

ENVIRONMENTAL ASPECTS OF MARIJUANA CULTIVATION AND PROCESSING

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MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

Outline

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- State Marijuana Laws
- Overview of Environmental Impacts
- What EGLE is Doing
- What the City of Grand Rapids is Doing
- Resources

State Marihuana Laws

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- 2008: Michigan Medical Marihuana Act
- 2016: Medical Marihuana Facilities Licensing Act
- 2018: Michigan Regulation and Taxation of Marihuana Act
- LARA Administrative Rules

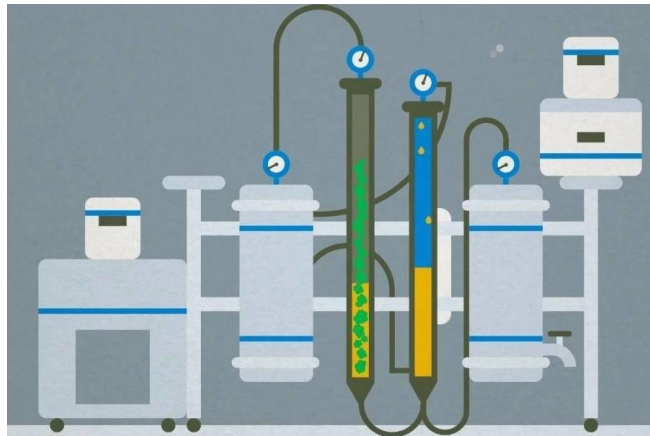
Marijuana Industry

4

The marijuana industry can be broken into three categories:

- Cultivation
- Processing
- Consumption

→ Many environmental impacts



Natural Resource Impacts

5

- Deforestation and Clear-cutting
- Trespass or Guerilla Grows
- Wildlife Impacts



Natural Resource Impacts in Michigan

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(a) 9.5 acre site of what was previously high quality forested wetland



(b) 1-2 acre site of previous high quality flood plain wetland

If you see something like this happening in your community, please contact the Environmental Assistance Center at 1-800-662-9278

Water Usage

7

- Potential for significant water use
- Indoor grows can better control water use
 - Drip irrigation



Water Permit and Approval Programs

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- Siting
 - Soil Erosion and Construction Storm Water
 - Wetlands
 - Floodplains
- Water Withdrawal Approvals



Wastewater

9

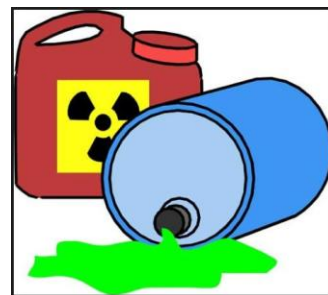
- Point Source Discharges
 - Municipal Wastewater Treatment Plan (WWTP)
 - Direct discharges
- Groundwater discharges are not recommended



Waste and Disposal

10

- Types of waste generated:
 - Plant waste
 - Fluorescent bulbs
 - Unused pesticides, herbicides and fertilizers
 - Waste solvents
 - Used batteries



Marijuana Agricultural Waste

11

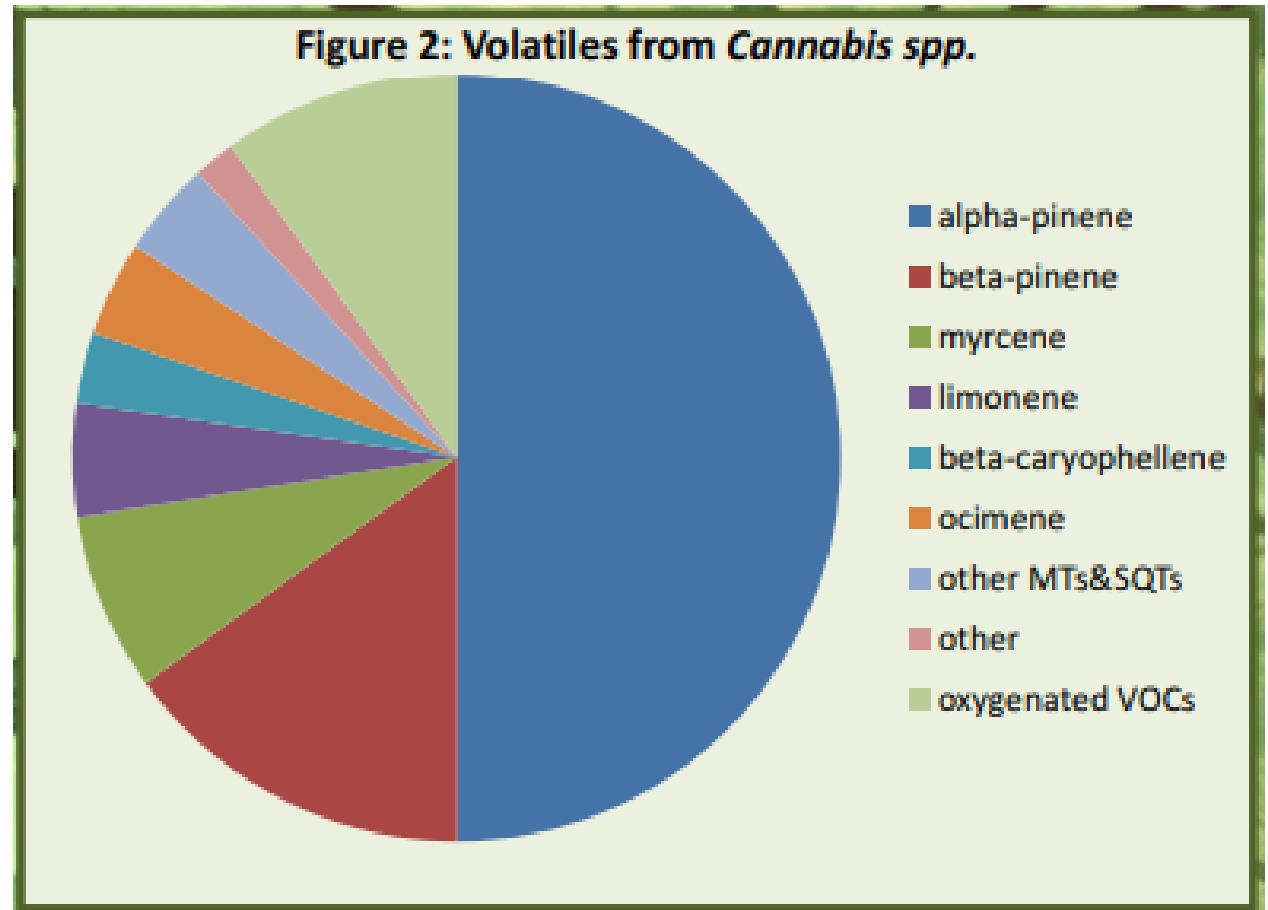
- Must be made unrecognizable and unusable
- Solid wastes from growth, production, and processing can go to landfills or registered compost facilities



Air: Volatile Organic Compounds

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- Cultivation
 - Terpenes
- Processing
 - Solvents



Air: Attainment Issues

13

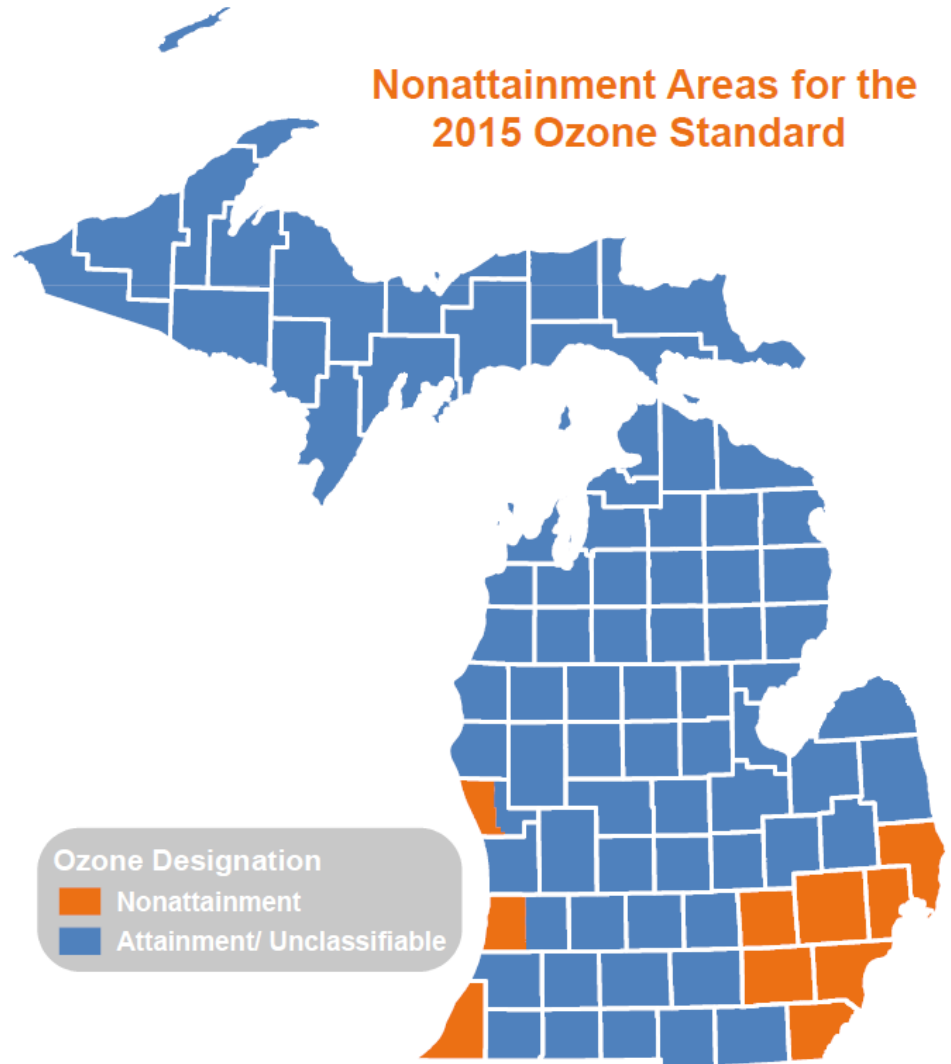
Small biogenic VOC emissions

x

large increase in marijuana
cultivation facilities

=

increase in VOC emissions



Processing and Essential Oil Extraction

Air, Waste and Water

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- Alcohol
- Butane
- Propane
- Hexane
- Benzene
- Steam
- Supercritical Carbon Dioxide



National Fire Protection Association (NFPA)

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NFPA Code

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- **Chapter 38 Marijuana Growing, Processing, or Extraction Facilities**
- **3.3.177 Marijuana Extraction Facility.** A building used for the solvent-based extraction process of marijuana.

Processing and Essential Oil Extraction

Air, Waste and Water

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Essential Oil Concentrates

18

CO2 Oil



CO2 Oil

Sour Diesel Wax



Sour Diesel Wax

Pie Crust/Honeycomb



Pie Crust/Honeycomb

Shatter



Shatter

Processing and Essential Oil Extraction

Air, Waste and Water

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- Many more questions than answers
 - Where are these facilities located?
 - What chemicals are used?
 - What are their annual emissions?
 - Air Permit or exemption?
 - Solid waste produced and disposal?
 - Wastewater?

Marijuana Odors – causes

20

- Terpenes
- Strain
 - Low odor strains*
 - Lemon Haze
 - Alpha Blue
 - Kali Mist
 - Northern Lights
- Temperature and Humidity
- Plant maturity

Mature flower close up



Source: PotGuide.com, <https://potguide.com/pot-guide-marijuana-news/article/when-to-harvest-your-marijuana-and-other-helpful-post-grow-tips/>

*Source: Wikileaf, <https://www.wikileaf.com/thestash/weed-skunk/>

OCP Review Checklist: Marijuana Cultivation

Instructions: Check one or more of the following in each section if sufficient info provided, unless otherwise specified.

1. OCP TRACKING NUMBER	
<p><i>OCP Tracking #:</i> _____</p>	
2. FACILITY INFORMATION	
<p>a. <input type="checkbox"/> Name of facility</p> <p>b. <input type="checkbox"/> Name, phone #, and email of facility owner</p> <p>c. <input type="checkbox"/> Name, phone #, and email of facility operator or licensee, and any authorized designees</p> <p>d. <input type="checkbox"/> Facility physical address</p> <p>e. <input type="checkbox"/> Facility mailing address (if different from physical address)</p>	<p>f. <input type="checkbox"/> Facility type</p> <p>g. <input type="checkbox"/> Facility hours of operation</p> <p>h. <input type="checkbox"/> Description of facility operations</p> <p>i. <input type="checkbox"/> Emergency contact information</p> <p>j. <input type="checkbox"/> Business file number(s)</p> <p>k. <input type="checkbox"/> Air permit and permit number</p>
3. Facility Odor Emissions Information	
<p>Check if: Sufficient <input type="checkbox"/> Insufficient <input type="checkbox"/> <i>Instructions: In the "Comment" section, describe the factors that deemed the content as sufficient or otherwise.</i></p> <p>a. <input type="checkbox"/> <input type="checkbox"/> Facility floor plan • <i>Comment:</i> _____</p> <p style="margin-left: 150px;">_____</p> <p>b. <input type="checkbox"/> <input type="checkbox"/> Specific odor-emitting activity/activities • <i>Comment:</i> _____</p> <p style="margin-left: 150px;">_____</p> <p>c. <input type="checkbox"/> <input type="checkbox"/> Phase (timing, length, etc.) of odor emitting activities • <i>Comment:</i> _____</p> <p style="margin-left: 150px;">_____</p>	
4a. Administrative Controls	
<p>Check if: Sufficient <input type="checkbox"/> Insufficient <input type="checkbox"/> <i>Instructions: In the "Comment" section, describe the factors that deemed the content as sufficient or otherwise.</i></p> <p>i. <input type="checkbox"/> <input type="checkbox"/> Procedural activities • <i>Comment:</i> _____</p> <p style="margin-left: 150px;">_____</p> <p>ii. <input type="checkbox"/> <input type="checkbox"/> Staff training procedures • <i>Comment:</i> _____</p> <p style="margin-left: 150px;">_____</p> <p>iii. <input type="checkbox"/> <input type="checkbox"/> Recordkeeping systems and forms • <i>Comment:</i> _____</p> <p style="margin-left: 150px;">_____</p>	

Odor Control Plan Elements

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- Facility Information
- Odor sources
- Mitigation Practices
 - Administrative Controls
 - Procedures
 - Training
 - Recordkeeping
 - Engineering Controls
 - System design
 - Operation
 - Maintenance

Odor Control Technology

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- Control technologies:
 - Activated Carbon Filtration
 - Negative Ion Generation
 - Ozone Generators
 - Wet Scrubber
 - Negative air pressure
 - Air-tight door and window seals
 - High Efficiency Particulate Air (HEPA) Filters

Marijuana Odor Complaints - Michigan

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- **Residential**
 - Municipality
- **Commercial – Unlicensed**
 - Contact State Police
 - Municipality – Public Safety, Code Enforcement
 - Notify LARA BMR Enforcement if violation issued:
 - email LARA-BMR-Enforcement@michigan.gov or Tel. 517-284-8597
- **Commercial – Licensed by LARA BMR**
 - Municipality
 - Notify LARA BMR Enforcement if violation issued

PENDING

- **Commercial – Licensed by LARA BMR and Permitted by AQD**
 - Municipality
 - Contact PEAS: 800-292-4706
 - Notify LARA BMR Enforcement if violation issued

What the EGLE is Doing

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- Evaluating potential environmental impacts
- Education and outreach
- Many of our current environmental regulations apply to the marijuana industry
 - Waste and disposal
 - Water withdrawals and discharges
 - Air emissions

Grand Rapids Case

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- Ordinance allows for medical only
- Growing, processing, provisioning as special use
- Testing lab & transporter as permitted use
- Energy concerns re: growers
- Discharge concerns re: growers, processing, and testing labs

Grand Rapids Energy Concerns

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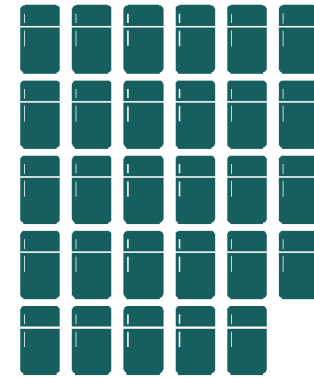


45%

of Denver's energy growth from 2014 to 2015 is directly attributable to the **MARIJUANA INDUSTRY.**

4%

The total amount of electricity use attributed to marijuana growers in Denver.



A 4 PLANT OPERATION with standard HID lighting has an energy consumption equivalent to that of **29 REFRIGERATORS.**



increase in energy consumption in Boulder County, CO from 2015 -2016 due to the cannabis industry (the equivalent of 1,300 households).

Aluminum production consumes around **7 kWh/pound.**
Indoor cannabis production consumes on the order of **2,000 kWh/pound.**

energy usage



A **CLASS A** grower in Michigan can have up to 500 plants. Indoor facilities typically grow

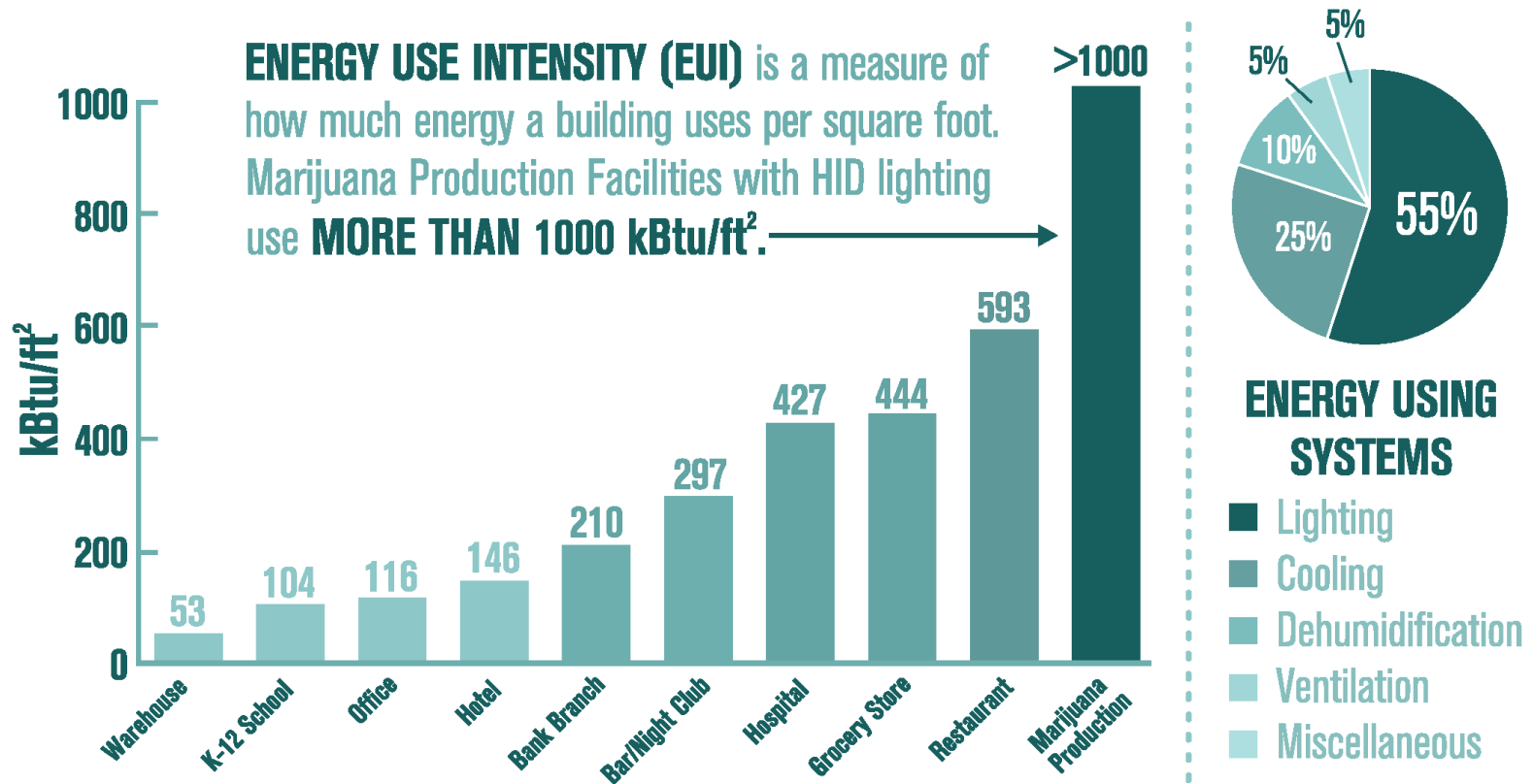
1.5

PLANTS PER SQUARE FOOT using Sea of Green planting method



Grand Rapids Energy Concerns

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Other crops use LED grow lights with great success: carrots, potatoes, tomatoes and lettuce

Energy Concerns

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- **Exploring energy requirements –**
- All facility types:
 - Enrollment in Grand Rapids 2030 District (reporting)
 - Environmental sustainability plan
 - Design EUI
 - Estimated GHG emissions
 - Water efficiency measures
 - List of wastewater pollutant loadings & toxics
 - Solid waste management plan

Grand Rapids Energy Concerns

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- **Exploring energy requirements –**
- **Growers:**
 - Environmental sustainability plan
 - 50%+ canopy high efficiency lighting
 - Fan airflow control
 - Energy Star standalone dehumidifiers

Grand Rapids Energy Concerns

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- **Exploring energy requirements -**

- Growers:

3 of 5

1. $\geq 40\%$ electricity from renewables
2. High-efficiency standalone dehumidifiers
3. High-efficiency cooling equipment
4. Whole-building energy audit
5. Water reclamation system

Grand Rapids Discharge Concerns

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- **Industrial Pretreatment Program (IPP)**
- Growers, processing labs, testing labs
 - Wastewater discharge permit
 - Marijuana facility survey
 - Facility type
 - Processing methods/products
 - Fertilizers/pesticides/herbicides used
 - Pretreatment for pH, solids
 - Baseline monitoring report

How to find out if a facility is licensed?

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Michigan.gov

LARA HOME

CONTACT LARA

ONLINE SERVICES

NEWS

Q SEARCH

DEPARTMENT OF

LICENSING AND REGULATORY AFFAIRS

BUREAU LIST ▼

SEARCH LICENSE TYPES

VERIFY A LICENSE ▼

FILE A COMPLAINT ▼

LARA NEWS RELEASES

FOIA REQUEST

LARA / BUREAU LIST / MARIJUANA REGULATION

Marijuana Regulation

The **Bureau of Marijuana Regulation** will establish Michigan as the national model for a regulatory program that stimulates business growth while preserving safe consumer access to marijuana.

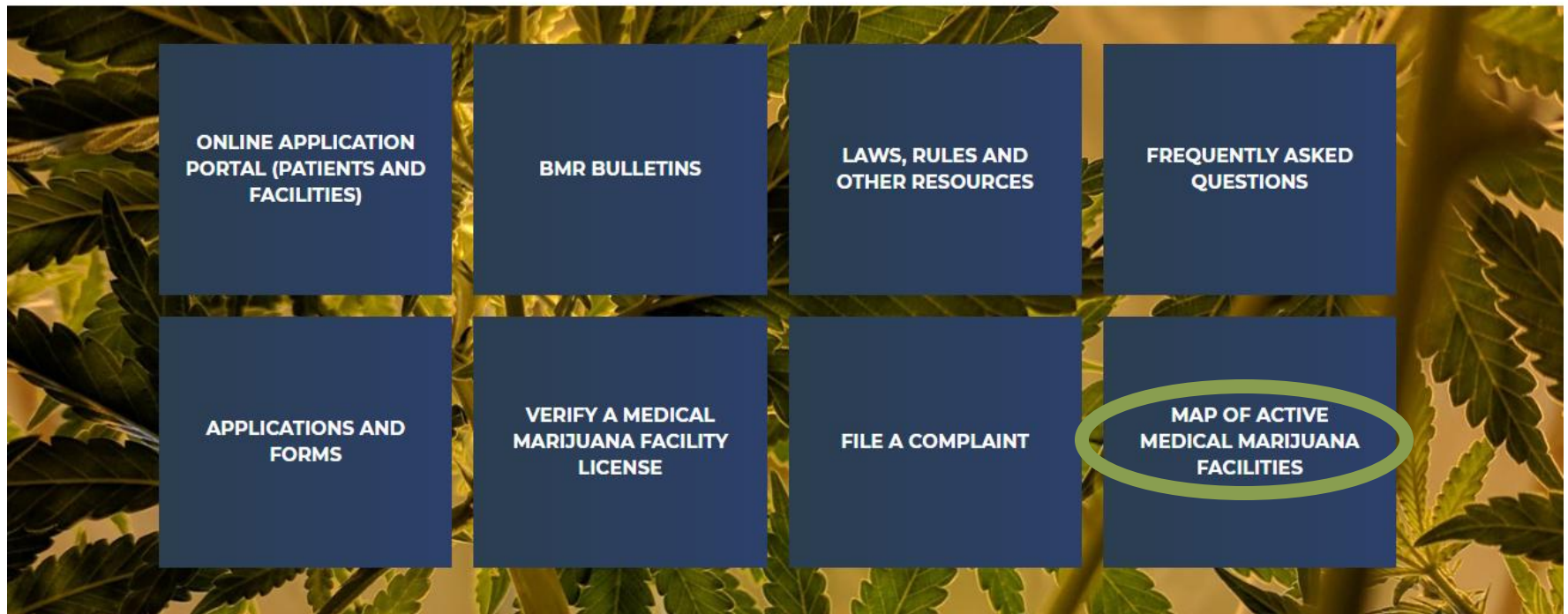
**MEDICAL MARIJUANA FACILITIES
LICENSING**

**MEDICAL MARIJUANA PROGRAM
(PATIENTS/CAREGIVERS)**

**ADULT USE (RECREATIONAL)
MARIJUANA**

How to find out if a facility is licensed?

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As of 2/28/2019 - Updated Mon - Fri 5pm
EST



*NOTE: Some locations have multiple

334,258 views

[SHARE](#)



Licensed Medical Marijuana Facilities - ...



Provisioning Center

Class C Grower

Processor

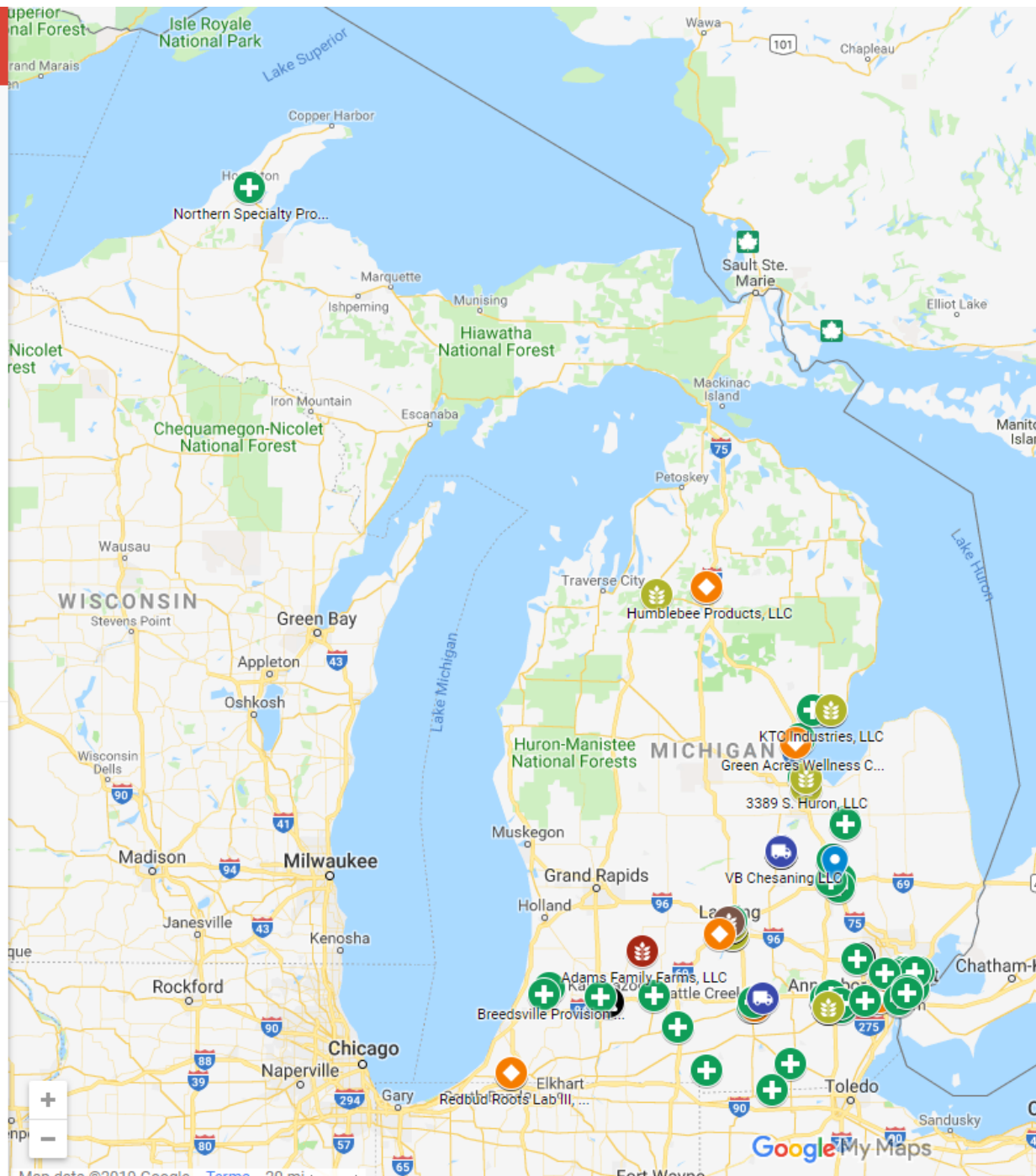
Secure Transporter

Safety Compliance

Class A Grower

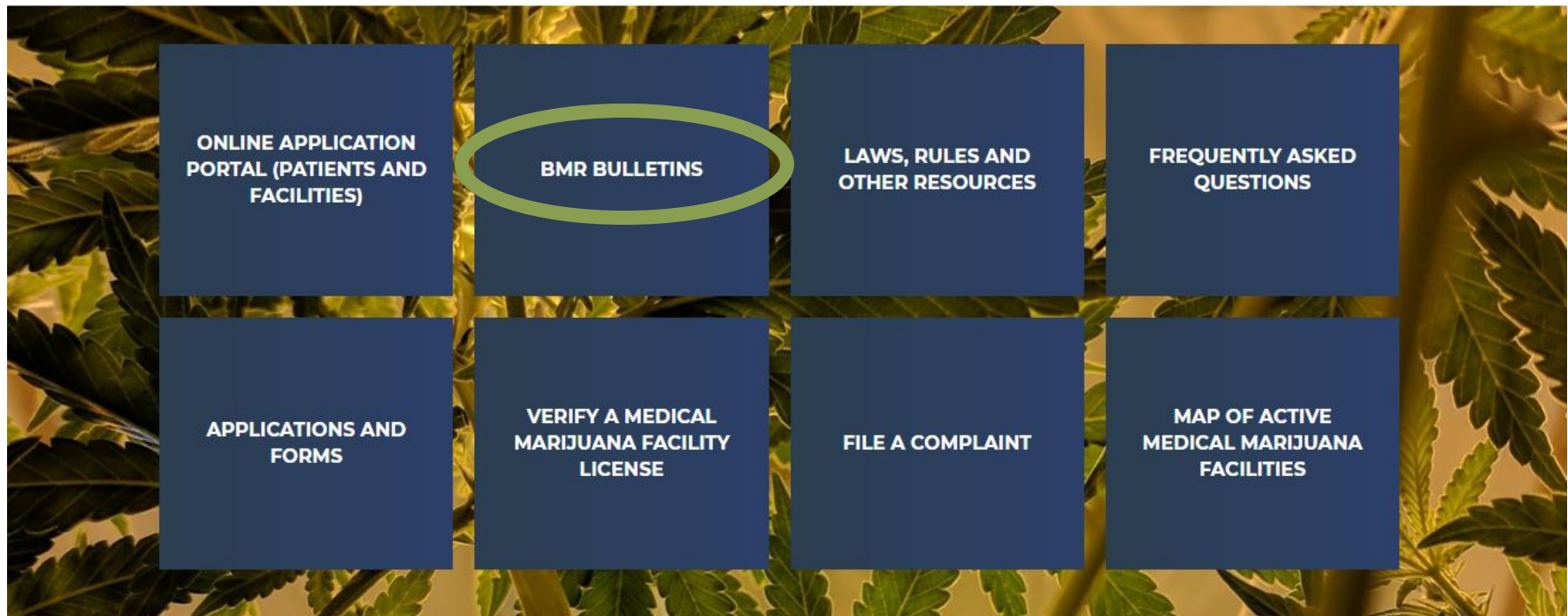
Class B Grower

Class C Grower



Where to Find Additional Information

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Where to Find Additional Information

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Michigan.gov

LARA HOMECONTACT LARAONLINE SERVICESNEWSSEARCH

DEPARTMENT OF
LICENSING AND REGULATORY AFFAIRS

BUREAU LIST▼SEARCH LICENSE TYPESVERIFY A LICENSE▼FILE A COMPLAINT▼LARA NEWS RELEASESFOIA REQUEST

LARA / BUREAU LIST / MARIJUANA REGULATION / BMR BULLETINS

Marijuana Regulation

Adult-Use (Recreational) Marijuana

Medical Marijuana Facilities Licensing

Michigan Medical Marijuana Program (Patients/Caregivers)

Applications and Forms

BMR Bulletins

Board, Panel & Public Hearing Information

Laws, Rules & Other Resources

Frequently Asked Questions

Contact BMR

Verify a License

File a Complaint

BMR Bulletins

Public Health and Safety Advisory Bulletins▼

BMR Advisory Bulletins▲

02-04-2019 Maximum THC Levels for Marijuana-Infused Products - Updated

02-04-2019 Purchasing Limits

Michigan Department of Treasury: Notice to Taxpayers Regarding the Michigan Regulation and Taxation of Marihuana Act

Updated Consent Form for the Sale or Transfer of Untested Marihuana Product

Recent Changes to Marijuana Laws

Notifications of Diversion, Theft, Loss, or Criminal Activity

Medical Marijuana Facility Temporary Operation Set to End on December 31, 2018

Updated Universal Symbol

Visiting Qualifying Patients: Out of State Registration

THCA Crystals/Diamonds

Caregiver and Patient Status Requirements for Certain Licensed Facilities

Protecting Water Resources When Growing and Processing Marihuana

Clarification Regarding Chairman Johnson's Statement at Today's Medical Marihuana Licensing Board Meeting

Looking Ahead

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- The marijuana industry is constantly growing and evolving.
- Environmental regulatory programs will continue to adapt as needed.
- Stay tuned and stay in touch!

Contact Information

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Environmental Assistance Center
800-682-9278

QUESTIONS?

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MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

References

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Cannabis

<https://en.wikipedia.org/wiki/Cannabis>

Controlled Substances Act

https://en.wikipedia.org/wiki/Controlled_Substances_Act

Medical Marihuana Facilities Licensing Act - Act 281 of 2016

[http://www.legislature.mi.gov/\(S\(av1k0wglj5kocl0bix14mq2\)\)/mileg.aspx?page=GetObject&objectname=mcl-act-281-of-2016](http://www.legislature.mi.gov/(S(av1k0wglj5kocl0bix14mq2))/mileg.aspx?page=GetObject&objectname=mcl-act-281-of-2016)

Michigan Medical Marihuana Act

[http://www.legislature.mi.gov/\(S\(ao12zpr1yfc201mg5r4wahno\)\)/documents/mcl/pdf/mcl-Initiated-Law-1-of-2008.pdf](http://www.legislature.mi.gov/(S(ao12zpr1yfc201mg5r4wahno))/documents/mcl/pdf/mcl-Initiated-Law-1-of-2008.pdf)

United Nations Office on Drugs and Crime - World Drug Report 2017

<https://www.unodc.org/wdr2018/>

References: Odor Control Plans

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- Clark County, Nevada
 - <http://www.clarkcountynv.gov/business-license/lq/Documents/OCP%20Template.pdf>
- Puget Sound Clean Air Agency, Washington
 - <http://www.pscleanair.org/DocumentCenter/View/3184/Marijuana-Application-PDF>
- Boulder, Colorado
 - https://www-static.bouldercolorado.gov/docs/Odor_Control_Plan_04.24.18-1-201804301208.pdf
- De Beque, Colorado
 - <https://www.colorado.gov/pacific/debeque/odor-control-plan>
- Denver, Colorado
 - <https://www.denvergov.org/content/dam/denvergov/Portals/771/documents/EQ/Odor/TemplateEnglish.pdf>