



Preserving Genetics of Legacy Cannabis Communities

Building a Pathway to Archive, Authenticate, and Value Cannabis Genetics

Published April 20, 2022

Authors: Mike Catalano, Jason Cragholm, Lelehnia DuBois, Kelly O'Roke, Jeff Hamilton, Pattie Harris, Dale Hunt, Caleb Marks.

Contributors: Mitchell Colbert, Eli DUFFy, Rob Golightly, Christian Gray, Daniel Henricks, Eric Hiss, Kevin Jodrey, Michael Krawitz, Ryan Lee, Sandra Castaneda Lepp, Brendan Mckernan, Kevin Mckernan, Kelsey Parker, Bryan Preti, Mark Slaugh, Sarah Schuette, Sean Stamm, Charles Stockstill, Joshua Stroud, Dan Weedock, Martel Yip

Table of Contents

[Executive Summary \(Key Messages\)](#)

[Background](#)

[Preserving Legacy: Protection, Validation, and Elevation](#)

[Overview](#)

[Legal Protection for Breeders: Ownership vs. Artistry](#)

[How are Works Authenticated?](#)

[The Humboldt Legacy Auction](#)

[Overview](#)

[The Specials Auction](#)

[The Extraordinaries Auction](#)

[The Unlimited Auction](#)

[Who Can Participate?](#)

[Breeder Prospectus](#)

[Platform Details](#)

[Breeding Rights](#)

[Conclusion](#)

[How Everyone Gets Value](#)

[Technical Definitions](#)

[Works Cited](#)

Executive Summary (Key Messages)

- I. The Humboldt Grace Legacy Project seeks to defend, preserve and promote small, independent/craft farmers and breeders.
- II. The group is a collaboration of cannabis industry leaders specializing in breeding; cultivation; community building; science and technology—working towards the common goal of hosting a yearly event that auctions unique and new-to-market genetics.
- III. There is a crisis in the cannabis community today. Small craft farmers and legacy operators are being pushed out of business by over-regulation, over-taxation and industrial overproduction, as well as a lack of commercial business support services and infrastructure.
- IV. A yearly auction is being developed to sell seeds, clones, pollen, and license genetics through an innovative platform with the goal to increase the market value of craft products. We aim to educate on the value of the culture in these legacy producing regions—empowering the small craft operator to concentrate on unique genetics & processes.
- V. The Auction will utilize unique distributed ledger technology and smart contracts to create a new system for securing and tracking cannabis genetics through the supply chain.
- VI. Blockchain technology, including distributed ledger and smart contracts, are ushering in a new era of decentralization; transparency and efficiency—reducing counterparty risk in contracts. This technology aims to improve ineffective supply chains and contractual processes.
- VII. Tools like QR codes can follow and track the success of their genetics through different product line revenue streams, advertisements and offerings, sharing in those revenue streams as royalties and simplifying contract obligations.
- VIII. The key to this Auction’s success is a collaborative, active Community organized around the central values of “Love, Grace, Cooperation, and Diversity.” The Community was organized before the solution, not vice versa, like most DAOs. (Decentralized Autonomous Organizations.)

Background

Effects of Legalization and Industrialization on Legacy Cannabis Communities in California

For well over forty years, three counties in far Northern California have produced a huge percentage of the Cannabis (*Marijuana*) purchased and consumed in the United States. Following the sixties-era timber bust, groups of ‘back to the landers’ found inexpensive, logged-out land in rural Mendocino, Humboldt, and Trinity Counties and started establishing agricultural communities based on the values of the emerging counter-culture. According to Whitethorn-based historian Ray Rafael, the trade of Cannabis flower started as a sort of local currency within the region—with a much lower monetary value than we see today:

“Everybody shared vegetables, so why not share pot? We didn’t have any concept of pot as a commercial entity. We just wanted it to smoke. We wanted to have a good time, right? What else is there?”¹

A growing public health issue of hard drug addiction prompted the United States Government to launch the “War on Drugs” in 1971. Though many who grew and consumed considered the plant harmless, Cannabis was presented to the American public as a dangerous “gate-way” drug, and thus included in the military campaign to defeat the drug culture. This mission to eradicate the plant (and the alternative communities which grew it) ended up transforming Cannabis into one of the most valuable agricultural products on earth; effectively turning the places where it was grown into war zones. Law enforcement relentlessly targeted family farms² in the Emerald Triangle by way of military-style, helicopter assisted raids. Yet, as Rafael puts it, *“a struggling people in a depressed local economy could scarcely afford not to raise a crop as valuable as this³.”* At the height of prohibition, a pound of processed Cannabis flower could go for upward of \$3000 per pound. (For reference, a pound of seedless grapes sold for an average wholesale price of less than \$2 per pound in the US in 1995.⁴)

As time passed and prices continued to soar under prohibition, communities in the emerald triangle became more heavily subsidized by the growth and sale of Cannabis—by 2007, the U.S. Department of Justice estimated that California produced between sixty and seventy percent of all the marijuana consumed in the US.⁵

¹ Rafael, Ray. *Cash Crop*. 1985 p 46

² Family may also be defined with counter-cultural values; chosen family; intentional communities

³ Rafael, Ray. *Cash Crop*. 1985 p 46

⁴ Bureau of Labor Statistics. “Average retail food and energy prices, U.S. city average”
<https://www.statista.com/statistics/236887/retail-price-of-grapes-in-the-united-states/>

⁵Carah et al. “High Time for Conservation: Adding the Environment to the Debate on Marijuana Liberalization”
Bioscience. 2015, 1

In 1996, California passed the Compassionate Use Act (Proposition 215) and became the first state in the nation to legalize cannabis for medical use. This allowed someone who had been growing and innovating in the Cannabis space to do so legally though it remained (and continues to remain) a Schedule I⁶ at the federal level. Twenty years later, California voters approved Proposition 64, opening the industry further for recreational use. Voters in legacy producing regions such as Humboldt County narrowly approved Prop 64 based on the promise that a 1-acre cap would ensure that traditional farms would be able to transition to the regulated industry and remain competitive.

In spite of these promises to protect regional legacy economies, the acreage cap mysteriously disappeared from final regulations at the last minute. This opened the door to major corporate consolidation and industrial-level production in places like Santa Barbara County. Additionally, legalization across the nation continues to spread with states such as Arizona, Michigan, South Dakota, Oklahoma, New York, and Illinois opening to local production and retail sales.

In 2016, the California Department of Fish and Wildlife estimated the number of illegal farms in Humboldt County at around 4,000; though many, such as local environmental organization *Friends of the Eel River*, claimed it was much higher, more like 8,000 or 10,000.⁷ By 2021 however, there were only 1100 Cannabis Permits active in Humboldt. Though data in this area is still clouded by prohibition, we can estimate that less than a quarter have transitioned to a “legal” operation as of this writing. Additionally, industrial overproduction in other areas of the state has resulted in the price of Cannabis plunging to below \$300 per pound, if the operator can sell the product at all. Corporate overproduction; massive regulatory obstacles; over-taxation; and disadvantages such as remote locations, bad roads, and isolation from market partners—these factors have combined to create an extremely difficult climate for legal operators in the Triangle.

News articles emerging in mid-2021 began warning of an “extinction” event for small, family-run farms.⁸ What was once a multi-billion dollar industry for the region is rapidly giving way to the dominance of the industrial model-based far away in the central valley, draining local resources, sales tax revenues, and the capital needed to keep emerging small businesses afloat. Not only are family farms in danger of becoming extinct, we are also facing the loss of half a century of innovation, experience, genetic diversity, local culture, and the quality of product grown in Emerald Triangle appellations.

Diversity is deeply related to resiliency and sustainability in all kinds of systems. In terms of agriculture, we know from the last 150 years of industrialization that there are many benefits to

⁶ Schedule I drugs, substances, or chemicals are defined as drugs with no currently accepted medical use and a high potential for abuse. Some examples of Schedule I drugs are: heroin, lysergic acid diethylamide (LSD), marijuana (cannabis), 3,4-methylenedioxymethamphetamine (ecstasy), methaqualone, and peyote.

⁷ Mernit, Judith Lewis. [“High Times: Marijuana Growing and the Environment”](#) *Capital and Main*. August 30, 2016

⁸ Bryant, Jackie. [“Growers in the Emerald Triangle are Facing a Potential Extinction Event”](#) *High Times Magazine*. Sep 9, 2021

a monocrop which can offer predictable, consistent results and high yields. However, we have also observed the heavy costs: such as limited resistance to new pathogens which can cause devastating, wide-spread crop loss. Some genetic expressions may provide high yields but are not suitable for the local environment. This can result in the need for more water and extensive soil amendment with chemical fertilizers. Monocrops almost always present with more pest pressure, leading to widespread pesticide use and damage to local eco-systems.

Even though you see many different cannabis varieties advertised in your legal dispensary, most of those that are commercially available have been developed from a relatively limited number of ancestors. This can lead to what is known as the “Founders Effect.” Botanist, molecular biologist, and patent attorney Dr. Dale Hunt describes:

“Think of the castaways stranded on Gilligan’s Island. Suppose the island had been very large with abundant resources, the castaways never left, and no one else ever came to the island. Instead, the original seven inhabitants had children, their children had children, and so on.

*Many generations later, there could be millions of people on the island. But all those people would have the same ancestors. No matter how many branches in any family tree, **the entire population of millions of people still would have no more genetic diversity than the original seven people, unless an occasional mutation occurred and was passed on to subsequent generations.**”⁹*

Emerging research suggests that genetic diversity in terms of medical applications of Cannabis is critical. Cultivation methodology and conservation of cannabis genetic plant material is of utmost importance for providing consistent therapeutics for targeted disorders and body systems¹⁰. Many patients claim that only a few types of cultivars alleviate their symptoms, and a wide variety of biodiversity within cannabis genomics is important to provide patients access to products which provide therapeutic efficacy.¹¹

Isolation of breeders and farmers under prohibition has preserved a rich diversity outside the industrial-corporate space which is so susceptible to this “Founders Effect.” This wealth of diversity is living in Legacy Cannabis communities and in the seed collections gathered by some of the giants of our industry, most of whom are not famous or yet recognized for their work. It is also available in landraces that exist all over the world. However, if we do not actively seek out, protect, validate and provide a path for just compensation for these unique genetic expressions, they may be lost under a great tide of industrialization.

⁹ Hunt, Dale. “[Biodiversity in Commercial Cannabis: Why it Matters.](#)” *Cannabis Business Times*. August 7 2020

¹⁰ Chandra, et al. Cannabis cultivation: Methodological issues for obtaining medical-grade product. *Epilepsy & Behavior* 70 (2017) 302–312. [https://www.epilepsybehavior.com/article/S1525-5050\(16\)30588-1/fulltext](https://www.epilepsybehavior.com/article/S1525-5050(16)30588-1/fulltext)

¹¹ Oultram, J.M.J.; Pegler, J.L.; Bowser, T.A.; Ney, L.J.; Eamens, A.L.; Grof, C.P.L. “Cannabis sativa: Interdisciplinary Strategies and Avenues for Medical and Commercial Progression Outside of CBD and THC.” *Biomedicines* 2021, 9, 234.

Preserving Legacy: Archiving, Validating, and Elevating

Overview

With our regional communities struggling under these exceptionally difficult market conditions, **The Humboldt Grace Legacy Project** was formed as a strategy to protect legacy operators and seek out creative, collaborative solutions. In early 2021, the group started holding open, weekly online meetings—bringing together industry experts on cannabis genetics; cannabinoids; cannabis cultivation; DNA sequencing; blockchain technologies; cannabis compliance, and law. The group’s goal was to build a pathway forward to preserve and value the genetic diversity and experience of the legacy communities—reinventing how breeders transfer the rights to cultivate their unique cannabis genetics.

The group operates under a set of mutually agreed on value statements to guide the development of the work:

We create with integrity.

We empower innovative solutions.

We value quality over quantity.

We support regenerative practices.

We act in service.

We are conscious.

We are cooperative.

We are collaborative.

The group has developed the framework for a **METRC-compliant Auction**. The Auction is a marketing platform to help elevate the value of the items but all auction transactions are conducted B2B with CA licensed operators. The 21 and up only “farmers market” aspect of the event will include sales to the public and on-site consumption and is hosted with our METRC complaint partners who hold active nursery, retail, distribution, and events licenses. The auction will offer traditional plant breeding materials including seeds; clones; pollen; and the *rights* to commercialize a genetic expression for a fixed period of time. The auction and associated technologies which are being collaboratively developed to support it, give California compliant breeders, nurseries, and cultivators a chance to protect and value their intellectual property, while also creating unique and secure sales opportunities through blockchain technology.

The Legacy Project auction will provide farms, brands, and researchers outside of the region the opportunity to access unique and legacy cannabis genetics while at the same time empowering the small farms in the Emerald Triangle to stay focused on innovation, uniqueness, and quality.

A Pathway to Defend Breeding Works: *Ownership vs. Artistry*

In order to preserve and enhance the “craft” value of our regional products and processes, clear boundaries must be in place to create an exclusive, unique product. At the same time, important philosophical issues emerge with words like “ownership” within Cannabis Culture.

How can you own a plant or plant genetics? In order to ask legacy breeders and collectors to risk bringing their highly-coveted genetics public for auction, we had to first attempt to approach this problem of intellectual property (IP) in cannabis: how to defend it, where to store this data privately; and how to value it.

The Legacy Project is collaborating with several pieces of developing technologies in order to create solutions. (Definitions of important technical terms are included at the end of this paper for your reference.)

Canopyright is a *decentralized*¹² digital bank, currently in the patenting process. Drawing on the precedent of the music industry, this new platform treats breeders like *artists*, rather than owners. Expanding this music metaphor, a unique cannabis cultivar is treated as a song, with flowering Cannabis plants (or other derivative products that are manufactured using that genetic material) as the “*play*” of a song. Thus, what might commonly be known as a “cultivar, varietal, or strain” is defined and preserved as an **artistic work**— a demonstrable relationship between the breeder, plant, social and genetic history, growing environment, and methodology—which is all tied to a registered physical sample in Canopyright.

This sophisticated mechanism confidentially links a sample of plant material to a large set of quantitative and qualitative data about the work including, but not limited to: chemical profiles; DNA sequencing; narrative history; microclimate, and more. The software also integrates with METRC so that invoices may be created for each archived cultivar. Additionally, though unable to participate in the Legacy Auction, home growers and traditional market breeders who did not manage to transition to the highly regulated legal market can utilize this blockchain to place their artistic works (genetics) in the safe deposit box (Canopyright) until such time they are able to legally license those works.

Allele Group’s approach to leveraging blockchain technology to archive cultivars is from a data organization perspective. They offer this project a patent-pending algorithm of smart contracts

¹²Decentralized means that no single computer stores data associated with the “bank.” Data is instead broken up into smaller packets stored on multiple servers, and linked by an encrypted code.

and features that allow breeders (plant artists) the tools to tokenize their horticultural collections and creations.

This data will be tokenized on the Polygon¹³ blockchain via smart contract code—turning the cultivar (artistic breeding work) into what is known as a **Master Unique Identity Asset Marker or MUIAM**. Ownership of a master UIAM evinces both ownership and “publishing rights.” Minting¹⁴ rights can then be granted for *fractional* genomic identical copies of that UIAM for sale or to an individual or company. These Gen 2 UIAMs represent the respective number of clones, seeds or tissue cultures that the owner has available for sale. You could think of the master UIAM just like the original master tape recording of the Beatles’ song “Let it Be.” The owner of that master recording can license the right to utilize the song for many applications: in a car commercial, a movie, or to be downloaded via iTunes, for example. The song playing in the background of that commercial is an example of a fractional copy of a UIAM.

Let’s take a cannabis example now: a breeder registers a sample of their artistic work on Canopyright by preserving a small sample of plant material or seed into a QR code stamped evidence bag. The breeder/artist adds a narrative history of the cultivar; genomic sequencing data; Cannabinoid and terpene profile data; information about microclimate and growing processes into the Canopyright platform which is then tied to that physical sample through the QR code.

The Allele group algorithm then takes all of this combined physical and digital information and mints the master UIAM associated with that sample. The artist (the breeder) can then mint and sell identical copies of that work¹⁵—the minted tokens can be verified as authentic genetic copies from the authentic creator of that genetic material. A cannabis brand can then license the right to mint flowering plants of the cultivar for a set period of time. Utilizing Metrc data tied to the token, the owner of the Master can now automatically generate invoices, through Canopyright, for fractional copies all the way down the supply chain, like a musician can be compensated for each play of their song, CA cannabis licenses operators only.

¹³Polygon is a public ledger of transactions – a highly secure and distributed database that everyone can read from and write to. A copy of the ledger, which only persists in the latest state, is stored on each node. These core concepts of distributed consensus and decentralization make public ledgers the most trusted way to store verifiable information and assets.

¹⁴ Minting is the method of publishing data to a blockchain or digital ledger that enables a person to generate a new token without the involvement of a central authority. Minting a fungible token allows you to increase the total supply of the token. Minting a non-fungible token creates an NFT with its unique metadata for the class of NFTs defined by the token ID

¹⁵ How the smart contracts currently work is; only the wallet that minted the MUIAM has permission to mint gen 2 copies, and breed or auction breeding rights to that MUIAM.

The Ethical Data Alliance is a Non-profit organization that created the Ethical Data Exchange Network (EDEN). The Ethical Data Exchange Network is a protocol that teaches users how to leverage and share data amongst trusted peers in ethical and meaningful ways, EDEN utilizes the Interplanetary File System, (IPFS) which is a decentralized peer to peer encrypted data sharing file storage system, IPFS is also where NFT metadata is stored off-chain and can be updated or edited by the content creator. Here the cannabis culture can continue to archive and share their unique processes and experiences. The Legacy Project will be using the EDEN pilot project to document this paper, the “Extraordinaries” prospectuses, and other data we create from our work.

Through the collaboration of the community and these emerging technologies, we have created a pathway for our community’s unique legacy, as well as a mechanism for invoicing utilizing the track and trace system for legal operators to retain chain custody and prove compliance regulations.

How are Works Authenticated?

Now that we have an understanding of *how* we can defend a breeder’s unique work with decentralized technology, we need to authenticate and validate these artistic works for the purpose of Auction. In developing a prospectus for the cultivars, The Legacy Project has identified several categories of documentation that can be utilized within the blockchain to defend the cultivar and tie it to a physical sample including:

- Breeder Biographical Narrative
- DNA sequencing
- Private Research
- Marketing Description
- Historical Documentation
- Photo and/or scanned leaf pressing
- Other testing and scientific analysis.
- Industry expert evaluation
- QualSCORE®
- Ethical Data Alliance

Medicinal Genomics¹⁶ has offered Next-Generation DNA sequencing using the StrainSEEK panel for our project, though breeders are welcome to use an alternative service provider for DNA sequencing data. The StrainSEEK genome sequencing panel allows the identification of cultivars by providing a detailed genetic fingerprint. This genomic profile is locked into the blockchain to give breeders an indelible piece of evidence that can be used for protection and license management. This genomic information and block-chain registration can be linked within Canopyright to augment the breeder’s cultivar profile and help provide the potential

¹⁶ <https://www.medicinalgenomics.com/genomic-services/>

licensee with the most complete set of information. In addition, short of whole-genome sequencing, the StrainSEEK panel provides the most information about the underlying genetics of the cultivar including desirable traits, such as cannabinoid and terpene synthase pathways, pathogen resistance, sex determination, and more. The panel sequences more than 10 Mb of the cannabis genome, covering over 7,000 important functional genes, and hundreds of thousands of genomic variants. Medicinal Genomics uses the most contiguous and complete cannabis reference genome, Jamaican Lion, to map all the genomic data it generates. With BUSCO scores exceeding 97%, Y-chromosome information, and active CBDA and THCA synthase genes, the Jamaican Lion reference provides the most usable genomic analysis available.

QualSCORE®, is the first fully systematized unified feedback solution for the cannabis industry to measure and track quality and customer happiness through market research. QualSCORE® Quality Ratings are based on real, verified customer feedback. The Legacy Project is working with this technology to gather feedback from the breeders, the buyers, the panel of evaluators, and the attendees during the event. With the fully-automated system, that is directly integrated into payments, we will not only provide the breeder with valuable market data but we are allowing everyone attending the event to evaluate the auction items¹⁷ and the auction experience.

By utilizing a mix of quantitative and qualitative data, we are giving breeders a chance to tell the whole story of the breeding work (or carefully preserved legacy cultivar.)

The Humboldt Legacy Auction

Overview

With the ability to archive, authenticate and validate unique cultivars, the Legacy project has now developed the framework to value and offer these works for licensing through an innovative, annual Auction event. The Legacy Project will act as a marketing platform to help the breeder sell their cultivars but all auction sales transactions will be B2B invoiced through the CA METRC in Canopyright. All on-site sales and consumption will be METRC compliant through our nursery, distribution, and retail partners. The auctions will be live-streamed via the U.S. Weed Channel (USWC), the only Cannabis Media platform federally certified as both a 'Broadcast and Streaming' and 'Digital Advertising' company via the USPTO. USWC is installed and viewed in over 170,000 homes, reaching 56 million U.S. plus a global reach of 21 million to 100+ countries in 5-languages.

Our auction will provide a sleek industry space to educate on the wide range of applications that high-value genetic expressions have—from recreational market trends to specialized medical research. Well-designed auctions have been shown to distribute resources more fairly and the

¹⁷ More information on QualSCORE here: https://www.youtube.com/watch?v=nCG_wW6C6hE

Legacy Auction is being carefully developed to preserve and create an equitable distribution of value. The value of a breeder's work is not simply determined by the quality of the data which authenticates it, or by the market value of similar cultivars, but also by the perceived value of the bidders in real-time.

In 2020, two Stanford economists were awarded the Nobel prize in Economics for their improvements to auction theory and formats, and the Humboldt Legacy Project is developing our event around this research. "People tend to have the impression that auctions are all about competition, but a lot of what we also study is how to design the rules to get an efficient, cooperative outcome."¹⁸

The Legacy Auction will offer **three auctions**. Two with in-person *and* online bidding, and another online-only auction that continues for a day after the main event. Both in-person auction events will be hosted by a professional auctioneer with a deep understanding of the cultivars.

There will be an invitation-only, non ticketed event, the evening before the auctions in a relaxed and sophisticated setting in compliant with CA cannabis regulations. Bidders and breeders will have the opportunity to connect, discuss and sample the auction items and then QualSCORE® will be used by attendees to "score" the items prior to the next day's auction events.

All breeders must be 21+, and have a CA cannabis licensed nursery and/or cultivation license. All bidders must be 21+, and have a CA cannabis licensed nursery, farm, distribution, retail, and/or micro license that is compliant to CA regulations. All attendees must be 21+.

The Specials Auction:

The first auction of the day is "**The Specials**" Auction, which is held in-person and online. It takes place during the day with a "farmers' market" type atmosphere that includes local art, music and food. All the auction items will be available to purchase and consume in a CA cannabis compliant setting. There will be other exotic genetics from the local region as well. The market allows attendees to engage in the evaluation process through QualSCORE®.

After adequate time for registration and evaluation, the first item goes up for bidding when the auctioneer determines the crowd is ready, (within a predetermined window.) It will feature Metro compliant sellers offering unique cultivars with a partial prospectus. It is open to all attendees who are pre-qualified and pre-registered CA licensees Metro compliant B2B buyers and sellers. This auction will end late afternoon, and the farmer's market will continue toward the main event of the evening.

¹⁸ De Witte, Mellissa. "[The bid picture: Stanford economists explain the ideas behind their 2020 Nobel Memorial Prize in Economic Sciences](#)" *Stanford News*. November 19, 2020.

The Extraordinaries Auction:

The climax of the event will be an in-person *and* online auction—featuring Metrc compliant sellers and limited to 6-8 of the most authenticated, unique and desirable cultivars. All bidders in this auction have pre-qualified and are Metrc compliant buyers. Most Bidders have attended the invitation-only event; had ample opportunity to read the prospectus and vet the cultivars.

Each cultivar offered has completed the in-depth prospectuses process, outlined below. They will be registered in Canopyright; have a QualSCORE® Quality Rating from the attendees at the day event; and will show high value through the evaluation conducted by a panel of expert evaluators.¹⁹ The evaluators will use the prospectuses in Canopyright to evaluate. Evaluations will be published along with bios of each breeder and cultivar, available online before the event and in print at the event. In-person bidders will be given the traditional paddle to bid and each breeder will tell their story before the bidding on their item begins. We will show a video to honor the legacy of the cultivars and tasting will be available for all bidders. When the auctioneer feels the room is ready they will open the bidding for the cultivar. We will repeat this cycle for each item until the close of the auction.

The flagship cultivar for the Legacy Project is a Donated *Skunk #1 pre 1996*. Breeder Martel Yip, in collaboration with Hendrix Nursery, has donated this controversial cultivar to go through the process of protecting, authenticating, and validating to ensure the integrity and functionality of the Auction and all associated technologies. All proceeds from this flagship cultivar will be used to purchase Metrc-compliant community cryobanks for all three regions in the Emerald Triangle.

The Unlimited Auction:

The “Unlimited” Auction begins immediately at the closing of the “Extraordinaires.” This is an online-only event, and the only requirement to participate as a seller is to be legally able to sell in the State of California. The only requirement to bid is to be a Licensed buyer in the State of California.

Who Can Participate?

Any California licensed breeder, nursery, and/or cultivator who has prequalified, and is registered on Canopyright can offer contracts in the unlimited Auction event. In order to be eligible for the more exclusive auctions, (**Specials** and **Extraordinaries**) a *Breeder Prospectus* must be submitted along with Canopyright registration. In order to be offered in the *most* exclusive tier of the auction, an industry expert panel will conduct and publish an evaluation for each cultivar, in addition to the prospectus and Canopyright registration.

Currently, any licensed California buyer who registers with the Auction may participate in bidding. The Auction may choose to develop a framework in the future which adds leverage for

¹⁹ Evaluation panel will consist of scientists, doctors, breeders, cultivators, patients, and market experts.

small, craft players. There could theoretically be minimum qualifications for bidders for specific auction items, such as requiring that a bidder be the owner of another type of NFT. While this aspect of the auction is currently in development, equity groups, appellations, certifications and even artists and influencers could potentially mint tokens which qualify a brand to bid on a rare cultivar.

Breeder Prospectus

The Prospectus is a type of application form which helps the auction to demonstrate the potential value of the offered work and consists of the following sections:

1. Breeder Biographical Narrative
2. Marketing Description (i.e. why the strain is special and what work has been done to date)
3. Historical Documentation
4. DNA Sequencing
5. Lab Testing
6. Cultivar description
7. Cultivation requirements
8. Appellation of origin
9. Photo and/or scanned leaf pressing.
10. Auction Information (i.e. what is available for sale and how it can be sold)
11. Qualified Bidder/Minimum Volume Requirements
12. Lease Contract requirements
13. Breeding Contract Requirements “if you want to breed with this, you have to pay me X ”
14. Social Equity/Community Support Statement
15. Non-fungible token (NFT)

Platform Details

Breeding works (or cultivars) will be “tokenized” for the purposes of the auction using the Allele Group and Canopyright mechanisms detailed in the previous sections. For example, a breeder who has tokenized their cultivar into a Master UIAM, submits a robust prospectus and is selected to participate in the “Extraordinaire Auction.” The breeder will then choose to mint a certain number of tokens for auction. These newly minted digital assets do not represent ownership of the cultivar, which always stays with the breeder. Instead, they represent a *licensing contract*. For now, we call them “Cultivar Authorization Tokens” or **CAT**²⁰s.

These fractional NFTs are a new type of property right which represents the right to commercialize a cultivar for a fixed contract term. A winning bidder would receive a CAT, giving them the right to generate “Fractional Unique Identity Asset Markers,” or in other words, the right

²⁰CATs or Cultivar Authorization Tokens may be renamed with a marketable, ‘meme-able’ acronym as the Auction is branded for promotion.

to create clones, seeds, tissue culture, flower or concentrate using the tokenized cultivar. This also gives them the right to market and label their derivative products as genuine, along with a chain of custody which can be followed back to the original sample in the breeder's freezer. The Canopyright registration within the token will always be tied to a real physical sample, validating the token as genuine.

The auction will utilize defined commercialization periods within licensing contracts; with licensing details determined by the owner of the master UIAMs. Only the breeder's CA Cannabis licensed nursery or CA cannabis licensed farm *and* holders of the gen 2 tokens are allowed to produce it for a defined window. Tokens may also include a *right of first refusal* to purchase the harvest from the breeder's CA licensed farm, as the breeder will know best how their strains grow. The harvest coming directly from the breeder's CA cannabis licensed farm would be known as the "private reserve" or "estate grown" flower.

The breeder always sets the parameters around the ownership of the Tokens including how many there are; qualified bidder requirements etc. CATs are auctioned off to the bidder willing to pay the highest price per "flowering plant" (*or other trackable trigger in Metrc*²¹) for commercialization.

Let us take an example: Four Brands all want to market an acceptable volume of a desired cultivar, but the breeder only wants to issue two "CATs" In this case, the four competing brands would have to outbid each other, and the two brands willing to pay the highest price-per-flowering-plant (let's call this the "winning bid price") would be the victors.

Another important feature of a CAT is that it can be resold. If, for instance, the winner decides *not* to include the new cultivar in its strain lineup, the brand would then have the right to sell the token to another brand. This increases market value and decreases risk for bidders seeking new cultivars.

It is important to note that all contractual obligations are between the breeder and the winning bidder, the Auction is only providing a platform for simplified interactions.

Breeding Rights

The Utility of the UIAM smart contract is the ability to transfer breeding rights. As such, we will also be auctioning off the rights to use plant material (seeds/clones/tissue culture) as part of a breeding program, using some application of "Cannabis Breeder's Rights ver. 2.0."²² Rights could be auctioned as a straight cash-to-the-breeder exchange or bidders can bid for use of the cultivar for a percentage of future profits generated from a breeding program that uses that cultivar.

²¹ Metrc records employees, all plants, changes in rooms or growth phases, inventory transfers, activities within a package tag, waste records, user activities, date and time of activities, sales, processing activities, and repackaging. Everything that is recorded in Metrc cannot be deleted.

²² [Whiting, Jerry. "Cannabis Breeder's Rights Ver 2.0." 2019](#)

For instance, if a breeder wants to cross their cultivar with another rather than growing it unmodified, an auctioneer would be taking bids that maximize the cash flow to the breeder. Breeding rights also would only last for the commercialization period, unless the bidder comes up with a separate arrangement with the breeder.

Data Contract

In the Prospectus, the breeder can specify all of the cultivation/breeding/plant data that's being collected and offer the rights to license that data. Private companies would bid on this data and then set the cost for nonprofit institutions at a percentage of that amount. Mechanisms for transferring actual plants for research will need to be developed.

The "Home Grower"

As part of the price of admission to the in-person auction event, home grower attendees will be given the option of buying up to 6 clones or seeds for rare/hot genetics. The idea is if someone wants to roll up to the in-person event and spend a weekend sampling the rarest/hottest genetics on the market, there should be an up-front commitment to support one of the breeders whose strains are being showcased.

Conclusion

How Everyone Gets Value

The Humboldt Grace Legacy Project builds collaborative networks, creating wins-wins toward common goals. Everyone must receive value if the project is to be in alignment with the organization's values.

First and foremost, a portion of the "Home Grower" admission goes straight to the breeder in exchange for the clones. Second, when the token holder tags a plant in Metrc, Canopyright generates an invoice at the "*Winning-bid price.*" **All Tokens and Breeding Rights expire at the end of a fixed commercialization window (set by breeder) and all rights revert back to the breeder (unless the breeder chooses).** When a Brand acquires a cultivar authorization token, the breeder has the right to mint new CATs from the original MUIAM as soon as the terms of the licensing contract expire.

Along with a way to defend their unique works, breeders will also receive discounted genetic sequencing (Whole Genome Shotgun Sequencing with Stem Sample) through our market partner, Medicinal Genomics. Breeders will have access to unique market data through

QualSCORE®, which can be utilized when offering future works. Works chosen to be offered in the most exclusive Auction event will also receive documented, expert evaluation of the cultivar, and the associated marketing advantages of participating. This project may also assist breeders in navigating traditional IP strategies such as patents and trademarks, which are often costly to obtain and out of reach for many legacy players.

By offering this Auction, The Humboldt Grace Legacy Project will continue to grow its value and reputation as a collaborative group that creates solutions for community members. At first, profits from the Auction events will go toward community cryobanks to safely store genetic samples. The auction honors our culture by educating and increasing the value of a breeder, an expert cultivator, a small farmer, and the IP behind legacy cannabis. The auction also provides a marketing opportunity for local vendors, driving traffic to our farms, nurseries, market partners, and supporting community organizations.

Bidders and Buyers receive massive value by gaining access to diverse genetic expressions that have been, in some cases, hidden for decades. The authentication process allows for a basic framework for the valuation of an expression based on any number of factors, including how it was grown and bred; its potential medical applications; any associated market data, plus a real-time community-driven valuation that is reflective of the ever-changing market. The combination of an authenticated and validated (we know this genetic is the same as the sample registered on Canopyright) mitigates risk for the buyer. Much like horse racing, the bidder has the chance to risk more or less, based on the quality of the prospectus and expert evaluations. For bidders hoping to manufacture a formulated product, the auction provides a streamlined way to seek out particular terpene or THC profiles, leading to better consistency in their product lines.

The community overall receives value from the Legacy Auction through sales tax revenues, increased tourism, and the economic success of local Cannabis businesses, which re-invest into our communities through local and state cannabis taxes and fees, as well as through charitable giving. It allows cultivators and nurseries to build value in the “virtual” space, rather than expand their growing operations, especially in the sensitive ecosystems of the Emerald Triangle.

Above all, the auction seeks to protect and preserve the genetic diversity of the Cannabis plant, as well as the human diversity of the emerging industry—carving a valued place for those who led the way in the exploration and legalization of this powerful plant ally. Together we can create a collaborative, equitable event that generates opportunity for everyone involved.

Disclaimer

This White Paper is a snapshot of the current work of The Humboldt Grace Legacy Project working group. It is a living document that will be used to grow our collaborative networks, seek investment, and further refine an equitable and successful Auction event. The details contained in the white paper may be subject to risks and uncertainties, and the Auction may choose to revise or adapt any of the information herein.

Technical Definitions:

Blockchain: a system in which a record of transactions are maintained across several computers that are linked in a peer-to-peer network.

Decentralized: In blockchain, decentralization refers to the transfer of control and decision-making from a centralized entity (individual, organization, or group thereof) to a distributed network.

Cultivar: a type of plant that people have bred for desired traits, which are reproduced in each new generation by a method such as grafting, tissue culture, or carefully controlled seed production.

Cultivar Authorization Token: These fractional NFTs are a new type of property right which represents the right to commercialize a cultivar for a fixed contract term. They are minted by the wallet which minted the master UIAM.

Emerald Triangle: an isolated region in Northern California that is made of three counties: Humboldt, Trinity, and Mendocino Counties. It has been identified by its rich timber, unique magnetic fields, isolating mountain ranges, and the historic Cannabis industry.

Intellectual Property: a work or invention that is the result of creativity. This could be a song, painting, or even a unique plant cultivar, growing process, and/or valuable data. There are several different classes of intellectual property protections in the US including copyright, patent, and trade secrets.

Legacy: In general, the mark an individual leaves on the world. In Cannabis, Legacy is a term often used to describe a person or group of people who helped to create the industry before, during and after legalization.

Master Unique Identity Asset Markers MUIAM: a customized type of *Non Fungible Token* that is defined legally as a Utility Token and acts as an asset marker that represents and is a digital form of real property. These tokens are not securities, commodities, or fungible assets.

METRC: Metrc stands for Marijuana Enforcement Tracking Reporting & Compliance. It is a cloud-based compliance management solution. Regulatory institutions in multiple states require cannabis industry organizations to submit data to the Metrc system in order to fulfill their legal seed-to-sale tracking obligations. Metrc users interact with the platform through an online web portal. Users log on, report information, and confirm their data inside the cloud-based software application

Minting: the method of publishing data to a blockchain or digital ledger that enables a person to generate a new token using a smart contract. Minting a fungible token allows you to increase the total supply of the token. Minting a non-fungible token creates an NFT with its unique metadata for the class of NFTs defined by the token ID.

Non-Fungible Token (NFT): a unique digital identifier that cannot be copied, substituted or subdivided that is recorded in a blockchain, and that is used to certify authenticity and ownership (as of a specific digital asset and specific rights relating to it). NFT's are **not** crypto-currencies, such as Bitcoin BTC—those are examples of *Fungible Tokens*.

Tokenization - the process of utilizing software code to publish to a blockchain meaningful data, in this case, an account number (or Copyright registration); a genomic fingerprint sequence file; grow methodology; location information; botanical description etc. Once this data is published to the blockchain and digitized, these tokens become digital assets that live permanently on the blockchain.

Wallet (NFT): A digital asset wallet is used to access most blockchain or web 3.0 based applications, a wallets public keys or address is a form of a digital identity, wallets have both public and private keys, your wallet address is your public key and your private keys are a security feature of your wallet. For security reasons, you should never share your private keys with anyone as this would give them access or import your account. Digital wallets allow you to sign and confirm transactions when you publish data to the blockchain using a smart contract and are also where individuals store and access your NFTs. Digital assets are stored in your wallet and your public address and all of its transactions on the blockchain are auditable by looking up your wallet's public address on sites like etherscan.

Works Cited:

Bryant, Jackie. "[Growers in the Emerald Triangle are Facing a Potential Extinction Event](#)" *High Times Magazine*. Sep 9, 2021

Rafael, Ray. *Cash Crop*. 1985 p 46

Bureau of Labor Statistics. "Average retail food and energy prices, U.S. city average" <https://www.statista.com/statistics/236887/retail-price-of-grapes-in-the-united-states/>

Carah et al. "High Time for Conservation: Adding the Environment to the Debate on Marijuana Liberalization" *Bioscience*. 2015, 1

Chandra, et al. "Cannabis cultivation: Methodological issues for obtaining medical-grade product." *Epilepsy & Behavior* 70 (2017) 302–312. [https://www.epilepsybehavior.com/article/S1525-5050\(16\)30588-1/fulltext](https://www.epilepsybehavior.com/article/S1525-5050(16)30588-1/fulltext)

De Witte, Mellissa. "[The bid picture: Stanford economists explain the ideas behind their 2020 Nobel Memorial Prize in Economic Sciences](#)" *Stanford News*. November 19, 2020.

Hunt, Dale. "[Biodiversity in Commercial Cannabis: Why it Matters.](#)" *Cannabis Business Times*. August 7 2020

Mernit, Judith Lewis. "[High Times: Marijuana Growing and the Environment](#)" *Capital and Main*. August 30, 2016

Oultram, J.M.J.; Pegler, J.L.; Bowser, T.A.; Ney, L.J.; Eamens, A.L.; Grof, C.P.L. "Cannabis sativa: Interdisciplinary Strategies and Avenues for Medical and Commercial Progression Outside of CBD and THC." *Biomedicines* 2021, 9, 234.

Whiting, Jerry. "Cannabis Breeder's Rights ver 2.0" Creative Commons. https://www.academia.edu/38245865/Cannabis_Breeder_s_Rights_ver_2.0.1 2019.