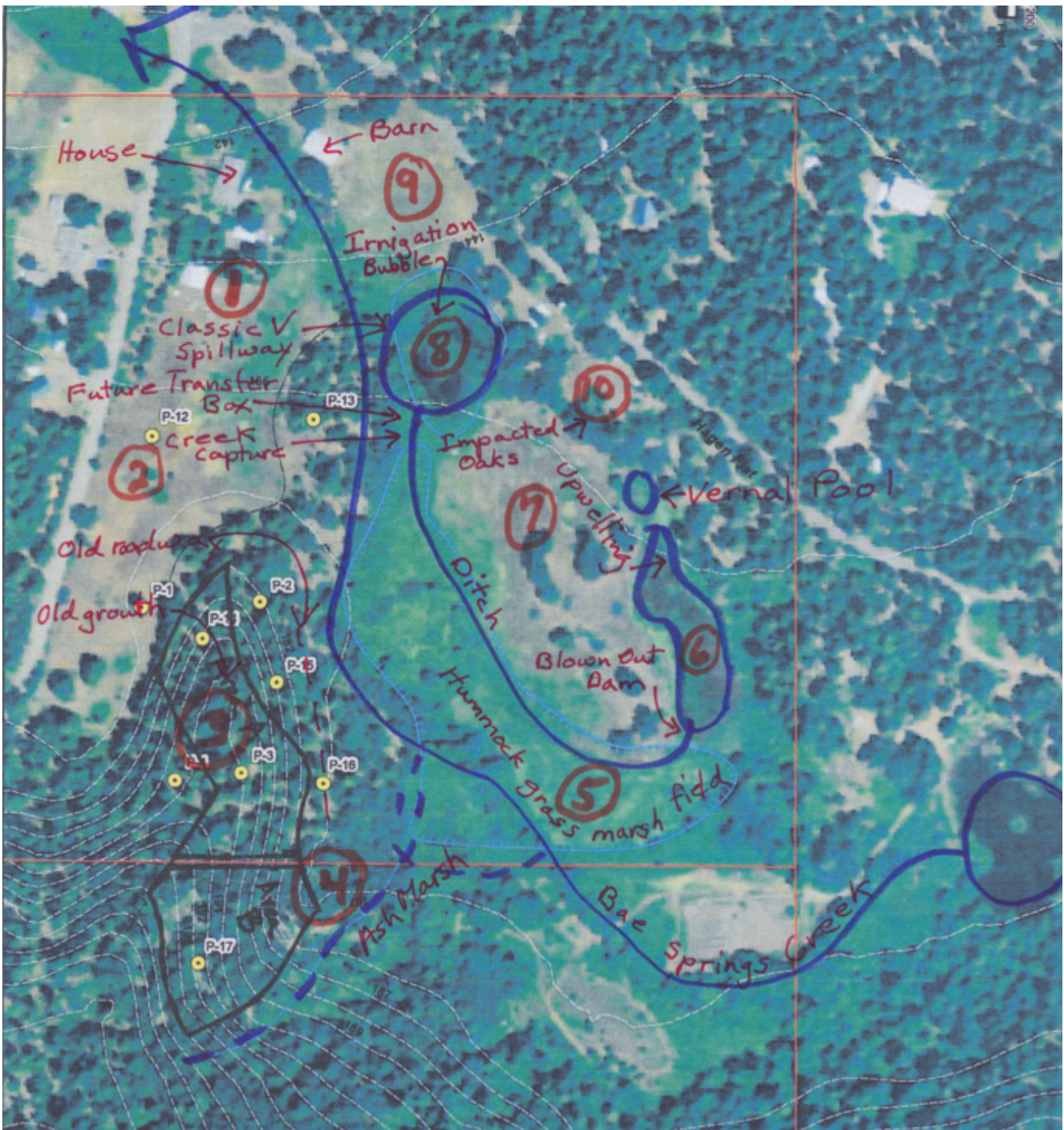


# Permaculture Assessment of Madesi Valley Community Land Trust Farm

24973 Big Bend Road – Big Bend, California

January 7–8, 2012



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# **A Permaculture Assessment of MVCLT Farm (“The Farm”) Includes adjoining parts of Shire Springs January 7–8, 2012**

**By Tom Ward, Permaculture Counselor,  
with Melanie Mindlin, Assistant**

## **Report Summary**

The Farm sits on relatively flat low lying land near the Pit River. Soils are volcanic debris, and topsoil layers are thin. Soils that are not in the sealed marshes are likely to have excessive drainage, but they should have high mineral fertility and provide good agricultural opportunity when carbon has been added to build tilth and retain water. This land can be expected to be a cold air collector and attention should be paid to frost drainage. Air quality will tend to be stagnant. Up canyon winds, which we expect to be the prevailing wind direction, will contribute to holding cold air on the valley floor. Storm winds will tend to come down canyon from the southeast. Keeping records of weather and observations on the land is highly recommended.

The Farm offers interesting opportunities in a number of areas. The wet areas that are not actually designated wetlands, but have been used for agriculture in the past, present a rare opportunity for special uses for growing of wetland plants both as food and nursery plants. Wetland plants are difficult to obtain from nurseries at this time and quite expensive, while wetland mitigation is required in many circumstances and require the use of these plants in addition to demand from permaculturists creating aquaculture and constructed wetlands. There are also opportunities here for fish farming and other aquaculture.

There are opportunities for reviving traditional land stewardship through growing of ethnobotanicals, coppicing and burning. Hardwoods maintained by burning in the past can be released through thinning and pruning.

The central dry field is suitable for a large number of uses including integrated orchard with alley cropping of annuals, larger tree food forest with nut trees, restoration of traditional savannah with burning or rotational animal grazing.

Areas with potential for house building have been identified, but are limited by solar access (an essential component for a permaculture home) and road building challenges. The area along Hagen Flat Road is the most accessible but will be impacted by road noise and pollution. There are likely areas around the existing farm house that also have easy access which were not assessed in this visit. Air quality is a concern for homes here, as heating with wood will create serious air pollution problems for houses clustered together.

Wetlands, creeks, ditches upwelling, and irrigation bubble are present on this property, along with ditches and berms to control water. These show extensive work probably done by hand a long time ago. Care should be taken to prepare for maximum event conditions

here, especially as the creek leaving this property goes through many other populated areas of Big Bend before reaching the Pit River. Changes to the spillway and control of water in and out of the irrigation bubble are recommended.

There are many beautiful old growth oak trees on this property which are remnants of indigenous burning land management. These should be protected by thinning nearby young conifers, especially to the south of the large oaks, so they can get light and air. Near and within their driplines should be protected from compaction and irrigation. Recommendations are made concerning the oak trees, sugar pines and ash trees, along with other comments about forest conditions. Some good forestry work has been done here in the past, and a forest management plan should be made and followed.

## **Introduction**

Observations for this assessment were made on two warm winter afternoons with temperatures around 50 degrees. Despite the warm temperatures, much of the ground was frozen below the plant and duff layer. The air was generally still, and smoke from residential wood heating at the neighbors could be smelled for several hundred feet.

An attempt was made to get a look at most areas of the property, although little attention was given to the area around the existing house and barn and we did not do a thorough exploration of the land along Hagen Flat Road. The assessment was commissioned by Rod Newton, current owner of The Farm, at the request of Melanie Mindlin, with whom he had engaged in plans to subdivide and develop the property as an ecovillage with cohousing clusters and food production. Charlotte Anthony was also present, who had been engaged with Rod Newton to install a food forest on the property and generally start food production. However, at the time of the visit, the future of these projects had become uncertain.

### **The objectives of the assessment had been conceived as:**

Determine the best locations for various land uses:

- roads
- houses
- living system waste water treatment
- various types of crops
- animal
- springs and other water sources

Discover essential contingencies that need to be addressed in making decisions about the land uses.

## **Area 1. Farmhouse Zone 1**

The main house at The Farm Farm has an orientation that is slightly west of south on its short end. It looks good for solar heating the house if a whole bunch of cedar trees are taken out between the house and shop. These trees are also under the power lines. High pruning should be done on trees to the southeast to allow early winter sun to penetrate to the house. Removal and high pruning as recommended should not significantly impact summer shade to the house.

No further analysis was done on the house, barn or Zone 1 area as this was not the primary objective of the assessment.

## **Area 2. Field to the south of the farmhouse along Big Bend Road**

This field which is due south of the Farmhouse Zone 1 used to be pasture, and tap root plants indicate compacted soils. *Rhus trilobata*, squaw bush or lemonade bush was found next to Hawthorne, near the center of the field, and these plants grow on rocky or compacted soil. This field also contains Earthworks where somebody bulldozed up a berm that appears to connect to the road near road level. There are also a series of pipe risers which may indicate the presence of an irrigation line underground in this field.

At the east edge of the field, where the tractor travelled to go up the ridge to dig the test pits, the tractor sank in quite deeply into soft soil right on that edge. So there are complex soils and it shows more organic material in the area where the tractor left its deep ruts. At the top of the field, at the south east portion where it borders the Finger Ridge, there is a big edge effect where a whole bunch of new species were observed. The presence of ethnobotanicals is encouraging for food forest potential because roots might be getting down to perched water tables.

The berm may have been put there in wetter times. We are in a 60 year drought cycle by tree ring records according to studies of Methuseleh, the white pine records from the California–Nevada border which show we are in a very long pattern of 60 year droughts. The current 60 year drought cycle started in 1977–78. These earthworks look older than that, so might be evidence of a wetter time. This can be checked against snowfall records at Shasta or Lassen Parks, because we are in a very long dry spell this year. Who knows what global weirding will do to that classic pattern, but we are just a little past the middle of the drought cycle in that classic pattern. One of the potentials here is to look at the ditches and the run off from the Big Bend road and to think about re-directing road run off and culverts into swales and soak away areas in that field if there is a need for additional seasonal water.

Since we saw a lot of European grasses and weeds, including tap root weeds, on that field, re-building the pasture guild there is an interesting possibility. One could also re-introduce field burning which would help to re-introduce native grasses, bunch grasses, and nitrogen fixers, reducing the fuel loads of the pasture weeds which are now dominating some of these drier sites.

### **Area 3. Finger Ridge. Starting south of the Farmhouse and extending south to the end of the property.**

At the north end, this forest is overstocked with cedars without much old growth. Some stumps and firewood bolts left behind show it was logged in the past, and that it has been worked over and over. There are hardly any ground layer plants because of overstocking and shade.

Moving south, there are some white oaks that are a remnant of burning times and indicate that it was burned regularly. Those hardwoods are now overtopped by the large conifers, so they could be rescued by taking out some conifers. It is important to preserve the hardwoods such as oak, ash and maple because they are reservoirs of mycorrhizal fungi, meaning that they are keepers of mushrooms that help other trees (conifers) resist drought and improve nutrient uptake.

Further south on the finger ridge a septic test hole was scraped out by backhoe then dug another foot or so, allowing us to examine the soil profile. Here we found angular rock, way above the flood plain; this rock has been eaten down by bacteria, forest roots and fungi, showing deep red dirt forest soils. The deeper you go into the subsoil, the more volcanic red dirt you see, probably blown in by giant volcanic explosions. The closer you are to the surface, the darker the soil, due to tannin staining which shows this has been a forest soil for a very long time, and has changed color from red to dark--the red being oxidation of iron and the dark being tannic acids darkening the soil as they accumulated in the bottom of the forest.

Another test pit was found, 100 meters south of the previous one, in which the soil is a yellower soil with more ash. This soil may not percolate as well as it might be more consolidated ash and the water wouldn't sink in as well. This is not the tannin stained highly developed forest soil of the previous test pit, so we are speculating that the complex ecosystem that was here during burning times was probably clumpy, a mosaic. We have pockets of really good soil, rocky ground with a complex volcanic soil some ashy, some red, some yellow.

As construction is being considered for this area, it should be noted that we have concern about compaction if one was driving along the ridge line (a typical place for access roads). Central to this area is a magnificent large black oak leaning around a sugar pine right on the crest of the ridge. To save things like these trees requires flagging to stay outside the dripline to avoid compaction and careful monitoring.

Sugar pine is important to hold because, based on observations during the drive here, white pine blister rust is moving into this area. The big old sugar pines will survive a long time with blister rust while producing babies. Sooner or later, some of those sugar pine babies will be more or less immune to the blister rust. We need to save all the old sugar pine we can in order for diversity to develop, and we have time to find the sugar pine seedlings that don't succumb. Mostly it's the young sugar pines that die from the blister rust. Opening up air circulation and doing thinning and burning all help reduce blister rust potential. You

can do high pruning on young pines to hold them a little longer till they make cones. The point is to keep the cone bearing sugar pines and encourage the genetic lottery.

Near the south end of the The Farm property on the crest of the ridge, about 100 feet from the south property line, is a location that has some potential for building a solar home(s). It's not too steep and it's far enough from the steep sections to the south that it might get some good solar access if trees to the south were thinned and controlled. However those trees are on Shire Springs property. Additionally this area would require careful protection of the old growth area around it. A lot of the trees in this area are pretty good lumber, especially the cedar, and could be used in building homes.

Saving the old growth hardwoods that are the remnants of the savannah that was here during the times when the Pit River Indians were burning is a template for where to put the houses. Removing the conifers that are suppressing the hardwoods opens up the old hardwoods and saves them at the same time it opens up solar access for house sites.

On the east of the Finger Ridge, and the west side of the open fields at the foot of the hill, there is a drainage ditch perched at the very edge of the finger ridge which goes all the way to the Shire Springs fenceline and appears to pick up water from the wetlands on Shire Springs Ash Marsh described in Area 4, and shown on the maps as an ephemeral stream.

On our way across the foot of the Finger Ridge to the Shire Springs fenceline, we were on the old road and could see the potential housing sites. There were several clumps of redbud that had been coppiced, and were probably basketry clumps from old ethnobotany. Redbud was an important basketry material. The road and trail is pretty straight forward right to the fence. Melanie followed the bear trail all the way to the two acre meadow on Shire Springs, and it wouldn't be difficult to put a good trail through, although a road would be challenged by the marshy area at the bottom of the seep and perennial watercourse.

The areas along the west edge of the bottomland look much better than the top of the ridge in the old growth area for housing. It has a good southeastern exposure and really good shade on the west and southwest side for cooling, with the old road for access.

#### **Area 4. Shire Springs area south of the property line with The Farm.**

This area had been proposed for acquisition for cluster housing in the planned ecovillage.

There is a whole different forest regime on the south side as opposed to the north side of the property line, marked here with a fallen down barbed wire fence. Behind on The Farm, is a beautiful forest with old growth and ahead on Shire Springs, is a classic hammered logging ground with a couple of larger trees higher up on the slope. On the south side of the fence all the old growth has been logged out and all that's left is the spindly jack-straws (the tall skinny trees). A bunch of them are falling over because they've been overcrowded. This is a fire hazard. It's hard to walk through it. There are steeper slopes in this area on the northwest corner of Shire Springs as the topography heads up a steep hill. This

degraded forest area would be a good candidate for re-purposing, although it is more of a north slope which reduces solar access.

To the southeast, contouring at the same elevation, there is an oak pine savannah that's pretty open with a northeast aspect, and nicely open to the southeast. There is evidence of fairly recent logging with low pine stumps, and a lot of logging slash and trash on the ground. There are broken up oak trees where the logs were felled on them. There is a different ecosystem here and appears to be a different soil type. There may be less dense forest because of a clayey soil here, more ash in the soil, or being too wet here to support the kind of old growth on the finger ridge. This is a classic oak pine savannah, but its been run all through with dozer tracks. Low stumps rotted down indicates logging maybe 20 years ago at a guess. There should be some clean up in here; but it is a lovely white oak glade perhaps 150-200 feet wide.

At the east side of the white oak-pine savannah, we find a grove of Oregon Ash in a seep area with a seasonal marsh. This is an Ash marsh, with symphoricarpus (snowberry), Himalayan blackberry, black cap raspberries and lots of brush. This is a much higher species diversity area, and could be a food forest heaven where you would come in with berries, hazel, currants (in spite of the white pine blister rust). There is also a potential for wildcrafting in this area due to the biodiversity and shallow soils. There is a rocky area at the east end of this wetland, as well as an old road bed. Oregon Crab was seen (or possibly a feral apple), as well as willow, probably scullers willow.

Ash trees are often tall and straight unless they have been coppiced previously which makes them shrubby. Ash in this area could be coppiced for firewood, fencing or basketry materials. The injured, leaning or crooked ash trees are usually the ones to coppice. The exception is where the tree has cavities or bird nests and are thus a "wildlife tree" and thus a keeper.

Housing could be put at the foot of the slope in the oak-pine savannah and have nice southeast facing solar. It's not good forestry ground and has shallow soils and the homes would be above the perched swamp (forested wetland) and could manage it as Zone 1.

## **Area 5. Wet fields at the The Farm south end.**

Here is a field currently with some areas with shallow surface water. Observation was made in an unusually dry December following reportedly 6 inches of rain to date this season. A berm which is the excavation spoils from building of the drainage ditch is thrown up alongside a ditch which runs east-west and then curves around to the north. This is the spillway of a 2 acre wetland described as Area 6. This field is located between the creek coming from Shire Springs, hereafter known as Shire Springs Creek as we do not know if it has a real name, and the ditch. The adjoining central field, Area 7, beyond the berm is 2-3 feet higher in elevation than this wet field. This ditch swings around to the west then north without joining with the creek that flows in from the Shire Springs pond.

Agricultural development on this land between the drainage ditch and the Shire Springs Creek is a hummock grass marsh with big clumps of grass and water between the clumps of grass, all of which shows some shovel work long in the past where drainage was attempted and perhaps it was a pasture at one time. It is a well established hummock grass type marshland, and it has potential for development for wet marsh type agriculture. This might mean wild rice, various aquatic edibles such as arrowroot, cattails, tule rush, etc. Chinampas would be possible.

Living wastewater treatment could be done as tertiary water treatment, or if part of it was lined. You would need to monitor that as it went into Shire Springs Creek and the pond. You could do some rebuilding—clearing the drainage ditch, using very tight surveying. Very minor adjustments (like ½ inch) can make a big difference to whether an area is wet or dry. It would not necessarily take any water out of Shire Springs Creek. There is a lot of opportunity in this area.

## **Area 6. Upper Wetland located on the southeast of the open fields.**

This approximately 2 acre wetland has a low level of standing water at the time of observation. Neighbors report that this area fills with water in the winter and dries out in the summer. At the north ¾ mark on the wetland, the wet part of the marsh is not frozen as hard and it seems like there is an upwelling or blind spring here where water is rising to the surface. This water is flowing to the south making a hook under a big willow tree where an old dam has blown out. The water runs down the ditch with the berm next to it, described in Area 5. A lot of work was done to drain and control the water from this wetland.

This wetland appears to be an upwelling, not fed by observable drainage, since this is a year with very little rain and it's not frozen. This area is right over the fault line indicated on the Hot Mama Ecovillage map supplied by client, so water might be warm that is upwelling. Next to the upwelling is super black muck soil showing that the marsh is a natural marsh that has been there for a very long time with eutrophication and carbon collection. There is a small depression to the north which is at a lower elevation than the main area of this wetland, and is dry at the time of observation. At this small depression to the north, there is dry soil, and we can see brown soil not the black muck. However there is a water line, so the main wetland flows over when it fills up and creates a vernal pool. An input drainage comes in from the central higher field to the west.

A reason we think there is an upwelling in this wetland on The Farm, is the small depression, that appears to have been built, only fills from overflow from the upwelling pond even though it is at a lower elevation. The plants in the small depression indicate that it is a vernal pool, a temporary pond that dries out. You could bring in beautiful wildflowers that are appropriate for this kind of vernal pool.



## **Area 7. Central Field to the south of the Irrigation Bubble (or pond)**

This central field is located between the wetland, the drainage ditch and the re-built bubble (pond). A test hole about 2 feet deep was dug to the south of the bubble, outside the area where excavated soil from the re-built bubble had been spread. The soil shows a lot of pink that is oxidized iron volcanic soil. This is a dry, volcanic, deposited soil that has not had water standing on it. It is well drained and has a lot of rock in it. It is mineral fertile clay volcanic debris. Charlotte, who dug the test hole, reported that she stopped after digging 2 feet because she hit a "clay layer" which we speculate is probably an ash bed because ash beds are seen all over this area. On top of the presumed ash bed is 2 feet of good mineralized soil making a good agricultural field, with lots of water nearby including electricity for pump. It is rocky but fertile. It has a high diversity of weeds so was heavily grazed in the past, but does not appear to have been plowed because it is hummocky (bumpy). It appears to have never been in field culture only in pasture. This is a good place for a food forest or mixed small garden with woody plants and orchard.

It could also be used for native grasses and grass seed production and burned regularly because it is an easily contained burning area surrounded by wetlands. The large white oak and oak pine savannah on the south edge of this field shows that this meadow was burnt regularly. This is an interesting pocket field in the middle of everything with lots of potential. Nut trees, nut pines and selected oaks are possible. Walnuts need deep soils, but are very productive. Right away one can start building topsoil, as there is only 1 inch of topsoil here, possibly because it is volcanic ground that has never had enough water or irrigation in the summer to develop topsoil.

## **Area 8. Wetlands, Creek and Irrigation Bubble**

There is a complex of wetlands on Shire Springs and The Farm property. Starting on the Shire Springs property, there is reputedly a spring that feeds a large pond and the overflow of that pond has perhaps been re-directed. It now goes south of the old fenced developed garden on Shire Springs, then heads northwest through a field, crosses the The Farm fenceline, then hugs the west edge of the open ground as a stream course. It then passes very close to the re-built bubble (pond) and continues through downtown Big Bend to the hot springs property where it meets the Pit River. There is a whole bunch of property in the flood damage sector if there was flooding coming off Shire Springs and The Farm. The watershed (the actual catchment basin for the creek) is more extensive than one might think. It covers quite a bit of topography to the SW on steep slopes with 30% or greater slopes. Road building to the SW of the creek could increase flash flood input due to impervious surfaces on roads, roofs, and trails.

There is a separate wetland system that is on the The Farm property that starts with the wetland that appears to be an upwelling wetland described as Area 6. At the north end where it still holds water during this dry winter observation, there is less freezing with a warmer temperature, and it is currently puddling there. There is a blown out dam at the south end by the willow tree. There is a constructed drainage that has a berm to its N and NE sides, going from the upwelling on The Farm property directly to the bubble (pond),

however the Shire Springs Creek has been combined with the drainage ditch to both run through the re-built bubble. The confluence of the creek and drainage ditch is quite complex. It appears that Shire Springs Creek was going through the bubble before it was re-built. Recent work dragged some boulders out of the original by-pass that goes to the west side of the bubble.

In Oregon, if you have water that rises on your land, and then sinks in on your land, you have full rights to its use. If you have water that rises on your land and leaves your land as a perennial creek, it is a different legal situation. The legality of the water use and water rights in California generally and for this property need to be investigated. Possibly one could separate the The Farm drainage from the Shire Springs Creek so that flooding from the creek would not be the responsibility of The Farm. This separation might not be that difficult and possibly done by human labor (rather than machine labor) by creating a control point where the drainage ditch approaches the creek and the rock causeway is moving the Shire Springs Creek into the bubble. There are a number of ways to do this, but it would need to be carefully planned and executed. The upwelling wetland could feed the bubble in the winter storm season, and the spillway could be adjacent to the entry point.

The existing spillway on the rebuilt bubble is a classic v-built spillway with some rock on the side of it, and it is not capable of handling large flows of water without blowing a big hole in the bubble where the present overflow is. I would recommend that the present overflow on the rebuilt bubble be blocked with gabions, which are willow baskets or wire fencing baskets filled with rocks. They are leaky, and are not meant to hold back water but they hold back debris. They will raise the water level on the re-built bubble just enough that it can overflow at its in-input point so the inflow and outflow can be adjacent to each other. That way the bubble can be secured. The gabions will allow a major flood event to utilize a couple of spillways on the bubble as the gabions would leak through and the bulk of the water would go over the spillway at the entry point. This would separate the two water systems for liability and permit reasons, and prevent a flood blow-out of the re-built bubble which is still unstable.

The bypass around the bubble has check dams and a lot of flat water. On a second look, Tom saw that the overflow from the bubble has quite a large flow of water coming through it, a much bigger flow of water than is in the bypass ditch. So while the previously stated ideas are good, the actual details, surveying and the way to flood proof and control water and prevent the bulge from blowing out need some careful examination.

The berm between the bubble and the Shire Springs Creek bypass was not adjusted by the re-building of the bubble. One should get a larger topographic map and calculate the drainage area contributing to the creek and determine the volume that might be expected in a maximum event. Information from the flood of 1964 could be useful in this analysis of what might happen on this farm and on down the creek through town.

There are still a lot of questions about the water flows here. We don't know what the summer flow is out of the drainage ditch. Would the bubble have enough water in the summer not to drain down? Where is the water table? Is there going to be an oxygenation (carbon fixation) problem, eutrophication? The upwelling pond's black muck soil shows it has been there a long time. At some time in the past it was a larger area that created this

natural “peat”, that is much different from the soil in other places. No test pit has been done yet in the hummocky marsh land, so there is still exploration to dial in this marshy water opportunity. We are surrounded by insurmountable opportunities.

## **Area 9. Field south of the barn between Shire Springs Creek and Hagen Flat Road**

Based on information from neighbors, it appears that burden from the rebuilding of the bubble (pond) was spread on this field. Neighbors also reported that this field gets standing water in the winter. The ground is deeply dug up with areas of 2 ft. relief and soil that hasn't been flattened.

It appears that the muck from the bottom of the pond went into the pile that is between the bubble and the newly fenced garden area. The east side of the field by the road, does appear to be spread out debris, but it has marsh grasses and hummock grasses spread out among the rocks. We speculate that first a bunch of these grasses were pushed over into that pasture in a haphazard manner, but that haphazard manner has exposed rocks that can be moved and many microclimates that might provide potential for pit plantings of trees. However by report from neighbors, this area is under water during normal winters and would likely be too wet for trees. Plus it's so difficult to walk there that it would be difficult to access. They would also collect frost being at the bottom. It would be difficult to suppress the marsh grasses that have re-established themselves very effectively.

A question was asked, “Could we use overflow from the wetland system to develop rice patties?” This may have some merit because further machine work would be recommended to clean up the rough ground, and while that was done, one could engineer a flat field there. One would build a not very tall berm around the field, building a flat field as a paddy that could hold water. What we don't know is how the percolation would be in that field. Would we be able to flood the rice for transplanting time? Rice is first grown out in nursery beds and then hand transplanted out into the wet paddy. Later the paddy is drained when the rice matures and sets its seedhead. Because of the catastrophic flooding possible here, Tom would suggest that, to flood the rice paddy or irrigate that field, large siphons be used over the re-built bubble dam.

Re-establishing the field is worthwhile for pasture at least. A good engineering job on that field setting it up as a rice patty to see if it works would not be a loss of investment because it would be useful as a flat field even if the rice didn't work out. Potential of this field is increased by being in Zone 2, on the Zone 2-Zone 3 edge, really close to the main farmhouse and the quonset hut, Area 10, slated in some plans to be a housing cluster.

## **Area 10. Open area in forested section along Hagen Flat Road South of quonset hut.**

To the SE of the rebuilt bubble (pond) and to the South of the quonset hut, is an open area with good accessibility from Hagen Flat Road. This is an area where a lot of the burden to deepen the pond was temporarily stored while it was sold out the gate by the truckload per neighbors report. After these piles had been distributed to the community, the remains of those piles was spread out apparently in a thin layer over the soil. This area is flattened and doesn't have anything much growing in it, neither weeds nor evidence of the remains of an annual seeding despite neighbor reports that a seeding was done. It is a highly fertile, volcanic mineral soil with lots of rocks in it. A test pit was dug here, but had been closed again prior to this visit. Charlotte says she went down 3 ft. without finding a change in the type of material.

When the clean-up was done, some of the burden was pushed onto the dripline and inside the dripline of some old growth oak trees. Those old growth oak trees may now be in trouble because this is a classic problem in saving oak trees in difficult situations. One should be careful not to compact at the dripline, near or inside the dripline, and not to put any burden on the root system near the dripline. Now one needs to watch. Tom is not sure that it would help to pull the burden back from under those oak trees at this point. It might help if done with a small bobcat or something like that. One should not use a large machine because there has already been too much compaction on the roots of those trees.

This row of old growth oak trees is creating a shade sector to the NE on an open area that has high potential for market gardening because of its accessibility from the road and its nearness to proposed housing. It is a prime garden area. A housing cluster has been suggested in this area which makes sense because it's on dry ground above the flooding potential and near the road.

It's possible that some high pruning in these oaks would be helpful. We did not see mistletoe in them which would be an indicator of stress. Limb pruning in white oak trees does help when they have mistletoe in them, taking out whole limbs, opening up circulation and removing the mistletoe. If roots are damaged, it would be good to take some crown out through pruning. It's possible to high prune these oaks to let more light into this area. Meanwhile, there is a need to watch these oaks carefully because they have been highly impacted.

Melanie further investigated the forested area along Hagen Flat Road. A large amount of this section near the south boundary with Shire Springs is covered in blackberries and appears to be a water drainage area. Some of the area to the south of the opening described in this section may be dry flat ground usable for cluster housing if trees are cut to allow for solar access.

## Water – General Comments

One of the maps we have shows a hot well due west of the re-built pond. We don't have any documentation or further information on that. Also interesting is that there are two well sheds, one of which is abandoned, and we heard some rumors that there were additional wells at other times too. It would be useful to know the location of these wells and why they were abandoned.

We believe that Rod stated that The Farm has irrigation rights from the Shire Springs Creek. There should be a document stating how many acres can be irrigated from the creek. Having water sources solely on The Farm provides redundancy and adds to options. The suggested earthworks can be used for different water sources.

It is wonderful to have this much wetland and this much water resources, and to have it on a developed farm with some infrastructure in place, and some ditching and direction in place. A lot has already been done here. The tremendous amount of water infrastructure here suggests that some additional work would be worthwhile. It would also be nice if someone was present when flooding happened and would go out in their "wellies" and make observations and do some tweaking if necessary.

The wetlands here appear to have sealed themselves over time, perhaps through accumulation of peat and organic material, eutrophication, and perhaps through sorting of the clay content out of the mixed volcanic debris, which is a lot of the soil on this whole site. Where there are these basements in the soil, where the soil is sealed and water is being held, that is a flood irrigation opportunity.

Cutting chinampas could actually cut through these marsh seals and cause the marsh to drain into porous soils underneath. We wouldn't know that until it was tried. We could perhaps find out more about the soil layers by seeing the records from the drilling of this new well or talk to the person who drilled this well to find out what they went through. It would be very interesting to dig a test pit in the marshland, up in one corner of the marshland where one wouldn't accidentally drain the whole thing, to see if there's special soil here. Perhaps there's an ash bed here and the ash bed is holding water.

Melanie found a ditch on the east side of the upwelling marsh. It appears from the finding of the two additional ditches on the edge of the open area that a great deal of effort was made to try to dry out and drain these bottom lands perhaps to use as pasture a long time ago. Up in the corner of the wetlands at the Shire Springs property fence, there is another small wetland with another berm which you can see on the aerial map. This one is pretty deep, reportedly 2 ft. deep when Charlotte tried to cross it at the end of the dry season (August) before the first rains. There is a lot of willow there and there are so many blackberries covering what was done, that it's hard to see it. I recommend burning it out, get rid of the blackberries, see what's there and fertilize the marsh at the same time.

Clearly there's all kinds of work that was done here in the past. Most of these earthworks were probably done with oxen and blades and tons of handwork. An incredible amount of effort was put into this in the past.

When we walked the Finger Ridge, we noticed quite a difference in the soil types in the test pits, and that shows this is a very complex series of volcanic debris soils. Some of these fields that are open and look like they dry out really hard in the summer, have a lot of tap root weeds on them showing that they've been used for pasture and that they have surface compaction. That doesn't mean the soils under the surface compaction aren't well drained, excessively drained even. We received reports of other lands in the area having excessive drainage. If the soils are excessively drained, drip irrigation may not spread horizontally; it may go straight down in what is known as the shadow under the drip irrigation emitter, having the shape of a carrot, rather than bulging like the shape of a turnip. A micro spray might be a better option for spreading the water out more on the surface, if it was under a plant where it wouldn't have immediate evaporation. Overhead spray on these grounds, and we've seen quite a few PVC risers indicating that there may be an irrigation distribution system already in place, would waste a large amount of water to evaporation.

Compacted areas might be the best to transition towards food forest and do your planting in clumps so the food forest is a series of Guilds. Each guild would have a micro-spray component and some slow emitters spread out at the dripline of the guild. Find out how to use the water without wasting, because if the water goes straight down through the subsoil, which I suspect it will on a great deal of this property outside of the wetlands, it's not doing your plants a lot of good.

There are lots of questions about what areas will be irrigated, where you will pump from and what water rights you have off Shire Springs Creek and how they can be used. From his pond and irrigation work in Oregon, Tom suggests that you shouldn't call your water detention areas ponds, you call them irrigation bulges or bubbles because the water is simply flowing through it and you are using it to pump irrigation water from. At that point you could get a permit if you have irrigation rights on Shire Springs Creek. You could be using the re-built pond as an irrigation bubble where you're storing water in order to be able to pump it out easily and manage your irrigation. So the bubble is an irrigation transfer box.

The upwelling area also is not a pond, it's a wetland and re-building the original dam at the south end of this area should be called wetland enhancement, not pond repair. These vocabulary games are happening now and you should be careful about what you call things because it can reverberate.

## Alternative Possibilities for The Farm

This area is a reservation and it is a typical reservation type community with a mix of different people. On this landscape we see abandoned ethnobotanicals, rather than managed ethnobotanicals, and are not aware of local people re-developing their ethnobotanical tribal ways. One could bring Margaret Mathewson, who teaches native indigenous basketry, here to help develop the ethnobotanical materials, and move this farm towards willows, dogwoods, basketry materials, medicinal materials, fiber materials, and native foods and that might be part of a nursery operation and part of a re-culturing thing that could involve everybody, not just indigenous people.

Margaret's basketry courses are a mix of people, native and white, getting along because they're doing things—making things together. The last one Tom attended was in the Illinois Valley at the Acorn Festival and included native people. This option implies that you first grow the stuff, and they will come. Learn to make basket hats, cooking baskets, get the stone boiling back. This land is well set up for these activities. There is a botanical exploration component to this, going around the Pit River Canyon finding the basketry clones, bringing the cuttings back and rooting them, growing them out, doing the nursery work and slowly building up the inventory. You need a large inventory to do basketry work. You need bundles and sheds and drying and soaking areas. You could move into production here for the craft stuff, not just food. Although you have Live Oak here, unsurprising as this elevation is below 2,000 feet, some things are missing that may have been here before and could be brought in like California buckeye, Toyon berries, nut pines, different currants.

Nobody has put together a permaculture nursery yet. Since it's such a niche market, and since there's this wholesale nursery in Montana, Lawayers, where you can get bundles of stuff really cheap, it's challenging. But even Lawyers has things missing, like the Foothill Pine (Grey Pine) for example that we've been looking for.

This kind of ethnobotanical nursery work could be a great thing to do where you're not being intrusive, but doing something both economically and ecologically worthwhile. You can talk to the native women who will know these things. Don't go to indigenous people with plans, but go with specific questions and bring gifts of stuff you've already done.

One could also re-introduce field burning which would help to re-introduce native grasses, bunch grasses, and nitrogen fixers, reducing the fuel loads of the pasture weeds which are now dominating some of these drier sites. In some cases there are really good places, such as the oak grove between the drainage ditch and the upwelling wetland, where there is a contained area good for burning. The same is true for the west field; it has a road, edges where firebreaks could be established. It's small enough to do some small field burning to move on the guild of the prairie ecosystem that could be the support for introducing the food forest.

## ADDENDUM – Rare Plants

To: Melanie Mindlin <[sassetta@mind.net](mailto:sassetta@mind.net)> From: Cecile Shohet <[cshohet@gmail.com](mailto:cshohet@gmail.com)>

Subject: plants of concern at Big Bend... Date: January 4, 2012

Melanie, You are in luck – the rare plant list is pretty limited for your area.. These plants won't be identifiable until likely May. There are some rare fungi in the Big Bend area – are you interested in these as well? There doesn't appear to be any rare non-vascular species (lichen, mosses) – I will look into this a bit further and get back to you if I find something...

### **Smilax jamesii** –

- riparian associate, stream banks, edge habitat, lake margins
- trailing vine-like... Notice the venation on the leaves...
- CNPS Inventory of Rare and Endangered Plants on list **1B.3** (rare, threatened, or endangered in CA and elsewhere).
- characters that distinguish from common Smilax – no spines and no fuzziness
- ID'able – March to Oct – when leaves are up... See my book for further details. For pictures:

[http://calphotos.berkeley.edu/cgi/img\\_query?where-genre=Plant&testing=123&query\\_src=photos\\_flora\\_index&rel-taxon=contains&where-taxon=Smilax+jamesii&rel-namesoup=matchphrase&where-namesoup=&where-lifeform=any&rel-location=matchphrase&where-location=&rel-country=eq&where-country=any&rel-state=eq&where-state=any&where-county=any&where-collectn=any&rel-photographer=eq&where-photographer=any&rel-kwid=equals&where-kwid=](http://calphotos.berkeley.edu/cgi/img_query?where-genre=Plant&testing=123&query_src=photos_flora_index&rel-taxon=contains&where-taxon=Smilax+jamesii&rel-namesoup=matchphrase&where-namesoup=&where-lifeform=any&rel-location=matchphrase&where-location=&rel-country=eq&where-country=any&rel-state=eq&where-state=any&where-county=any&where-collectn=any&rel-photographer=eq&where-photographer=any&rel-kwid=equals&where-kwid=)

### Clarkia borealis ssp. borealis –

- found in openings in woodlands... (maybe in the fallow agriculture land on your site – check that – not known from this habitat – but could well be there...)
- It is included in the CNPS Inventory of Rare and Endangered Plants on list **1B.3** (rare, threatened, or endangered in CA and elsewhere)
- starts coming up (depending on phenology) in May
- there are a number of clarkia – you will need to key it out..
- Found in Iron Canyon and Deadlund Campground

for pictures: [http://calphotos.berkeley.edu/cgi-bin/img\\_query?rel-taxon=contains&where-taxon=Clarkia+borealis+ssp.+borealis](http://calphotos.berkeley.edu/cgi-bin/img_query?rel-taxon=contains&where-taxon=Clarkia+borealis+ssp.+borealis)

### **Streptanthus longisiliquus**

- large plant with large leaves and flowers – look for a large Streptanthus...
- found on road cuts – likes disturbance – check the abandoned ag field... and openings in the forest
- found north of Big Bend – Stump Creek, Cape Horn Creek, Blue Jay Ridge
- It was included in the CNPS Inventory of Rare and Endangered Plants on list **[4.3]** (limited distribution). For pictures – check out:

[http://calphotos.berkeley.edu/cgi/img\\_query?stat=BROWSE&query\\_src=photos\\_flora\\_sci&where-genre=Plant&where-taxon=Streptanthus+longisiliquus&title\\_tag=Streptanthus+longisiliquus](http://calphotos.berkeley.edu/cgi/img_query?stat=BROWSE&query_src=photos_flora_sci&where-genre=Plant&where-taxon=Streptanthus+longisiliquus&title_tag=Streptanthus+longisiliquus)

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