The Farm

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Permaculture Design Submission

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The Location

The property has been in my wife’s family for 150 years and unless we buy it, it will be sold at auction. After taking Geoff’s PDC we decided to buy and turn the site into a permaculture farm producing for our family and any overage sell to reinvest in the homestead. The original homestead was 80 acres. Through bad financial decisions the property has been reduces to just 6 acres. The other 74 acres are monocrop, sprayed heavily, and loosing fertility.

Located in the Midwest of the United States, Crawfordsville Indiana. Located at 40°07'25.44”N x 88°59'34.12”W and at an elevation of 820 ft to 835 ft across the property. Below is an areal picture from Google Earth with property line in yellow.
Below is the original homestead to view what is around The Farm. As you can see runoff, and erosion seems to be a problem in the surrounding area.

The Climate

The property is zone 5b by USDA standards. Permaculture climate zone CFA-DFA. From experience some winters are mild and while snow may be on the ground it will only be for several days. Other winters there may be a blanket of snow from November to Late March. Summers can be mild reaching highs in upper 80’s to lower 90’s or others where temperatures can reach 100’s. Rainfall again is sporadic in some seasons rain will be on a weekly basis, to others where all summer no rain will fall.

<table>
<thead>
<tr>
<th>Temperature - Precipitation</th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
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<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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<tbody>
<tr>
<td>Average high in °F</td>
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<td>38</td>
<td>50</td>
<td>61</td>
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<td>78</td>
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<td>51</td>
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<tr>
<td>Av. precipitation - inch</td>
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<td>2.01</td>
<td>3.15</td>
<td>3.7</td>
<td>4.09</td>
<td>4.29</td>
<td>3.78</td>
<td>4.02</td>
<td>3.43</td>
<td>2.8</td>
<td>3.78</td>
<td>2.64</td>
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Winds generally come from the North West. Due to the massive amount of farmland and little obstruction there is almost always a breeze across the property. Placing a windmill for either electricity, or water pump on the north west corner and south east corner will turn 70% of the time.

**The Property**

Several structures exist on the property currently and several infrastructure additions are either installed or unmovable. There are 7 structures on the property, including a house. A propane tank is installed for cooking and supplemental heating. There are also 3 fireplaces throughout the house. There are several plumbed water lines to supply grazing lots 30+ years ago and are still operational. These are outlines in later drawings. The property is on well water and septic system. Power is provided by local municipality. There is a pond, and the property is split by the county road.

The home was started 100+ years ago as a 1 room building and over the years have added sections and room as the property has changed hands and needs grew. Currently there are 4 bedrooms and 1 ½ bath. Below is a outline using a transparency of existing structures, property lines, and some existing features.

The property slopes downward from the northwest corner to the southeast and southwest corners of the property. The south west corner of the property is the lowest. Here there is a hand dug well from at least 60 years ago which has since been filled in with bricks but could easily be reclaimed.

Using a transparency and Google earth maps I have outlined the property line, hardscapes, and not easily moved resources.

The soil is varied depending on the location. Where there is dense vegetation the soil is loamy and thick. In grassy areas, the soil has more clay, but still loamy, however it is compacted. Under the first six inches of soil is a dark gray-black clay. Based on digging from around the pond beneath the clay level is sand and gravel.

The property is surrounded by conventional farming using soybeans, and corn with chemical spraying for fertilizer and weed control. There is no overwinter crop in this area, which may present an opportunity to work with the farmer to plant a cover crop which may be grazed late fall/early spring.
Gray water outlet

Water outlets from well
Below is the existing producing plants that are already established.

Apple trees
Persimmon Trees
Mulberry trees
“Old fashion cherry” tart cherry
Mid season Peach trees
Mid season pear tree
Mid season plum tree
Gooseberry

Midseason blueberry bushes
Midseason red raspberries
Wild raspberries
Concord grapes
Oak
Pawpaw
Garden
Medicinal Herb Garden
Below is an overlay of the proposed grazing areas that will be established based on existing trees, structures, and patterns.

**Pasture 1.** This area contains the main barn, and an additional pole barn. Water is already run to this area in an underground line. There is also a hand dug well in the south west corner of the lot. The lot is currently partially wooded with pine, mulberry, and persimmon trees and dense undergrowth of shrubs and “junk” bushes, Asian honeysuckle, and various species of weeds. The pines will be removed and sawn into planks to repair the barn from years of aging. The tops and smaller branches will be used to mulch the blueberries, and raspberries canes. The pines will be replaces with oaks, and other upper story nutting trees. Oaks being the likely choice as they tend to do well in the acidic soil left by the pines. Fencing will be made of high tensile electrified fencing.
**Pasture 2** This area is on the west portion of the property. There is an existing underground water line that supplies this area. Pasture 2 has dense under growth and the pine trees once present are being replaced with oaks, mulberry, cherry, and pawpaw. The same process of rehabilitating the undergrowth will be used as in Pasture 1. Fencing will be constructed of high tensile electrified fence. Property boarders will be seeded with Osage Orange to weave a natural fence.

**Pasture 3** This pasture contains the pond on the property and is the highest point. No water flows from any area other than directly around the pond. The walls of the pond are very steep, and trees have taken up root around the walls. There is approximately 10-15 foot drop from the pond wall to the water level. The pond gets little aeration and the trees inhibit much light. As a result the pond is covered with a green string slime. Azola, and duckweed have been seeded in the pond to provide coverage, reduce nitrates, and provide food for future fish stocking. The pond is what was referred to as a “turkey nest” pond during the PDC training, except there is a sloping almost boat ramp leading to the surface. The plan is to dig the walls out further, allowing more catchment from the surrounding area around the pond. Leaving small islands where existing trees can remain, and having chinampas around the outer ring of the pond. Because of the gravel sand composition, it may be necessary to seal the pond again. This will not be known until excavation. Bentonite clay is not available. There is clay in the surrounding soils and may be used to seal with compaction. If this does not work, gley, using green organic matter fermented along with cardboard will be used. The end goal of the pond is: water source, fish pond, swimming area, irrigation source, water purification, and food source. Fencing will be made of high tensile electrified fence. On the outer edge of the fence Osage Orange fencerow will be planted to eventually have a source of coppicing wood for fuel, and a living fencerow to keep animals in, and predators out. Portions of pasture 3 are currently being used as a hay lot and harvested 2 times a year only to keep the field cut and manageable.

The pond will have fencing around to keep animals out of the pond area. The pond will be used for irrigation, animal watering and fish production.
**Pasture 4**

Pasture 4 is currently cut as a hay lot. It has some orchard grasses, some alfalfa, and red clover. There is currently no water to this area however there is a water outlet in pasture 5 and water can be brought to the animals. A portable structure will be used to protect animals while in this area. There is currently a deep pit which was used as a burn pile for waste from the farm. This has the potential to be a enclosed area for animals if a roof was added.

![Pasture 4 Images]

**Pasture 5**

Pasture 5 is a wooded lot used as a wind break. There is dense undergrowth. There is an underground water line already run to this area. There are pines, cheery, mulberry, and maple in the treed area. The established plants in this area are similar to Pasture 2.

**Pasture 6**

Pasture 6 is heavily wooded. There are pines, mulberry, cherry, pawpaw, and maple trees. The pines will be cut over time and allow the maple and cherry to grow. Oaks and additional pawpaw will be planted to replace the pines.
**Pasture 7**

Pasture 7 is the orchard. Currently planted trees are apple, peach, pear, old fashion cherry, plum, gooseberry. Some trees are over 30 years old and heavily productive. The area is relatively flat however swales will be added in the future to accommodate the existing trees. Newly planted trees will be planted along the new swales. Orchard grass, clover, and plantains are growing however it is mowed heavily as lawn.

**Pasture 8**

Pasture 8 is all pine, however mulberry and cherry are starting to emerge through the undergrowth. Pasture 8 is a temporary pasture 2-3 years at most due to its size and future plans with a pond on the lower portion of the property which will be used for water runoff control, water collection, and pond to pump water back up to the upper pond.
**Pasture 9**

Pasture 9 is heavily wooded with pine, mulberry and persimmons. There is an old hand dug well at the south west corner of pasture 9. There is a pole barn enclosed on 2 sides and a roof. The roof and sides are of sheet metal and wood.

Animals that will be raised are goats, cows, horses, and pigs. Goats will be introduced initially to remove much of the undergrowth. Pigs will follow to turn soil. Chickens will follow the pigs to reduce seeds, and pests. Cover crops of legumes, clover, alfalfa, and radishes will follow.

While some pastures are small, they will be rotated as the pasture demonstrates the ability to support each species. The production will initially be for persons on the homesteaders and if abundance sale or trade to local families.
Currently there is no room for zone 5. As future purchases allow for property expansion more zone 5 area will be added to allow the soil to rest, heal, and regenerate. Zone II will contain the vegetable gardens and some chicken tractors. Zones III will contain the pasture and main animal grazing area, as well as the orchard. Zone IV will also be a grazing area for pigs/chickens but will also foster wood harvesting and act as a wind break. The outer edges of Zone III will also be used for coppicing for wood production.

**Animals**

The animal introduction will span over years as budgeting allows. Starting with layers in Zone 1. There is an old chicken yard which will be resurrected. In Zones 2 and 3 chicken tractors will be made with scavenged lumber and parts from around the farm from years past use on the farm. Three tractors of 25-50 chickens each of meat birds will be place on pasture 1. Additionally four tractors in pasture 3, four tractors on pasture 5, and four tractors on pasture 7. This chickens will prepare the ground for seeding with nitrogen fixing cover crops. 2-3 days behind the chickens seed will be spread and lightly covered with straw or hay. This could result in 375-750 chickens per cycle and 3-4 cycles per year. The total for
the year would be 1,125-3000 birds a year to purchase additional fencing, plants and earthworks. The fencing purchased would be installed to pastures 9, 2, 5, 6, and 8 which are Zone 4. Rotating as needed based on impact to plant and pasture life. 2-4 pigs will be raised and rotated. Once pigs are introduced, free range layers will follow behind the pigs. Behind the chickens cover crop and forage plants will be seeded. Eventually pasture 1, 3, 4 and 7 will be fenced for cattle. Once cattle are introduced all the animals will rotate following the examples from The Permaculture Manual.

**Earthworks**

Due to limited funding smaller swales will be dug by hand, larger earthworks projects such as extending the pond, and adding additional ponds will have to wait until the farm can support through revenue generated by the farm from animals and produce.

Brown lines indicate hand dug swales. Directional arrows from the hand dug well on the south west corner and the new pond on the south east corners are pump lines. Solar or wind powered pumps will pump water from the pond and well to the pond higher up on the property.

The pond will be dug out to remove the steep sides and allow for more water collection by sloping the side more for a wider collection area. The blue line is the original pond, the red is the proposed pond. Some existing trees will remain on islands for habitat of water fowl and amphibians. The outer ring of the pond will be 6-36” deep for reeds and filtering water/bog plants. Vining vegetables will be planted in chinampas and harvested from a flat bottom boat.
The hand dug well will be re-dug, and utilized to collect water and pump back up to the pond.

Osage Orange hedges. Fencing, and later as coppice firewood, tools, and lumber
Comfrey patches, feed for animals, compost additions, fertilizer teas, medicinal uses.
Earthwork pond/dam
Water line flow, or drainage flow
Swale Water pump, wind or solar.

Structure
There are currently numerous structures already present on the property. The current design has gray water running off the property and sewage going into a septic tank. Plans to direct the gray water back to the pond rather than off the property have been made. A greenhouse will be added to the south facing wall of the home. During summer months this greenhouse is shaded from the sun by deciduous trees. The greenhouse would further the solar collection during the winter months. A head sink of rock or a small aquaponics pond will also allow for solar collection.

If there were no buildings present the location would almost be the same. 2-3 additional ponds in pastures 3, 4, and 7 would be a benefit, and perhaps less buildings and more growing area.
There are no water collection abilities on any of the buildings. An addition would be guttering around all buildings and adding water barrels, or 275 gal poly totes for water storage. Water or rain gardens around the buildings would also be of benefit.

Solar power collection could be added to building roofs. Currently municipal power is supplied to the property. The long term goal is to repurchase the 80 acre original homestead and establish more wooded areas. This wooded area will be the fuel for a wood gasification generator with wood boiler. Cooling would be using geothermal lines on the bottom of the pond and water circulated through solar/wind pumps.

Animals will be over wintered in the barns. Meat chickens and pigs will not be raised during the winter months. Free range layers and when cows are introduced will be kept in the barn.