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PROPOSAL:

Best Management Practices

Plastic Netting & Support Trellis in Cannabis Cultivation



prepared for

COUNTY OF HUMBOLDT
PLANNING & BUILDING DEPARTMENT

proposal prepared by

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ENVIRONMENTAL & LAND USE CONSULTING

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The contributors emphasize the importance of consulting experienced and qualified consultants, advisors, and other business professionals to ensure the best results for producing nursery stock.

Acknowledgements

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Overview of Best Management Practices

The cultivation guidelines described in this manual represent Best Management Practices (BMPs) for commercial use of plastic trellis netting commonly deployed to support growing cannabis plants. All guidelines outlined below are voluntary activities designed to minimize negative impacts on wildlife and the natural environment at large.

While these practices have been prepared for licensed cultivators operating in Humboldt County, BMPs are generally adaptable to fit the unique needs of cultivators while satisfying environmental protection regulations. Plastic trellis netting (PTN) is used almost ubiquitously in California's licensed cannabis cultivation industry. However, regulations regarding PTN use within Humboldt County are inconsistent among permitted farms. Furthermore, ecologically friendly and equally effective alternatives to PTN are practically non-existent. While trellis made from jute and other natural materials is available, such alternatives are much more costly and ultimately less effective in providing proper support to growing crops. Alternative materials do not have the elasticity required for commercial use and cost for these non-plastic alternatives is prohibitively expensive for use at an industrial scale.

Misuse and improper disposal of PTN and similar materials used for erosion control in road and highway construction can certainly pose critical danger to wildlife and natural resources. However, it is the opinion of the authors of this manual that **proper use and disposal of PTN poses minimal risk to the natural environment**. For this reason, a clear and concise set of *Best Practices* regarding use of PTN in legal cannabis should be adopted by the County of Humboldt and its licensed cultivators. Consistent application of the guidelines in this manual should foster a 'win-win' example of responsible and environmentally sustainable farming, in which cultivators are able to use industry-standard materials without compromising wildlife safety or environmental welfare.

Plastic Trellis Netting – Types and Need

Horticultural trellis and other forms of physical plant support have been widely implemented since the dawn of agriculture. Just as grapes and tomatoes require physical support to prevent damage to vines and fruiting bodies, mature cannabis plants benefit from a support structure which balances rigidity with flexibility. Legacy cultivators often employed bamboo lattice or metal caging built from the ground up to support potted plants which routinely grew over 10 feet in both height and circumference. Such intricate lattice-work protected growing plants from damage caused by wind and rain while simultaneously encouraging vigorous and healthy plant growth by improving light penetration and airflow. Without support, the weight of ripe cannabis flowers can easily break plant limbs, thereby exposing the plant to mold and other pathogens which are dangerous to both consumers and cultivators alike.

While the traditional bamboo- and metal-lattice support technique is still widely-used for full-term cannabis cultivation (particularly in above-ground pots), modern greenhouse cultivators require a support solution tailored to commercial row-crop growing style and a shorter growing cycle. Prior to being adopted by

greenhouse cannabis cultivators, PTN manufactured by companies including *Hortanova* and others was popular among gardeners growing tomatoes, beans, peas, and other climbing crops.

PTN is generally manufactured from nylon, polypropylene, or plastic and is not considered toxic to humans or wildlife. Polypropylene is not a known carcinogen, and it is considered less flammable than wool or other fabrics. PTN is typically UV-resistant and does not break down into microplastic pollution. In fact, when used and stored mindfully, PTN can be reused for two (2) or more successive growing cycles.

Horticultural PTN typically features thin filaments of UV-resistant material (nylon or polypropylene) woven into a lattice of 6-inch by 6-inch squares. The flexible nature of the material prevents tangles, which makes PTN installation cheap and effective at a commercial scale. Trellis netting manufactured with alternative “natural” materials does not have the same tangle-resistance and thereby presents a much higher risk of inadvertent wildlife entrapment or disturbance if not properly handled. Jute, twine, and other natural trellis materials also tend to stretch and break more than PTN when exposed to direct sunlight, moisture, and heat.

Plastic and polypropylene fencing similar to PTN is widely used in other California industries. Plastic mesh of various dimensions and material compositions is used abundantly to deter and exclude invasive and special status species (i.e. deer, protected birds, turtles), as well as to prevent erosion and sediment discharge in land development projects. Exclusionary fencing and erosion control materials which include non-photodegradable plastic support mesh are commonly used in rural property management and large-scale construction projects funded by the State of California (Chapter 4: Construction Details, Section 21: Erosion Control).

Whereas consistently applied BMPs for exclusionary fencing and erosion control materials exist, this manual proposes a guide for safely installing, maintaining, reusing, and disposing of PTN materials in Humboldt County’s legal cannabis cultivation industry. As of the publication of this document, inconsistencies across private land-use permits regarding the use of PTN in Humboldt County are common and widespread. Without a common framework for managing PTN use in the local commercial cannabis industry, continued confusion and enforcement delays should certainly be anticipated.

Plastic Trellis Netting – Best Management Practices (BMPs)

As previously stated in this document, proper use of PTN in California’s licensed cannabis industry presents an opportunity for cultivators to maximize product quality and yield without compromising environmental stewardship. In this section, BMPs for PTN use are categorized according to the material’s typical use lifecycle. Licensed cultivators who voluntarily apply the following BMPs when using PTN support materials for greenhouse cannabis cultivation demonstrate a commitment to environmental sustainability which should be recognized by regulators at local, state, and federal resource protection agencies.

Installation

When properly installed according to the protocols described in this subsection, PTN presents no more hazard to wildlife or California’s natural resources than any other commonly used and commercially

available plant support structures. PTN used at the commercial level typically comes rolled onto a cardboard tube for easy deployment. Proper installation of PTN in licensed commercial cannabis gardens takes very little time and should be completed on the same day installation begins. When not in use, rolls of undeployed PTN must be stored in an enclosed space to prevent accidental wildlife entrapment. In addition to preventing unintended impacts to wildlife, storing PTN in a secure enclosed space dramatically extends the shelf life of undeployed PTN by limiting exposure to heat and UV radiation.

BMP #1: Store rolls of undeployed PTN in an enclosed space to prevent accident wildlife entrapment and to reduce material degradation due to heat and UV exposure.

Proper PTN installation begins with securing one end to greenhouse or plant support infrastructure installed for the purpose of hanging PTN. Plant support infrastructure often includes steel T-posts, wooden stakes/posts installed along raised beds at regular intervals, or another similar system employing reusable posts. Alternatively, gardens which employ aluminum or other metal greenhouse frames whose width is approximately the same as the width of the raised garden bed or cultivation trench may opt to use the metal greenhouse frame (or “ribs”) as anchor points for tightly securing PTN to cultivation infrastructure.

Regardless of which style of support anchor is employed, proper PTN installation minimizes loose hanging material, often found near the ends of the raised bed or cultivation trench. Operators who employ PTN in their gardens for supporting cannabis growth should understand that leaving excess PTN at the ends or along the sides of installation sites can trap wildlife including birds, mammals, and other wildlife species. Proper PTN installation includes trimming excess material and disposing it directly into a trash receptacle.

BMP #2: Secure end both ends tightly to cultivation support infrastructure. Trim extra PTN material at the ends and along the sides of installation site. Dispose of scraps directly into sealable trash receptacles. Avoid littering!

When installing PTN in commercial cannabis gardens, operators may choose whether to hang the material directly on support posts (i.e. T-posts, wooden stakes, etc.) using the PTN’s natural elasticity to achieve a tight installation across the length of the installed material. Alternatively, operators may choose to use zip-ties or other method of securing the PTN material to cultivation infrastructure. Whether hung over posts or secured directly to greenhouse infrastructure, PTN can be incrementally worked down to an appropriate level right at or just above the canopy height of young immature plants during the vegetative stage. Healthy immature cannabis grows quickly and should fill the properly installed PTN within a matter of days. Operators should make every effort to minimize the number of separate PTN sections deployed, opting for a one-piece installation where possible.

BMP #3: Minimize number of separate PTN sections deployed at cultivation site. One-piece sections of PTN support plants more effectively and reduce likelihood of improper material disposal.

Once PTN is successfully installed according to the BMPs described in this section, operators should immediately store remaining undeployed materials in secured storage areas. In addition to rolls of undeployed PTN, other materials used during installation (i.e. zip-ties, plant support tape, etc.) should also

be removed from the cultivation site. Used zip-ties and other materials used to secure PTN to garden infrastructure should be immediately removed from the garden site and properly disposed of as soon as possible. Microplastic waste can easily accumulate during PTN installation, so it is critical that operators installing PTN in commercial cannabis gardens remain alert to proper disposal of any and all waste related to supporting plants with PTN.

Some larger-growing cannabis cultivars may require two (2) or more layers of PTN to adequately support the weight of fully mature cannabis colas. While it may be tempting to install multiple layers of PTN during a single installation period, the upper layers of PTN can remain empty entrapment hazards for wildlife until the maturing cannabis plants have reached full size at the end of their transition into the flowering stage. For this reason, it is recommended that additional PTN layers only be installed once the canopy indicates a need for additional support.

BMP #4: Avoid installing additional layers of PTN until the plant transition period is well-underway. Empty layers of PTN cause unnecessary entrapment risk to wildlife and may be an unnecessary cost to commercial cannabis operations.

Maintenance

Once properly installed, PTN requires far less maintenance than other methods of plant support typically deployed in commercial cannabis cultivation. However, operators should develop a habit of monitoring installed PTN support systems for breakage and sagging, as these visible signs of material stress can indicate improper installation and/or potentially dangerous interactions with native wildlife. Please note that while most PTN products are resistant to degradation due to UV light exposure, many plant support tapes and zip-ties are not necessarily designed to endure prolonged exposure to direct sunlight. In cases where operators notice broken PTN or fixtures (i.e. zip-ties and plant tape), these Best Practices strongly encourage mending broken sections as soon as possible.

During routine maintenance inspections, operators are encouraged to carry sharp scissors and a trash receptacle to collect any broken or damaged sections of the PTN support structure. It is absolutely critical that small pieces of microplastic trash are properly disposed of in a sealable container (including tied trash bags) to limit further introduction of trash and debris into the natural environment. Small pieces of broken or cut PTN cause severe hazards to wildlife who may unwittingly swallow or become entrapped by small pieces of plastic trash related to commercial cannabis cultivation.

BMP #5: Conduct routine maintenance inspections of support systems which include PTN. Carry sharp scissors and replacement fixtures (i.e. zip-ties, plant tape) for repair broken or damaged sections of PTN support structure. Immediately dispose of any microplastic waste in a sealable trash container.

Reuse

In some cases of careful harvest, one (1) or more layers of PTN may be carefully removed from the garden without significant damage. In these circumstances, some operators may choose to store and reuse PTN as a practice of reducing operating and materials expense. Reusing intact PTN for subsequent growing cycles

should begin with proper removal of fixtures (i.e. zip-ties or plant tape). Used fixtures are generally single-use items and should be immediately disposed of in a sealable container. Reusable sections of PTN should then be immediately rolled along the length of the greenhouse or cultivation trench and stored in a sealed container (i.e. trash bag or lidded tote boxes). Should the operator feel motivated to cleanse the PTN before storage, a short soak in or spray with liquid hydrogen peroxide (H₂O₂) will likely eliminate the risk of pathogen or fungus propagation during periods of storage. Under no circumstances should sections of rolled or deployed PTN remain in cultivation areas once the growing cycle is complete.

BMP #6: Reusing PTN can help commercial operators cut costs. Any fixtures (i.e. zip-ties or plant tape) should be immediately disposed of in a sealable container. Reusable sections of PTN may be neatly rolled up for cleaning and immediately stored in a sealable container inside an enclosed space away from the cultivation area.

Disposal

Given the relatively cheap cost of PTN plant support systems, many operators prefer to treat PTN as a single-use material. Should operators choose to cut sections of PTN during harvest, high standards of waste management must be considered in order to protect wildlife and our natural environment. Although harvest is typically a face-paced time marked by long days and a race against the coming wet season, responsible use of PTN in commercial cannabis operations includes immediate cleanup and proper disposal of cut or broken sections of PTN during harvest. Operators are encouraged to train harvest laborers to collect small pieces of PTN and fixture material immediately into a trash bag or free pocket. As any experienced cultivator knows, small pieces of plastic waste generated in the garden can be nearly impossible to completely remediate should mindful cleanup steps be missed.

In addition to unnecessary wildlife and environmental risks (including a serious trip hazard to operators and staff), improperly disposed PTN material can become entrapped in farm machinery and equipment in the blink of an eye. Once removed from greenhouses or other cultivation areas, PTN must be immediately collected into sealable containers such as trash bags or lidded tote boxes for transportation to the appropriate waste management facility as soon as possible. Given the high tensile strength of intact PTN and the damage this material can cause to mechanical equipment if not properly managed, some waste disposal facilities refuse to accept loads which contain unsecured PTN.

BMP #7: Perhaps most importantly, please ensure that PTN waste material is immediately gathered into sealable containers (i.e. trash bags or lidded containers) and removed from the cultivation area as soon as possible upon completion of harvest. Store collected sealed containers in enclosed spaces away from cultivation areas and transfer to an appropriate waste management facility as soon as possible.

Conclusion

Thank you for taking the time to consider the potential impacts of PTN use in commercial cannabis cultivation. While the risks posed by irresponsible use of agricultural materials to the natural environment, wildlife, workers, and property are absolutely real, the guidelines for mitigating unnecessary consequences presented in this document are designed to minimize all potential risks. When followed carefully, the BMPs outlined in these pages can certainly help mitigate any risks associated with PTN use in commercial cannabis.

This document is intended by its authors to be a living document, made more useful and more complete with input from resource protection agencies, commercial operators, and any gardeners with ideas for improving the Best Management Practices outlined in this manual. While it is true that there is no realistic replacement for PTN in commercial cannabis cultivation, the fact of the matter is that improper use will almost certainly lead to board regulations banning PTN use in commercial cannabis in the very near future. It is only by coming together as a community under the banners of responsible operation and sustainable industry.

Best Management Practices (BMPs) Summary

BMP #1: Store rolls of undeployed PTN in an enclosed space to prevent accident wildlife entrapment and to reduce material degradation due to heat and UV exposure.

BMP #2: Secure end both ends tightly to cultivation support infrastructure. Trim extra PTN material at the ends and along the sides of installation site. Dispose of scraps directly into sealable trash receptacles. Avoid littering!

BMP #3: Minimize number of separate PTN sections deployed at cultivation site. One-piece sections of PTN support plants more effectively and reduce likelihood of improper material disposal.

BMP #4: Avoid installing additional layers of PTN until the plant transition period is well-underway. Empty layers of PTN cause unnecessary entrapment risk to wildlife and may be an unnecessary cost to commercial cannabis operations.

BMP #5: Conduct routine maintenance inspections of support systems which include PTN. Carry sharp scissors and replacement fixtures (i.e. zip-ties, plant tape) for repair broken or damaged sections of PTN support structure. Immediately dispose of any microplastic waste in a sealable trash container.

BMP #6: Reusing PTN can help commercial operators cut costs. Any fixtures (i.e. zip-ties or plant tape) should be immediately disposed of in a sealable container. Reusable sections of PTN may be neatly rolled up for cleaning and immediately stored in a sealable container inside an enclosed space away from the cultivation area.

BMP #7: Perhaps most importantly, please ensure that PTN waste material is immediately gathered into sealable containers (i.e. trash bags or lidded containers) and removed from the cultivation area as soon as possible upon completion of harvest. Store collected sealed containers in enclosed spaces away from cultivation areas and transfer to an appropriate waste management facility as soon as possible.