**COOPx**

One origin story of how the Northern Paiute people came to be begins with “*a bird, the Sagehen. It was the only bird that survived a massive flood. The Sagehen made a fire and cared for it until the fire grew bigger and bigger. The water from the flood dried, and a man "happened."*
 - Isabel Kelly, "Northern Paiute Tales," The Journal of American Folklore

COOPx are mobile hen houses that only could be found at Fly Ranch. A dazzling orb on the landscape and littered with little chickens pecking at the struggling earth, COOPx are designed to be mobile, and are a perfect addition for the first phase of development for the Fly Ranch property. Like a disco ball beacon, they support the mission of this property. Let COOPx be a part of balancing the natural systems of the land, while celebrating the joy and inspiration of the incredible chicken.

**STRUCTURE**

The frame of a COOPx is based on the shape of an egg. Modularly built, the vertical plywood spines of the piece radiate on axis to form the volume of the hen house. Horizontal slats are then added to the frame to stabilize the structure and to add surfaces for nests and roosting bars. The inside of a COOPx functions like any small-scale family farm hen house, with a secured space providing food and water stations. The floor surface is a steel grate, allowing the nitrogen rich bird droppings to be collected once the piece is moved.

The entrance to the COOPx is through a small door that, when opened, serves as the entry ramp for the chickens. It is large enough for the average adult to crawl through for semi annual cleanings. When closed, it seamlessly aligns with the exterior surface of the egg-shaped hen house. The exterior is tiled with aluminum paneled ‘scales’, patterned like the breast of a hen. They are designed to shine bright during the day and at night are backlit with LED lighting for a futuristic glow. Like a cap upon its top sits a series of solar panels to power the LED lights, the ventilation fan in the summer and the winter water heater.

COOPx is managed from the outside. For collecting the freshly laid eggs, at key locations around the perimeter of the COOPx, aluminum panels are designed to rotate providing easy access to the nests. Water and food can all be refilled with ease from other access flaps.

For added cooling in the summer months, a ventilation fan can be placed at the top of the COOPx. By tilting the solar panel top and turning on the fan, air can be pulled up from below. For additional security, a prototype for an outside pen has been included. This metal, fenced in chicken run, attaches to the access door of the COOPx and provides sufficient area for the chickens to roam, while being protected from certain animals that may have been attracted to the chickens.

**INTEGRATION INTO LAND AND PLACE**

While celebratory in scale, the reflective surface of the egg-shaped hen houses captures the surrounding light, reflecting the pride of the place and the mission for stewarding the land at Fly Ranch.

The dynamic egg-shape welcomes guests, from neighboring towns or distant cities. For the casual visitor that may stop by to get a better look at the COOPx, visitor information panels are provided, incorporated within the tiles of the exterior surface.

For locals, COOPx provides exciting economic and educational opportunities. Made available to surrounding community members, the collecting of eggs can be made into a viable small business venture for selling the eggs. The purchase of Fly Ranch COOPx eggs are a boost to the local economy while supporting local families. Well-fed hens can lay up to 250 eggs per year. For every chicken producing at COOPx, you can expect over $100 in revenue annually.

COOPx can serve as a dynamic educational tool for area schools. Classroom visits help local youth learn about the amazing chicken: the natural processes of their eating and fertilizing and the incredible, edible egg! As well, students can be introduced to the basic concepts of the environmental stewardship taking place on the land at Fly Ranch. For schools eager to be more engaged, educational workshops could be provided, or additionally, travelling a COOPx to a nearby school for a visit, or engaging local youth as summer ‘hen helpers’ tending the hens while gaining new skills and responsibilities.

Historically, *Centrocercus,* or the Sage grouse, numbered more than 16 million along the sagebrush steppes in 11 western states and Canada. Currently there are as little as 200,000 believed to be in the U.S. today, none located currently at Fly Ranch. As the sagehen holds significant value to the indiginous peoples of the area, COOPx would serve as a larger initiative in exploring the restoration of landfowl to the area.

*\*The design team wishes to acknowledge that this proposal is sited upon the ancestral, traditional and contemporary lands of the Northern Paiute peoples.*

**SUPPORT SYSTEMS**

FOOD:
Through the natural production of eggs, these chickens provide on-site organic and regenerative practices in food production. With the COOPx, local food scraps can be used to offset the diet of the chickens, naturally decomposing food waste for the benefit of creating fresh new food: eggs!

REGENERATION:
The closed loop cycle of the chicken is exemplary in demonstrating the regeneration and re-composition of the land for zero waste. Utilizing the mobility of the units, the surrounding landscape can be gently fertilized and aerated naturally by chickens. Droppings from the hen house can be collected and mixed into soil in the surrounding areas for better nitrate-fixing of the land. By placing the chickens on land in need of restoration, existing noxious weeds (which can harbor harmful insects and compete with native flora for nutrients) can be suppressed, without the use of labor-intensive mowing or the application of herbicides.

**REPLICABILITY & MOBILITY**

The COOPx is fully mobile and is recommended to be moved several yards every three days. This flexibility allows seasonal movements based on pest control and soil depletion.

Because a COOPx can be moved with a simple tractor, these pieces could be taken to nearby Gerlach, and used as an “egg stand” or a demonstration house for small scale farming practices.

**INPUTS**

For this site, with large climatic swings and proximity to people, it is recommended to bring docile, cold hardy, egg laying chicken breeds: Rhode Island Reds, Buff Orpingtons, Australorps, and Silkie Bantams.

The average adult egg-laying hen can eat around nine pound of food per month. If you limit layer rations, hens can biorecycle vegetable matter and insects at an alarming rate: Four hens can power through nearly 400 pounds of food waste in a year!

It is noteworthy to mention that chickens eat European mantis, a non-native species on site that is located ‘everywhere.’ Another invasive species, cheatgrass, can be managed by the chicken.

**OUTPUTS**

The goal for COOPx would be to house forty chickens per unit, generating as many as 10,000 eggs annually. But, the single most important benefit of COOPx is building the soil at Fly Ranch. Called “black gold” to some, chicken droppings are very high in nitrogen. A chicken can create one cubic foot of manure every six months.

**MATERIALS & TECHNOLOGY**

While dynamic in shape and scope, COOPx is pragmatic in its production, utilizing a simple construction methodology with standard construction materials.

Major dimensions: 13’ tall x 9’ wide

Materials: Plywood, dimensional lumber, recycled aluminum sheeting, waterproofing wrap, steel, solar panels

Technologies: Natural functioning of the chicken, composting, and solar panels for lighting and winter water heaters

Solar Panels:
Atop the COOPx sits a cap of solar panels. These panels keep the units off-grid and renewable. Power is required for lighting and the 125-watt winter water heaters for the chickens. While the technology is ever-evolving, the team would like to explore thin-film non-silicon solar cells.

**COSTS**

Cost estimate for one COOPx:
Wood: 24 sheets ¾” plywood: $1,500
Aluminum sheeting: 450 sqft: $300
Steel floor grid: $350
General lumber and fasteners: $1000
House wrap: $250
Solar Panel/dome: $2,500
LED lighting & wiring Exhaust fan: $1000
Chicken feed/water dispensers: $300
wheels and axle: $400
Optional Covered Chicken Run: $1000

Subtotal: $8600
contingency: $1300
**Total Approx. Cost: $10,000**

**PROTOTYPE STRATEGY**The COOPx would be as flexible in its production as it is in its mobility. We anticipate starting the prototype off-site, fashioning the parts and pieces that then could be shipped and assembled on site at Fly Ranch. An on-site buildout would consist of putting the pieces together, taking as little as two weeks to one month.

**LIFECYCLE**The lifecycle of the COOPx has been carefully planned for its long-term environmental impact. Built to last utilizing a solid exterior surface of recycled aluminum sheeting with an underlayment of waterproof building wrap, when the piece is ready to be decommissioned, nearly all of the materials can be recycled (steel and aluminum) or decomposed (wood).

**Environmental Assessment**

Traditionally, chicken production has had destructive impacts on water quality, harming natural habitats and adding to the global climate crisis. The [U.S. EPA](http://www.epa.gov/agriculture/ag101/printpoultry.html) cites these factory farms as being “a significant source of water pollution.” COOPx can have a GOOD impact in demonstrating a responsible way of living sustainably with the land.

Because factory chicken farming concentrates large numbers of chickens, manure production, sick animals, microbial pathogens, and nonorganic feed additives can negatively impact the environment. Factory farming contaminates soil and pollutes air and water, affecting both human and animal health. COOPx are smaller scale and mobile, but risks do remain.

It is important for organizers to consult local land officials. Chicken farming and its impacts may violate local, state, or federal regulations, which are enforced by fines or other penalties

Soil

Chicken manure, especially when worked into the ground, improves soil structure and provides nutrients for plants. But overfertilizing harms plants and can result in contaminated runoff. It is imperative that organic practices are used, as chicken manure can contain sources of heavy metals, trace antibiotics and hormones. Research has found that, “Droppings or manure sometimes contain cecal worm larvae that cause blackhead disease. Soil can also be a source of other pathogens from disposal of dead chickens or when chicken manure is stored nearby or spread on top of fields. This sickens wildfowl in particular.”

Wildlife

The amounts of fecal waste produced by chickens, with feathers, bedding and dead chickens, must be managed on site as compost. Storage of waste or overfertilization of land with chicken manure can cause runoff into the nearby lakes and springs. Manure contains phosphorus and nitrogen, and runoff that carries these nutrients causes algae blooms in fresh water. Heavy metals and pathogenic microbes in chicken waste also harm and cause disease in land wildlife.

Feed

As stated, chickens can eat as much as nine pounds of food per month. If free-ranging this can be a benefit to the environment, as long as their environment isn’t over consumed. Offsetting their food by introducing chicken feed can add costs and environmental concerns. Grains used in chicken feed have to be grown somewhere. The production and transportation uses fossil fuels, in some cases pesticides, and may have lead to soil erosion - all components of modern day agricultural practices.

As a farmer states: *“there really is no option for us humans to have no impact. Instead, we need to understand the impact we are having with any particular activity—whether that be the food choose we eat, where we choose to live, or how we choose to get around—and then seek ways to minimize the negatives and maximize the positives.”*

Small scale farming, like backyard hens or COOPx, produce a fraction of the manure creating a smaller footprint. Waste must be handled properly, returning to the soil in an eco conscious manner. Proper handling and maintenance of chickens can keep odors down, creating happy chickens, happy eggs, and happy neighbors.