
To: Mayor and City Council

From: Mary Neilan, City Manager

Subject: Consider proposal to conduct Deer population count and suggestion to hold a Community Meeting on the topic of Deer

Recommended Motion/Item Description

1. Consider proposal from Dr. Benjamin Sacks to conduct Fecal DNA Mark-Recapture project in Belvedere.
2. Consider scheduling a community meeting in early September.

Background

At the June meeting, the City Council heard a presentation and recommendation from the 2016 Deer Committee that the City undertake a deer sterilization project in Belvedere to reduce the size of the deer population. After hearing comments from the public, the Council directed staff to find a “neutral party” to assess the size of the deer population in Belvedere.

Findings

John Krause, Wildlife Biologist with the Dept. of Fish and Wildlife, Bay Delta Region, was contacted to see if he could recommend a firm that could conduct the count. He suggested contacting WRA, the environmental consulting firm that provided the 2009 Deer Committee with a report on deer biology and population management techniques.

I also spoke with Jason Yakich, Associate Wildlife Biologist at WRA. He described a process they could use that involved installing 20 or so game cameras around Belvedere to observe and count the deer (“camera trapping”). Unfortunately, the lack of markings that distinguish one deer from another combined with other constraints regarding access and topography, WRA was not confident they could get an accurate count. The firm ultimately declined to submit a proposal.

I then contacted Justin Brashares, Associate Professor of Wildlife Ecology and Conservation at UC Berkeley, who referred me to Dr. Benjamin Sacks, Director of the Mammalian Ecology and Conservation Unit, Center for Veterinary Genetics at UC Davis. Dr. Sacks conducts fecal DNA Mark-Recapture studies that collect and analyze deer pellets to determine number and sex ratio of deer populations. UC Davis personnel collect deer pellets and analyze them at the Veterinary

Genetics Lab to produce sex-typed, individual specific DNA profiles. The data is used to estimate the number of female and male deer, at a confidence level of plus or minus 15%.

This research is fairly expensive, so Dr. Sacks proposed a two step process: an initial Pilot Project that would collect 100 samples in hopes that would provide sufficient data to draw reasonable conclusions. If not, a more comprehensive project (Complete Project) could be undertaken that would significantly expand the number of samples and areas of study.

The Pilot Project would cost \$17,500 and the Complete Project is estimated to cost up to \$70,000.

Other Considerations; Community Meeting

There is a great deal of interest in the broader topic of deer in Belvedere, evidenced by the 60+ letters and emails the City has received since the Deer Committee brought their presentation to the Council in June. Opinions vary from complete support for the deer sterilization project as a way to control the population, to absolute disagreement with the notion that there is a deer problem at all. Somewhere in the middle are those residents that agree the deer have an impact, but believe the sterilization project is too extreme a response and other options, such as immunocontraception, should be explored. Still other residents find that fencing and use of deer resistant plants are sufficient to allow deer and humans to peacefully coexist.

The urge to “do something” in response to community concerns is understandable, but before taking on a specific project, be it a deer population count or deer sterilization, the Council may wish to discuss what is achievable and what goals can reasonably be expected to be met.

With regard to the population count: What will it reveal that will inform the next steps? Regardless of how many deer there are in Belvedere, if the impacts of the deer have exceeded what the community will tolerate, then no matter how large the herd is, it may need to be reduced. Alternatively, if the Council is interested in gathering some baseline information that could be compared to subsequent deer population counts, it may make sense to proceed with the count and plan to repeat the project next year. An accurate census would not be terribly useful unless there is agreement about how big (or small) the deer population should be.

Similarly, before embarking on the sterilization project, the Council should be clear about what to expect. Will the project reduce the deer population and if so, how much and over what period of time? Once the does can no longer reproduce, what is the likelihood of unsterilized deer migrating to Belvedere and having babies themselves? And finally, how will the reduction in number of deer affect the rate of property damage, number of deer/vehicle (or human) conflicts, and the potential exposure to Lyme disease?

In summary: How much of an ongoing impact from the deer is the community willing to accept and are there methodologies available that will reduce the impacts to that acceptable level?

Given the strong and diverse opinions of Belvedere residents, it may be advisable for the Council to offer the community an opportunity to define the problem and come to some agreement as to what they would like to see change. Once goals are established, the conversation can explore the various methods of controlling deer behavior, limiting deer reproduction and protecting residents' property and person from harm to determine if the community's goals are attainable. 100% agreement on an issue like this is unlikely to say the least, but providing an opportunity for the whole community to participate in a forum where everyone hears the same information at the same time and has an equal chance to express their opinion may reveal a community preference the Council can rely on. Selecting and implementing a solution will have a much higher chance of success if it has a broad base of community support.

A community conversation on a topic that has proven to be as divisive as this one should be planned with care, so all participants feel they are being heard, factual (rather than anecdotal) information is presented from a trusted source and options are considered that have proven and measurable results.

Organizations whose input might be valuable at such a meeting include:

- Dept. of Fish and Wildlife
- WRA Environmental Consultants
- Marin Humane Society
- WildCare
- White Buffalo, Inc.
- Members of Belvedere Deer Committees, past and present

The Council may also wish to engage a trained facilitator, who can lead the meeting and assist with collecting and organizing a large number of comments and opinions into goals and objectives.

Information Gathering

As the Council is aware, there is no shortage of information available on the internet from other communities, regulatory agencies and wildlife organizations about the problems associated with deer in urban and suburban settings. Much of it is written about white-tailed deer, but seems to be applicable to our local black-tailed deer. Below are links to a few documents and websites that might be helpful, including the report produced by WRA for the City of Belvedere in 2009.

Urban Deer Technical Guide, Indiana Division of Fish and Wildlife (2014)

<https://secure.in.gov/dnr/fishwild/files/fw-UrbanDeerTechnicalGuide.pdf>

An Integrated Approach for Managing White Tailed Deer in Suburban Environments: the Cornell University Study (2014)

<https://blogs.cornell.edu/cerp/files/2015/11/IntegratedApproachForManagingWTDeerInSuburbanEnvironments-28ax086.pdf>

Village of Hastings-On-Hudson White Tailed Deer Immunocontraception Project (2016 update)

http://www.hastingsgov.org/sites/hastingsonhudsonny/files/uploads/hoh_project_summary_2016.pdf

Article from Humane Society of the United States on use of wildlife contraception (2014)

http://www.humanesociety.org/news/magazines/2014/05-06/out-of-season-alternatives-to-deer-culls.html?credit=web_id518016155

Report from City of Bloomington/Monroe County, Indiana Deer Task Force (2012)

Executive summary

<https://bloomington.in.gov/media/media/application/pdf/12762.pdf>

Complete Report (20MB file)

<https://bloomington.in.gov/media/media/application/pdf/12811.pdf>

FAQ's from above report

<https://bloomington.in.gov/media/media/application/pdf/13330.pdf>

Website of DeerFriendly, a not for profit research project supporting deer management, research, and deer rehabilitation

<http://www.deerfriendly.com/urban-deer-management>

City of Belvedere Deer Study, prepared by WRA Environmental Consultants (2009)

<http://www.cityofbelvedere.org/DocumentCenter/View/2968>

Citizen Input

The correspondence received on this topic since June can be found on the City's website under "Deer Sterilization Project Proposal" at: <http://www.cityofbelvedere.org/index.aspx?NID=245>

Fiscal Impact

The FY2016/17 budget does not contemplate this project. Council will need to appropriate funds from the General Fund budget surplus to pay for the deer population count or any costs associated with a community meeting.

Recommendation

1. Consider proposal from Dr. Benjamin Sacks to conduct Fecal DNA Mark-Recapture project in Belvedere.
2. Consider scheduling a community meeting in early September.

Attachments

Proposal from Dr. Benjamin Sacks, Director, Mammalian Ecology and Conservation Unit, UCD.

Scope of Work

Estimating numbers of deer in Belvedere using fecal DNA mark-recapture

Background

Accurate estimates of abundance and sex ratio are essential to deer management and monitoring programs, yet can be difficult to obtain through traditional capture-intensive or sight-based counting approaches, particularly in certain environments (e.g., residential areas). Use of noninvasive DNA-based capture-mark-recapture (CMR) approaches that utilize individual genetic “fingerprints” gathered from fecal pellets presents a more appropriate alternative in many circumstances. Fecal CMR approaches have potential to provide precise, unbiased estimates of abundance, density, and sex ratio that are comparable across study sites and regions, regardless of visibility, enabling more reliable data with which to monitor population trends, especially when conducted in a regional framework. The Mammalian Ecology and Conservation Unit of the Veterinary Genetics Laboratory at UC Davis has been a leader in the field of noninvasive DNA-based population estimation of deer and other mammals in a range of environments in California, including Pacific-coastal and Sierran bioregions (e.g., Lounsberry et al. 2015; Miles et al. 2015; Brazeal et al. 2016).

Methods

In cooperation with the City of Belvedere and residents, the study area will be partitioned into sampling units and access points for sample collection within each unit. Deer pellets will be collected by UC Davis personnel and transported to the Mammalian Ecology and Conservation Unit of the Veterinary Genetics Laboratory for analysis. Laboratory analysis will entail isolation of deer epithelial cells from the surface of fecal pellet samples, extraction of genomic DNA from cells, and replicated genotyping of DNA at 10 microsatellite markers, including one X-chromosome-linked marker, and a Y chromosome gene to produce sex-typed, individual-specific DNA profiles. Standard or spatially explicit CMR models will be applied to derive estimates of numbers of female and male deer, and confidence intervals bounding the precision to a range of plus or minus 15% of the estimated abundance.

Approach

Several variables potentially affect the numbers of pellet group samples required to estimate abundance, including population size, space-use patterns of individuals, and heterogeneity of deer abundance, which determine the spatial intensity and breadth required. Additionally, deer diet, season, and weather (e.g., precipitation, humidity, temperature, exposure to ultraviolet radiation) can affect genotyping success rates, affecting numbers of pellets needed per sampling site. Therefore, we will conduct a pilot study using ~100 pellet samples prior to finalizing the study plan. Depending on the above-mentioned variables, the pilot study could prove sufficient to meet study objectives. Alternatively, up to 300 additional pellet groups would be sampled and analyzed according to a refined sampling design.

Schedule of Completion Dates

To be determined

(The planning for field sampling for the pilot study could be initiated and sampling conducted as soon as fall 2016 pending contracting. Otherwise, field sampling could be conducted at any time of year thereafter as weather allows (avoiding rainfall). Ideally, sampling would occur by 31 May 2017 prior to peak fawning in June, but could occur after fawning, beginning mid-July 2017.)

Scope of Work

Facilities

Collections will be performed in the City of Belvedere. Laboratory and data analyses will be performed at the Veterinary Genetics Laboratory, primarily within the Mammalian Ecology and Conservation Unit.

Report

The contractor shall provide a report to the customer which details the results as outlined above.

Costs

Option 1: pilot project only

Belvedere deer abundance estimation pilot project	
Services	FY 16/17
Graduate Student Researcher	\$13,000
Fecal DNA analysis (\$45/sample * 100)	\$4,500
	\$17,500

Option 2: complete project*

Belvedere deer abundance estimation complete project	
Services	FY 16/17
Graduate Student Researcher	\$52,000
Fecal DNA analysis (\$45/sample * 400)	\$18,000
	\$70,000

*Estimated cost reflects the maximum

References

Brazeal J.L., T. Weist, B.N. Sacks. 2016. Efficacy of non-invasive fecal DNA-based estimation of population abundance, density, sex-ratio, and survival in the Pacific deer herd. Report to the California Department of Fish and Wildlife, 6 April 2016, 52 pp.

Lounsberry ZT, Forrester TD, Olegario MJT, Brazeal JL, Wittmer HU, Sacks BN. 2015. Estimating Sex-Specific Abundance in Fawning Areas of a High-density Columbian Black-Tailed Deer Population using Fecal DNA. *Journal of Wildlife Management* 79:39-49.

Miles, K.A., Holtz, M., Lounsberry, Z.L., and Sacks, B.N. 2015. A Paired Comparison of Scat-Collecting versus Scat-Swabbing Methods for Noninvasive Recovery of Mesocarnivore DNA in an Arid Environment. *Wildlife Society Bulletin* 39:797-803.

Scope of work and cost estimate prepared by Dr. Benjamin N. Sacks, Director, Mammalian Ecology and Conservation Unit