Grower Quality Standards and Food Safety Requirements

Training and Resources Manual
Hop Growers of Michigan
Version 2.0 – 2018





Development of this guide was funded in part by a USDA Specialty Crop Block Grant (SCBG) through the Michigan Department of Agriculture and Rural Development (MDARD) awarded to Hop Growers of Michigan, 2016

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Introduction and Background

- Hop production in Michigan has developed over the past decade and continues to grow from a small base to now include more than 1200 acres of production.
- In 2014 the **Hop Growers of Michigan (HGM)** trade association was formed with a mission makes a positive difference in Michigan's hop industry by providing educational opportunities and research for better hop production and processing, as well as advocating for and promoting the use of Michigan grown hops.
- The sector continues to benefit from **strong MSUE support**.
- The Michigan hop sector is **very diverse**, with farms as small as 1/8 acre to over 500 acres. Likewise pellet processing ranges from table-top to industrial scale.
  - This range is not unusual for an agricultural sector that is just a decade old, with many enterprises learning as they go.
- In 2015 HGM identified a **need to develop quality and operating standards** to ensure the sector as a whole met the requirements of craft brewer customers of today and the future. USDA SCBG grant funding was secured to define the required growing and processing standards herein.
- Just as the hop sector is maturing as it expands, so is the craft brewing sector – setting ever-higher standards needed to consistently meet its consumer's expectations.
- The expectation is that **by delivering quality and consistency HGM members can gain brewers trust**, thereby increasing market access and market share.

Program Goals *(from HGM's SCBG Application, 2016)*

- **A. Statement of Purpose**
  - Michigan hop farms are rapidly increasing acreage to support the craft beer boom, but sales and long term contracts are lagging behind. The Pacific North West (PNW) is the trusted source for hops as they have provided 98% of the hops produced in North America. A primary deterrent to Michigan sales, especially to the very large breweries, is a lack of confidence in receiving a consistently high quality (and safe) product. This lack of confidence is justifiable as each farm and processing center is left to their own discretion on what quality practices and standards they choose to implement. There is a need for a hop quality program in Michigan that includes food safety and that includes, at a minimum, self-verification and ideally, voluntary third party verification.
  - There is a sense of urgency for this project as millions of dollars are being invested state wide to install infrastructure for harvesting and processing. Without guidance, some will hit the mark and some will require expensive rework and improvements if they are to meet the expectations of the industry.

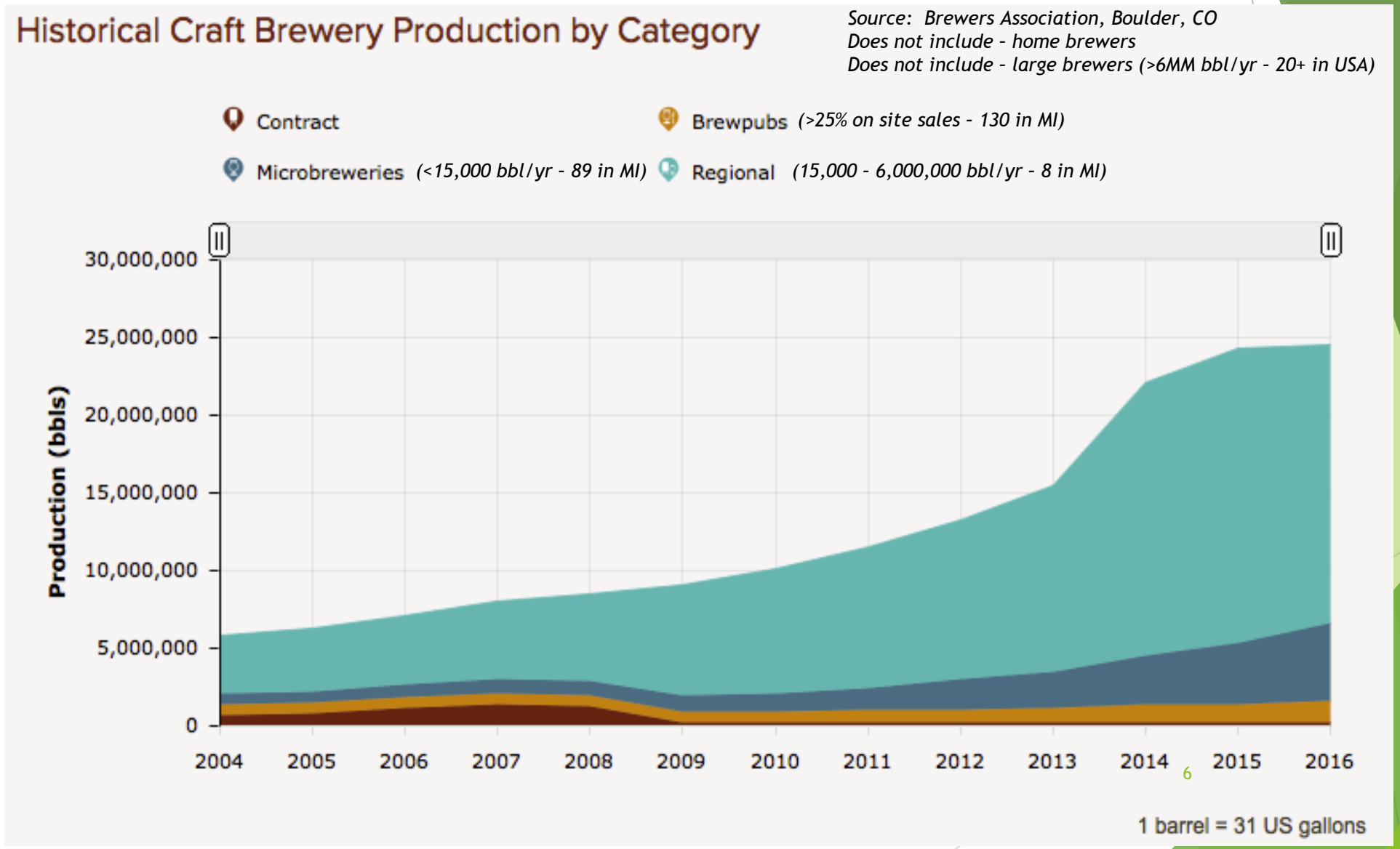
- **B. Statement of Work**
  - This project will establish for the first time in Michigan a **quality system specific to hops** that includes:
    - **Recommended Operating Procedures *to insure food quality and safety***, broken down into three areas: a) field (IPM and spray records), b) harvest (pick-dry-bale-storage), and c) processing (pelletize-package-storage)
    - An education program that will **train farm owners and employees** to use the recommended operating procedures and help prepare them for the verification program. \
    - A **two level voluntary verification program**, level 1) a self-audit, and level 2) an HGM sanctioned third party verification.
  - After the development of the procedures, the project includes a pilot program in 2017, followed by implementation in 2018. Hop farms, having met all the standards, will be able to promote their product as having met the level of quality that the craft brewing market demands.

Quality and Food Safety: Our Approach

- In the interest of growing market share for Michigan hops it is important to **align with both local and global market** expectation. Parallel to the initiation of this program the HGA has taken initiative on Food Safety/Handling Practices and Good Agricultural Practices (GAP) to provide the foundation for American competitiveness in the global marketplace.
- HGM's SCBG Program steering committee saw wisdom in aligning with HGA on its 2017 Food Safety/Handling Practices initiative (Module 1) and their follow-on Global-GAP Hop Subscope protocols. To that end, for Food Safety we herein incorporate the HGA standards and practice guidelines.
- The Hops Quality Standards developed and presented herein incorporate current best practices, by gleaning from the experience of hop growers in other regions as well as Michigan, and addressing the needs of the Michigan sector at its current scale and with and an eye to future growth.

The Marketplace

Understanding the marketplace, specifically the drivers of the craft brewery sectors, is important when defining a hop quality program



Brewers' Hops Usage

Brewery Tier	bbl/yr	Examples	Hop Types	Lb/yr (scale)	Hop Suppliers
Large	>6,000,000	AB-InBev, MillerCoors, Leinenkugel's	Extracts	100,000s	MNC Brokers
Craft - Regional	15,000 – 6MM	Atwater, Bells, Dark Horse, Founders, NHB, Perrin, Shorts	Pellets *(Extracts?)*	10,000s	MNC Brokers MI – Top Tier
Craft - Micro	<15,000	(89 in MI)	Pellets	1,000s	MNCs MI – many
Craft - Brewpub	>25% onsite sale	(130+ in MI)	Pellets, Dry, Fresh	100s	MNCs MI – many
Craft - Home	n/a	(many)	Pellets, Dry, Fresh	10s	

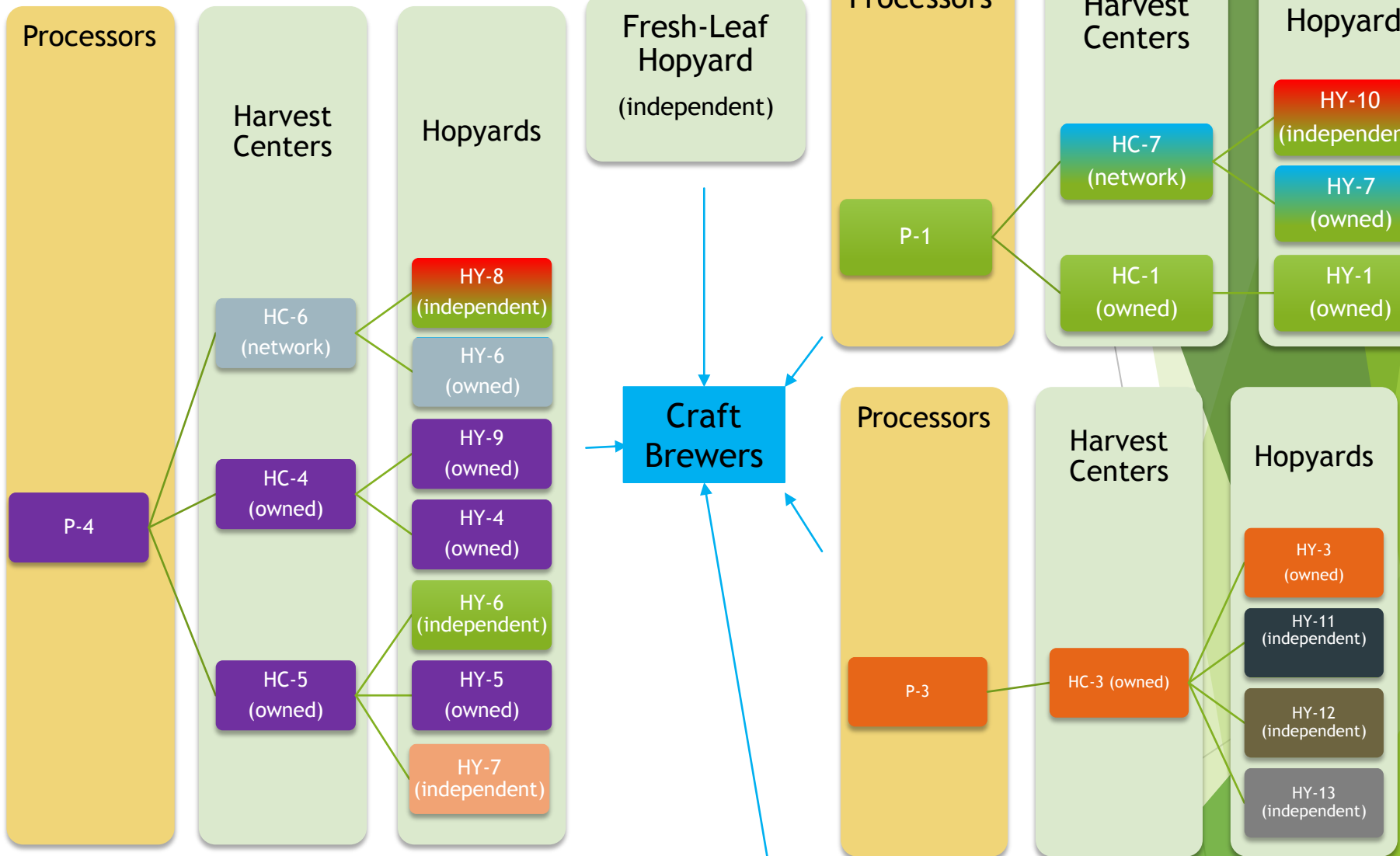
Market Drivers:
meeting the hop volume, quality and consistency requirements of **regional and microbreweries** will drive growth for the Michigan hop sector

*The **Craft-brewpub** market will remain a key element of the local Michigan sales opportunity for all hop growers in the state*

Michigan Hop Sector: Cluster Structure

(illustrative purposes only):

- **Processors** (food)
- **Harvest Centers** (farming)
- **Hopyards** (farming)



Processor QA internal or hired auditors conduct audit of Harvest Centers and associated Network Hopyards.

- use *"Hop Grower Quality Standards: Auditor Checklist"*

Brewer (HQG) or 3rd PArty Auditors conduct Processor audits)

Quality Priority Pyramid

(source: Brewer Association, 2017)

Brewers are the primary customers for hops. Aligning a hop growing quality programs with brewer expectations is recommended.

The Brewers Association (BA) Quality Subcommittee created the Quality Priority Pyramid to provide a broad overview of the **structure of a formal quality program.** The pyramid is a visual representation of essential features and the order in which they should be put into practice. Items at the base are a quality program's foundation and should be employed first. Items towards the top should be approached after the foundation has been established.

As the growing of hops is an agricultural practice, **Good Agricultural Practices (GAP) provide the quality program foundations** that hop growers should adopt.

Learn more at:
https://www.brewersassociation.org/educational-publications/quality-priority-pyramid/

Expectations of the Market: Quality, Food Safety, Consistency

- Quality
  - The Brewers' Association **Hop Quality Group (HQG):** align to its goals and expectations
- Food Safety
  - Think Food, not 'commodity': and important consideration for market access
  - The HGA ***"Food Safety/Handling Practices Module 1"*** guide incorporated herein provides the current best set of guidelines for hop farmers to use in establishing programs and practices to mitigate food safety risk
  - The Hop Quality Group (HQG) guidance is to adopt formal safe-food processing practices beginning at the Harvest Center, and to 'think' food safety back through the hopyards, as it were, from "field to pint".
- Sanitation
  - Treat harvested hops like food, the facility like your kitchen
    - Cleanliness of contact surfaces, food grade lubricants, etc.
- Consistency
  - Deliver what your market/processor expects – consistent variety, color, alpha, service
    - Lot-to-lot
    - Year-to-year

Note: Avoid surprise, always be in dialog with your customer!

Stakeholders: Program Collaborators *(1 of 4)*

- **Michigan Hop Producers/Farmers:** Enterprise owners/managers engaged in commercial hopyard and/or harvest center operation for hop production

- **Michgan Hop Processors:** Enterprises engaged in the processing of baled and/or frsh hops into value added pellets and/or other hop products.

- **HGM (Hop Growers of Michigan):** Voluntary trade association of the Michigan hop growers with a mission to "***makes a positive difference in Michigan's hop industry by providing educational opportunities and research for better hop production and processing, as well as advocating for and promoting the use of Michigan grown hops.***"
  - *HGM leads the effort to create these Quality And Food Safety resources*

- **HGA (Hop Growers of America):** is a trade association focused on grower support through technical, scientific research; trade promotion and harmonization; educational outreach; expansion of industry and USDA statistics, and more.
  - *Aligning this HGM effort with HGA's developing Food Safety and Good Agricultural Practices initiatives avoids duplication and ensures synergy in addressing the craft brewing sector needs domestically and internationally.*

Stakeholders: Program Collaborators *(2 of 4)*

- **Hop Quality Group (HQG):** *representing all craft brewer's interests for quality hops, its mission aligns with that of the Hop Growers of Michigan association.*

> ***The Hop Quality Group is a non-profit organization made up by the membership of craft brewing companies partnering together to work with both growers and brokers of hops to advocate for the sustainable and quality focused production and processing of hops for the craft brewing industry in the United States. This group serves as an advocate for all craft brewers (not just members) in the maintenance and improvement of hop quality, as well as developing useful information with regard to the quality characteristics of hops that is accessible to all craft brewers keeping the desires of the brewer (the end user) in mind.***

Stakeholders: Program Collaborators *(3 of 4)*

The market for hops is driven by the craft beer sector. The state and national craft beer association are vested in the food safety and quality of the hops supply they use in their beer.

- **The Michigan Brewers Guild:** http://www.mibeer.com
  - is a non-profit corporation dedicated to increasing sales of Michigan brewed beer through promotions, marketing, public awareness, and consumer education while monitoring and assuring a healthy beer industry within the state.
  - The Brewers Guild has three levels of membership - brewery, allied trade, and enthusiast. All levels are renewed annually.
- **Brewers Association:** https://www.brewersassociation.org
  - A not-for Profit trade association- an organization of brewers, for brewers and by brewers
  - Purpose: To promote and protect American craft brewers, their beers and the community of brewing enthusiasts.

Stakeholders: Program Collaborators *(4 of 4)*

Good Agricultural Practices are the foundation for food safety in farming enterprise.

- G.A.P. stands for **Good Agricultural Practice**
- GLOBALG.A.P. is a **worldwide standard**
  - We're a global organization with a crucial objective: safe, sustainable agriculture worldwide. We set voluntary standards for the certification of agricultural products around the globe–and more and more producers, suppliers and buyers are harmonizing their certification standards to match.
  - *Note: the GLOBALG.A.P. standards for hopyards are met when HGA's Module I requirements are completed. For Harvesting HGM engages indirectly through the HGA Global-GAP Hops Subscope initiative.*
- **Auditors:**
  - A number of 3rd party firms provide audit services. Examples include:
    - **SCS Global** — Setting the standard for sustainability.™
    - **NSF**
    - **AIB (American Institute of Baking)**
    - **The Hop Quality Group also conducts hopyard, harvest center, and processor audits**
    - Various other local and regional service provider

Operations: Risk Assessment

Conduct a Risk Assessment before developing Quality and Food Safety Programs for your Hop Operations

- **"The scientific evaluation of known or potential adverse health effects resulting from human exposure to foodborne hazards."**
  - As defined by the Codex Alimentarius Commission and adopted by international **food safety** commissions.

- The process consists of the following steps:
  - **Hazard identification:** The identification of known or potential health effects associated with a particular agent.
  - **Hazard characterization:** The qualitative and/or quantitative evaluation of the nature of the adverse effects associated with biological, chemical, and physical agents which may be present in food. For chemical agents, a dose-response assessment should be performed. For biological or physical agents, a dose-response assessment should be performed if the data is obtainable.
  - **Exposure assessment:** The qualitative and/or quantitative evaluation of the degree of intake likely to occur.
  - **Risk characterization:** Integration of hazard identification, hazard characterization and exposure assessment into an estimation of the adverse effects likely to occur in a given population, including attendant uncertainties.

Operations Risk Assessment

- **Risk Assessment**
  - **Start with your customer and the consumer in mind**:
    - Quality
    - Consistency
    - Food Safety
  - Determine responsible party
  - Put in place policies and procedures
  - Document activity
  - Self-audit
  - 2nd/3rd Party Audit (as needed)

HGA Risk Assessment Module II

- In 2018 Hop Growers of America is developing a Risk Assessment Module that will be posted on-line at the https://www.usahops.org/growers/food-safety.html web page.
- The next six slides/pages are draft version of those Risk Assessment Tools that growers can use in the interim to begin doing risk assessment:
  - Food Defense Risk
  - Food Safety Risk
  - Pre-Harvest Risk
  - Site Risk
  - Water Risk
  - Worker Health Safety Risk

FOOD DEFENSE & FOOD FRAUD RISK ASSESSMENT

Go through the list on this Risk Assessment, put a check mark in the boxes below to see where you are for levels of risk. Correct any items you find while performing this walk around. All of your risk assessment should include Chemical, Biological and Physical.

All records are kept on file for at least 2 years		LEVEL OF RISK				
HAZARDS AND RISKS	**MANAGEMENT PLAN**	**NONE**	**LOW**	**SOME**	**LIKELY**	**HIGH**
		0	1	2	3	4
	List out what you would do if any of the hazards or risks were a problem					
Workers	All workers will present proper ID prior to being hired. All documentation will be be kept on file. All employees will have a supervisor/crew leader with them. Only authorized employees will have access to the chemical storage areas or any sensitive areas of the farm.					
Visitors & sub contractors	All visitors will sign in before entering fields or facilities. In some cases visitors must be escorted by an authorized employee. All sub contractors must fill out proper paperwork stating they will follow all food safety rules of the company while on the farm					
Suspicious activities, unusual behavior						
Worker training	example: What to look for if people are standing around or acting suspicious					
Access to farm and water sources						
Suppliers: Make sure you are not buying counterfeit products. Know your suppliers						
Access to Plant Protection Products or other sensitive areas of farming operation						

FOOD SAFETY RISK ASSESSMENT

Go through the list on this Risk Assessment and check your facility. Put a check mark in the boxes below to see where you are for levels of risk. Correct any items you find while performing this walk around. Include on all risk assessments any chemical, biological and physical risks.

Any records (calibration, etc) are kept of file for at least 2 years		LEVEL OF RISK				
HAZARDS AND RISKS	**MANAGEMENT PLAN**	**NONE**	**LOW**	**SOME**	**LIKELY**	**HIGH**
		0	1	2	3	4
Moisture Sensors	Calibrate annually. As drying occurs test kiln beds for moisture					
Moisture Probes	Calibrate annually. Check bales for moisture levels and document					
Magnet	Check annually. Test to check for strength levels. (how strong)					
Picking Machine	Picking machine is checked for cleanliness. Food grade lubricant is used. See machinery/building/equipment cleaning/maintenance log					
Kiln Drying Room	Make sure all belts/conveyors are cleaned before harvest and daily checks. Check for cleanliness of cloth lining rooms. Check for flecking of any paint or wood used in the rooms. See maintenance/building/equipment cleaning/maintenance log					
Baling Room	Clean all floors before harvest begins. Check floors daily for any issues that may occur from equipment in the baling room. Check all equipment (forklift/bobcat) that maybe in the baling room to move product. If using employees and manually moving product make sure they are using clean equipment that does not leave the baling room and some type of footwear that is not allowed outside of the baling room.					
Trucks	All vehicles that come into contact with the fresh product must be cleaned pre-harvest and visually checked before each shift. Truck cleanliness logs are to be in each truck.					

PRE-HARVEST RISK ASSESSMENT

Go through the list on this Risk Assessment and check your facility. Put a check mark in the boxes below to see where you are for levels of risk. Correct any items you find while performing this walk around. All of your risk assessment should include Chemical, Biological and Physical.

All records are kept of file for at least 2 years		LEVEL OF RISK				
HAZARDS AND RISKS	**MANAGEMENT PLAN**	**NONE**	**LOW**	**SOME**	**LIKELY**	**HIGH**
		0	1	2	3	4
Restrooms: Mobile or Fixed Water contamination, overflow from waste	Make sure there is no runoff or leaking. Place Porta-Potties outside of the fields where there is no risk to fields or any water ways if the event of a spill or leak.					
Equipment or Tools - Reusable Crop contamination & worker injury	Check daily for cleanliness and damage. Repair or clean daily as needed. Clean and repair at least 7 days prior to harvest. If employees bring their own equipment have a place for them to clean as needed or visually inspect daily					
Eating, Tobacco, Liquids Crop contamination	No eating, tobacco use, beverages other than water in the fields or hop facility. Employees may have these items in their personal cars or other designated areas					
Animals & Rodents Crop contamination	Visually check daily for any signs of animals or rodents in fields or hop facilities. Use screening on facilities if necessary and fencing in the fields where needed					
Water Testing For human use & crop exposed to water	Open water source tested at least 3 times annually. Well water tested at least 1 time annually					
Worker Cars Leaks tracked to fields	No parking inside the rows when crop is still in the fields. All parking outside of the fields and crop loading area					
Worker Training Safety to workers & crop contamination	All workers receive Hygiene and Food Safety training at least annually. Training items are posted. Proper clothing in work areas, proper clothing or PPE in specific work areas					

All records are kept of file for at least 2 years. Maps available for all fields/facility		LEVEL OF RISK				
HAZARDS AND RISKS	**MANAGEMENT PLAN**	**NONE**	**LOW**	**SOME**	**LIKELY**	**HIGH**
		0	1	2	3	4
	List out what you would do if any of the hazards or risks were a problem					
Irrigation & well water: Look at quality, availability, do you have permits or water rights						
Soil: Look at soil type for crop, drainage, erosion						
Surrounding areas: Water ways, roadways, housing, neighboring fields/crops, open areas. Domestic animals owned by you or neighbors.Wildlife, wetlands						
Microbial contamination: Animals, composing or manure						
Terrain: Dangerous slopes, waterways, access to fields						
Machinery, buildings						

WATER RISK ASSESSMENT

The water risk assessment is for you to know how clean your irrigation water is and where is comes from. Irrigation water is tested 3 times per year, all 3 should be done during the growing season. Well water is tested 1 time per year. Well water used for drinking and hand washing should be tested 1 time per year and that test MUST be negative. This is for potable water. Put a check mark in the boxes below that fit your farm and the water assessment. None is you have no potential of a risk and 4 is you have a very high level of risk for each of the items listed below. All of your risk assessment should include Chemical, Biological and Physical.

All water testing records are kept on file for at least 2 years.

		LEVEL OF RISK				
HAZARDS AND RISKS	**MANAGEMENT PLAN**	**NONE**	**LOW**	**SOME**	**LIKELY**	**HIGH**
		0	**1**	**2**	**3**	**4**
Irrigation water tests are performed at least 3 times per year. Tests should be done as follows: head box or pumping station, beginning of irrigation system and middle or end of irrigation system. Well water is tested annually	This method of testing shows that our irrigation system is free of contamination. All irrigation tests shall be under 126cfu or mpn ecoli/100ml					
Use of untreated sewage or manure is not used for irrigation/fertigation or other pre-harvest activities. This can include fecal matter from animals. Contamination from neighbor run-off	Farm policy does not allow the use of untreated sewage or manure					
Are all water boxes protected from possible contamination	All water boxes are covered and monitored.					
Well water used for drinking and hand washing is tested 1 time per year	All water MUST be potable that is used for drinking and hand washing. The test MUST be negative on the results. If the test does not come back as negative a different source of water will be used and a new test completed.					
Ground water contamination	This could include fertilizer use and amounts. Avoid irrigation run-off					
Spray drift around water ways	This could include using chemicals according to the label. Watching spraying around water ways and watching weather conditions such as wind.					

WORKER, HEALTH & SAFETY RISK ASSESSMENT

Go through the list on this Risk Assessment, put a check mark in the boxes below to see where you are for levels of risk. Correct any items you find while performing this walk around. All of your risk assessment should include Chemical, Biological and Physical.

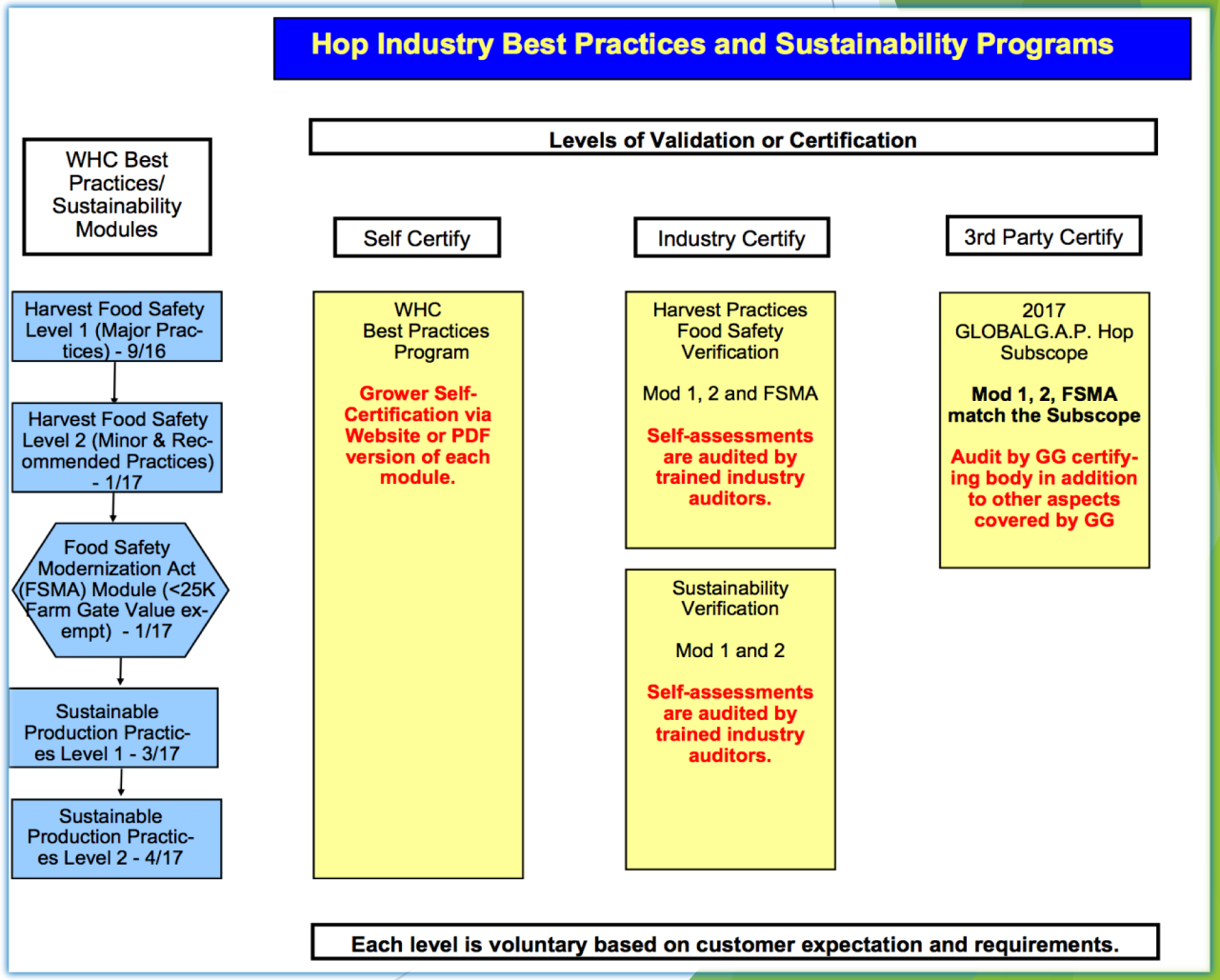
All training records are kept on file for at least 2 years		LEVEL OF RISK				
HAZARDS AND RISKS	**MANAGEMENT PLAN**	**NONE**	**LOW**	**SOME**	**LIKELY**	**HIGH**
		0	1	2	3	4
	List out what you would do if any of the hazards or risks were a problem					
All Workers	Example: All workers will be trained for their specific job and have proper PPE available when needed					
Sprayers & handlers						
Powered rotating shafts, chainsaws and all terrain vehicles						
Worker Injury: Are there procedures in place. Emergency contact list, first aid kits, first aid/cpr card holders						
Tractors						
Toilets						
PPE training						
Trellis platforms						
Knives & machetes						
Proper clothing						
Heat Stress						
Ponds/Water ways						
PPE for non spray handlers						

Auditing Roles in a Three-Level Verification Program

Auditing Hopyard and Harvest Center operations can validate compliance to Quality and Food Safety Programs that address risk, and provide guidance for corrective action and operational and product quality improvement.

- **Self** = farm operator, internal
- **Industry** = Trained Auditors (HGM, HQG)
- **3rd Party** = GG Certified Auditors
  - SCS, AIB, NSF, etc

- Farm business goals and/or customer expectation will determine the level of verification/certification required of a specific hopyard and/or harvest center
- For HGM members the HGM "Verified Source" program can serve the verification needs



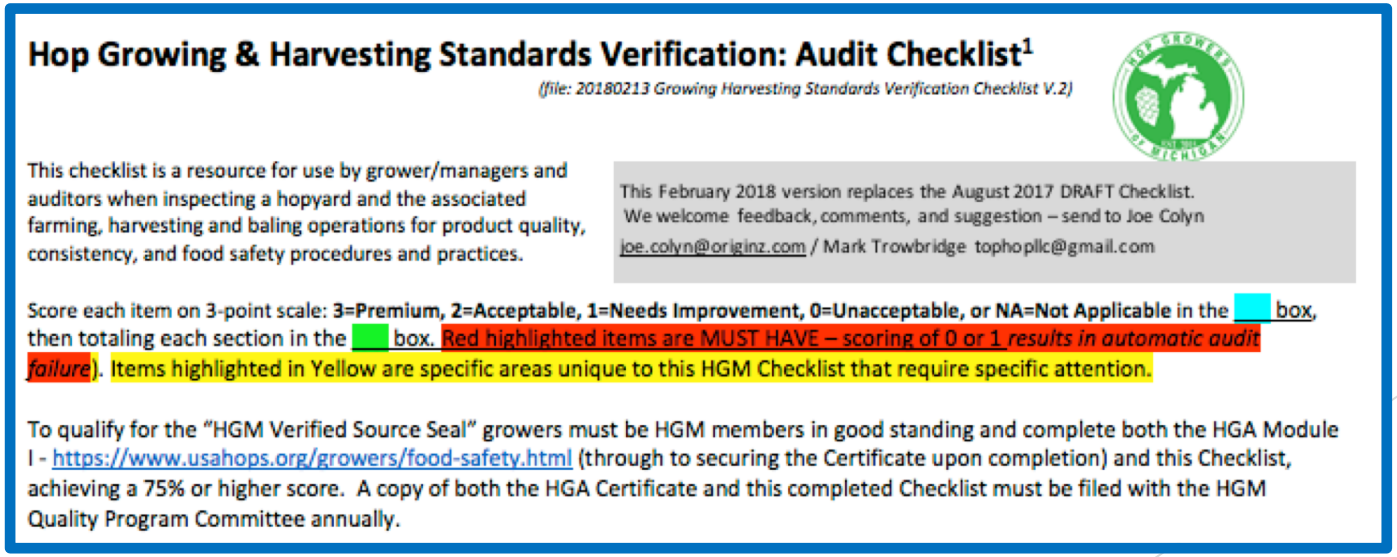
Auditor Checklist:

The HGM SCBG program has created an Auditor Checklist to compliment this Hop Quality Program.

The checklist can be used by the growers as a self-audit tool and by 2nd/3rd-Party auditors *(including government inspectors, brewers-HQG, trade auditors,and/or contract auditors).*

- The checklist was beta-tested in 2017, and finalized for the 2018 season.

(below is a screenshot of the checklist header. The checklist is a separate document, with images imbedded in the next 6 pages.)



Hop Growing & Harvesting Standards Verification: Audit Checklist[1]

(file: 20180213 Growing Harvesting Standards Verification Checklist V.2)

This checklist is a resource for use by grower/managers and auditors when inspecting a hopyard and the associated farming, harvesting and baling operations for product quality, consistency, and food safety procedures and practices.

This February 2018 version replaces the August 2017 DRAFT Checklist. We welcome feedback, comments, and suggestion – send to Joe Colyn joe.colyn@originz.com / Mark Trowbridge tophopllc@gmail.com

Score each item on 3-point scale: **3=Premium, 2=Acceptable, 1=Needs Improvement, 0=Unacceptable, or NA=Not Applicable** in the box, then totaling each section in the box. Red highlighted items are MUST HAVE – scoring of 0 or 1 *results in automatic audit failure*). Items highlighted in Yellow are specific areas unique to this HGM Checklist that require specific attention.

To qualify for the "HGM Verified Source Seal" growers must be HGM members in good standing and complete both the HGA Module I - https://www.usahops.org/growers/food-safety.html (through to securing the Certificate upon completion) and this Checklist, achieving a 75% or higher score. A copy of both the HGA Certificate and this completed Checklist must be filed with the HGM Quality Program Committee annually.

Hop Growing & Harvesting Standards Verification: Audit Checklist[1]

(file: 20180326 Growing Harvesting Standards Verification Checklist V.3)

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joe.colyn@originz.com / Mark Trowbridge tophopllc@gmail.com

Score each item on 3-point scale: **3=Premium, 2=Acceptable, 1=Needs Improvement, 0=Unacceptable, or NA=Not Applicable by circling the number** in the **3 / 2 / 1 / 0 / NA** box, then totaling each section in the ___ box. Red highlighted items are MUST HAVE – scoring of 0 or 1 *results in automatic audit failure*). Items highlighted in Yellow are specific areas unique to this HGM Checklist that require specific attention.

To qualify for the "HGM Verified Source Seal" growers must be HGM members in good standing and complete both the HGA Module I - https://www.usahops.org/growers/food-safety.html (through to securing the Certificate upon completion) and this Checklist, achieving a 75% or higher score. A copy of both the HGA Certificate and this completed Checklist must be filed with the HGM Quality Program Committee annually.

Further information on the listed items can be found in the **Grower Quality Standards and Food Safety Requirements** *manual, a resource available online at http://hopgrowersofmichigan.com should the grower/manager, or auditor, require additional information. Note: this Checklist does not cover the further processing (pelleting, etc.) of hops – a separate Hop Process Checklist is available at the HGM website for processing.*

Auditor/Responsible Person: _____
Farm/Facility Name: _____
Location/Address: _____
Acres: _____
At This Location: ___Hopyard, ___Harvest Center
Date: _____

[1] This checklist was developed as part of the Hop Growers of Michigan Hops Quality project 2016-18, funded in part by a USDA SCBG (Specialty Crop Block Grant) awarded by the Michigan Department of Agriculture and Rural Development

1 - Documentation, Record Keeping, Reporting

- 3 / 2 / 1 / 0 / NA Grower has completed HGA Food Safety Module 1 – Harvest Practices
  - Available online at: https://www.usahops.org/growers/food-safety.html
  - Note: the HGA's ***Module I Attachments*** resource includes many forms and templates that can be used by growers to establish policy, procedure, practices and records
- 3 / 2 / 1 / 0 / NA Operating procedures are documented for all key processes
- 3 / 2 / 1 / 0 / NA Farm records are complete for growing, harvesting, kilning, and baling
- 3 / 2 / 1 / 0 / NA Work-in-process and final product labeling is clear, prominent
- 3 / 2 / 1 / 0 / NA Product traceability policy and procedure are in place and tested annually
- 3 / 2 / 1 / 0 / NA Documentation available for review by auditors/inspectors
- 3 / 2 / 1 / 0 / NA Compliance to pertinent government law is documented
- 3 / 2 / 1 / 0 / NA Internal and third party lab procedures are documented, accredited, and confirmed to meet requirements
- 3 / 2 / 1 / 0 / NA COAs, lab reports and other quality/food safety data are recorded/associated to lots/lot codes/customers

Section Comments: _____

_____

Section Total Score *(out of 27, or reduce by 3 for each NA line)*

2 - Hopyard & Farming

- 3 / 2 / 1 / 0 / NA Site Map – including buildings, hopyards, well heads, pesticide storage, flammable storage (elements of First Responder Emergency Plan)
- 3 / 2 / 1 / 0 / NA Written Property Maintenance Program: mowing, buffer strips, drains, non-crop areas
- 3 / 2 / 1 / 0 / NA Hopyard map: location of each variety (labeled), including planting dates.
- 3 / 2 / 1 / 0 / NA Written Integrated Pest Management Program addresses disease, insects, weeds, rodents, and wildlife pests etc.
  - pesticide usage plans, procedures, and reporting requirements
  - regulatory and label compliance in pesticide application
  - Proper storage facilities for pesticides and hazardous materials
  - SDS documents on file and available/communicate to employees
  - Responsible personnel identified
- 3 / 2 / 1 / 0 / NA Pesticide treatment records are current, dated, signed and including pre-harvest Interval compliance

- **3 / 2 / 1 / 0 / NA** If product is intended for export, ag chemical use complies with regulatory requirements of destination country
- **3 / 2 / 1 / 0 / NA** Written Fertilization Program: soil sampling, products, forms, rates, timing
- **3 / 2 / 1 / 0 / NA** Written Irrigation Program: water sources, schedule and/or application records,
- **3 / 2 / 1 / 0 / NA** Well/Surface Water testing requirements are fulfilled/ records are complete
- **3 / 2 / 1 / 0 / NA** Written Training Plan for Hopyard Personnel outlines best practices and tasks
    - Employee training and written procedures are in place for: safe machinery operation, food-grade handling and housekeeping requirements, traceability & inventory record keeping, health and safety, pesticide application, quality records, food safety compliance, waste and pollutant management/disposal, and site/facility cleanliness.
- **3 / 2 / 1 / 0 / NA** Manager can articulate his hopyard 'walk-through' practices and schedule.
- **3 / 2 / 1 / 0 / NA** Pre-harvest alpha and other assay protocols are in place and records retained
- **3 / 2 / 1 / 0 / NA** Petiole/leaf evaluation/sampling/testing plan and practices, as required by customers, are in place.

Section Comments: _____

_____

___ **Section Total Score** *(out of 39, or reduce by 3 for each NA line)*

3 - Health and Human Safety

- **3 / 2 / 1 / 0 / NA** Health and Safety policies in place, posed, and training provided for workers, contractors, and subcontractor
    - A manager is designated with health and safety responsibility.
    - Manager is knowledgeable on health and safety laws and regulation pertaining to the workplace.
    - Personal Protective Equipment is available and used, as needed (clothing, hearing protection, gloves, footwear, respirators, hardhats/bump-caps, etc).
- **3 / 2 / 1 / 0 / NA** A Food Defense risk identification is on record to assure that all inputs (chemicals, tools, equipment) and personnel comply to food safety regulation and customer expectations.
- **3 / 2 / 1 / 0 / NA** Proper break station, toilets, and smoking areas are designated outside of fields and harvest center areas
    - Employees have unlimited access to clean drinking water during work hours
- **3 / 2 / 1 / 0 / NA** Animal/bird controls in place to keep out of harvesting/handling areas
- **3 / 2 / 1 / 0 / NA** Safety precaution signs (MIOSHA compliant) posted and Lock-out/Tag-out policy and procedures are in place

- 3 / 2 / 1 / 0 / NA First aid supplies available, signed properly
- 3 / 2 / 1 / 0 / NA Accident documentation reporting in place and return-to work policy is in place and enforced
  - includes policy and practices for dealing with blood/bodily fluid spills.
- 3 / 2 / 1 / 0 / NA Visitor check-in/checkout and hygiene/safety protocols in place.

Section Comments: _____

_____

___ **Section Total Score** *(out of 27, or reduce by 3 for each NA line)*

4 - Harvesting

- 3 / 2 / 1 / 0 / NA Pre-harvest and in-season cleaning and maintenance records are complete (equipment & building)
- 3 / 2 / 1 / 0 / NA Facility is closed-off during off-season in order to mitigate pest harborage
- 3 / 2 / 1 / 0 / NA Procedures documented and available to operators
- 3 / 2 / 1 / 0 / NA Equipment operation logs and service schedules established/maintained
- 3 / 2 / 1 / 0 / NA Sanitation and handwashing facilities available, signed, in working order
- 3 / 2 / 1 / 0 / NA Free of food, drink, cigarettes, and employee personal effects
- 3 / 2 / 1 / 0 / NA Food grade lubricant only are used
- 3 / 2 / 1 / 0 / NA Facility pest management plan in place
- 3 / 2 / 1 / 0 / NA All floors, conveyors and contact surfaces free of grease, dirt, contaminants
- 3 / 2 / 1 / 0 / NA All safety guard installed and maintained
- 3 / 2 / 1 / 0 / NA Shatterproof lighting in all areas
- 3 / 2 / 1 / 0 / NA Emergency stop buttons in place and functioning properly
- 3 / 2 / 1 / 0 / NA Tools and spare parts properly stored
- 3 / 2 / 1 / 0 / NA Entrances/opening to harvesting/handling areas are controlled/monitored
- 3 / 2 / 1 / 0 / NA Fresh/Wet/Green hops food-grade handled/storage/packaging/delivery practices are defined: including temperature, timeliness of delivery
- 3 / 2 / 1 / 0 / NA Harvest records are complete and satisfy product traceability, inventory and recall requirements

Section Comments: _____

_____

___ **Section Total Score** *(out of 48, or reduce by 3 for each NA line)*

5– Drying, Cooling, and Baling (or loose hops)

- 3 / 2 / 1 / 0 / NA Kiln area/surfaces/cloth clean and free of dust/dirt/grease and other contaminants
- 3 / 2 / 1 / 0 / NA Light fixtures are of proper design or shielded/enclosed to avoid product contamination risk.
- 3 / 2 / 1 / 0 / NA Process in place to ensure kiln temperature matches set point and is within preferred range of 120-140F
- 3 / 2 / 1 / 0 / NA Hop cooling is adequate and timely (ideally to <45F in <24 hrs., season dependent) before baling/packaging
- 3 / 2 / 1 / 0 / NA Magnets and/or Metal detection is in place and regularly cleaned/maintained
- 3 / 2 / 1 / 0 / NA Packaging, bale-wrap and containers are stored in clean/dry location to prevent contamination
- 3 / 2 / 1 / 0 / NA Bale press area is clean and properly maintained
- 3 / 2 / 1 / 0 / NA Bales clearly labeled using industry-standard format
- 3 / 2 / 1 / 0 / NA Facility entrances and opening are/can be controlled/monitored.
- 3 / 2 / 1 / 0 / NA Record and retain process parameters, product variety/moisture/temperature/other quality attributes data

Section Comments: _____

_____

___ **Section Total Score** *(out of 30, or reduce by 3 for each NA line)*

6 - Storage and Transportation

- 3 / 2 / 1 / 0 / NA Designated storage area is clean, dry, and properly cooled to retain hop quality
- 3 / 2 / 1 / 0 / NA Chemical, tools, trash, unrelated equipment stored properly and away from storage, handling and process areas
- 3 / 2 / 1 / 0 / NA Work-in-process/finished product stored only in proper, clean, designated areas
  - Policies, Procedures, and Practices are in place to prevent Co-Mingling of product within the farm, facility, and in transit
- 3 / 2 / 1 / 0 / NA Pest controls in place, clean, documented, functioning.
- 3 / 2 / 1 / 0 / NA Temperature controls in place, maintained, and records retained
- 3 / 2 / 1 / 0 / NA Product (baled and/or leaf hops) contact surface are clean, dry, free of contamination and condensation risk
- 3 / 2 / 1 / 0 / NA Vehicles are clean, properly maintained, operated in a manner to not negatively impact food safety/quality

Section Comments: _____

_____

___ **Section Total Score** *(out of 21, or reduce by 3 for each NA line)*

Summary Sheet / Aggregate Score:

___ **Section 1 Total Score**
___ **Section 2 Total Score**
___ **Section 3 Total Score**
___ **Section 4 Total Score**
___ **Section 5 Total Score**
___ **Section 6 Total Score**
___ **/ 192** *(deduct 3 points from denominator for each N/A scores)* **x 100 = _____%**

___ Number of 0 (zero) or 1 (one) score in a *"Must Have"* Item *(NOTE: one or more results in automatic audit failure)*

A minimum Score of 144 (or 75%), and no 'Must Have' deficiencies, is required to qualify for the "HGM Process Verified" Seal.

Auditors Notes, Summary of Findings, and Recommendations:

Commendations (*affirmation/recognition of best practice compliance novel solutions*):

_____

_____

Recommendations (*not mandatory, for consideration to improve*):

_____

_____

Corrective Actions Required (*Itemized, with Target Completion Date*):_____

_____

_____

Summary Comments, by Auditor: Pass/Fail (*and/or status pending corrective actions – based on scoring and other items noted above*)

_____

_____

_____

Corrective Actions Taken:

Item:_____Action:_____
Date:_____ By Whom:_____ Signed off by:_____ Signature:_____

Item:_____Action:_____
Date:_____ By Whom:_____ Signed off by:_____ Signature:_____

Item:_____Action:_____
Date:_____ By Whom:_____ Signed off by:_____ Signature:_____

Quality Standards and Requirements: Growing and Harvesting Quality Hops

Hop Quality:

Achieving hop quality requires attention to production practices as well as attention to specific product attributes:

- **Production Practices**
  - Hopyard Management
  - Harvest Center Operations
- **Product Attributes**
  - Color
  - Purity
  - Moisture
  - Aromatics
  - Oils
  - Storage (HSI)
  - Temperature
  - Packaging, Handling and Transportation

Expectations: Production Management

- Hopyard (field production) requires a management plan to address the following to ensure healthy plants that yield quality hops:
  - Irrigation and water plan, including water quality records
  - Soil testing and fertilizer plan, and supporting records
  - IPM (Integrated Pest Management) plan
    - including licensing of pesticide applicator personnel, and documentation of application record
    - Field walk-through & scouting plan to monitor for pests, downy mildew, plant health, cone quality
    - Pesticide Application: record all application, insure compliance to Pre-Harvest Interval requirements
- Harvest Center Facility
  - Equipment/facility/contact surfaces: cleanliness and maintenance records
  - Pest Control: rodent, insect, bird, other
- Comply to regulatory requirements of state government agriculture departments and export countries regulations.
- Variety Identification/Isolation
  - Hop-yard Maps – variety location
  - Ensure traceability from bine to bale

Expectations: Harvesting & Handling

- Sanitation
- Employee Practices
- Lubricants and other chemicals – food grade
- Equipment/Tools Storage, Maintenance & Service Records
- Pest Management
  - Rodent, insect, etc.
- Contact surfaces
- Product Protection and People Safety – safety guards, lights, signage
- Security/Biosecurity

As Quality and Food Safety do intersect, these "Expectations" are addressed in more detail in the HGA Food Safety/Handling Practices Module 1 section of this manual

Expectations: Health & Human Safety

The current state of the art of small- and mid-scale hop production and harvesting as practiced in Michigan engages quite a number of people. Specific attention must be paid to people practices and securing human health and product quality/safety.

- Visitor check-in /check-out log and protocol in place
  - Biosecurity, risk management (in season)
- Employees receive health and human safety training
- Policies in place addressing:
  - First Aid, including access to kits
  - No: smoking, drugs, pets, animals, food/drink, or sundry storage in receiving/harvest center facilities
  - Lock-out / Tag-out policies and protocols in place
  - Appropriate rest-rooms, hand-washing facilities, eye-wash station
  - Staff lunch/breakroom provided

Hop Quality Requirements:

Other Resources

- Federal Standards: the **USDA Hop Inspection Manual**
  - *Encompassed in the Hop Inspection Manual is guidance for state departments of agriculture to conduct seed, leaf and stem inspections as a joint Federal-State program. The current manual is being updated to reflect changes in hop harvesting and handling technology (summary of changes). USDA will issue a Policy Statement prior to the 2016 harvest to notify states of the new revisions. An updated Hop Inspection Manual will be released in 2017. In addition to mandatory inspections in Oregon, Washington and Idaho, several additional states are implementing this program on a voluntary basis, in order to provide customers with consistent quality information.*
  - Link: https://www.usahops.org/cabinet/data/FGIS%20Hop%20Inspection%20Handbook.pdf
- Gorst Valley Hops produced, in 2013, a ***"Best Practices Guide for Hop Processing"***, funded in part by USDA through the State or Wisconsin. The subject matter extends beyond processing, and much of the information in this bullet-formatted document can apply to Harvest Center practices. It includes 16 sections.
  - Link: http://gorstvalleyhops.com/wp-content/uploads/2015/03/Processing-Manual.pdf

Hop Traceability – Bale Labelling/Stencil

- Overview:
  - **Hop Traceability is a crucial tool for brewers, not only for food safety, but to help deliver quality and consistency as well.**
  - *"**Grower numbers** are an important tool used in the hop selection process, as important as variety and lot numbers...This standard has been a part of the hop industry in the Northwest for decades, and has helped guide brewers, not only for reasons of raw material traceability, but also for reasons of consistency and familiarity with individual farms. Grower numbers are one of a number of data points that we log with every brewer's cut that we assess and have helped us to recognize the farms and the growing regions that produce the best hops for our beers. As commercial hop growing moves out of the Northwest and across the country, having a standardized system in place that connects the bale to the growers in these new regions is obviously important."*

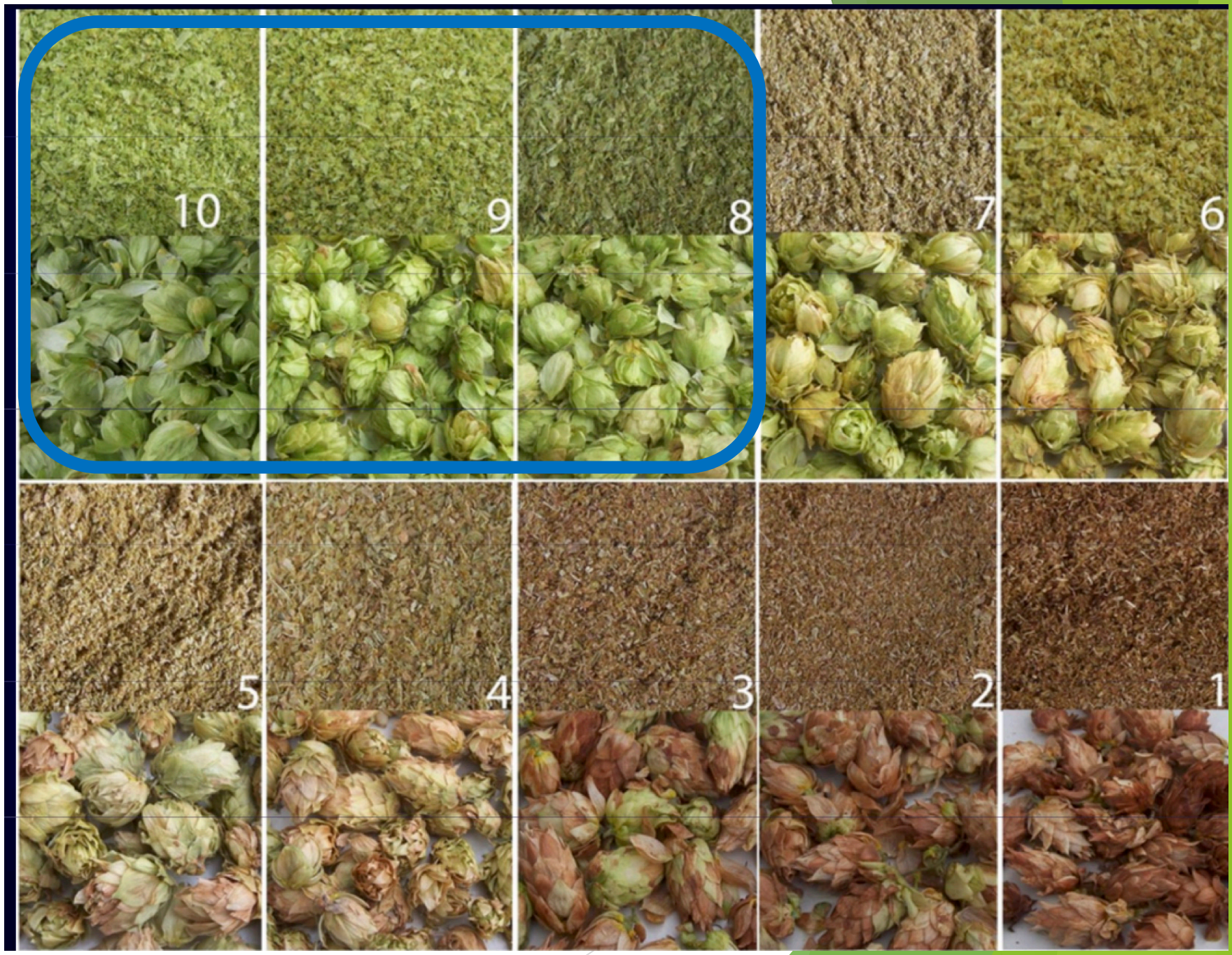
    - *Firestone Walker Brewmaster Matt Brynildson*

Hop Quality: Key Attributes

- Color
- Purity
- Moisture
- Aromatics, Acids, & Oils
- Storage (HSI)
- Temperature
- Packaging, Handling and Transportation
  - Maintaining Quality for Marketing & Sales

Color: Haas 10-Point Hop Quality Scale

- Target – 8 and above
  - for cones, milled, or pellets
  - Most customers will require 8, 9, or 10
  - Color is a good measure of hop quality. Green is good, brown is undesirable.
  - Note: too green may indicate immature hops, this visual guide is not to be used independent of alpha, acid and other lab assays.



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Purity:

- **Sticks / Leaves / Stems**: Less than 2% *(per USDA Hop Inspection Manual)*
- **Metal:** Free of, by use of magnets and/or metal detectors at key transfer points in processing/handling
- **Staining:** Free of oil, grease, dirt, grim (product & packaging)
  - Avoid/minimize contact with ground, floors
  - Keep contact surfaces clean
  - Packaging material cleanliness
- **Other Foreign Material:**
  - free of…

Moisture

- Target less than **10.5 % moisture** in dried/cooled hops
  - *(preferred range 8.5-10.5%)*
  - Typically achieved with kilning temperatures of 125-140F
    - Use controlled heating and/or dehumidification
  - Variety specific *(manage accordingly)*
    - *oil content and other unique attributes may require storing at lower moisture*
  - Avoid storing at higher moisture:
    - risk of *mold and/or off-quality color and aromatics development*

Moisture Testing Equipment & Supplies:

- Microwave: (any brand will do)
  - If it overheats during the process, set to a lower power level.
  - Run 20 seconds at a time and picked a power level that gives 10 seconds of emitter on time and 10 seconds of cooling fan time while emitter is off. You can hear the difference in the sound of the microwave to know when these stages occur.
- Scale (Balance):
  - Minimum 1 mg resolution
  - Example: AWS Gemini-20 *(around $20 on Amazon - others brands may be little more stable, but the $20 price tag is tough to beat)*
- Weigh boats
  - To contain/hold/move the sample from the microwave to the scale and back
  - Should not absorb liquids (water or oil)

Note: other options include automated moisture meters.
Ensure proper calibration of any equipment used and consider validating equipment performance against an accredited lab or in a check-program at least annually.

Procedure for Moisture Testing: *(example)*

1. Weigh the container (weigh boat)
2. Add sample and weigh sample (wet weight)
3. Microwave for 20 to 30 seconds
4. Weigh sample
5. Did sample weight change? If yes, go to #3, if no then this is the dry weight, continue to #6
6. Calculate Moisture (dryness)
    1. ((wet weight – boat weight) - (dry weight – boat weight))/(dry weight – boat weight) = Moisture Percentage

Aromatics, Acids, & Oils

- **Aromatics:**
  - Subjective, by variety (Train yourself to these attributes and customers expectations)
  - "Aroma is tested by smelling a crushed handful of whole cones. The hops should have a pronounced aromatic smell free from extraneous taints and odors, [list of unpleasant odors include dankness, onion, garlic, cheese]. . . . Smell may also be tested by rubbing the cones between the fingers, which splits the lupulin grains. The aroma of the sample should not be sharp, but fine and mellow." Jean DeClerk, A Textbook of Brewing, 1958.

- **Acids: (variety specific, contributing bitterness to beer)**
  - Alpha (humulone-type)
    - Resource: http://msue.anr.msu.edu/news/how_to_calculate_alpha_acid_levels_of_hops_before_harvesting
  - Beta (lupulone-type)
  - A useful guide for determining harvest readiness for hops for optimal quality: http://msue.anr.msu.edu/news/determining_when_hops_are_ready_to_harvest

- **Oils: there are four main hop oils that can add flavor late in the brewing process**
  - Myrcene, humulene, Caryophellene, Farnesene*
  - Measurement of oils is expensive but may be required by some customer – dialog with customer on their needs

* Learn more at: http://beersmith.com/blog/2013/01/21/late-hop-additions-and-hop-oils-in-beer-brewing/

Temperature & Storage (HSI)

- **Temperature**
  - Bales formed at ambient temperature should be placed into refrigerated/frozen storage within 1-10 hours of baling – managed in a manner to avoid quality deterioration
  - Ideally store hops frozen - at **25-29F**
    - Refrigerated (<40F) storage may be an option for short-term storage/transit.
  - Higher temperatures increase risk of quality deterioration over time
- **Packaging**
  - Bales: Compressed & Sealed, to minimize air exposure (oxidation risk)
  - Leaf/Loose: sealed, oxygen barrier, light barrier
- **HSI – Hop Storage Index**
  - An indicator of hop degradation over time, typically assayed at a contract lab
  - Typical values for quality hops range from 0.20-0.32
  - As hops age, alpha decreases, oxidation products increase, and HSI goes up.
  - Learn about the HSI method at: http://methods.asbcnet.org/summaries/hops-12.aspx

- Oxidation compounds absorb light near 275 nm, Alpha Acids absorb near 325 nm*.

$$\frac{Oxidation\ Compounds}{Alpha\ Acids} = \frac{Absorbance@275}{Absorbance@325}$$

Maintaining Dry Hop Quality (bale, leaf/loose – any unit for sale)

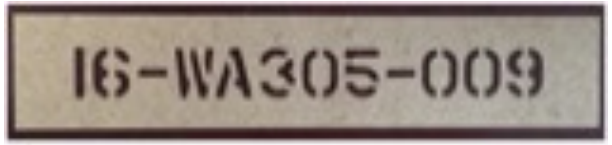
- **Documentation/Records/Traceability:**
  - Whether grown and harvested on-site or coming from an associate or network grower it is important to have **proper documentation** on the variety, cultivation and harvesting of the bales that may including all or some of:
    - bale label, date/lot coding, pesticide use certification, COA (certificate of analysis including alpha, beta, HSI, etc.), storage records, etc.
- **Sanitation**
  - Handle as food, avoid floor contact, use only food-grade and food-specific tools and other contact-surfaces.
  - Any spilled product that comes in contact with non-food-grade surfaces should be disposed of – should not enter the process.
- **Transportation & Handling & Storage** (retain hop quality attributes)
  - Retain bale integrity
  - Maintain cold-chain integrity (mode of transport – ambient, refrigerated, frozen) may vary by season and ambient temperature

Bales: Other Standards and Practices

- **Bale size and compression:**
  - **Note: bale size/weight is not standardized yet in Michigan**
    - **ensure processor (internal or external) or customer will accept your bale configuration.**
  - Compression: no industry standard, however, <14:1 is typically deemed to be acceptable
    - **Manage to a compression that does not degrade hop quality**
      - **For reference:**
        - 100-160 lbs/bale is typical range for MI hops
        - 132-160 lbs/bale is typical in Europe
        - 200 lbs/bale is standard weight for PNW growers
    - Export market consideration: compress to 200 lbs/bale, effectively the world standard
  - **Bale Lot Certificate of Analysis (COA) attributes to report: customer driven (not standardized)**
    - Manage by monitoring crops before harvest
      - Testing/monitoring in-field for alpha, color, cone development before harvest is the typical practice
    - Testing of finished baled product going into storage is a better, recommended practice
      - Test and report attributes as required for your management and to customer requirements

Hop Traceability – Bale Labelling/Stencil

Example: Labeling Convention, HGA/USAHops



- Pictured: sample of grower stencil for a 2016 lot from a Washington grower; number 305; lot 009. (Note: WA305 currently an in-active number for sample purposes only).
- **Obtaining a grower number is a free service** to the industry and does not require membership in HGA.
- Grower Numbers are available to those who:
  - Are growing hops with the intent of commercial use
  - At a minimum, have a quarter of an acre of hops
- If you would like to apply for a grower number, email a completed **Grower Number Application Form** (https://www.usahops.org/cabinet/data/USA%20Hops%20-%20Grower%20Number%20Application%20Form%204-16.pdf) and email it to **growernumber@usahops.org**.
- See https://www.brewersassociation.org/best-practices/hops/hop-grower-codes/ for a list of Hop Grower Codes. There is also a Hop Variety Codes list at this website. The Hop Variety Code or name is additional information you may also incorporate into the bale label as part of your marketing and traceability.
- Additionally bale labels may include:
  - Variety name
  - Analysis data (i.e.: aromatics, oils, HSI (hops storage index), etc.
  - Information your farm or your customer (processor, broker, brewer, etc) may deem important (field ID, harvest date, baling date, etc).

Bale labeling is key to Traceability *(and product recall, as needed)*.

Other formats are acceptable, however, the HGA/USAHops label convention is recommended as it is the recognized format in the global hops trade.

Source: https://www.usahops.org/growers/industry-standards.html

Hop Growers of America
Food Safety/Handling Practices: Module I

- The **Hop Growers of Michigan endorse the HGA Food Safety / Handling Practices Module 1** as the standards and practices that growers should adopt for their harvest operations. Module 1 is a tool that can be used in on-farm self-audits and in the establishment of the farm Standard Operating Procedures (SOP) and Food Safety Manual.

- HGA (and HGM) encourage all growers who are selling hops commercially to utilize this program and document their food safety practices.*
- The interactive version of Module 1 Food Safety is expected to go live in May 2018 and will be available at: https://www.usahops.org/growers/food-safety.html
  - This self-certification format will generate a Food Safety Policy Manual and Certificate of Compliance (in a printable format) for growers who implement and complete the documentation of required food safety practices. The certificate may be copied and provided to customers, and must also go on record with HGM to comply with the HGM Verified Source program.*

- The next 32 pages incorporate the HGA Module 1 in its entirety, for those that prefer to work off-line or do not have good internet service in the completion of Module I.
  - *Note: working off-line will not generate the Certificate and may require additional dialog with HGA to secure the certificate, and with HGM to secure the HGM Verified Source seal.*
  - ***We highly recommend working in the live, on-line version – at the link above - as it will make annual updating much simpler in future years.***

* source: HGA website, with HGM addendum

Standards and Requirements: Best Practices*

- Farm operations vary based on their equipment and other resources. However unique, all hop growers should **commit to continuous improvement of farming and harvesting practices and crop quality**. Some growers subscribe to third-party audited quality control programs such as GLOBALG.A.P. and USDA GAP. Some customers (hop merchant companies and brewers) provide specific guidance to their growers for food safety and quality control practices.
- Over the next few years Hop Growers of America will develop several **"Best Practices"** modules that will allow growers to self-certify the care and attention they invest in their crop, insuring customers receive hops that are safe and consistently high in quality.
- While future modules will only be available in the Member Area of this website https://www.usahops.org/growers/food-safety.html, we feel Food Safety practices during hop harvest are critically important for all growers, regardless of membership in HGA. This self-certification Food Safety/Harvest Practices program that is consistent with third-party certified programs has been developed, and includes templates for many of the documents you will need to document your practices.

* source: HGA website: https://www.usahops.org/growers/food-safety.html

Hop Growers of America
Food Safety/Handling Practices: Module I

- the following page incorporate the HGA ***Food Safety Module 1 – Harvest Practices*** (32 pages) and ***Module 1 Attachments*** (supporting forms/templates)
- Also available online at : https://www.usahops.org/growers/food-safety.html

Food Safety/Harvest Practices Module One
Version 2.6 – March 2017

- This module will assist your development of a food safety policy and plan for your farming operation based on your farm's risk assessments. **PLEASE NOTE: These practices apply only to the harvesting portion of the production cycle, not to field operations prior to harvest** (for field production requirements see page 8)

- This module is derived from a number of industry-recognized certification programs. It is designed to provide growers who may not have access or resources to implement merchant, brewery or 3rd party audited programs with a self-certified option consistent with industry recognized standards, to ensure a food-safe and quality crop to their customers.

- For farms with **multiple harvesting facility locations**, this assessment should be completed for **each location**.

- Module One focuses on the "Must Do" practices from common industry and 3rd party audited certification programs. Templates are provided for reference only. Each grower should factor in their own farm's risk assessments.

- Future modules will focus on requirements of the Food Safety Modernization Act (FSMA) , along with "Recommended" practices from other food safety programs.

Food Safety/Harvest Practices Module One includes five sections:

A. General

B. Records

C. Health and Human Safety

D. Hop Harvesting Field and Handling

E. Summary and Final Checklist

Each section is divided visually by tabs so you can track your progress.

Next

USAHOPS
Food Safety/Harvest Practices Module One
Version 2.6 - March 2017

Please complete the following:

Farm Name:
Primary Contact Person:
Mailing Address:
Farm Facility Name and Location covered by this assessment:

Phone:	Email:
Food Safety Contact Person:	
Phone:	Email:
24 Hour Contact Number for Food Safety Emergency:	
Grower #s produced at this facility:	

Why do I need a grower number?

Grower numbers are assigned free of charge by Hop Growers of America (membership is not required). This is the US hop industry's standardized system for crop traceability and identification. If you do not have a grower number click, please complete Attachment A1 to apply for one. Standardized grower numbers are a key aspect of food safety and traceability programs.

Next

Overview of Records Section:

B.1. Spray records to meet USDA/EPA requirements are complete.

B.2. Agricultural chemicals (organic and conventional) are applied by trained, licensed or certified application personnel, as required by prevailing regulations and the pesticide label.

B.3. If product is intended for export, ag chemical use shall comply with regulatory requirements of the intended country of destination.

B.4. Irrigation Well/Surface Water irrigation water testing requirements are fulfilled and records are complete.

B.5. Records for harvesting, field, picking machine, kilning and baling are complete, to ensure traceability.

B.6. Pre-harvest, cleaning and maintenance records are complete.

B.1. Spray records to meet USDA/EPA requirements are complete.

- Use of ag chemicals shall comply with label directions and prevailing regulations. Complete the required spray records either online or using the correct paper form for your area or state. This must include a record of the active ingredient, EPA registration number, target pests, and method of application.
  - ✓ Review Sample Pesticide Label (attachment B1a, or others specific to your state or local jurisdiction). "The label is the law!" All chemicals applied to the crop (organic or conventional) are legally allowed for application to hops intended for commercial sale. All applications are in compliance with label instructions, including rate, application timing, total number of applications per season, total allowable applications per season, re-entry interval, pre-harvest interval, personal protective equipment, and other requirements and restrictions.
  - ✓ Spray application record templates may be available from your State Department of Agriculture or other pesticide regulatory agency. Or, you may utilize the following:
    - » *Click here to download Example 1 (attachment B1b)*
    - » *Click here to download Example 2 (attachment B1c)*

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☐ **I certify that I have implemented this practice and will continue to do so. (Check box to confirm completion).**

Next

B.2. Agricultural chemicals (organic and conventional) are applied by trained, licensed or certified application personnel, as required by prevailing regulations and the pesticide label.

- Copy of spray license and/or training record is on file and available for review (see sample training record). (Attachment B2)

HOP GROWERS OF MICHIGAN EST. 2014

☐ **I certify that I have implemented this practice and will continue to do so. (Check box to confirm completion).**

Next

Food Safety/Harvest Practices Module One
Version 2.6 - March 2017

B.3. If product is intended for export, ag chemical use shall comply with regulatory requirements of the intended country of destination.

- If selling to a merchant who may export the crop, obtain their list of chemicals with usage restrictions.
- You may also reference the US Hop Industry Plant Protection Committee's international MRL chart (available at https://www.usahops.org/growers/plant-protection.html).

- ☐ I certify that my crop is destined only for Domestic customers and all applied pesticides (conventional or organic) are legally allowed for application to hops in my state/area and are detailed in full on the spray reports submitted.

- ☐ If hops produced on this farm will be exported to foreign customers, I certify that no pesticide residues are present that do not comply with the regulatory requirements of that country. Laboratory testing for pesticide residues is recommended to validate compliance for export.

☐ **I certify that I have implemented this practice and will continue to do so. (Check box to confirm completion).**

Next

B.4. Irrigation Well/Surface Water irrigation water testing requirements are fulfilled and records are complete.

- No sewage, sludge or human waste contamination. Water source is protected from livestock.
- See Water Risk Assessment (attachment B4)

B.5. Records for harvesting, kilning and baling are complete, to ensure traceability.

- You must track all crops from field to warehouse
- See Daily Harvest Log (attachment B5)

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☐ **I certify that I have implemented these practices and will continue to do so. (Check box to confirm completion).**

B.6. Cleaning and maintenance records are complete.

- Include the following:
  - ✓ Harvesting equipment/tools (trucks, tractors, field tools, equip., etc.)
    - See Machinery/Building/Equipment Maintenance/Cleaning log (attachment B6a)
    - See Truck Cleanliness log (attachment B6b)
  - ✓ Receiving area/picker
    - See Machinery Policy (attachment B6c)
  - ✓ Kiln, if used
    - See Food Safety Risk Assessment (attachment B6d)
  - ✓ Cooling/baling or other packaging, if used (including magnet or other system to remove metal foreign material)

☐ **I certify that I have implemented this practice and will continue to do so. (Check box to confirm completion).**

Next

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Overview of Health & Human Safety Section:

C.1. Employees receive health and safety training per OSHA guidelines.

C.2. Employees receive food safety training.

C.3. First aid posting, supplies and protocols.

C.4. No smoking signs.

C.5. Formal visitor check-in/check-out protocol is in place.

C.6. A health and human safety policy is posted and communicated to staff.

C.7. Lock-out and tag-out policies and procedures are in place.

C.8. No animals in harvesting and crop handling areas.

Overview of Health & Human Safety Section (continued):

C.9. Safety precaution signs are posted.

C.10. No food and drink in harvesting/crop handling areas; designated eating/break area is defined.

C.11. Policy for toilet, hygiene and health.

C.12. Drinking water is available to all field employees.

C.13. Smoking, chewing, eating, drinking (other than water), urinating, defecating, or spitting is not permitted in any crop growing areas, harvesting and crop handling areas.

C.14. Operation should have a blood and bodily fluids policy.

Next

C.1. Employees receive health and safety training per OSHA guidelines. Written policy on Personal Protective Equipment (PPE)

- If required by state regulations, a person certified in CPR/first aid is present on the farm at all times. Employer must have CPR/first aid cards on file.

C.2. Employees receive food safety training.

- See Training template (attachment C2)
- All Food Safety & facility hygiene signs shall be posted & visible with clear instructions to employees & visitors.

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☐ **I certify that I have implemented these practices and will continue to do so. (Check box to confirm completion).**

Next

C.3. First aid posting, supplies and protocols.

- See First Aid Sign template (attachment C3)
- Are first aid kits located with or close to workers? Do they have adequate supplies according to the work performed?
- Are all accidents documented, even if no medical treatment is needed? Are doctor reports submitted to the employer? Was the accident investigated and was new safety training completed and documented if needed? (OSHA requirements).
- All injured employees shall have a release from their Doctor before returning to work for light duty or full duty work

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☐ **I certify that I have implemented these practices and will continue to do so. (Check box to confirm completion).**

Next

C.4. No smoking signs.

- See No Smoking template (attachment C4)

C.5. Formal visitor check-in/check-out protocol is in place.

- See Visitor and Worker Hygiene and Safety Procedures (attachment C5)

C.6. A health and human safety policy is posted and communicated to staff.

- Must be able to provide documentation of training.
- See Visitor and Worker Hygiene and Safety Procedures (attachment C5)
- A Visitor Log is utilized (attachment C6)

☐ **I certify that I have implemented these practices and will continue to do so. (Check box to confirm completion).**

Next

HOP GROWERS OF MICHIGAN EST. 2014

C.7. Lock-out and tag-out policies and procedures are in place.

- See Sample Lockout Tag Out Policy (attachment C7)

C.8. No animals in harvesting and handling areas.

- Document efforts to minimize contamination risk.
- If domestic animals are utilized in the growing system for weed control, a risk assessment is performed and practices to reduce risk are documented.

C.9. Safety precaution signs.

- Examples include propane and fuel tanks (Flammable), burners (fenced or enclosed), etc.

☐ **I certify that I have implemented these practices and will continue to do so. (Check box to confirm completion).**

Next

C.10. No food and drink in harvesting/crop handling areas; designated eating/break area is defined.

- *Water is acceptable in all areas, in non-breakable containers.*

C.11. Policy for toilet, hygiene and health.

- Toilet and wash stations shall be available and maintained in clean and sanitary condition.
- Personnel shall wash hands at any time when their hands may be a source of contamination, including before starting work, before and after using the toilet, before and after eating/drinking/smoking.
- Signage for hand washing is posted.
- No gloves should enter toilet facilities.
- See Bathroom Daily Log (attachment C11)
- Wash stations shall have potable water.

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☐ **I certify that I have implemented these practices and will continue to do so. (Check box to confirm completion).**

Next

C.12. Drinking water is available to all field employees.

- Water is acceptable in all areas, in non-breakable containers.

C.13. Smoking, chewing, eating, drinking (other than water), urinating, defecating, or spitting is not permitted in any crop growing areas or Hop Facility.

C.14. Operation should have a blood and bodily fluids policy.

- Include education on employees with illness, exposed cuts, sores or lesions not in direct contact with product.
- See Contamination Policy template (attachment C14)

☐ **I certify that I have implemented these practices and will continue to do so. (Check box to confirm completion).**

Next

HOP GROWERS OF MICHIGAN EST. 2014

Overview of Hop Harvesting & Handling Section:

D.1. Sanitation and hand washing facilities are available with signage and instructions.

D.2. Fields and Facilities are free of food and drink containers. Water only in Harvest and Handling areas. Food and drinks in designated eating areas only.

D.3. Clearly labeled food grade lubricants are used.

D.4. Equipment properly maintained and serviced; anything that comes in contact with produce is in good repair and not a source of contamination. This includes all field equipment, tools and all vehicles used for transporting hop bines. Logs are completed pre-harvest and daily during harvest.

D.5. Cleaning and maintenance records are maintained for buildings and facilities. Logs completed pre-harvest and daily during harvest.

Next

Overview of Hop Harvesting & Handling Section (continued):

D.6. Pest management plan and system are in place for harvesting/handling areas.

D.7. All floor areas and conveyor belts are free of grease, dust, dirt and other contaminants.

D.8. All safety guards are installed and maintained.

D.9. Shatter-proof lighting.

D.10. Emergency stop buttons are in place.

D.11. Tools and spare parts are collected and properly stored.

D.12. Entrances and openings to harvesting/handling areas are secured.

Overview of Hop Harvesting & Handling Section (continued):

D.13. Harvest procedures include measures to inspect for and remove or provide signage for physical hazards.

D.14. Packaging, bale wrap, and hop containers are stored in clean, dry conditions to prevent contamination.

D.15. Bales are clearly labeled with an approved numbering scheme that includes grower number, lot number, crop year, and variety.

Next

Overview of Hop Harvesting & Handling Section (continued):

D.16. Loading and unloading procedures and equipment shall minimize damage to and prevent contamination of product.

D.17. Trash shall not come into contact with produce.

D.18. All chemicals shall be stored in a secured, separate area to prevent contamination with product. All chemicals shall be properly labeled.

D.19. In case of ambient air or sun drying in the field, locations are maintained to prevent debris and are protected from excessive wildlife, roosting/nesting areas.

Next

D.1. Sanitation and hand washing facilities are available with signage and instructions.

- See Section C.11
- Inspected daily, cleaned and restocked with supplies as needed. Cleaning and inspection records are kept and available for inspection.
- Hand washing sign template (attachment D1)

D.2. Fields and Facilities are free of food and drink containers. Water only in Harvest and Handling areas. Food and drinks in designated eating areas only.

D.3. Clearly labeled food grade lubricants are used.

- Get statement or certificate from vendor if not stated on the label.
- Safety Data Sheets are current and kept on file.

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☐ **I certify that I have implemented these practices and will continue to do so. (Check box to confirm completion).**

Next

D.4. Equipment properly maintained, calibrated and serviced; anything that comes in contact with produce is in good repair and not a source of contamination. This includes all field equipment, tools and all vehicles used for transporting hop bines. Logs are completed pre-harvest and daily during harvest.

- A preventative maintenance and/or master cleaning schedule, with related standard procedures, shall be established (attachment D4)
- See Daily Cleaning/Maintenance Log templates
  - Machinery/Building/Equipment (attachment B6a)
  - Trucks (attachment B6b)

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☐ **I certify that I have implemented these practices and will continue to do so. (Check box to confirm completion).**

Next

D.5. Cleaning and maintenance records are maintained for buildings and facilities. Logs completed pre-harvest and daily during harvest.

- Receiving area/picker, kiln, cooling/baling room, magnet, any storage areas
- See Machinery/Building/Equipment Log for pre-harvest (attachment B6a)
- See Daily Cleaning & Maintenance Log template for daily use during harvest (attachment D5)

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☐ **I certify that I have implemented these practices and will continue to do so. (Check box to confirm completion).**

Next

D.6. Pest management plan and system are in place for harvesting/handling areas.

- Methods in place for monitoring and correcting pests in harvesting, handling and storage areas.
- Rodent traps are used in the interior of facilities only. Traps are located an adequate distance from product to prevent contamination.
- Bait stations are for exterior use only.
- Activity is monitored and recorded.
- Bird control methods to control access to facilities during harvesting and post-harvesting seasons (netting, screening, air curtains, etc.).

☐ **I certify that I have implemented these practices and will continue to do so. (Check box to confirm completion).**

Next

D.7. All floor areas and conveyor belts are free of grease, dust, dirt and other contaminants.

- Use Daily Logs to chart visual inspections (See D5 – Daily Log)

D.8. All safety guards are installed and maintained.

- Use Daily Logs to chart visual inspections (See D5 – Daily Log)

D.9. Shatter-proof lighting.

- Retain invoice copies from installation

D.10. Emergency stop buttons are in place.

- Stops are clearly marked/labeled

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☐ **I certify that I have implemented these practices and will continue to do so. (Check box to confirm completion).**

Next

D.11. Tools and spare parts are collected and properly stored.

- Have designated area for all tools to be kept while working

D.12. Entrances and openings to harvesting/handling areas are secured.

- Signage for authorized personnel

D.13. Harvest procedures include measures to inspect for and remove or provide signage for physical hazards.

- Magnet installed or other mechanism to remove foreign objects from product

☐ **I certify that I have implemented these practices and will continue to do so. (Check box to confirm completion).**

Next

D.14. Packaging, bale wrap, and hop containers are stored in a clean and dry conditions to prevent contamination, and are inspected prior to use.

- Procedure in place for rejecting packaging material
- Hop packaging materials must be food-grade
- If ink is used to mark bales, it must be food-grade

D.15. Bales are clearly labeled with an approved numbering scheme that includes grower number, lot number, crop year, and variety.

- Documented traceability procedures in place that can trace hops from field to finished bale
- Grower numbers are issued by Hop Growers of America to ensure numbering standardization. Please see section A.

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☐ **I certify that I have implemented these practices and will continue to do so. (Check box to confirm completion).**

Next

D.16. Loading and unloading procedures and equipment shall minimize damage to and prevent contamination of product.

- Use Daily Logs to chart visual inspections (See D5 – Daily Log)
- Document inspection of harvest areas to prevent contamination of product
- Document inspection of equipment to prevent contamination of product

D.17. Loose and baled hops are protected from contamination.

- If water is used during cooling process on the final product, it shall be potable
- Procedures are documented to prevent co-mingling and cross-contamination of varieties. Varieties are clearly identified and documented
- No trash is allowed to contact product

☐ **I certify that I have implemented these practices and will continue to do so. (Check box to confirm completion).**

Next

D.18. All chemicals shall be stored in a secured, separate area to prevent contamination with product. All chemicals shall be properly labeled.

- All chemicals are to be kept in the original containers unless they are cleaning solutions
- Cleaning solutions in other containers MUST be clearly labeled for contents

D.19. If using ambient air or sun for the drying of harvested hops in the field, adequate methods to prevent contamination and maintain product integrity have been implemented.

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☐ **I certify that I have implemented these practices and will continue to do so. (Check box to confirm completion).**

Next

Summary & Final Checklist:

- E.1. Traceability and contamination policies in place
- E.2. The food safety plan shall be reviewed at least annually
- E.3. The food safety policy is in place
- E.4. Disciplinary policy for food safety violations (attachment E4)
- E.5. Documentation shall be readily available for inspection
- E.6. Documentation shall be kept that demonstrates the food safety plan is being followed

☐ **I certify that I have implemented these practices and will continue to do so. (Check box to confirm completion).**

Next

HOP GROWERS OF MICHIGAN EST. 2014

Hop Growers of America is committed to supporting all commercial hop growers, whether HGA members or not, with the necessary tools to ensure a food-safe and quality product to our customers. To this end, we will maintain the PDF version of LEVEL 1 HARVEST FOOD SAFETY on the Public side of the USA Hops website where it can be referenced by all growers and brewers.

The **interactive version of this module**, along with future modules focused on advanced Food Safety, Sustainability, and Food Safety Modernization Act compliance **will be available in the new Member Area* when launched**. Upon completion of all "check boxes" the interactive version of this module would generate the farm's food safety policy and self-certification document, which can be printed, dated and signed by the responsible party and provided to customers.

**check back at the HGA website for when the module goes live, at:*
https://www.usahops.org/growers/food-safety.html

HGA Module I – Attachments

- HGA has compiled a set of **documents and template that growers can use to create their farm SOP and Food Safety Manual**. Included are sample signage and other resources that can be printed for posting at the appropriate location on the farm and in the harvest center.
- This link is to the 40+ page "Attachments" file on the HGA Website:
  - https://www.usahops.org/cabinet/data/PublicModule1Attachments.pdf
- In addition to HGA's resources there are Michigan-specific templates and documents. Examples are included in the following slides/pages.
  - *(if you have a template you like to work with on your farm and are willing to share for the benefit of the entire sector, please share with joe.colyn@originz.com and we'll incorporate in the 2018 version of this Grower Standards & Requirement publication)*

Global GAP - Overview

- **GlobalG.A.P.** is an internationally recognized set of farm standards dedicated to Good Agricultural Practices (**GAP**). Through certification, producers demonstrate their adherence to GlobalG.A.P. standards.
- **GlobalG.A.P. is a private sector body that sets voluntary standards** for the certification of production processes of agricultural (including aquaculture) products around the globe. The GlobalG.A.P. standard is primarily designed to reassure consumers about how food is produced on the farm by minimizing detrimental environmental impacts of farming operations, reducing the use of chemical inputs and ensuring a responsible approach to worker health and safety as well as animal welfare.
- **GlobalG.A.P. is a pre-farm-gate standard that covers the whole agricultural production process,** from before the plant is in the ground or the animal enters the farm to non-processed product (*processing, manufacturing or slaughtering is not covered, except for the first level of product handling in Aquaculture*). Only products covered by the GlobalG.A.P Product List, published on the GlobalG.A.P website, can apply for certification. GlobalG.A.P does not cover wild/catch, wild catch fish or crops harvested in the wild.
- Learn more at: www.globalgap.org/
- *NOTE: Only a few hop farms globally have achieved GlobalG.A.P. certification because the Combinable Crops standard is not a good fit for the unique harvest and handling practices for hops. Currently (2016-17) HGA is engaged with GlobalG.A.P. to establish a Hops Subscope as a solution for hop farms. See next slide.*

Global-GAP Hops Subscope (a W.I.P., as of Spring 2018)

THIS PAGE WILL BE REVISED AND LINKED TO THE FINAL SUBSCOPE DOCUMENT, WHEN APPROVED LATER IN 2017.

- Hops are grown in the United States, Germany, and many other countries around the world for use as a flavoring and stability agent in beer.

  Hop production has been assessed over the past three years under GLOBALG.A.P. IFA Combinable Crops Sub-Scope. However, **a Sub-Scope specific to hops is needed by the industry to cover the unique process that takes place on farm.**

  The Hop Growers of America (HGA), representing the US hop growers who produce 40% of the world's hops, has worked with GLOBALG.A.P., hop growers, merchants, processors, and brewer customers around the world to develop a draft **GLOBALG.A.P. Sub-Scope specific to hops.**

  GLOBALG.A.P. now seeks the public comment from the hop industry and interested stakeholders to ensure consistency with best practices across the world's hop producing countries.

  Producers will need to comply with the All Farm, Crops Base and the new proposed Hops module. Consultation is only open for the Hops module, however, other comments received might be considered for future revision of the Integrated Farm Assurance Standard.

  We invite comments to the draft standard at http://www.globalgap.org/uk_en/what-we-do/globalg.a.p.-certification/public-consultation/ **until 27 April 2017.**

  Please insert your comments directly into the document and send it to publiccomments@globalgap.org.

Global-GAP Hops Subscope

- Place-holder slide - Link to and full “HGA Global-GAP Subscope” document from GG/HGA *(once the final version is posted after the Spring 2017 comment period input is incorporated).*

- *Note: as of Fall 2017 HGM is not expecting Michigan hop farms to adopt the Hops Subscope in the near-term. Larger farms in Michigan may adopt the Subscope practices as pertain to hop production, likely driven by their specific market/customer requirements.*

GroupGAP: *(Optional – for future consideration)*

- Group Good Agricultural Practices (GroupGAP) is an innovative program that helps groups of farmers navigate food safety regulations, provides access to new markets, and ensures product quality and consistency.
  - In partnership with The Wallace Center, the USDA Agricultural Marketing Service is developing a Group GAP certification program. Building on the initiatives and successes of the Upper Peninsula Food Exchange, Cherry Capital Foods is joining the pilot program and seeking participating farmers.
  - Learn more about the USDA's GroupGAP Food Safety Program at: https://www.ams.usda.gov/services/auditing/groupgap
  - For more information about Group GAP participation in Michigan, contact:
    - Phil Britton at 906.869.6131 or phil@migroupgap.com

Note: *for 2018, in reference to the Group GAP, the HGM Quality Project team working on implementation of the HGM Quality program has discussed GroupGAP and agreed to not pursue it at this time. GAP Certification is a significant accomplishment not on the near horizon for most HGM members. We'll first accomplish the objectives of the grant we are working on which does not include GAP Certification.*

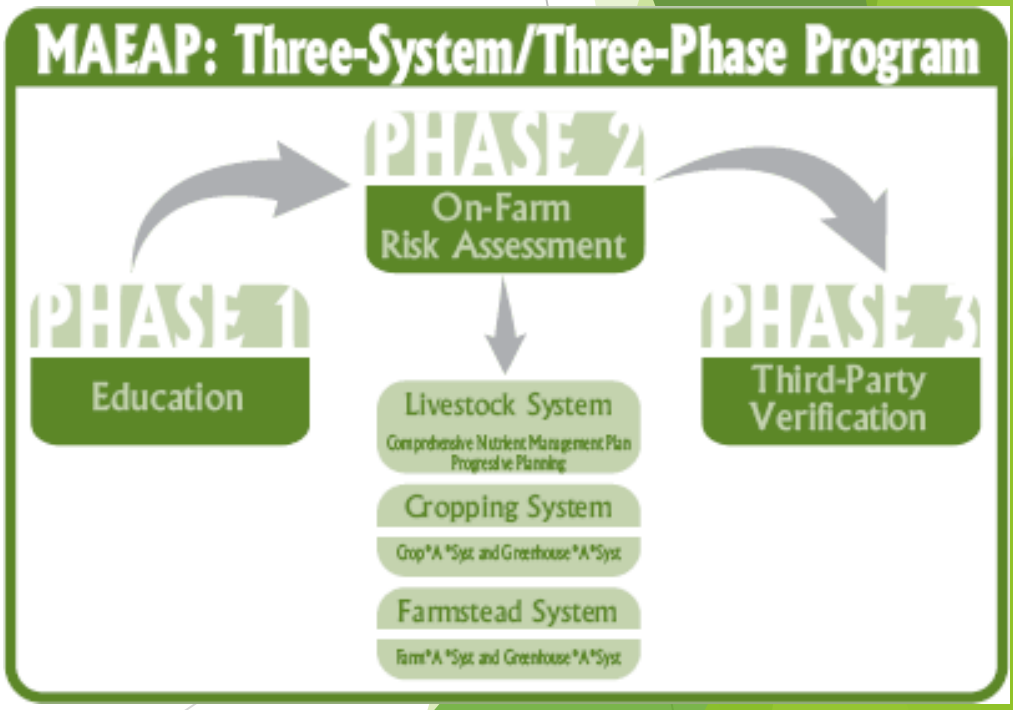
Individual farms will need to determine their own approach to GAP or GroupGAP, as required to meet their customer expectations.

Other Resources:
Other Standards and Practices *(Optional)*

- Hop growers and their market channels may choose to subscribe to other standards, best practices, and certification/verification program to differentiate their product in the marketplace and add to the story of their
- Examples include:
  - Environmental Stewardship: MAEAP (MDARD)
  - Organic Practices
    - USDA Certified Organic
    - Others
  - *GroupGAP - an alternative for groups of small farmers to achieve GAP verifiction.*
- *These program do not address food safety and quality and are presented as options that hop growers may consider (more information on following slides)*

Environmental Standards *(Michigan Specific)* MAEAP Verification *(Optional)*

- The **Michigan Agriculture Environmental Assurance Program (MAEAP)** is an innovative, proactive, and voluntary program that helps farms of all sizes and all commodities voluntarily prevent or minimize agricultural pollution risks.
  - This comprehensive, voluntary, proactive program is designed to reduce farmers' legal and environmental risks through a three-phase process: 1) education; 2) farm-specific risk assessment and practice implementation; and 3) on-farm verification that ensure the farmer has implemented environmentally sound practices. The program's four systems — Farmstead, Cropping, Livestock and the newly developed Forest, Wetlands and Habitats System — each examine different aspects of the farm. After becoming MAEAP verified, a farm can display a MAEAP sign signifying that MAEAP partners recognize the farm is environmentally assured.
- Hop growers are encouraged to pursue **"Cropping System"** and **"Farmstead System"** Verification. Many customers value MAEAP as an assurance of on-farm best practice.
  - Learn more at http://www.maeap.org



Organic Practices Certification *(Optional)*

- Many USDA agencies serve the growing organic sector. Whether you're already certified organic, considering transitioning all or part of your operation, or working with organic producers, we have resources for you. This portal connects you with programs, services, and educational materials that can help your organic farm or business: https://www.usda.gov/topics/organic
- Hopyard farmer choice
- Customer driven..
- Challenges – pest & disease management

Definitions & Acronyms

- HACCP: Hazard Analysis and Critical Control Point
- GMP: Good Manufacturing Practices
- GAP: Good Agricultural Practices
- GlobalG.A.P.: Global Good Agricultural Practices
- GRASP: GlobalG.A.P. Risk Assessment on Social Practices (a voluntary compliment to G-GAP audit)
- SOP: Standard Operating Practices
- RTE: Ready-to-Eat (foods)
- FSIS: Food Safety & Inspection Services (a USDA Agency)
- USDA: United States Department of Agriculture
- FDA: Food & Drug Administration
- CCP: Critical Control Point
- CDC: Center for Disease Control & Prevention (a HHS Agency)
- HHS: US Department of Health & Human Services
- WFP: World Food Program
- FSQMS: Food Safety & Quality Management System
- FSMA: Food Safety Modernization Act
- HARPC: Hazard Analysis & Risk Preventive Controls
- MDARD: Michigan Department of Agriculture and Rural Development
- HGM: Hop Growers of Michigan
- HGA: Hop Growers of America (also known as USA Hops).
- HQG: Hop Quality Group (an initiative of the Michigan Brewers Guild and BA)
- BA: Brewers Association
- MBG: Michigan Brewers Guild
- Small Business: has fewer than 500 employees
- Very Small Business: <$1M gross annual sales of human food

Contract Labs: Hop Assays

- The following are some of the contract labs that provide hop analysis services should your farm require external lab support*:
  - KAR Laboratories http://www.karlabs.com/hops.htm (Kalamazoo, MI)
    - This website includes guidelines for sample preparation, pricing, and a sample report link
  - Alpha Analytics https://www.alphaanalyticstesting.com (Sunnyside, WA)
  - Alliance Analytical Labs www.aatestlabs.com (Coopersville, MI)
  - Black Creek Farms Lab www.blackcreekhops.com (opening Summer 2017, Scottville, MI

- ** HGM does not endorse any specific lab(s), this list is provide for information only*

Additional Resources

- Useful Links:
  - HGM website: http://hopgrowersofmichigan.com
  - MSUE Hops Program: http://msue.anr.msu.edu/topic/info/hops
  - HGA website: https://www.usahops.org
  - HGA "Small Grower Council: https://www.usahops.org/growers/grower-council.html
  - Supplier Directory (HGA): https://www.usahops.org/cabinet/data/Supplier_Directory.pdf
  - Originz, LLC: food systems consultancy partner of HGM in creating this guide: www.originz.com
  - Apple Leaf: GAP Auditor with specific expertise in hops: www.usappleleaf.com

Thank You

- We trust that using this Manual was helpful in improving your hop farming and harvesting operation.
- Understanding that assuring food safety and quality requires continuous improvement as new situations arise and new knowledge is gained we welcome feedback and suggestions from HGM member growers, auditors, customers, and other sector stakeholders that can improve this manual.
- Provide your comments/critiques and other feedback to the HGM Quality Committee at http://hopgrowersofmichigan.com/contact/ or the SCBG Hop Quality Project Team:
  - Jeff Steinman Jeff@hopheadfarms.com
  - Mark Trowbridge tophopsllc@gmail.com
  - Howard Haselhuhn Howard@blackcreekhops.com
  - Susan McCabe ribbonfarmhops@gmail.com
  - Joe Colyn joe.colyn@originz.com 616.581.1360