to describe many of my students as "wild." The picture Matt suggested of my students nurturing these seemingly delicate frogs from eggs to metamorphosis, while also making detailed scientific observations, seemed obscure.

However, Matt was persuasive so I told him I'd see if the Environmental Club at the High School might be interested.

As it turned out, the sponsor of the Environmental Club was retiring the next year, and she was very interested in the frog project, especially if I were willing to become the new sponsor. That summer I made contact with Pat Collins and Mike Strel, herpetologists with the Arizona Fish and Game Department (AGFD). Pat and Miles were excited about the project.
and some of their enthusiasm rubbed off onto me. They actually designed a simple experiment which could be done to determine the effects of diet and temperature on the growth of the tadpoles.

A Whole Year of Practice

When the 95-96 school year began, I explained the project and experiment to the Environmental Club. The Club president at the time was Lucia Bond. This bright and dynamic young lady was able to solicit reduced prices for most of the equipment and supplies needed so that money the club had earned through past year’s fund-raisers was adequate to acquire almost everything needed. Unfortunately, one of the things needed was frog eggs, and 1995 wasn’t particularly productive year for the Chiricahua Leopard Frogs in the borderlands near Douglas. The club had to settle for using non-native frogs that died within a few weeks after hatching.

Reorganizing the Second Attempt

During the summer of 1996, Pat Collins and I met several times to discuss possibilities of continuing the Douglas High School frog project. Near the end of the summer, Kevin Cobble, Matt Magoffin, and Tony Velasco from the U.S. Fish and Wildlife Service, (USFWS), San Bernardino National Wildlife Refuge, (SBNWR), joined in our meetings. They agreed to offer additional advice and some support for the project. Tony volunteered to deliver untreated well water from the refuge on a weekly basis. Matt was particularly confident that it would be possible to acquire eggs early in the year. and Kevin Cobble offered to doate some funding and supplies. Also that summer I decided to recruit a few of my “wild” students as participants.

When the 96-97 school year began the Environmental Club underwent some reorganization. Heidi Aquino was elected the new president to replace Lucia Bond who had graduated. The club was also joined by three of my students who had recruited as teacher’s aides. These students were Baulio Valencia, Adam Garcia and Jeff Scribner. It is interesting to note the mix of students that were brought together at this time. Adam and Jeff were extremely spirited individuals that had been placed in special education programs for difficulties in academics. Heidi was the valedictorian of her class, very studious and generally quite serious. Brazio was somewhere in the middle of these extremes. To be honest, as the year began, I was a bit concerned about the dynamics of this diverse group.

By the end of August, the Club had cleaned and reset up the aquaria, replaced faulty equipment, and developed data collection sheets and schedules. Everything was going smoothly and my qualms about group dynamics were unfounded. To my surprise the handful of “wild” students I had injected into the club had actually assumed a considerable amount of responsibility. They were planning far into the year and had by far the most enthusiasm for the project. The only thing lacking was frog eggs.

Eggs at Last

A month passed and I was beginning to get concerned that the frogs might have another bad year. I actually suggested we raise local bullfrogs as another practice exercise so that the club and my students would not be too disappointed, but the folks at the USFWS and the AGFD suggested patience. In early October, Matt Magoffin called up with a report of egg masses in a small stock tank on his ranch. On October 11, 1996, a small group of club members, students from my class, Anna Magoffin and I visited the stock tank. As directed, the club collected approximately 180 eggs from three separate egg masses. The bulk of each mass was left undisturbed and, as evidenced by the copious quantities of tadpoles, there had already been a fair number of egg masses which had ripened before our arrival. Back at the classroom all of the frog eggs were placed into one tank. Within 3 days all of the collected eggs hatched. The hatchlings were left in the single tank for yet another week so that they could feed off the egg cases and gradually adjust to their surroundings. After a week the students distributed the tadpoles into the 12 aquaria. It was originally suggested about 10 tadpoles be placed in each aquarium. However, since there were a surplus of tadpoles, the students decided to establish a few aquaria which were crowded. The students placed approximately 10 tadpoles in eight of the aquaria and about 25 in the four remaining aquaria. One of the crowded aquaria was heated to about 80°F and the others were maintained at room temperature which
was about 70°F. At the time of distribution all tadpoles measured about 84 mm in length.

A Presentation and A Promise

For the next two months the club developed a routine of daily feeding and tank cleaning. This task primarily fell on those three students who I roped into being teacher’s aides. Much to my surprise, students rapidly increased in their efficiency. They also were the first to notice that crowding had a greater effect on tadpole growth and mortality than did temperature or diet. This was somewhat unexpected since most of the literature I had read suggested temperature to be a more important factor. In a conversation concerning these results, Tony Velasco of the USFWS suggested to me that my students formally present the results of their work to the “Declining Amphibian Task Force”. This group of wildlife biologists, ranchers and public land managers holds an annual meeting to develop ideas on how to conserve amphibians throughout the western U.S.

Although my students had become very responsible in their care of the tadpoles, I was a little nervous about their being able to present their data to such a formidable group. I actually requested that Heidi Aquino, the club president, present the data. Heidi was very busy with other clubs and classes, and was unable to generate the needed background information. However, she did agree to do the actual presentation. Brandi, Jeff and Adam took it upon themselves to generate all of the tables, graphs and photos needed for the presentation. Jeff and Adam were particularly amazing at this task since in their special education classes they had limited experience with this type of computer work.

On January 9, 1997, Heidi, Adam, Jeff, and I drove to Albuquerque with Karen French, a biology teacher at the high school. The high school paid for travel and the USFWS advanced all four of us funds for food and lodging. The assembled group in Albuquerque consisted of approximately 30 people. The scene was a bit intimidating, but when the time came, Heidi bounded up to the podium and delivered her presentation in outstanding form.

Heidi’s presentation was well received by those present at the meeting. The club received much praise and offers of future support. Also, after the meeting, I received calls from a few teachers who were interested in doing a similar project at their school. However, the most surprising result of the presentation came from Adan who approached me while we were still in Albuquerque and emphatically requested that he be allowed to give the next public talk.

The Creation of a Refuge

Shortly before the presentation in Albuquerque a meeting between the AGFD, USFWS and officials at DHS was held to determine what would happen to the frogs raised at the high school. After some minor debate it was decided that approximately two thirds of the frogs would be returned to Matt Magoffin’s ranch and the remainder could be kept at the school in a specially constructed pond. The pond at the high school would act as a refuge. That is, it would be a separate population which would provide some insurance if something happened to the original population. This idea excited the students. The only catch in this refuge idea was that the new pond had to be constructed before the tadpoles metamorphosed, and no one was sure when that would happen.

Matt Magoffin, volunteered through the USFWS to dig a hole for the new pond using a backhoe. Beyond his labors it was the responsibility of the Club to install plumbing and construct an enclosure around the pond area. This seemed simple enough and Jeff, Braulio and Adan threw themselves into the task. The pond needed to be lined with cement, there were no funds, and it seemed as though time were running out.

An Unlikely Leader and Speaker

I was able to solicit 20 sacks of mortar from the school maintenance department. After a few afternoons of mixing and spreading, it became apparent that the pond would require three to four times that much mortar and that the project needed much more manpower. An emergency meeting of the Environmental Club was called. Club funds were low and many of the members were over-extended with other activities since it was coming closer to the end of the year. At this point it seemed to me that the DHS Frog Refuge may not become a reality. Then much to my amazement Adan showed up one afternoon with about ten sacks of mortar. He actually had solicited
other teachers, family and friends for funds. He also
told me that he had secured permission from Mr.
Miller, a special education teacher at the High School,
to lead a small crew of his fellow special education
students in additional hours of pond work.

About the time Adan started additional work hours
on the pond, the Environmental Club received a re-
quest to talk about the Frog Project in front of the
Parent, Teacher, Student Organization (PTSO). As
promised, Adan was to speak in behalf of the club, but
being a little nervous, Adan asked if Braulio could also
share in the honor. The two students developed their
joint talk over the course of a week of research and
rehearsal. On the night of the PTSO meeting both
arrived early, dressed and groomed untypically neat.
It was obvious that both were very nervous.

After some introduction and formalities, Adan and
Braulio were called to the podium. Adan instantly had
a nervous attack of a giggling, but in relatively quick
order he pulled himself together and began explaining
the project. He then introduced Braulio who went on to
explain some of the experimental results. Adan
finished off with a summary of pond construction
activities and future plans for release of the tadpoles.
After he finished, the applause was thunderous, but he
didn’t hear much of it as he quickly ran out the door
after finishing. Braulio exited shortly afterwards then
later returned and told me Adan felt as if he made a
fool of himself. The next day in a conversation with
Adan he told me that several friends of his now called
him “giggles”. I told him that he probably was a lot
braver than any of them, that I was very proud of him
and that his speech was one of the high points of my
Teaching experiences at Douglas High School.

The End of a Successful Year & Plans for Another

The DHS Frog Pond was up and holding water by
mid-May. After a week of testing to make sure it
would consistently hold water, approximately one
third of the tadpoles were released into this pond. At
that time only a few of the tadpoles had grown rear
legs, but it was decided it would be best to release
them before the students left for summer vacation.
Most of the remainder of the tadpoles were released to
ponds on the Magoffin Ranch and a few were released
into a breeding enclosure on the SBNWR. At the time

of release all tadpoles were greater than 5 centimeters
long. The survival rate from the time the eggs were
collected to the time of release was about 50%.
Although this may seem low, it is a great improvement
over the estimated survival of less than 1% in the wild.
I last visited the pond at DHS on June 11, 1997. I was
able to observe several of the released tadpoles through
breaks in the algal mats. I also noticed one completely
metamorphosed Chiricahua Leopard Frog.

The frog rearing project at DHS was at times
frustrating. However, in the final analysis the results
were very successful in terms of the frogs and near
magical in terms of my students. In the beginning of
the article I mentioned that it was not too unfair to
describe some of my students as “wild”. Affectionately
I still think of some of them in this way, but more
often I consider them as having great potential. There
has been a bit of a metamorphosis in me as I watched
students like Adam Garcia take leadership and
responsibility from a position which seemed unlikely.
For the upcoming 97-98 school year I have proposed
and have had approved, a course in applied biology
which will incorporate the frog project and similar
projects which will have my students work with such
agencies as the U.S. Fish and Wildlife Service,
Arizona Game and Fish Department, U.S. Forest
Service, Bureau of Land Management and others.
Almost everyone I have talked to about the class is
excited, especially a handful of “wild” students who
have already signed up for it.

Biographical Sketch

Hans Bodenheimer has taught science at Douglas High
School for 2 years. He has also taught at junior high
schools on the Navajo Reservation and in Mexico. He
received a bachelor's degree in Civil Engineering from
the University of Arizona and studied Geology at
Northern Arizona University. Prior to starting his
career as a teacher, Hans worked for a few years as an
engineer for the U.S. Geological Survey and the City
of Tucson. Also, prior to the start of his teaching
career, Hans worked numerous seasons with the U.S.
Forest Service and National Park Service developing
conservation programs for caves and wilderness areas.
Our goal is to restore and maintain the natural processes that create and protect a healthy, unfragmented landscape to support a diverse, flourishing community of human, plant and animal life in our Borderlands Region.

Together, we will accomplish this by working to encourage profitable ranching and other traditional livelihoods which will sustain the open space nature of our land for generations to come.

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