CITY OF CHARLEVOIX

AGENDA
CITY OF CHARLEVOIX CITY COUNCIL WORK SESSION
Monday, October 29, 2018- 6:00 PM
Council Chambers, 210 State Street, Charlevoix, Michigan

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1. **Pledge of Allegiance**
2. **Roll Call**
3. **Presentations**
   - A. Downtown Parking Study
   - B. Deer Management
4. **Reports and Communications**
   - A. Public Comments
   - B. City Manager Comments
   - C. Mayor and Council Comments
5. **Other Council Business**
6. **Adjourn**

The City of Charlevoix will provide necessary reasonable auxiliary aids and services, such as signers for the hearing impaired and audio tapes of printed materials being considered at the meeting, to individuals with disabilities at the meeting upon one weeks' notice to the City of Charlevoix. Individuals with disabilities requiring auxiliary aids or services should contact the City of Charlevoix Clerk's Office in writing or calling the following: City Clerk, 210 State Street, Charlevoix, MI 49720 (231) 547-3250.

CHARLEVOIX CITY COUNCIL

Presentations

TITLE: Downtown Parking Study

DATE: October 29, 2018

PRESENTED BY: Rob Bacigalupi, AICP

BACKGROUND:

Mr. Bacigalupi will be back to discuss further findings and recommendations he has for Council on the topic of downtown parking. You can find his presentation attached.

ATTACHMENTS:

- Parking Presentation

CITY OF CHARLEVOIX

Networks Northwest
Talent / Business / Community

Downtown Charlevoix Parking Study

City Council Update - October 29, 2018

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Previous Studies

- **2015 Market Assessment and Strategy**
- **2018 Charlevoix Downtown Alley Corridor Vision**

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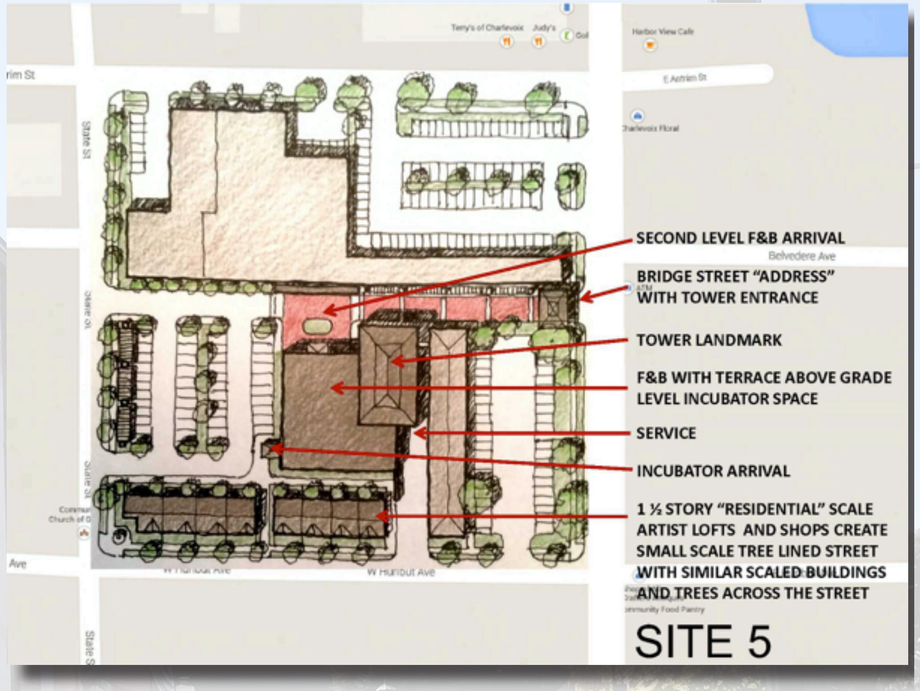
2015 Market Assessment and Strategy

- **Identified two infill sites in downtown that would, if built, increase demand and decrease supply**
- **Pointed to other communities who've reduced parking requirements and parking lot size**
- **For businesses who were unsatisfied with Charlevoix's businesses environment, parking was cited as one reason**
- **"On-street parking and traffic congestion in season are the norm"**



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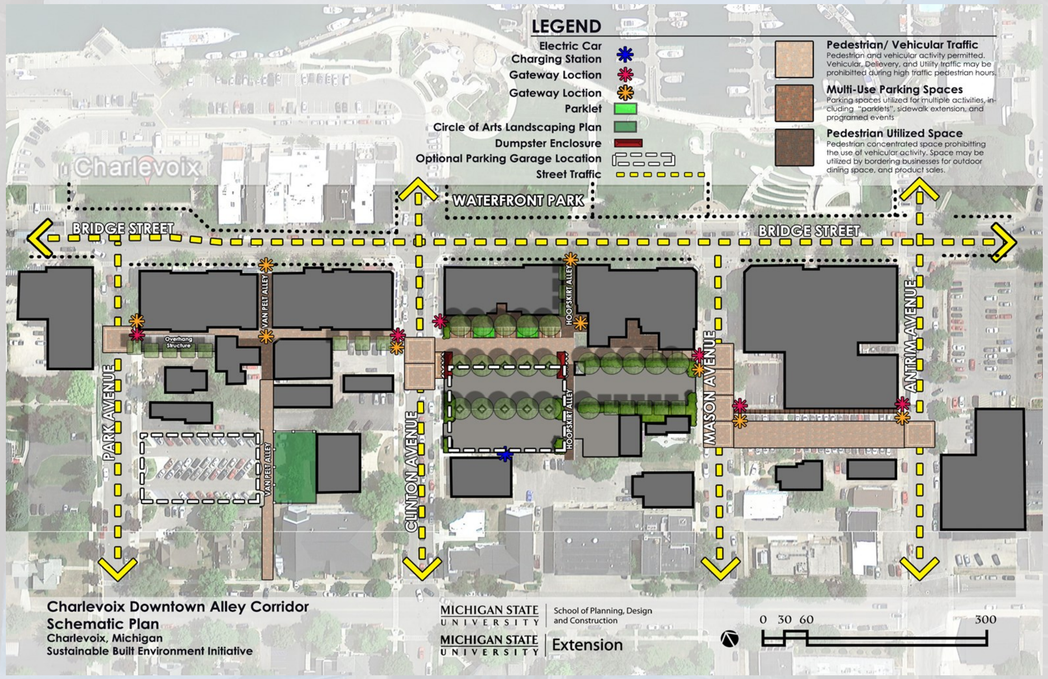
2018 Charlevoix Downtown Alley Corridor Vision

Schematic Plan Map

This map shows the future schematic plan for downtown Charlevoix, distinguishing pavement variations, new gateways and potential locations for a future parking garage.



- **Includes a Schematic Plan that identifies two locations for a potential parking garage**
- **Community input on parking included suggestions for a mixed-use parking structure, better way-finding for parking, and eliminating parking on Bridge Street**
- **Report suggested maintaining parking numbers and possible parking garage**
- **Suggested waiving parking requirements for businesses on alleys off Bridge Street**
- **Meeting Two feedback included more bike parking and adding transparent awnings over parking**

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Parking Supply

	Number	Percent
Public Onstreet	470	38.9%
Public Offstreet	282	23.4%
Private Offstreet	455	37.7%
Total	1,207	100.0%

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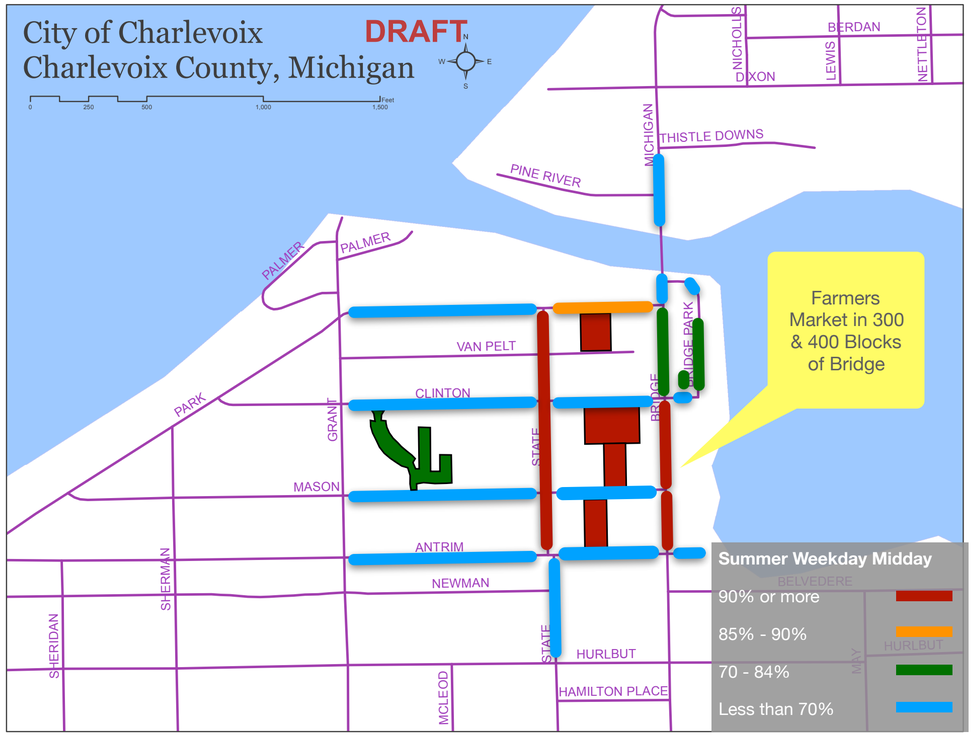
Parking Supply/Usage

- **Want to achieve about 85% usage**
- **In summer, Bridge Street, 100 block of Park Street, State Street, and the lots are often under too much pressure**
- **Off-season usage largely drops below the 85% usage threshold, except the Park Street lot**
- **Block bound by Antrim, Bridge, Hurlbut & State is mostly parking/vacant**
- **During events, Knights of Columbus provides spillover parking on private lots**



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Development Projections

	Conservative - Sites 4 & 5 in 2015 Study	More Agressive - 2 x Conservative
New Development (square feet)	52,500	105,000
New Parking Demand (@ one space/500 s.f.)	105	210
+ Lost Parking	45	60
- New Parking	43	0
Net New Demand	**107**	**270**

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Development Impacts

- **The increase in demand for the Conservative scenario could be absorbed by existing available parking off-season; come summer, however, it would create real pressure on existing parking**

- **The More Aggressive scenario would increase demand by 36% of your current public supply (270 compared to 752 total public spaces)**

- **The more development downtown Charlevoix sees, the more likely it will displace existing parking**

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Commuter Surveys

- **Mostly 9-5 full-time workers**
- **About half coming from Charlevoix, Charlevoix Township, and Marion Township**
- **Most drive, but 39% get to and from work some other way, some of the time**
- **Parking garage is a popular idea**

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Visitor Surveys

- **Dining and shopping the #1 and #2 reasons to visit downtown**
- **Over half don’t travel far**
- **Interest in other modes**
- **Not many transit riders**
- **Easy to park in Winter, difficult in Summer**
- **Suggestions include more spaces, parking garage, shuttle for events**

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Business Owners Meeting

September 17, 2018

- **Don’t want to become Traverse City**
- **Traffic concerns about Bridge Park location for a parking garage**
- **Concerns about events, particularly trailers**
- **Question about loading space**
- **Work more with shuttles for events**
- **Concern about too many permit spaces going unused in the “Acacia Lot”**

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Other Sources

- **Charlevoix Transit provided 2,892 rides to Charlevoix destinations in February 2018 and 5,466 in July and August 2018 (103/day in Feb, 88/day in July and August)**

- **U.S. Census American Community Survey, 2106 for City of Charlevoix**

  - **74.8% report driving alone to work**

  - **8.9% report carpooling to work**

  - **5.5% report using public transportation**

  - **9.5% report walking to work**

  - **0% report biking to work**

  - **1.4% reported working at home**

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Strategy Considerations

- **Key Discussion Points - City Council Meeting September 17, 2018**
  - **There was some support for expanding meter zones in the 100 blocks of Park, Clinton and Mason, as well as the DeWitt Lot (off of Park), and possibly along State Street.**
  - **The idea of medium-term parking in the remaining lots west of Bridge, limited to say four hours, seemed to have some support**
  - **The future of City's existing payment in lieu of parking allowance was discussed**
  - **There was a lot of public discussion about the low usage of the permit spaces in the Acacia Lot**

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Suggested Strategies

Short Term

- **Institute Mobile Pay Solution**
- **Expand meter zones as described**
- **Reduce permit spaces in Acacia Lot**
- **Replace mechanical meters with pay stations**
- **Conduct preliminary parking garage studies to identify costs and number of spaces**

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Suggested Strategies

Long Term

- **Eliminate Payment-In-Lieu policy and reduce or remove parking minimums, and consider maximums**
- **Develop a plan to finance a parking garage, if desired**
- **Continue to improve bike parking and overall bikability**
- **Develop curb side management plan in advance of ride-hailing service, scooters, autonomous vehicles, etc.**

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Thank You!

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CHARLEVOIX CITY COUNCIL

Presentations

TITLE: Deer Management

DATE: October 29, 2018

PRESENTED BY: Jennifer Kleitch, Michigan Department of Natural Resources

BACKGROUND:

Jennifer Kleitch has been a Wildlife Biologist with the Michigan Department of Natural Resources for over 10 years. Her work area currently includes five counties in northern Michigan including Charlevoix (Antrim, Charlevoix, Emmet, Cheboygan, Otsego). She graduated from MSU with a Bachelor's degree in Wildlife Ecology and Management and from The University of Tennessee with a Master's degree in Forestry and Wildlife. She has previously studied quail in Florida, grouse in North Carolina, moose in the UP, and rare species in southern Michigan. In her current position she works to manage wildlife (mammal and bird) populations and habitat on over 300,000 acres of state-owned land while also working with the public on wildlife related issues.

Ms. Kleitch will discuss background on deer populations and management methods. She can answer your questions about the role the Michigan DNR can play in this topic and what future actions the Council might consider.

ATTACHMENTS:

- Management Information

Charlevoix City Council Meeting

October 29, 2018

- Human-Deer conflicts
    - Damage to vegetation (e.g., landscaping)
    - Risk of Car/Deer accidents
- Human-deer conflict causes
    - Feeding of wildlife
    - Attractive habitat (food, water, cover, space)
    - Lack of fear of humans (habituation)
    - Absence of hunting/natural predators
- Determining whether population increase is the cause of issues
    - Deer are not evenly distributed – they go where resources are
    - This may mean there are areas where deer concentrate that provide the necessary habitat components
    - Will the areas that deer concentrate always supply habitat? (food, water, cover, space)
    - There are things like changing landscaping, removing cover, etc. that can reduce habitat quality
    - If those changes do not work or are unfeasible, there are management options available
- Management Options Available
    - Take no action
    - Education efforts and signage to inform the public
    - Exclusion – Fencing is effective at keeping deer away from certain areas
    - Repellents – require repeated application to be effective
    - Local feeding bans
    - Population control
        - Non-lethal
            - Habitat alteration – remove or alter food, water, cover or space; can include reduction or elimination of feeding wildlife (including birds)
            - Capture and relocation – not allowed due to disease issues
            - Contraception or Sterilization – extremely expensive and controversial; only allowed as a research project
        - Lethal
            - Managed Hunting during hunting seasons by the public – does not require a permit from the DNR but may require changes to local ordinances, and the city would need to manage the hunting (e.g., who hunts where and when, check in/out, antlerless deer first, etc.). All State hunting laws and seasons apply (e.g., archery equipment only during archery season, licensed hunters only, etc.). Recommend contacting other municipalities for advice on how to manage (e.g., Ann Arbor).
            - Hunting during hunting seasons under Deer Management Assistance Permits. DMAPS are issued to the city which then distributes the tags to hunters as part of a managed hunt (see above), or tags can be

distributed to a licensed nuisance wildlife contractor if used during hunting seasons. Antlerless deer only.

- Cull under special DNR permit (shooting deer outside of a hunting season) by either a licensed nuisance wildlife contractor, police officers, or volunteers. Culls require a special Permit from the DNR and have restrictions and requirements. DNR Law Enforcement Division and Wildlife Division must sign off on this type of permit. Names and addresses of people allowed to take deer must be included as part of the permit. Other conditions can be added. Antlered or antlerless deer. Typically done in winter (January-March). All carcasses must be used for human consumption (donated to food bank is one option).
- Capture and Euthanize – Extremely time consuming and expensive

- All population control methods (non-lethal and lethal) require time and effort to take effect.

- Additional information
  - Deer are a public resource. It is **strongly encouraged** that any management options considered, especially population control methods, are vetted within the community. This may require some public meetings and research to determine what issues are most important to the community prior to deciding what method is appropriate and acceptable.
  - Once an understanding of the scope and nature of the issue is achieved, a clear and transparent decision-making effort is recommended.
  - Several municipalities around the state have dealt with deer issues in various ways. Consulting with them is recommended, as they may have sage advice to give. One example is the City of Ann Arbor: https://www.a2gov.org/departments/community-services/Pages/Deer-Management-Project-.aspx

Wildlife Division Policy & Procedure	Topic **White-Tailed Deer and Urban Conflict**	
	Chapter **Wildlife**	Date Drafted: **December 15, 2106**
	Responsible Region/Section/Unit **Wildlife Policy & Management Section**	

Title	Number
Urban White-Tailed Deer Conflict Management Policy and Procedures	**10.001**

DEFINITIONS

Urban/Suburban – The U.S. Census Bureau considers urban and suburban areas as a densely developed territory, and encompass residential, commercial, and other non-residential urban land uses. Often, hunting cannot take place in an effective and efficient traditional manner due to the layout and structure of the land and the proximity to human inhabitants on most or all of the public land.

Damage – One type of urban conflict where a group of animals is engaging in destructive, depredating behavior that results in a loss of public resources or commercial value.

Hunting Seasons – These include the firearm season, muzzleloading season, archery season, early antlerless firearm season, late antlerless firearm season, Liberty Hunt, and Independence Hunt.

Lethal Management – Methods used to remove deer where the final disposition of the animal is mortality, including: hunting, trap and euthanasia, and sharpshooting.

Non-Lethal Management – Tools used to discourage the presence of deer, including: fencing, repellents, scare tactics, habitat alterations, etc.

Nuisance – One type of urban conflict where a group of animals is engaging in undesirable or impeding behaviors.

Hazardous Situations – Areas where the presence of any deer, regardless of number, create potentially dangerous or life-threatening situations.

POLICY

While white-tailed deer are highly valued by Michigan residents, conflicts between deer and humans occur at various levels of intensity across the State. Suppressed forest regeneration, high rates of deer-vehicle collisions, and destruction of landscaping and other property by deer can exceed social tolerances in urban/suburban areas where deer populations are abundant. Many individuals experiencing these conflicts frequently request assistance from their local elected officials, who often lack experience or expertise in solving such problems. These officials often turn to the Department of Natural Resources (DNR) to resolve these conflicts, which in many cases are polarizing and become highly politicized. While the DNR attempts to minimize deer-human conflicts by managing deer at appropriate levels through hunting, development and implementation of new strategies will be necessary to successfully manage deer in areas where hunting may be limited or restricted. The role of the DNR is to provide technical assistance and flexibility in the management options available, within reason. The final decision on which management approach should be pursued is the decision of the municipal/community representative or landowner, pending DNR approval.

The primary objective of Michigan's Deer Management Plan is to increase the effectiveness at managing deer impacts in urban and suburban areas where conflicts with deer can be impactful and potentially hazardous to humans. The Urban White-Tailed Deer Conflict Management Policy and Procedures of the Michigan DNR will:

1. Emphasize the harvest of white-tailed deer during existing deer hunting seasons using legal methods, where applicable.
2. Provide assistance and information in the use of lethal and non-lethal methods of reducing human conflict with white-tailed deer where hunting is not applicable or its impact can be limited.
3. Maintain a permitting system that allows for the expeditious response to potentially hazardous situations.

4. Provide guidance to landowners and municipalities to resolve conflicts with urban deer through a clearly defined process.

PROCEDURES:

I. Urban Deer Conflicts on Municipal Land and Certain Private Lands

As deer have lost their inhibitions of humans and densely populated areas, they have taken advantage of an environment that provides sufficient cover, abundant food, and freedom from natural and human predators (recreational hunters). Increasing numbers of urban deer-vehicle accidents and excessive damage to plants (landscaping or natural vegetation) are the most common conflicts with deer in these settings. In addition, concerns of disease associated with an abundant deer population living so closely with humans (e.g. bovine tuberculosis, Lyme disease) also arise.

Perhaps the most challenging aspect of deer management is the issue of how to deal with deer in urban and suburban areas where use of lethal control as a management tool has been unavailable. In most cases, municipal/community leaders must work together with stakeholders to gain acceptance of these highly effective, lethal techniques and utilize them in conjunction with a variety of non-lethal techniques to successfully reduce human-deer conflicts in these urban-suburban areas.

A variety of deer management tools, both lethal and non-lethal are available for municipal lands as well as certain privately owned lands. Lethal tools are more effective than others but may be unacceptable in areas where social or safety concerns are an issue. Applying a combination of several techniques specifically tailored for each situation should prove to be more successful than utilizing a single tool.

Municipal/community Representative or Landowner	Acknowledge there is concern amongst their constituency that urban deer may pose a problem. Contact the local wildlife biologist or deer specialist/biologist with supporting documents.
Wildlife Biologist, and/or Deer Specialist/Biologist, Field Operations Manager, Regional Supervisor or appointed Conservation Officer	1. Provide the appropriate municipal representative or landowner with information on urban deer management options once the Michigan DNR has been contacted. a. Provide options for non-lethal management, including fencing, repellents, baiting/feeding bans, etc. If the situation ***can be resolved*** through non-lethal management or hunting seasons, no further reporting or action is necessary. b. If the situation ***cannot be resolved*** through use of non-lethal means or hunting seasons, the biologist may conduct a site visit and advise the municipal representative of the Damage and Nuisance Animal Control Permit request process. Provide instructions for applying for a Damage and Nuisance Animal Control Permit. The prospective applicant should also be informed of the Prohibited Methods of Deer-Human Conflict Resolution (Appendix A)
Wildlife Biologist	2. The Wildlife Biologist may inform the municipal representative of the options available for deer conflict resolution. The community is strongly encouraged to hold public meetings or determine the support for options that they are willing to consider. If damage due to overabundant deer is being claimed, documentation or proof of damage should be provided to the biologist.
Municipal Representative	Conduct public meetings, issue communications, discuss options with citizens and municipality leaders. Engage DNR experts to address questions and concerns.
Municipal Representative	2. Submit a Damage and Nuisance Animal Control Permit request to the Wildlife Biologist and a conflict resolution plan.

Wildlife Biologist	3. The Wildlife Biologist will attach a short report accompanying the request that includes a brief history of urban deer management discussions he or she has had with the municipality and whether or not the biologist supports the conflict resolution plan outlined by the request. The Wildlife Biologist will send a copy of the report to the Regional Supervisor, Deer Specialist and/or Program Biologist, and District Law Enforcement Supervisor.
Regional Supervisor and/or Deer Specialist/Biologist	4. In considering the request, the Regional Supervisor and/or Deer Specialist/Biologist will give major consideration to public health and safety considerations outlined in the application, as well as the use of non-lethal and the use of lethal methods. If the request has merit, issue a Damage and Nuisance Animal Control Permit.
Municipal Representative/Permittee	5. The permittee must keep record of all animals taken during the valid permit dates. If the use of sharpshooting is approved, the permittee must maintain a current, accurate list of the names of approved, designated sharp shooters. A copy of the Damage and Nuisance Animal Control Permit must be in the possession of each sharp shooter while in the act of taking a deer.
Municipal Representative/Permittee	Within 30 days after the permit expiration date, the permittee will submit a final report to the Wildlife Biologist. The report will assist in future decision making processes. The report should document all aspects of the deer removal process, including any public reaction to the deer removal or control.
Wildlife Biologist	Send the report to the Wildlife Permit Specialist.

II. Urban Deer Conflicts Resulting in Hazardous Situations

Hazardous areas are meant to be free of deer due to the activities that take place on the grounds. These areas are typically airports and automobile proving grounds where collisions with deer at a very high rate of speed could result in serious human injury or fatality.

Wildlife Biologist and/or authorized representative	Any complaint involving a hazardous situation or a public safety issue must be addressed immediately. Under various circumstances, an onsite inspection is not required in order to authorize lethal management. Follow the *Instructions for Deer Conflict Permits and Exceptions* (IC2018-4) section on *Public Safety Issues Regarding Deer*.

III. Permit Not Issued

The following procedure should be followed by the Wildlife Biologist when a permit is not issued:

Wildlife Biologist	1. Send a letter to the requestor within 10 business days specifying the exact reasons why the permit was not issued. The format for the Letter is as follows: a. Use official Michigan DNR Letterhead (R1026e). b. Include the applicant's name, address, and date of the letter. c. The first paragraph should include: i. Personnel involved in overseeing the conflict mitigation and review period of the application. ii. A statement advising the complainant that a permit will not be issued. d. The second paragraph should state the reasons the permit is not being issued and briefly summarize measures that can be used to improve the application status in the future. e. Include the Wildlife Biologist's signature, address, and telephone number in the closing of the letter.

	f. Send a copy of the letter to the Regional Supervisor and Law Enforcement District Office. g. The Wildlife Biologist may refer a complainant to the appropriate Regional Supervisor.

REFERENCES

Natural Resources and Environmental Protection Act, Act 451 of 1994.

Dr. Russ Mason, Chief — Date: 12-15-2016

APPENDIX A. PROHIBITED METHODS OF DEER-HUMAN CONFLICT RESOLUTION

1. Translocation of Deer

The live-capture, translocation and release of deer into a free-ranging situation will not be authorized by this permitting process. Deer will not be translocated and released back into wild populations for the following reasons:

- The State of Michigan will not facilitate the potential spread of any disease or parasite that may be harbored by a deer to another part of the state.
- Translocating deer into a different area is likely to cause stress to and provide competition for resources with resident deer (Scillitani et al 2013).
- Research shows the survival of translocated deer is low largely due to traumatic side effects such as capture myopathy and deer vehicle accidents resulting from unfamiliarity with the new terrain (Jones and Witham 1990).
- Research also shows that translocated animals disperse over greater distances once at release sites than resident populations (Whisson et al 2012).

2. Contraception or Sterilization of Deer

The use of contraception or sterilization of free-ranging white-tailed deer shall not be endorsed as a conflict resolution method authorized by this permitting process. Contraceptive and sterilization research could potentially be approved as a research project given proper funding, research personnel with extensive background and experience, identification of objectives and appropriate methodology, and location of need. Currently, the MDNR is not providing or soliciting funding or research for these techniques. These methods will not be permitted through this process for the following reasons:

- Contracepting or sterilizing deer does not immediately remove deer from a conflict situation.
- Current research has shown that fertility control can limit deer population growth in fenced areas and islands (Merrill et al 2006, Rutberg and Naugle 2008), but has been ineffective at controlling free-ranging deer herds.
- Research by Kirkpatrick et al (2011), indicate the challenges in the development and application of vaccine-based wildlife contraceptives are diverse and include differences in efficacy across species, safety of vaccines during pregnancy, the development of novel delivery systems for wild and wary free-ranging animals, and the constraints of certain non-contraceptive effects, such as effects on behavior.
- Kirkpatrick et. al (2011) also indicated that even when used successfully, challenges remain to improve delivery systems, modify vaccine components to enhance the duration of effectiveness, assure comprehensive safety, develop a sustainable funding base for research, and achieve general social acceptance.
- A study by Gilman et al (2010) show changes in maternal status imposed by sterilization may act to increase movement and mortality rates among sterilized females, resulting in an increase in deer-vehicle collisions.

APPENDIX B: APPROVED LETHAL METHODS OF CONFLICT RESOLUTION

1. **Public Hunting**

   Public hunting, either with selected or state licensed hunters is the most preferred, economical and practical method of removing deer, even in urban areas. Even if firearms cannot be used, or are not feasible, archery hunting can typically be safely used to remove deer in urban areas. Local governments are encouraged to use hunting for deer population management, which may involve reviewing and changing local ordinances if currently prohibited.

2. **Sharp Shooting**

   This technique is sometimes used near human-populated areas to safely, humanely, and efficiently remove deer. Sharp shooting is an intensive method of deer removal by competent marksmen and should not be considered or mistaken for a form of hunting.

   a. The landowner, homeowner's association, or government entity must submit a detailed plan for sharp shooting to the Wildlife Biologist for approval, which reasonably attempts to resolve the problem on a localized scale (per MDNR's discretion) for an extended period of time. The plan must include:
      i. Introduction - brief history of the conflict and a description of the area, including its location (political township, township, range, and section) or address and size. Describe in detail the extent of damage or conflict caused by the deer, attaching any supporting documentation as an appendix. Any additional problems/issues associated with the deer should be described as well.
         1. Authority –specifically cite your legal authority to act on behalf of those being affected and to conduct such activities on the lands where the sharp shooting will occur.
         2. Goal – describe the long term objectives of the sharp shooting plan
         3. Alternatives - a review of other alternatives (lethal and nonlethal) to sharp shooting including the reasons that these are not viable.
         4. Logistics – describe in detail the following:
            a. Number of deer to be culled – discuss the number of deer to be removed by sharpshooting and supporting information for the recommendation. (Note: Deer density estimates or counts are not required. Discussion with potential contracted sharpshooters and community involvement will best aid estimated number of deer to remove. Any discussion of age and sex restrictions of the deer to be removed would occur in this section.)
            b. Timing - when sharpshooting will be conducted
            c. Personnel – who will be conducting the cull and how/why the individuals were selected.
            d. Methods – what methods, equipment (ex. type of firearm), and aids or special exceptions will be used to perform the sharp shooting.
            e. Safety Issues – discuss all safety issues and how these issues will be specifically addressed during sharp shooting operations.
            f. Utilization plan – describe how the culled deer will be utilized/disposed.
            g. Long Term Management Plan – proposed management techniques to be employed once sharp shooting has been completed to meet the long term objectives of the sharp shooting plan.
            h. Public Information Plan – List all efforts that have been undertaken to discuss the problem with affected individuals. List all efforts that will be undertaken to inform affected individuals as the plan is implemented.
            i. Lead Contact – list the contact information for the designated individual, including a phone number and email address who affected individuals can contact immediately about any concerns during the sharp shooting operation.

   The Wildlife Biologist will forward the plan to the Deer Specialist/Biologist, Regional Supervisor, and District Lieutenant for review. Upon consensus agreement, a Damage and Nuisance Animal Control Permit will be issued by the Permit Specialist.

3. **Trap and Euthanasia**
   This method is seldom used, but is an option in areas where lethal techniques have been approved but hunting or sharpshooting are not possible due to safety concerns. It is an inefficient, expensive, and controversial method that should only be considered as a last resort.

   Deer may be humanely euthanized according to the acceptable methods applicable to free-ranging wildlife as described by the American Veterinary Medical Association. These include:
   - Noninhaled agents: Overdoses of injectable anesthetic agents (including barbiturates) and T-61. Other agents may be used that are acceptable for domestic or captive wildlife. Premedication with an injectable or inhaled agent may reduce animal distress and/or human safety risks, under some circumstances. Inhaled agents are less preferred due to the necessity of restraint and proximity to humans. The use of pharmacologic agents often prevents the option for venison to be donated, which is a desirable outcome of any lethal management program.
   - Physical methods: Gunshot to the head is acceptable provided the bullet placement can be assured. Gunshot targeted to the heart (chest) or to the neck (vertebrae, with the intent of severing the spinal cord) may also be used for free-ranging or other settings where close approach is not possible or where the head must be preserved for disease testing (rabies, Chronic Wasting, or other suspected neurologic diseases).

REFERENCES

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EXTENSION BULLETIN E-3042
NEW • JULY 2008

"DEER-RESISTANT" PLANTS FOR HOMEOWNERS

AUTHORS:
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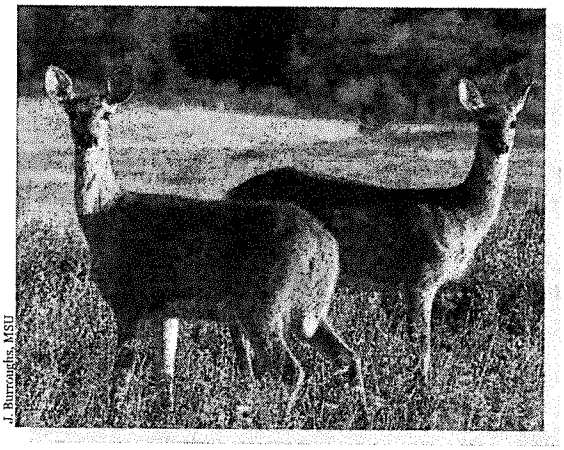
MSU Extension, Ottawa County

Bulletin produced in cooperation with the Michigan State University Department of Fisheries and Wildlife and Department of Horticulture, MSUE Fisheries and Wildlife Area of Expertise Team, Michigan Dept. of Natural Resources and Michigan Natural Features Inventory.

MICHIGAN STATE UNIVERSITY EXTENSION



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Damage to ornamental plants by white-tailed deer (*Odocoileus virginianus*) continues to increase. This damage has been associated with:

- Increasing deer abundance.
- Human population shifts to rural and suburban homesites.
- Maturing of abandoned agricultural lands into deer habitat.
- Landowner decisions to prevent deer hunting.
- Restrictions on firearm use in suburban regions.

Deer prefer to feed on certain plant species, including some ornamental plants used for landscaping. Additionally, ornamental plants may be more attractive to deer because they are fertilized and irrigated. Deer avoid feeding on some species of plants because they are less palatable. A technique to reduce deer browsing of landscape plants is to substitute less palatable species of plants for those that deer prefer to eat. **Though no plants are totally resistant to deer browsing, some are less palatable to deer and are less likely to receive heavy damage.**

Whether deer will eat a particular plant species or variety depends on the deer's previous experience, nutritional needs, plant palatability, seasonal factors, weather conditions and the availability of alternative foods. Deer are creatures of habit, and prior movement patterns or foraging experience can help predict where damage can occur. New plantings added to an existing landscape already severely damaged by deer will likely suffer extreme browsing pressure.

Deer may sample some less palatable plants until they determine the plants are varieties they do not prefer. Snow cover may prevent deer from finding food, and high deer numbers can create competition for available food, which can cause hungry deer to eat whatever plants are available. Note that unpalatable landscape plants may still incur antler rubbing damage. Only physical protection such as exclusion techniques can reduce or prevent deer antler rub damage to trees and shrubs.

To minimize deer damage, select landscape and garden plants that are less preferred by deer. The following tables provide a guide to the relative likelihood of deer damage to plants used by Michigan landscape contractors and landowners. This information can be useful for both selecting plants that are less likely to be damaged by deer and identifying those ornamentals that frequently require protection. Plants listed as **rarely damaged** are infrequently fed upon by deer and are the best candidates for landscapes prone to deer damage. Deer sometimes feed on ornamentals listed as **seldom severely damaged**, but damage is usually minor and has limited effect on the shape or attractiveness of the plant. The category **occasionally damaged** includes plants that may be severely damaged by deer. Finally, ornamental plants in the **frequently damaged** category appear to be preferred by deer and usually require physical or chemical protection whenever deer are present.

Before planting any of the following plant species, check to make sure that they are adapted to local climate and soil conditions. For additional information, contact your local county Michigan State University Extension office.

PLANTS RARELY DAMAGED

Botanical name	**Common name**
Perennials	
Achillea spp.	Yarrow
Aconitum spp.	Monkshood
Allium spp.	Onion
Allium christophii	Star of Persia
Allium neapolitanum	Daffodil garlic
Allium ostrowskianum	Lily leek
Anemone x *hybrida*	Japanese anemone
Anemonella thalictroides	Rue anemone
Aquilegia spp.	Columbine
Arabis spp.	Rockcress
Arisaema thiphylum	Jack-in-the-pulpit
Aubrietia deltoidea	Rock cress
Aurinia saxatilis	Basket-of-gold
Bergenia spp.	Bergenia
Ceratostigma plumbaginoides	Plumbago
Cimicifuga racemosa	Snakeroot
Colchicum autumnale	Colchicum
Colchicum speciosum	Colchicum
Consolida ambigua	Larkspur
Coreopsis verticillata	Threadleaf coreopsis
Cyclamen hederifolium	Neapolitan cyclamen
Dicentra spectabilis	Bleeding heart
Digitalis spp.	Foxglove
Dryopteris marginalis	Wood fern
Echinacea purpurea	Purple coneflower
Epimedium spp.	Barrenwort
Euphorbia spp.	Euphorbia
Fritillaria spp.	Fritillary
Galium odoratum	Sweet woodruff
Gloriosa superba	Glory lily
Hemerocallis 'Stella d'Oro'	'Stella d'Oro' daylily
Lamium maculatum	Deadnettle
Lavandula spp.	Lavender
Linaria vulgaris	Toadflax
Lindera benzoin	Native spicebush
Lychnis coronaria	Rose campion
Matteuccia struthiopteris	Ostrich fern
Narcissus spp.	Daffodil
Osmunda regalis var. *spectabilis*	Royal fern
Pachysandra procumbens	Allegheny spurge
Pachysandra terminalis	Japanese spurge
Papaver orientale	Oriental poppy
Perovskia atriplicifolia	Russian sage
Rudbeckia spp.	Coneflower
Salvia spp.	Sage
Santolina chamaecyparissus	Lavender cotton
Scilla spp.	Squill
Stachys byzantina	Lamb's ears
Tanacetum vulgare	Common tansy
Thymus spp.	Thyme
Tiarella cordifolia	Foam flower
Yucca spp.	Yucca

Botanical name	**Common name**
Annuals	
Ageratum houstonianum	Ageratum
Anethum graveolens	Common dill
Antirrhinum majus	Snapdragon
Capsicum annuum	Hot peppers
Capsicum frutescens	Sweet peppers
Citrulus lanatus	Watermelon
Cucumis melo cantalupensis	Canteloupe
Cucumis sativus	Cucumber
Hyacinthus orientalis	Hyacinth
Lobularia maritima	Sweet alyssum
Nicotiana spp.	Flowering tobacco
Pelargonium spp.	Scented geranium
Rheum rhabarbarum	Rhubarb
Solanum melongena	Eggplant
Tagetes spp.	Marigold
Tropaeolum majus	Nasturtium

Botanical name	**Cultivar**
Ornamental Grasses	
Ravennae grass, hardy pampas grass	
Saccharum ravennae	
Japanese silver grass	
Miscanthus sinensis	'Cabaret'
Miscanthus sinensis	'Cosmopolitan'
Miscanthus sinensis	'Malepartus'
Miscanthus sinensis	'Morning Light'
Miscanthus sinensis	'Strictus'
Miscanthus sinensis	'Variegatus'
Miscanthus sinensis	'Zebrinus'
Switch grass	
Panicum virgatum	'Cloud Nine'
Panicum virgatum	'Dallas Blues'
Panicum virgatum	'Heavy Metal'
Panicum virgatum	'Northwind'
Panicum virgatum	'Shenandoah'
Tall purple moor grass	
Molinia litoralis	'Skyracer'
Molinia litoralis	'Transparent'
Feather-reed grass	
Calamagrostis xacutifolia	'Karl Foerster'
Northern sea oats	
Chasmanthium latifolium	
Fountain grass	
Pennisetum orientale	'Karley Rose'
Japanese grass	
Hakonechloa macra	'Aureola'
Sedges	
Carex morrowii	'Variegata'
Carex oshimensis	'Evergold'
Carex flagellifera	'Toffee Twist'

Botanical name	Common name
Native grasses	
Andropogon gerardii	Big bluestem
Bouteloua curtipendula	Sideoats grama
Carex muskingumensis	Palm sedge
Carex pennsylvanica	Pennsylvania sedge
Elymus canadensis	Canada wild rye
Koeleria macrantha	Prairie June grass
Luzula multiflora	Woodrush
Panicum virgatum	Switch grass
Schizachrium scoparium	Little bluestem
Sorghastrum nutans	Indian grass
Sprobolis heterolepis	Prairie dropseed
Shrubs	
Buxus sempervirens	Common boxwood
Ilex opaca	American holly
Leucothoe fontanesiana	Drooping leucothoe
Pieris japonica	Japanese pieris
Trees	
Betula papyrifera	Paper birch
Picea pungens	Colorado blue spruce

PLANTS SELDOM SEVERELY DAMAGED

Botanical name	Common name
Shrubs	
Celastrus scandens	American bittersweet
Cornus florida	Flowering dogwood
Cornus kousa	Kousa dogwood
Cornus sericea	Red osier dogwood
Crataegus laevigata	English hawthorn
Enkianthus campanulatus	Redvein enkianthus
Forsythia spp.	Forsythia
llex cornuta	Chinese holly
llex glabra	Inkberry
Juniperus chinensis	Chinese junipers
Kolkwitzia amabilis	Beautybush
Pinus mugo	Mugo pine
Salix matsudana tortuosa	Corkscrew willow
Sassafras albidum	Common sassafras
Syringa vulgaris	Common lilac
Wisteria floribunda	Japanese wisteria
Trees	
Betula pendula	European white birch
Fagus sylvatica	European beech
Gleditsia triacanthos	Honey locust
Kalmia latifolia	Mountain laurel
Picea abies	Norway spruce
Picea glauca	White spruce
Pinus nigra	Austrian pine
Pinus resinosa	Red pine
Pinus rigida	Pitchpine
Prunus serrulata	Japanese flowering cherry

PLANTS OCCASIONALLY DAMAGED

Botanical name	Common name
Perennials	
Asparagus officinalis	Asparagus
Campsis radicans	Trumpet creeper
Parthenocissus quinquifolia	Virginia creeper
Potentilla fruticosa	Bush cinquefoil
Annuals	
Abelmoschus esculentus	Okra
Cucurbita pepo	Squash
Raphanus sativus	Radish
Solanum tuberosum	Potatoes, Irish
Shrubs	
Cornus racemosa	Panicled dogwood
Cotinus coggygria	Smokebush
Cotoneaster spp.	Cotoneaster
Cotoneaster apiculatus	Cranberry cotoneaster
Cotoneaster horizontalis	Rockspray cotoneaster
Cryptomeria japonica	Japanese cedar
Forsythia x *intermedia*	Border forsythia
Hamamelis virginiana	Common witchhazel
Hibiscus syriacus	Rose of Sharon
Hydrangea anomala petiolaris	Climbing hydrangea
Hydrangea arborescens	Smooth hydrangea
Hydrangea paniculata	Panicle hydrangea
Ilex crenata	Japanese holly
Ilex x *meserveae*	China Girl/Boy holly
Juniperus virginiana	Eastern red cedar
Ligustrum x *vicaryi*	Golden privet
Lonicera x *heckrottii*	Goldflame honeysuckle
Philadelphus coronarius	Sweet mock orange
Pyracantha coccinea	Firethorn
Rhododendron spp.	Deciduous azaleas
Rhododendron carolinianum	Carolina rhododendron
Rhododendron maximum	Rosebay rhododendron
Rhus typhina	Staghorn sumac
Rosa rugosa	Rugosa rose
Salix spp.	Willows
Spiraea x *bumalda*	Anthony waterer spiraea
Spiraea prunifolia	Bridalwreath spiraea
Syringa x *persica*	Persian lilac
Syringa villosa	Late lilac
Viburnum x *juddii*	Judd viburnum
Viburnum carlesii	Koreanspice viburnum
Viburnum plicatum tomentosum	Doublefile viburnum
Viburnum rhytidophyllum	Leatherleaf viburnum
Weigela florida	Old-fashioned weigela
Trees	
Abies concolor	White fir
Acer griseum	Paperbark maple
Acer rubrum	Red maple
Acer saccharinum	Silver maple
Acer saccharum	Sugar maple
Aesculus hippocastanum	Common horsechestnut
Amelanchier arborea	Downy serviceberry
Amelanchier laevis	Allegheny serviceberry

Botanical name	Common name
Trees (continued)	
Chaenomeles speciosa	Japanese flowering quince
Larix decidua	European larch
Magnolia x *soulangiana*	Saucer magnolia
Metasequoia glyptostroboides	Dawn redwood
Pinus strobus	Eastern white pine
Prunus avium	Sweet cherry
Pseudotsuga menziesii	Douglas fir
Pyrus communis	Common pear
Quercus alba	White oak
Quercus prinus	Chestnut oak
Quercus rubra	Northern red oak
Syringa reticulata	Japanese tree lilac
Tilia cordata 'Greenspire'	Littleleaf linden
Tilia Americana	Basswood
Tsuga canadensis	Eastern hemlock
Tsuga caroliniana	Carolina hemlock

PLANTS FREQUENTLY DAMAGED

Botanical name	Common name
Perennials	
Aegopodium podagaria	Bishop's weed
Athyrium niponicum var. *pictum*	Japanese painted fern
Syringa reticulata	Wallflower
Clematis spp.	Clematis
Euonymus fortunei var. *coloratus*	Wintercreeper euonymus
Euonymus fortunei 'Kewensis'	Wintercreeper
Fragaria spp.	Strawberries
Hedera helix	English ivy
Hemerocallis spp.	Daylily
Hosta spp.	Hosta
Iberis sempervirens	Candytuft
Lilium spp.	Lily
Polygonatum biflorum	Solomon's seal
Trillium spp.	Trillium
Tulipa spp.	Tulips
Vinca minor	Periwinkle
Annuals	
Beta vulgaris	Beets
Brassica oleracea	Kohlrabi
Brassica oleracea botrytis	Cauliflower
Brassica oleracea capitata	Cabbage
Brassica oleracea italica	Broccoli
Brassica rapa	Turnip
Daucus carota sativa	Carrot
Helianthus spp.	Sunflower
Ipomoea batatas	Potatoes, sweet
Lactuca sativa	Lettuce
Matthiola incarna	Stock
Pelargonium spp.	Geranium
Phaseolus spp.	Beans
Pisum sativum	Peas
Ranunculus asiaticus	Buttercup
Spinacia oleracea	Spinach
Viola spp.	Pansies & violas
Zea mays	Corn, sweet
Shrubs	
Chamaecyparis thyoides	Atlantic white cedar
Euonymus alatus	Winged euonymus
Rhododendron spp.	Rhododendrons
Rhododendron spp.	Evergreen azaleas
Rhododendron catawbiense	Catawba rhododendron
Rhododendron periclymenoides	Pinxterbloom azalea
Rosa x *hybrid*	Hybrid tea rose
Taxus spp.	Yews
Taxus baccata	English yew
Taxus brevifolia	Western yew
Taxus cuspidate	Japanese yew
Thuja occidentalis	American arborvitae
Trees	
Abies balsamea	Balsam fir
Abies fraseri	Fraser fir
Acer platanoides	'Crimson King' maple
Cercis canadensis	Eastern redbud
Cornus mas	Cornelian cherry dogwood
Malus spp.	Apples
Prunus spp.	Cherries
Prunus spp.	Plums
Sorbus aucuparia	European mountain ash

Tables based on text by M.J. Farglone, P.D. Curtis and M.E. Richmond. 1991. Resistance of woody ornamental plants to deer damage. Ithaca, N.Y.: Cornell Coop. Ext. with information from Dr. Arthur Cameron, MSU Department of Horticulture.

PLEASE REMEMBER:
Under some conditions, deer may eat unpalatable or "deer-resistant" plants — no plant species will be avoided by deer under all conditions.