Integrating Environmental Restoration With Agroecology, The Future of Madrona Farm

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Abstract

Madrona Farm, an 11.03-hectare farm located in the Blenkinsop Valley in the municipality of Saanich Victoria, B.C., is currently engaged in a project, which integrates ecological restoration with agroecology, with the overall goal of reaching environmental, social and economic sustainability. The project uses crop rotations, cover cropping, intercropping, growing fruit trees, and tending livestock to increase biological diversity. As well, a corridor of native trees has been planted to create habitat, prevent erosion, and act as shade/wind block and possibly a future source of wood. Currently five hectares are under cultivation for vegetable production, which is being marketed at the farm's vegetable stand. The vegetable stand is a place of commerce, social interaction and education. A bulletin board has been posted at the vegetable stand to educate the community about ecologically sound farming practices, upcoming crops, harvest times and recipes.

Acknowledgements

I wish to dedicate this paper to my husband, David, for all the unbelievably hard work he has done and continues to do, to David's grandparents, Ruth and Lawrence, who paved the way to his passion and again to David, for sharing that passion with me and infecting me with farm fever that I just can't seem to shake.

I would especially like to thank my father in-law, Bruce Chambers, for everything he has done for us, including his role as 'indentured laborer'. Without his help, the revitalization of this farm would not have been possible. Thanks to Derek and Russell Chambers for allowing us the great opportunity to live and steward this property.

Thank you to Don Eastman, who has been helping me for three years with this project, who has walked this land with me several times and who has shared his love of nature, wildlife and his expertise with me. Even in his retirement, he continues to help me with this project.

Other people who have been instrumental in helping with this project have been Rob Hagel, who initially gave me the 38 Quercus garryana trees to start the restoration project and Ron Cater, of Saanich municipality, who gave me the vexars. Also thanks to David's Mom and Dad and our loyal customer, Robin Roberts, for helping me edit this paper.

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1.0 Introduction

This project is written to satisfy the requirements necessary to obtain a diploma in the Restoration of Natural Systems program at the University of Victoria. The project site is Madrona Farm, which is located in the Blenkinsop Valley, Victoria, and can be accessed by the private driveway at 4317 Blenkinsop Road. This site is located on the southwest, sloping side of Mount Douglas and borders Little Mount Douglas Park to the north (see map #1). The property is 11.06 hectares in size and falls into the Coastal Douglas-fir biogeoclimatic zone (Klinka et. al., 1979). Currently 5 of the 11.06 hectares are being used for mixed market garden vegetable production. The produce is marketed at a roadside vegetable stand located at the end of the driveway. The remaining hectares are forested with heterogeneous vegetation indicative of the different variations in soil, slope and elevation (Figure #1, Tem mapping exercise).

This piece of land is a rare and beautiful commodity with the influx of urbanization and agricultural land on the decline. Preserving both the ecological integrity and the agricultural productivity of this land will ensure this farm is here for generations to come. The prescribed restoration plan will respect the ecological integrity of the land and align agricultural activities to make this goal possible.

In achieving this mandate, this project will integrate environmental restoration with agroecology. Ecological restoration is a relatively new branch of environmental technology that attempts to heal ecosystems, which have been damaged by human activities at the levels of composition, species and function (Jordan,1987). Agroecology

is the science of applying these ecological concepts to the design and management of sustainable agroecosystems (Gliessman,1998).

1.1 Goals and Objectives:

- Initiating agricultural practices that increase biological diversity at the levels of composition, function and species.
- Introducing environmental restoration techniques to manage invasive species, extend corridors, develop habitat and to remedy some areas that have been degraded by past agricultural activities.
- Enhancing the roadside vegetable stand to provide customers with increased access to the vegetables offered for sale and to continue its neighborhood agora role and place of social interaction.
- Providing public education at the vegetable stand through the use of the bulletin board. The bulletin board will discuss the restoration project and our overall goal of achieving environmental, social and economic sustainability.
- Monitoring will be an important part of this project and will be used to determine whether the objectives are being met.

1.2 Madrona Farm: A Good Candidate For An Agro-Restoration Project

This site is a good candidate for an agro-restoration project for a number of reasons. Much of the Blenkinsop Valley, including Madrona Farm, is located in Saanich in the Agricultural Land Reserve which means, for the moment, this land is protected from urban development. Along Blenkinsop Road, there are many different types of agricultural practices ranging from argotourism and tending

Site Location Map #1

livestock to market garden vegetable stands. Besides Madrona farm, there are approximately eight farm stands operating along Blenkinsop Road**.** The farm, being located in the Blenkinsop valley also has the benefits resulting from the surficial geology. Mount Douglas is a monadnock (that is, an erosion resistant hill) that rose out of the Vancouver volcanics, and when the glaciers carved the valley out, the ocean retreated. Madrona Farm would have then been a marine bay. This is evident on Madrona Farm by the sharp rocks on the side hill and the rounded ones in the back fields. The side hill would have been on the banks and the back fields would have been covered by water (pers Comm. Don Eastman, 2003). The many variations in slopes and soils can be attributed to the surficial geology just mentioned. The soils on Mount Douglas are marine lacustrine and some of the fertility on Madrona Farm can be attributed to the marine sediments (Curran et al, 1980). Mr. Galey's farm, located at the southern end of the Blenkinsop Valley, contains shells, another indicator of this same glacial system and fertility.

The suburban location of Madrona Farm, only 15 minutes from downtown Victoria, is another very positive variable in its potential to reach the community at large, to provide local food to the market and to educate customers regarding ecologically sound farming techniques. According to Gliessman and many other authors, the long-term sustainability of agroecology and agriculture is dependent on three components: environmental, economic and social sustainability. The social conditions of sustainability include equitability, quality of life, satisfaction, efficiency, and cultural stability (Gleissman, 1998). These conditions also combine to produce what Eric Higgs in his article, <u>What is Good Restoration,</u> describe as being necessary for ecological restoration to provide

lasting results and have the potential (Jordan, 1987) to initiate profound societal changes, such as having an effect on one's world view. The favorable location of Madrona farm has the benefit of not only being located in a fertile valley, but also of being close to town, thus having the ability to educate the community at large.

1.3 Background

In 1952, this parcel of land was purchased for $15,000.00, by Lawrence and Ruth Chambers and their three sons. Between the years 1952 and 1982, the farm underwent three different farming phases: cows, vegetables, and hay. The cows were chestnut brown, dual-purpose shorthorns, producing milk and meat, which they supplied to the resident family at 1000 pounds per year. The Chambers also produced all their own hay and had adequate pasture. The hay was loose and not baled; the family recalls one "wettish" summer when the hay in the front field was turned three times by hand.

In 1971, the cows were sold. That same year vegetables were already growing in the fields and sold through the vegetable stand which.was open from 1:00 pm to 9:00 pm. Most of the customers lived in the greater Victoria area. The vegetables were fresh, and customers were known individually. In those days, peas, carrots, sugar peas, green beans, yellow beans, beets, broad beans and lettuces of various kinds were grown. However, the big seller was corn, with a record on Labor Day of 100 dozen cobs of corn. The vegetable stand operated in this manner for eight years. These were happy years for Lawrence Chambers. He had a green thumb. Having grown up as a hungry child during The Depression, he developed an insatiable desire to grow food. However, as Lawrence and Ruth became older, and the vegetable stand became busier, the demands of increasing traffic, staff and wages became too heavy a burden. Once more, the

Chambers entered a new phase of farming. This time it was raising hay. Not wanting to gamble with just one crop variety, they grew alfalfa, orchard grass, rye grass and clover. The alfalfa seed came from the Okanagan. It was definitely the only alfalfa growing in the Blenkinsop Valley, and with the exception of the test plots at the agricultural offices on the East Saanich Road, the only alfalfa grown on the peninsula. The best crop of alfalfa and hay ever harvested was in 1988, and Lawrence was happy (Chambers, 1990). In the years following, the land continued to be hayed by Bruce Chambers, grandson to Ruth Chambers. Ms Chambers then hired Roy Hawes and Don's Tractor service to do the haying and that persisted until 1999.

In 1999, Ruth's grandson, David moved from the Yukon to care for her with his cooking and companionship, and decided to give farming a chance. This was a pivotal time in the history of the farm because it marks the beginning of the restoration of Madrona Farm.

November 26, 2000

PROFILE

ISLANDER

Enthusiasm helps revive family farm

DAVID CHAMBERS stands behind his grandmother Ruth in the gateway to a three-acre portion of the family farm, looking for all the world life a multi-generational rendition of American Gothic.

The farm in the Blenkinsop Valley has been Ruth Chambers's home for the past half-century, but since 1982 — when her husband Lawrence died — things have flipped a little.

IAN DUTTON

"It got to be just a little too much for me," said Chambers, who will turn 90 in December. "My husband did most of the farm work and when he died, well, I made a little money from selling the hay but I didn't do the things I needed to do to make the hay better."

That's where David comes in.

David, 25, Ruth's grandson, grew up in the Yukon where his father — one of Ruth's twin sons — was a senior federal civil servant.

"When I left school me and my buddy both wanted to be farmers and our families said, 'No way.' So instead we did a bunch of snowboarding and travelling and I wound up in Japan building gardens there — it was great."

On his way back home he stopped to visit his grandmother, then headed off to work on the Dempster Highway for a few months to get cash to get the farming started, and returned to Victoria.

In its prime the 27.34-acre farm produced market vegetables that were sold to local grocery stores, meat and fruit sold at the farm gate and enough food and funds for the Chambers to raise their three sons.

David would like to see those days return, and in the almost two years he's been farming, it's come a long way.

"The fields up the back were grown in with blackberries and the front field hadn't been broken up in years. The hay crop in the bottom part hadn't even been cut and I spent the first year just pushing back brush."

Last winter, he put up a fence and had some free-range pigs patrolling the fields on the western slopes running up to Mount Douglas.

"It was kind of a pig tractor," he said, grinning.

"I'd put up an electric fence around about three acres and turn the pigs loose and they'd did up the grass and fertilize it at the same time. I moved the fence about two or three times and then said, to heck with it, and fenced off the whole piece. But they did a great job and then I sold the hogs."

For all his eagerness and willingness to work, David's farming acumen was not exactly up to snuff.

But a valley neighbour took him under his wing, and helped with advice and more.

"When I wanted to get a tractor he took me out and we found a little one. Then I hitched up a single-blade plow to break up that front three acres. It took about five days and then I started he came running after me and told me I was doing it all wrong. He got me straightened out.

This year other neighbours came in with their modern machinery and what a job that would have taken David five days in an hour and a half.

"A lot of people are keen to see the land used and they're willing to help me get started once they saw I was willing to do the work," said David.

An unexpected side benefit for David has been meeting farmers up and down the Island who knew his grandfather.

"I didn't really know him all that well," David said. "But because I'm doing this, a lot of people are telling me they remember him. He was a well-respected man."

For her part, Ruth Chambers is delighted the farm is back as a going concern.

"There's so little arable we need to preserve it and keep it growing things," she said. "We need to educate people about where food comes from."

David said he also made a connection with the local mental health system, where users of mental health services came to the farm and worked with him in the fields.

In exchange, they got to sell the produce they helped raise, he said.

"It's important to connect with the community and this is one way we could do that. It was kind of great that these people were able to follow the growing process from beginning to end."

David said restoring the farm to its former health will be a slow process, even though he works all day every day.

"Granny kind of chastises me for that, but it doesn't seem like work if you love it."

IAN McCAIN PHOTO

David Chambers and his grandmother Ruth Chambers are teaming up to revitalize the Madrona farm in the Blenkinsop Valley.

Picture #1

Although the hay continued to be harvested for fourteen years, the soil was not replenished or nourished. The fields had grown over with *Rubus discolor, Cystisus scoparius and Euphorbia peplus*, the soils were deficient, the tractor accesses had grown over, David owned no farm equipment and had never farmed before. So this agro-restoration project began with many challenges. With the support of David's grandmother, Ruth, and the community of farmers in the Blenkinsop Valley who took David under their wing (namely Roy Hawes and Ray Galey), a farmer was born (see picture #1). In 2002, Ruth Chambers was "satisfied that David had restored the farm to what it had been before and that she had done everything she could to support a young farmer in the most rocky years of a farming career**"** (Chambers, 1990). On January 11,

2002 she died peacefully in her home of fifty years. What a blessing it must have been for her to see her land restored to what it had been before her husband had died!

1.4 Our Philosophy

When David and I started working together as partners, it was our common love of nature that made this possible and what had brought us together in the first place. My background as a treeplanter, various jobs at health food stores, volunteer at The Swan Lake Nature House as assistant naturalist doing interpretative plant walks with children, ten more years as a herbalist focused on plants and plant identification, all sent me off in search of wild places, conservation and of course, ecological restoration. I had learned that agriculture with chemical fertilizers; diversion of waterways, and compaction of soil was bad. When David talked of the frogs singing, picking cloudberries while watching caribou, and climbing mountains on the Dempster Highway in the Yukon, it was love.
In terms of farming together as business partners, parents and friends, we have woven our world views together. David sees a field for its soil
and what he's going to grow there and I see it as bird habitat and try and protect it. The result is integrating ecological restoration with agroecology. However, when there are visitors to the farm and they say "This is a great location for a house", David and I are standing on common ground as we both shudder and whisk them away because we both prefer nature to houses, the urban to the suburban.

I became associated with Madrona Farm in 2003, and I have completed most of my former restoration projects on this property. I have come to know this land intimately and in 2004, I became a steward/resident (as well as David's wife) of this land and in 2005 I started my restoration project. Although I never got to meet David's

grandmother, Ruth, I definitely learned to love her vicariously through the family, her love of plants and our common affiliations with the Victoria Naturalist magazine of which she was one of the early founders. I never actually read the newspaper article shown in this section until I started this paper, but I was especially comforted and inspired to learn that she and I share some of the same environmental ethics.

2.0 Restoration Timeline / Introduction To The Stages

The next section provides a year-by-year account of the important steps that were taken in the beginning of the restoration project. Stages 1-4 are the initial agricultural recovery phase.

- Stage One: 1999-2000, Getting Acquainted With The Land/
  Re-Building The Infrastructure Of The Farm
- Stage Two: 2000-2001, Finding Direction
- Stage Three: 2001-2002, Emphasis On Growing Vegetables And Developing A Market
- Stage Four: 2003-2004, Struggling To Expand. Stage Four introduces the restoration perspective and takes an ecological inventory that outlines the areas that are degraded by past agricultural/land use activities.
- Stages Five To Seven, Integrated Agroecology/Environmental Restoration Phase.

  Stage Five: 2004-2005; How To Be A Farmer And A Boss

  Stage Six: 2005-2006, Integrating Agroecology With Environmental Restoration

  Stage Seven: Putting All We Have Learned Into Practice.

2.1 Stage One, 1999-2000 Summary:

Getting Acquainted With The Land/Re-Building The Infrastructure Of The Farm

When David first arrived at the farm he had very little experience with farming and a great portion of his time was directed towards getting acquainted with the land. During this stage David examined different ways to make a living by experimenting with different livestock and crops. He was trying to grow all his own food and be as close to self-sufficiency as possible. In the beginning, meals consisted of mostly vegetables and then pork from the pigs he raised. He planted trial gardens, tested the soils and experimented with different types of organic inputs. Invasive species management immediately surrounding the house and on two acres began. The old orchard was cleared, pruned and maintained. Apples, plums and blackberries were sold to finance tractor and farm equipment. By the fall of 1999, David had bought his first, small tractor. It took three days to cultivate the front field.

2.1.1 Stage One Results:

- Planted test gardens adjacent to house.
- Cleaned out the barn
- Learned about the history of the farm from Ruth Chambers and Bruce Chambers.
- Cleared overgrown roads.
- Backfields and roads cleared, repaired side of R#3 (see Tem Map in Appendix) main irrigation pond because it was leaking.
- Organic farming course at Camosun with Tina Fraser.
- By fall of 1999 David purchased his first tractor.

- Raised pigs, sold blackberries, green gage plums, cucumbers and apples at a table at the end of the driveway
- Purchased single plow
- All fields tested by Evergrow.
- Front field was cultivated; it took three days to turn with his new tractor (this was under the supervision of Roy Hawes, long-time farmer of this area, his statue is actually on the Blenkinsop Bridge over the Lake).

Picture #2 Roy Hawes, One Of David's Mentors

2.1.2 Stage 1 Pictures Gallery

1999-2000 ~ When David First Arrived At The Farm.

Before

After

First Trial Garden

1999 Land Leased Out

.

Ruth Chambers And Her grandson, David, Depicting Land Use

Front Field Cultivated

Front Field Cultivated, Different Perspective

First vegetable Stand

2.2 Stage 2, 2000-2001 Summary: Finding Direction

In this stage of development, David used all his resources and capital to continue acquiring farm equipment and the inputs necessary to amend the soil. David became part of the horticultural program in which individuals with mental health issues from the Eric Martin Pavilion and Seven Oaks acquired the skills necessary to get back into the work force. David got free labor and these individuals were trained to do a job in a nice farm setting, while earning an income for themselves. In the spring, chicken manure, okara (crushed soybean) and leaf mulch were added to the front fields which were fenced to keep out the deer. The first farm stand was built and vegetables, blackberries and apples were sold. David also sold vegetables to the Eric Martin Pavilion out of the back of his truck. In the backfield hay was grown and harvested. David traded half of that to his neighbor with sheep, in exchange for excavator work. A pond was dug off to the side of the barn for the overflow from the main pond; this however, has since been filled when the municipal line was put in. David continued to work and learn from other farmers, continued with invasive species management, pruning and tending livestock. That fall, the side and upper fields were plowed.

2.2.1 Stage 2 Results:

- Began Horticultural Program
- Front field fenced Front field planted with vegetables
- Fruit trees pruned
- Built first vegetable stand/Sold vegetables as well as out of the back of his pick up truck
- Sold Hay

- Raised pigs, turkeys and meat chickens
- Worked for other farmers
- Cultivated and did invasive species management with Rubus discolor
- Bought hay mower and got all the old irrigation equipment working again
- Plowed side hill and upper field
- Swapped hay for the use of the neighbor's excavator
- Continued to experiment with different types of inputs. Continued with Saanich leaf mulch program. Brought in 18 tons of okara (crushed soybean): the result was it was too labor intensive and the smell was vile
- Covered front field with 172 yards of chicken manure, 200 yards of leaf mulch and 18 tons of okara

2.2.2 Picture Gallery

Front Field Garden

Front Field Being Irrigated

Bruce Chambers Builds Vegetable Stand

Sold Vegetables Out Of Pick-Up Truck

Orchard Covered In Mulch And Okara

David's First Year Of Haying

2.3 Stage Three 2001-2002: Summary

Emphasis On Growing Vegetables And Developing A Market:

At this time, with the results from the first two stages, David felt he had found his niche in growing vegetables. David spend time talking to the customers about the importance of local vegetables. It was at this time that the sign "HOW FAR DOES YOUR FOOD TRAVEL?" was posted at the stand. The sign shows David on his tractor at the end of the driveway with a wide diversity food in the bucket. The implications of this sign best described where David wanted to focus his farming. The pigs, chickens and hay were about to be phased out. David experimented with the wholesale market, growing and selling vegetables to other farmers and leasing land. The drain tiles in the back field were repaired with the help of our neighbour, Ernie's excavator. The rainwater off Mount Douglas now filled the middle pond, R3 (see Hydrology Map in Appendix.) A two inch water main was installed, irrigation pipe and trailer were purchased. The side hill was fenced. David grew cauliflower, watermelon, peppers, zucchini, broccoli, and cabbage in a greenhouse which he built. These were transplanted into the front field, the bottom and sidehills. Peas, beans, beet, artichokes, green onions, Swiss chard, kale, Brussels sprouts and corn were sown directly. David experimented with winter vegetables and later that year purchased a new tractor. This was the stage that placed David in the position to begin to work independently. That summer the customer base increased drastically due to the Mount Douglas road closure and the Blenkinsop Road detour resulting in 30,000 cars passing through the valley daily. The farm stand became known to many people. The regular customer base of about 500 increased to 1,000. This resulted in a shortage of vegetables. Customers started coming. It didn't really matter what we had, as long as we

had something. The Islander, a section in the *Times Colonist*, interviewed David regarding his famous artichoke recipe. The next day at the vegetable stand, it was pandemonium. Selling out at 1:00 P.M. became a norm. Customers could not believe that the beautiful watermelons and cantaloupes could be grown here. Next came the corn. It was a craze: many customers remembered David's granddad's corn, and were driving all the way from Oak Bay, Colwood, Cobble Hill and Duncan. David was thrilled with this popularity, became known as "farmer Dave" and became somewhat of a cultural icon associated with agriculture, good health and recipes. The end result of this year was to increase production and efficiency, to hire employees and to forecast for the upcoming year as much as possible.

2.3.1 Stage Three, Results:

- Results from Stage 1 and Stage 2, meat chickens, pigs and hay (with the exception of trading) proved to be uneconomical so moved into different phase
- Tried to develop wholesale market
- Wholesaled vegetables to Galey Farms. Bob Galey bought the seed and fertilizer and then David sold the vegetables to his market at 50% of wholesale. At the same time David, operated his vegetable stand
- 2 hectares were used for Mr. Galey's potatoes in exchange for the use of his farm equipment and sale of a portion of the potatoes at the vegetable stand
- Experimented with soil and remay on side hill garden
- 2-inch water meter installed this year for irrigation

- Continued horticulture program
- Continued composting Saanich leaf mulch for soil development
- Opened up bottom field
- Old chicken house demolished
- Acquired irrigation pipe and trailer
- Drain tiles
- Built Greenhouse
- Continued to hay, 100% going to neighbor for excavator work

2.3.2 Picture Gallery

Results Of Planting Front Field With Hand Seeder

Horticulture Program

Repairs Made To Barn Roof

10,000 Transplants In Two Days

Upper Field Leased Out For Potatoes

(Lower Field Still Being Hayed By David)

Drain Tiling Upper Field

(See Hydrology Map In Appendix)

Drain Tile

Transplants From Previous Picture

2.4 Stage Four:

2002-2003: Summary Overview: Struggling to Expand

In stage four, David focused on being more efficient in his placement of crops, for the purpose of irrigating and taking advantage of fields that could be worked early in the season. Rather than using the single-row hand seeder, a three-row seeder that ran behind the tractor was used. This allowed the tractor to cultivate and maintain in between the rows, which was important for weed management and increased planting speed. David

used green manuring (tilling in cover crops) or cover crops to protect and develop the soil. Crops were rotated to avoid insect and disease build-up. With expansion, farm business increased. The increased traffic needed to be regulated. At this time, the Mental Health program and volunteers were discontinued and paid staff were employed. A smaller crew of selected employees was needed. The 8.9 hectares of back fields were fenced: no small task. Ernie's excavator dug all the holes for the posts. Ray Galey devised a hydraulic fence roller attachment for his tractor. The fence was rolled out and tacked in place. Another tractor with hooks and bars tensioned it up and nailed it in place, followed by a strand of barbed wire. This has been successful in keeping out the deer and trespassers from the park. The Saanich leaf mulch program was continued, as was the experiments with other cover cropping techniques.

2.4.1 Stage 4, 2002-2003: Struggling To Expand

- Fenced property with seven foot wire fence with barbed top, with the exception of the 1.21 hectare Garry Oak ecosystem and 0.2 hectare deer corridor
- New tractor
- Increased vegetable production to 2.4 hectares
- Experimented with different cover crops
- Started to take more leased land back
- The Saanich leaf mulch program delivered 2400 yards of leaf mulch
- Leaf mulch was spread in the field with the manure spreader
- David hired one part-time and one full-time employee
- Mental health program and volunteers were discontinued

- Bush cutter purchased
- David continued experimenting with buckwheat, rye and sunflower green manure cover cropping
- Started to double crop on highlands to be more efficient with irrigation
- Pushed down old, pole barn
- Fill was brought in to level area below the barn and fill in a previously dug irrigation pond
- Two, 24’ x 16’ equipment storage sheds were purchased from neighbor, moved over and placed in level area below the barn

2.4.2 Picture Gallery

Vegetable Stand Showing Wide Diversity Of Vegetables Sold

Aerial Taken From Back Corner Of Field

Good View Of Vegetables Growing In The Front Field

More Beautiful Vegetables

Daily picking for vegetable stand

Plowing In Covercrop In Front Field

2.5 Introduction To The Restoration Perspective and Ecological Inventory 2004-Present

In 2004, an ecological inventory was taken of the areas of the farm which were degraded by past agricultural activities. I observed that the following areas would benefit from an ecological restoration project. The restoration prescription is

divided into environmental, social and economic sections. This paradigm has been used to reach our overall goal of sustainability.

Environmental Category

Erosion on the backfields. Slowly over time the sands from the soils in the backfields and surrounding areas have been coming down onto the roads. This occurs seasonally with heavy rains. Covercropping is one of the techniques we have used to deal with this problem. When the soil is covered, it is less likely to erode in times of heavy rainfall. Slumping is also evident in areas where the roots of the trees are exposed. In R4, there is an area where the slumping has caused a slide into the pond. This may also be from the disturbance of building up the side-walls when the road was cut out to the irrigation pond in 1955. We decided that the problem at hand with its various possible causes would benefit with fruit trees growing up and down the backfields. We are also collecting the soil and sands that have eroded down the hills and are returning them to the source. The ditches have grown over and need to be re-dug and the roads need to be repaired with road base. (See restoration recommendations.) Two rows of fruit trees were planted as a restoration initiative. In total, 130 trees: 9 apricot trees, 9 cherry tree's, 9 plum, 5 peaches, 98 apple trees.

Fruit Trees

Another View Of The Fruit Trees

More Fruit Trees

- Creation of a corridor that runs north to south through the middle of the farm will help to prevent any future erosion, provide habitat for the many types of bird species, act as a wind break, and provide partial shade which may be a necessary tool in combating global warming. Most importantly, it will create an agroecosystem that closely resembles a natural ecosystem. It may also be a possible source for future wood agroforestry. The corridor had to be done in legs (see restoration map).

The Corridor

Agro-Restoration Project Map #1

- Leg One: March 1, 2003: planting of 38 *Quercus garryana.* The trees were obtained from Rob Hagel at Forestry Canada. Ron Carter from Saanich municipality provided the vexars to avoid any predation from rabbits. Monitoring – The trees were watered once weekly and after 3 years, 19 of the 38 survived. In retrospect, they should have been watered much more frequently, but due to circumstances and time restraints, that was all that was possible.

Leg One

Individual Tree With Vexar

Leg One, Different Perspective

- Leg Two: 2005 Native Christmas tree was planted in the middle of the corridor on January 10, 2004. Summer - July 16, 2005: One native flowering Dogwood (since deceased). 50 *Quercuc garryana* , some with leaves, *Arbutus menziesii*, *Acer macrophyllum*, *Alnus rubra*, *Pseudotsuga menziesii*, *Abies grandis*, and seed propagules were spread in prepared soil bed, November 1, 2005. They were

monitored twice weekly and watered more frequently. In January and February, 110 trees were planted: *Pseudotsuga menziesii*, *25 Arbutus menziesii* and 25 *Tsuga heterophylla* and 10 *Thuja plicata* in the very wet patches beside R3. The trees were obtained from Arbutus Grove Nursery for $200.13. As it is the wet season, the trees have not been watered, but they are growing well. In late spring and summer, they will be watered every two days simultaneously with the vegetables in the fields above and below them.

Leg Two

Leg Two, Arbutus menziesii Seedling And Pseudotsuga menziesii Seedling

Leg Two, Another Pseudotsuga menziesii Seedling

- Leg Three: Leased land tenant given notice in November, and in January, the land was cleared. On March 16, 2006, Leg Three was planted. 50 *Pseudotsuga menziesii*, 30 *Tsuga heterophylla*, 10 *Arbutus menziesii*, and 5 *Thuja plicata* in the wet seams.

Leg Three

Leg Three, Depicting View Up The Slope Towards The Park

And *Tsuga heterophylla* Seedling

- Leg 4: Native Christmas tree was planted in this area January 10,2006, followed by 100 trees. 50 *Pseudotsuga menziesii*, 25 *Tsuga heterophylla* and 25 *Thuja plicata* in the wet area surrounding R3. There is some CWD in this plot (a huge snag had to be cut down for safety reasons. Being located next to the pond will make irrigation easy when it is necessary.

Leg 4, Depicting The Planted Christmas Tree, CWD And Seedlings.

Leg Four ~ Pseudotsuga menziessi Seedling

Leg 4, Seedlings At Landmark

- **Deficient Soils** ~ Although the soils have been improved greatly from the nutrient deficient state from fourteen years of intensive haying , we feel it necessary to develop soil on an on-going basis (see picture plowing in the cover-crop Stage four). The Saanich leaf mulch program has been instrumental in providing inputs necessary to develop the soil. The leaf mulch is composted for up to two years. Composted mulch is applied throughout the fields and used as a side dressing for over wintering crops. As well, my son, Sage, has 80 chickens and sells eggs twice weekly. He and David have built a mobile chicken house which moves around the farm, adding chicken manure to the fields that have been left out of cultivation. Fields are left out of cultivation or left fallow to rid them of pests or problems like club root in the *Brassica* family, which, most importantly, re-establishes the soil microorganisms that become depleted after growing certain crops.
- The mobile chicken house, completed February 23, 2006, has already been moved twice. David and Sage made a slide show and accompanying power point for Sage's home schooling project.
- Invasive species management. The *Rubus discolor* around the farm provides blackberries necessary for canning, food for birds, sale at the vegetable stand and the home freezer. The *Rubus discolor* located around the pond and in the corridor will be managed. It will be knocked over with the tractor in spring, summer and fall. *Rubus discolor* will be the only species in the corridor under invasive species management. *Cytisus scoparius* on the perimeter of the farm and in the fenced *Quercus garryana* meadow will also be left to natural succession to provide some privacy from the park. The *Cytisus scoparius* bordering Little Mount Douglas

Park will also be left alone. Over the last two years it seems to be dying back, although this discussion is beyond the scope of this paper.

Mobile Chicken House Which Will Provide Another Source Of Organic Input For Soil Development

Economic Category

- Purchase more farm equipment to reduce labor cost and increase efficiency (see picture of flame weeder).
- Maintain established environmental base: good environmental practices will result in a healthy economy.

Social Category

- Increase access to local vegetables and place of social interaction and education.
- Post a bulletin board listing eco-innovative farming techniques, recipe sharing, and food education.
- Improve parking situation to include parking ties so people all park one way and avoid the unsafe comings and goings of our customers.
- Web page that describes what we are doing, provides the hours of the vegetable stand and gives our coordinates for Google Earth for anyone who wants to view the farm.

2.6 Stage 5, 2000 Summary Overview:

How To Be A Farmer And A Boss

At this stage, David and I became business partners and started taking care of the farm together. I looked after the front end: the vegetable stand and house and yard of 0.81 hectares. David was then able to focus on expanding the vegetable production to 4.05 hectares. This involved cultivating, planting, tilling and beginning to prepare areas for restoration. We jumped on early land, not only by using the back fields with good drainage, but also by growing early vegetables for transplanting to give them more established roots.

2.6.1 Stage 5, 2003-2004

Results: The Agro-Ecological Restoration Plan (From this stage, the results will be divided into environmental, economic and social categories.)

Environmental:

- Devised restoration prescription, and started project.
- Irrigation centralized to R3
- Chicken house was built
- Ths was the first year David operated the farm on his own, in terms of leasing land.
- Started first leg of the corridor as outlined in restoration plan.
- 38 *Guercus garryana* trees planted.
- Planted 150 fruit trees.
- Re-built the greenhouse.
- Built Sage's chicken house (this is part of the restoration techniques used to increase soil development).

Economic:

- Full time employees were hired and put on payroll.
- Expanded vegetable production to 2.47 hectares
- Rented outhouse for employees. (Previously, the Mental Health Program rented it, without any cost to the farm.)
- Worked as far into the season as we could on our own, so we didn't have to hire employees until we had something to pay them.

- Sage sold eggs twice weekly.

Social

- . Natalie managed the vegetable stand and hired all farm employees except those part time employees returning from last year
- Moved vegetable stand back and enlarged parking lot

2.6.2 Picture Gallery

Back Field Cultivated And Planted

Crops Growing In Back Field.

Corn Grown With Fertilizer

A busy day at the vegetable stand.

2.7 Stage 6, 2004-2005, Summary Overview:

Integrating Agroecology With Environmental Restoration:

This year was pivotal in directing the future of Madrona Farm. We created a paradigm based on the integration of agroecology and ecological restoration, and started to put into action the restoration plan devised in Stage Four. The market

garden area stayed consistent at 2.47 hectares with 5 acres used for crop rotations and green manuring. Employees interested in sustainable agriculture were hired through the Ecological Restoration Newsletter. We received two student subsidies that paid 40% of the employee wages. Business increased from a customer base of about 1,000 regular customers to about 1,500 to 2,000. We were not able to keep up with the demand, usually selling out one hour after opening. I was operating the vegetable stand at this time (with a five-month old baby) after picking flowers that were intended for sale at the vegetable stand. The education board describing some of our eco-innovative farming techniques and fabulous recipes was a hit. As well, every customer who shopped was given a description of what we do and why, the ecological restoration project, and upcoming crops. The support we got from our customers was amazing. Buying fresh, local vegetables directly from the farmer gave them a feeling of control over what they were eating.

However, in spite of all this positive energy, growing business, great employees, integrating the restoration project and the increase in capital, we ran into some problems.

Firstly, the early spring crops were not as successful as we had hoped, due to poor germination. Cold July weather caused poor pollination in squash and watermelon crops. We experimented with drip line watering techniques on the watermelon and squash crop on the back sandy slopes. This form of irrigating, combined with the unfavorable climatic conditions, proved to be inconsistent and the technique ineffective. The tomatoes got blight and there were low yields in squash and

watermelon crops. David tried to remedy this by going big on the summer and winter gardens. As a result of this, there were some very long days of weeding carrots on hands and knees, in addition to hoeing, hoeing and more hoeing. The result was that our employees started to burn out, but we were not able to afford them any time off. Also, since this was the first year without chemical fertilizer for certain crops, (corn, for example) it was very time consuming for David to learn how much and how thick to spread the Gaia Green Mix organic fertilizer. Running the manure spreader up and down the hill to spread leaf mulch was also time-consuming. Use of organic fertilizer, hand weeding and hand harvesting of the corn, one of our previously biggest money makers, raised the cost of production. Prior to last year we had charged 50 cents a cob, but we had to raise it to 75 cents. Considering that 8 cobs of Californian corn cost $2 or 10 cobs of Chilliwack corn cost $1, we thought our corn price was high. At first, we thought no one would ever go for that (it wasn't even peaches and cream) until we tasted it and then the job of convincing our customers wasn't hard. People were driving from Oak Bay, Gordon Head, Colwood and even Duncan. There was only one day when there was left over corn for our dinner.

The lesson we learned, in order to take a break in the winter and rest the body after an intensive farming season, was to focus on spring and summer money crops. We needed to jump on spring. We needed to keep our employees happy. With this in mind, we are planning to purchase a flame weeder to help with the intensive weeding. We are thinking of hiring more employees in order to cover

time-off periods and avoid burn out. Selling flowers at the vegetable stand was not a big money maker, but they did attract many people!

2.7.1 Stage 6 Results:

Environmental:

- Use of synthetic fertilizers on certain crops was discontinued

Economic:

- Prices of vegetables had to be raised because of employee wages for hand weeding
- Hired employees interested in sustainable agriculture through ER newsletter
- Started flower business
- Made above ground outhouse to be cleaned by Coast Septic
- Applied for government student subsidy training package
- Nathalie worked at vegetable stand till June to cut down on labor costs and free David up so he could focus primarily on the backfields
- Enlarged vegetable stand and parking lot to allow for the safe comings and goings of our customers on Blenkinsop Road

Social:

- Bulletin education board was erected, to be used as a way to describe different eco-innovative farming techniques
- Recipe board was posted with clear instructions on how to prepare the vegetables sold.

2.7.2 Picture Gallery

Planted Trees For Restoration Project

Planted Fruit Trees For Restoration Project
2.8

Stage 7: Summary

Putting All We Have Learned Into Practice:

Winter 2006:

At the time this paper is being written, we are once again heading into farming season. Our lessons learned from the results in Stage 6 still sting. As a result of not making a jump on last spring, we were missing crops the whole season. We had to go big on the summer and winter gardens and as a result, except for about three weeks at Christmas, we were unable to close down for any time this winter. The good news is that we still found the time to build and complete the mobile chicken house (see pictures). We finally purchased our flame weeder, which is very useful for burning the pre-emergent weeds that come up in the exposed soil with a crop like carrots, because they take a long time to germinate. The U.S. $535.00 price of the flame weeder will be paid off in one week of employee wages. This will hopefully remedy the problems we had with the employees' low morale and our extensive labor costs.

Our goal this year is to go big on spring and summer crops so we can take off more time next winter. On February 6, 2006, David started his first wave of planting: mixed greens, radishes, turnips, Arugula, spinach, peas and cilantro. The second wave was sown March 2, 2006, along with carrots, beets and spinach. We have purchased a new roto-vator to replace the old one, which was constantly breaking down. The new one is wider and therefore able to cover more ground while saving fossil fuels. We also purchased a chisel plow, which is used to break up the sub-soil for better drainage and root penetration. We are just about to fix

the green house for spring transplants. Last week, David was able to push over the *Rubus discolor* in the third leg of the corridor and expose some soil. It is now ready for planting. We also plan on painting the vegetable stand red before spring.

The following pictures depict what we have done this winter and spring.

2.8.1 Picture Gallery

The Flame Weeder Discussed In The Results Section Of Stage 6 And In The Restoration Plan

Building The Chicken House

The Mobile Chicken House And A Good Portion Of The Corridor

Another View Of The Corridor Taken From Leg Two

Leg Three Of The Corridor: A Different Perspective

Leg Four Of The Corridor

2.8.2 Monitoring

Monitoring is one of the most of the important aspects of this project. It will serve as the parameter to assess whether the technical applications of the ecological restoration are effective, and whether the objectives outlined in the introduction are being met. A yearly checklist and planting schedule will assist in this process and ensure there is room for all spring, summer and winter crops. The checklists will also include a bird count and bird box use count, vegetable yields and soil testing. The monitoring of the corridor is outlined in the restoration prescription section and will follow an adaptive management approach. The educational/social monitors will include keeping up to date with our bulletin board and increase in customer base. The economic monitors will also include the increased customer base, the number of employees we are able to hire, whether there is capital to purchase new farm equipment, and if we have enough money to cover our expenses. Conducting these yearly checklists will determine whether the project needs to be altered to meet any environmental, social or economic changes.

2.8.3 Recommendations:

A few recommendations to help achieve the objectives set out will include the development and placement of bird boxes in the restoration areas as well as yearly tree planting to account for tree mortality and a future source of wood. The roads need to be repaired through the addition of road base, and the ditches need to be re-dug to prevent seasonal flooding. The sides of R4 also need to be repaired.

We also are considering creating a newsletter, Madrona Times, to discuss our philosophy, new things we learn, eco-innovative techniques, what's been planted, when it will be

ready (weather dependant) and recipes. We plan to have a customer comment box where comments and recipes can be shared. A web page with our Google Earth co-ordinates would give customers a chance to view the farm. We also thought of purchasing an old coffee cart and using it for the occasional Saturday morning cooking demonstration**.**

2.9 Conclusion: The Future of Madrona Farm

The marriage of ecological restoration and agroecology has been successful in reaching many of our objectives. However, the overall goal of reaching environmental, social and economic sustainability can only be determined with on-going monitoring and time. Twenty years down the road, we plan to continue with the integrated agro-restoration approach with an emphasis on using renewable sources of energy and decreasing our dependence on fossil fuels. Water conservation, seed collection, and tending livestock for food, green manure and weed control are currently underway. These overall goals will provide a basis for ecologically sound agricultural techniques and sustainability.

Appendices

Timetable: Agricultural/Ecological Restoration Schedule

January:

- Continue operating market vegetable stand, equipment repair, propagating vegetative matter.
- Cuttings will be taken of some native trees and others planted. As well some will over winter in sawdust for spring planting.
- Trees will be transplanted
- **I**nvasive species will be removed.

February:

- Continue operating vegetable stand
- **S**oil development - leaf mulch will be spread, liming on early fields
- **C**ontinue propagating plants for corridor and other restoration areas
- **S**pring vegetable transplants will begin at the end of February (weather dependent)

March:

- Work up field for transplants
- **D**isc in covercrops with late winter vegetables
- Continue harvesting spring covercrop areas with late winter vegetables
- Continue with corridor planting
- Cultivate over wintered crops for sale at vegetables stand
- Continue spreading mulch
- Planting

- Prune fruit trees
- April:
- Mow unwanted overgrowth of invasives
- Continue corridor planting
- **C**ontinue transplanting for vegetable crops
- Direct seeding and plug starts
- **C**ontinue spreading leaf mulch, liming and applying organic fertilizers to vegetable areas in preparation for upcoming corn plants
- Spinach, salad greens, spring onions, Swiss chard, baby bok choy and Arugula are now being harvested
- **R**epair roads.

May:

- May 1: major plantings of corn, squash and beans directly in the soil
- In the greenhouse plugs of tomatoes, brassicas, artichokes and flowers
- Areas where trees have been planted in corridor are now being monitored and watered daily
- Vegetable crops are now being irrigated (weather dependent)

June & July:

- Continue operating vegetable stand
- **D**irect seeding and transplanting vegetable crops
- Continual irrigation
- **M**onitoring the restoration species in the corridor
- **P**reparing the fields for the next crops.

August:

- Continue operating vegetable stand
- **I**rrigating, planting and preparing soils for upcoming crops
- Harvesting vegetables
- **P**reparing plugs in the greenhouse for winter crops
- **C**overcropping summer fields that have been harvested for the winte**r**
- **I**rrigation
- **M**onitoring corridor.

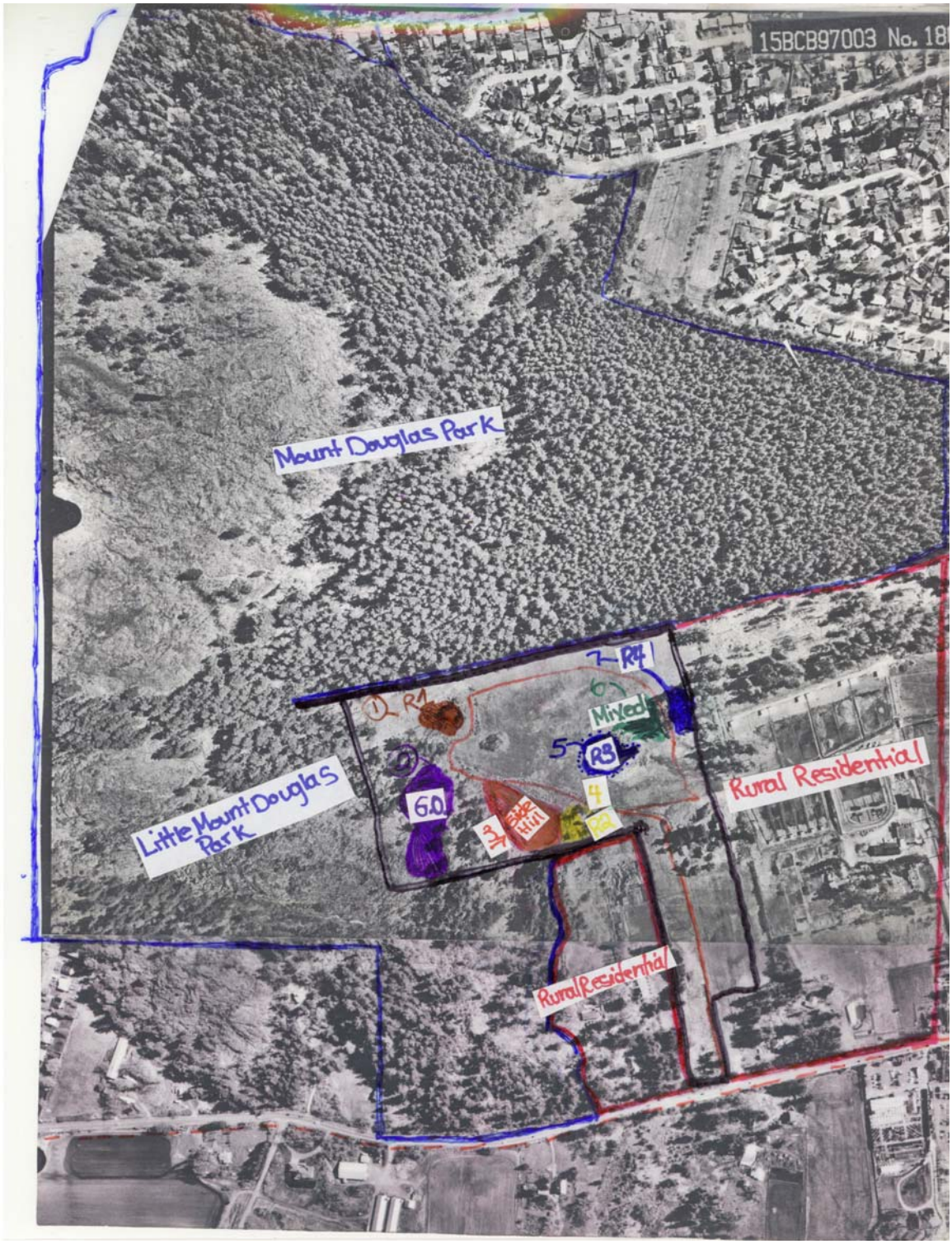
September & October:

- Very busy months on the farm for harvesting
- **I**rrigating and getting in the winter gardens
- Monitoring corridor will continue on a daily basis
- More fields will be cover cropped

November & December:

- Plugs in greenhouse will be planted for winter garden
- Covercrops will all be in
- **V**egetable stand will still be in operation**,** providing vegetables until December 24. This is a busy time for customers getting their vegetables for Christmas dinner
- The vegetable stand then closes until January 6.

Tem Mapping Exercise



Legend For TEM Map

Second Page of Legend For TEM Map (Separate Scanned or Copied Page)

Hydrology Map (Copied or Scanned from Separate Page)

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