



AGENDA

CITY OF SEASIDE
PLANNING COMMISSION

SPECIAL MEETING
COUNCIL CHAMBER
440 Harcourt Avenue
Monday, December 17, 2018
7:00 PM

PLEASE TURN OFF YOUR CELL PHONES UPON ENTERING THE MEETING

1. **CALL TO ORDER**

2. **ROLL CALL - ESTABLISHMENT OF QUORUM**

John Owens	Chair
Michael Spalletta	Vice Chair
Keith Dodson	Commissioner
Denise Ross	Commissioner
Arlington La Mica	Commissioner
Alissa Kisperskey	Commissioner
Vacant	Commissioner

3. **REVIEW OF AGENDA**

If there are any items that arose after the 72-hour posting deadline, this is the point in the meeting where a vote may be taken to add the item to the agenda. (A 2/3-majority vote is required).

4. **PUBLIC COMMENT**

Members of the public wishing to address the City Council on matters within the jurisdiction of the City of Seaside, but not on this agenda, may do so during the Public Comment period for up to three minutes. Public Comments on specific agenda items are heard under that item. For the public record, please state your name.

5. **APPROVAL OF MINUTES**

A. **OCTOBER 24, 2018**

6. **BUSINESS ITEMS**

**A. PROPOSED TEXT AMENDMENTS TO SEASIDE MUNICIPAL CODE
SECTIONS 6.04.165 (PERMIT REQUIRED FOR BEES) AND 17.52.020 (ANIMAL
KEEPING).**

RECOMMENDATION: The purpose of this item is for the Planning Commission to consider proposed code amendments to SMC 6.04.165 (Permit Required for Bees) and 17.52.020 (Animal Keeping).

It is recommended the Planning Commission approve the draft resolution recommending that the City Council adopts an ordinance approving proposed text amendments to Seaside Municipal Code (SMC) sections 6.04.165 (Permit Required for Bees) and 17.52.020 (Animal Keeping), subject to the findings and evidence contained therein enacting beekeeping as permitted by-right citywide.

7. **REPORTS FROM COMMISSIONERS**
8. **REPORTS FROM STAFF**
9. **ADJOURNMENT**

Next Regularly Scheduled Meeting:
January 9, 2019
Seaside City Hall
7:00PM

The City of Seaside is committed to providing accessible facilities and accommodating people with disabilities in all of its services programs and activities. If special considerations are needed by any person to fully participate in this meeting, they are asked to contact the City Clerk at 899-6707 no fewer than two business days prior to the meeting to allow reasonable arrangements. The City Council chamber is equipped with a portable microphone and assisted listening devices are available at all meetings.

City Council Meetings that are held in the City Council Chambers are broadcast live to all Seaside residents on Comcast Channel 25 and U-verse Channel 99. Meetings are also available through live streaming at:

<http://cvp.telvue.com/player?id=T01629&video=52314&noplaylists=1&width=400&height=300>

Videos of past meetings are available on demand through the City's website: <http://www.ci.seaside.ca.us>

Agenda-related writings or documents provided during public meetings are available for public inspection during the meeting or from the office of the City Clerk. This agenda is posted in compliance with California Government Code Section 54954.2(a) or Section 54956.



**CITY OF SEASIDE
STAFF REPORT**

Item No.: 6.A.

TO: Planning Commission

BY: Beth Rocha, Associate Planner

DATE: December 17, 2018

**SUBJECT: PROPOSED TEXT AMENDMENTS TO SEASIDE MUNICIPAL CODE
SECTIONS 6.04.165 (PERMIT REQUIRED FOR BEES) AND 17.52.020
(ANIMAL KEEPING).**

PURPOSE & RECOMMENDATION

The purpose of this item is for the Planning Commission to consider proposed code amendments to SMC 6.04.165 (Permit Required for Bees) and 17.52.020 (Animal Keeping).

It is recommended the Planning Commission approve the draft resolution recommending that the City Council adopts an ordinance approving proposed text amendments to Seaside Municipal Code (SMC) sections 6.04.165 (Permit Required for Bees) and 17.52.020 (Animal Keeping), subject to the findings and evidence contained therein enacting beekeeping as permitted by-right citywide.

BACKGROUND

Honeybees have lived in the area that is now Seaside since Spain founded a colony in Monterey, with and without the help of beekeepers, and continue to do so today. The European honeybees kept by beekeepers have been bred and selected for docile behavior for hundreds of years.

Unlike yellow jackets and hornets, honeybees are very unlikely to sting unless in defense of the hive or when a bee is inadvertently caught against someone's skin. Unfortunately, many people who have been stung by aggressive yellow jackets or hornets will say they were "stung by a bee," leading to unfounded fears of honeybees (see Attachment 2). In Seaside, most natural cavities (large hollow trees) have been removed over the years and beekeepers are the best way to keep honeybee populations healthy and non-aggressive (aggressive hives are killed).

Honeybees have been in decline nationally and internationally due to pesticides and imported parasites. During the past ten years, there has been a major shift concerning municipal code regulations against bees, and as a result, many cities in the United States are exploring opportunities that would allow for beekeeping in both residential and commercial zones. The benefits of having pollinators such as honeybees in the urban environment are many, including that they help pollinate fruit trees and many other plants. Cities as large and diverse as San

Francisco, Detroit, Atlanta, New York, Seattle, Portland, Denver, Spokane, Chicago, Toronto, Vancouver, and Los Angeles have recognized the importance of honeybees in an ecosystem and allow urban beekeeping. In many of these cities, urban beekeeping has resulted in entrepreneurs and environmental advocates becoming involved in community education and outreach, partnerships with local businesses, stimulating the local economy, and other efforts aimed at increasing awareness of the critical role played by pollinators in the urban environment.

Locally, in 2016 the City of Monterey repealed its prohibition on beekeeping (see Attachment 3), the City of Del Rey Oaks repealed and replaced their beekeeping ordinance in 2017 (see Attachment 4), and the City of Pacific Grove allows for honeybees in a similar manner as it allows for chickens (Attachment 5). Marina, Sand City and Carmel do not have beekeeping ordinances.

Seaside Municipal Code section 6.04.165 *Permit Required for Bees* requires the City Council make a determination that the maintenance of beehives will not be a public or private nuisance, nor detrimental to the property values or human health or safety, prior to approving a Use Permit for beekeeping in the city. Additionally, the code allows for conditions and operating limitations to be added to the permit based on the land use characteristics of the parcel. Since the ordinance was enacted in 1986, only one Use Permit (13-06, see Attachment 6) has been issued to a residential beekeeper and the following conditions were added to the permit:

1. No more than three bee hives may be maintained on the project site.
2. All bee colonies shall be kept in hive boxes consisting of movable frames and combs.
3. Hive boxes must be kept in sound usable condition at all times.
4. Hive box entrances shall face away from side and rear property lines.
5. A six foot fence of vegetative barrier must be maintained along the side and rear property lines of the residential parcel.
6. A water source for bees shall be provided at all times on the property near where the bees are kept to discourage bee visitation at swimming pools/hot tubs, hose bibs, and other water sources on adjacent public or private property.
7. Nuisance – bees or hives shall be considered a public nuisance when any of the following occurs:
 - a. Colonies of bees exhibit defensive or objectionable behavior or interfere with the normal use of neighboring properties.
 - b. Colonies of bees swarm.
 - c. Bees or hives do not conform to proper sanitary and property maintenance standards.
 - d. Hives become abandoned by resident bees or property owner.

The proposed amendments incorporate some of the conditions of approval, from nuisance regulations to hive placement and limits on the number of beehives allowed on a property. If approved, the proposed amendments will simplify a cumbersome permitting process, while at the same time setting necessary use and nuisance regulations. Additionally, enacting beekeeping as permitted by-right has the potential to create opportunities to encourage and engage the community to actively participate in environmental stewardship through beekeeping (Attachment 7).

ENVIRONMENTAL REVIEW

The enactment of this ordinance is not subject to the California Environmental Quality Act (CEQA) as it is not a project pursuant to guidelines section 15378 because it has no potential for resulting in physical change to the environment directly or indirectly. In addition, CEQA guidelines section 15061 includes the general rule that CEQA applies only to activities which have the potential for causing a significant effect on the environment. It can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, directly or indirectly as the placement of beehives would not interfere with views and or cause any noise, odors, air quality impacts or traffic related impacts. Because the proposed action and this matter have no potential to cause any effect on the environment, or because it falls within a category of activities excluded as project pursuant to CEQA guidelines section 15061(b)(3), this ordinance is not subject to CEQA review.

STAFF ANALYSIS

The proposed code amendments address nuisance regulations in 6.04.165, use regulations in 17.52.020, and eliminate the requirement of City Council approval of a use permit for beekeeping. Additionally, the proposed regulations incorporate some of the conditions of approval previously attached to a City Council-approved use permit for beekeeping. These inclusions were informed by discussions with local beekeepers about honeybee behavior, needs, and habitat preferences.

Seaside's Environmental Committee investigates and advocates sound environmental policy and action in the areas of air quality, water quality, energy and waste management, flora and fauna protection and community planning. The committee's annual work plan specified their involvement with the proposed beekeeping amendments. Staff has coordinated with the Environmental Committee of Seaside in drafting the proposed amendments, which involved analyzing Seaside's existing code, the codes of nearby jurisdictions and consulting a local, experienced beekeeper. The Environmental Committee has expressed their support of the proposed amendments to the SMC, as communicated in a memorandum (Attachment 8) addressed to the Planning Commission from the perspective of a land use regulation and how such an activity can be included as an innocuous accessory use of a commercial or residential property

The following findings support the suggested recommendation of approval:

1. The proposed text amendments to Sections 6.04.165 and 17.52.020 of the Seaside Municipal Code are consistent with the goals and policies of elements of the General Plan.

Evidence: General Plan Goal Conservation and Open Space - 4 specifies: "Preserve and protect the sensitive habitats and species within the community." Pollinator decline, including that of honeybees, must be prevented through preservation and protection measures in order to assist in the repair of a fragile and sensitive species.

2. The proposed amendments would not be detrimental to the public interest, health, safety, convenience, or welfare of the City.

Evidence: The proposed amendments clearly define beekeeping nuisance regulations aimed at protecting the health, safety, convenience, and welfare of the City. Additionally, the

environmental benefits associated with beekeeping are beneficial to the biological health and diversity of the City. The amendments will not create significant impacts or other conditions or situations that may be objectionable or detrimental to other permitted uses in the vicinity or adverse to the public interest, health, safety, convenience, or welfare of the City.

3. The proposed amendments are internally consistent with other applicable provisions of the Seaside Municipal Code.

Evidence: The proposed amendments will provide thorough and specific beekeeping regulations in both Title 6 (Animals) and Title 17 (Zoning Ordinance) of the SMC and will not interfere or contradict any municipal code requirements.

CONCLUSION

City staff recommends the Planning Commission open the public hearing, accept public testimony/comments, and move to approve a resolution recommending the City Council adopt an ordinance approving the proposed text amendments to SMC sections 6.04.165 (Permit Required for Honeybees) and 17.52.020 (Animal Keeping), enacting beekeeping as permitted by-right citywide.

ATTACHMENTS

1. Attachment 1 Draft Resolution
 2. Attachment 2 NAPPC No Fear Brochure
 3. Attachment 3 Monterey Ord. 3537
 4. Attachment 4 Del Rey Oaks Ord. 290
 5. Attachment 5 Pacific Grove Animal Permit
 6. Attachment 6 Seaside UP 13-06
 7. Attachment 7 Beekeeping Articles
 8. Attachment 8 EC Memo
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RESOLUTION 18-XX

A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF SEASIDE, STATE OF CALIFORNIA, RECOMMENDING THAT THE CITY COUNCIL ADOPT AN ORDINANCE FOR PROPOSED TEXT AMENDMENTS TO SEASIDE MUNICIPAL CODE SECTIONS 6.04.165 AND 17.52.020, ENACTING BEEKEEPING PERMITTED BY-RIGHT CITYWIDE.

WHEREAS, the enactment of this ordinance is not subject to the California Environmental Quality Act (CEQA) as it is not a project pursuant to Guidelines Section 15378 because it has no potential for resulting in physical change to the environment directly or indirectly. In addition, CEQA Guidelines Section 15061 includes the general rule that CEQA applies only to activities which have the potential for causing a significant effect on the environment. It can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, directly or indirectly as the placement of beehives would not interfere with views and or cause any noise, odors, air quality impacts or traffic related impacts. Because the proposed action and this matter have no potential to cause any effect on the environment, or because it falls within a category of activities excluded as project pursuant to CEQA Guidelines section 15061(B)(3), this ordinance is not subject to CEQA review.

WHEREAS, at a regularly scheduled meeting of the Environmental Committee on April 10, 2018, beekeeping permit requirements and municipal code sections regulating this activity were discussed and the committee discussed moving forward with text amendments in order to encourage beekeeping in the city by designating it as a by-right use rather than requiring approval by the City Council; and

WHEREAS, at a regularly scheduled meeting of the Environmental Committee on November 13, 2018, the committee voted to sign a memorandum of support for the proposed text amendments, as the committee considers beekeeping to be an opportunity that will positively impact the City of Seaside by contributing to a healthier, more sustainable, and resilient environment; and

WHEREAS, the City of Seaside is proposing text amendments to Section 06.04.165 (Permit Required for Bees) and Section 17.52.020 (Animal Keeping) of the Seaside Municipal Code to provide and read as follows:

Proposed Text Amendments

- (Text proposed to be deleted is listed with strikethrough (~~Strikethrough~~) and text proposed to be added is listed in **bold** with an underline (Underline))

1. Amend Title 6.04.165 to read as follows:

6.04.165 ~~Permit required for bees.~~ **Beekeeping Nuisances**

~~A. Any person desiring to maintain bees or bee swarms in boxes or hives within the city limits must first obtain a permit from the city council after a finding by the city council that the maintenance thereof will not be a public or private nuisance, nor detrimental to property values or human health or safety.~~

~~B. Any permit issued by the city council may be subject to such conditions and time limitations as the council deems appropriate, and is subject to revocation or modification after public hearing on ten days' written notice to the permittee.~~

~~(Ord. [709](#) § 1, 1986)~~

A. Honeybees or beehives shall be considered a public nuisance when any of the following occur:

- 1. Honeybees exhibit unprovoked defensive behavior against humans or animals.**
- 2. Honeybees interfere with the normal use of neighboring properties, including detrimental impacts to property values or human health or safety.**
- 3. Hives become abandoned by the property owner.**

2. Amend Title 17, Section 17.52.020 to read as follows:

17.52.020 Animal Keeping

E. Beekeeping Standards. Refer to Municipal Code Section 6.04.165 **for beekeeping nuisance regulations.**

- 1. No more than three beehives may be maintained on any site.**
- 2. Beehives shall not be considered structures or accessory structures.**
- 3. Beehives shall be kept in sound usable conditions at all times.**
- 4. Beehives shall be placed in a location on the subject property such that beekeeping activities do not adversely impact neighboring properties.**

WHEREAS, it is the responsibility of the Planning Commission to consider and weigh the merits of the text amendments in relation to the policies, standards and intent of the Seaside General Plan and Seaside Municipal Code in making its determination and recommendations to the City Council; and

WHEREAS, the Seaside Planning Commission considered oral comments and written information concerning the proposed ordinance at a duly noticed public hearing held on 17th of December 2018 and made a recommendation to the City Council to adopt the proposed text amendments; and

WHEREAS, the City of Seaside has conditionally permitted the husbandry of domestic honey because of the honeybees benefit to mankind and to Seaside in particular, by supporting healthy ecosystems, agriculture and garden pollination services and by furnishing honey, wax, and other useful products; and

WHEREAS, honeybees can be maintained within populated areas in reasonable densities without causing a nuisance when the honeybees are properly managed; and

WHEREAS, honeybees are selectively bred for desirable traits such as honey production, tendency not to swarm, and docile behavior; and

WHEREAS, honeybees and other pollinators have experienced a significant and rapid population declines due to a combination of habitat loss, use of pesticides and insecticides, and the spread of pests and diseases and supporting pollinators in Seaside will have positive impacts on the species and the environment; and

WHEREAS the City of Seaside considers beekeeping in the City to be an activity that will positively impact the community and environment and make it more healthy, sustainable, and resilient to future change; and

WHEREAS, the City of Seaside has the opportunity to make choices that will positively impact the community, environment, and economy and make it more healthy, sustainable, and resilient to future change; and

THEREFORE, in order to enhance understanding among local government staff and the public about the vital role that pollinators play and what each of us can do to sustain them, the City of Seaside chooses to support and encourage pollinator habitat creation and enhancement on both public and private land.

NOW, THEREFORE, BE IT RESOLVED, that the Planning Commission adopts the following findings in support of its recommendation to the City Council on the adoption of text amendments:

- 1. The proposed text amendments to Sections 6.04.165 and 17.52.020 of the Seaside Municipal Code are consistent with the goals and policies of elements of the General Plan.**

Evidence: *General Plan Goal Conservation and Open Space - 4 specifies: "Preserve and protect the sensitive habitats and species within the community." The prevention of further pollinator decline, including that of honeybees, must be advocated for by the City through measures that will encourage increases in pollinator populations.*

2. **The proposed amendments would not be detrimental to the public interest, health, safety, convenience, or welfare of the City.**

Evidence: *The proposed amendments clearly define beekeeping nuisance regulations aimed at protecting the health, safety, convenience, and welfare of the City. Additionally, the environmental benefits associated with beekeeping are beneficial to the biological health and diversity of the City. The amendments will not create significant impacts or other conditions or situations that may be objectionable or detrimental to other permitted uses in the vicinity or adverse to the public interest, health, safety, convenience, or welfare of the City.*

3. **The proposed amendments are internally consistent with other applicable provisions of the Seaside Municipal Code.**

Evidence: *The proposed amendments will provide thorough and specific beekeeping regulations in both Title 6 (Animals) and Title 17 (Zoning Ordinance) of the SMC and will not interfere or contradict any municipal code requirements.*

NOW, THEREFORE, BE IT FURTHER RESOLVED, that the Planning Commission recommends the City Council adopt an ordinance approving proposed text amendments to Seaside Municipal Code sections 6.04.165 and 17.52.020 in order to amend regulations, making beekeeping permitted by-right city wide.

PASSED AND ADOPTED at a Special Meeting of the Planning Commission of the City of Seaside, State of California, on the 17th of December 2018 by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

ATTEST:

John Owens, Chairperson

Planning Commission Secretary



Photo Jillian Cowles

Bee Facts

Native bees are mostly small and go unnoticed. Bumble bees are colorful giants compared with most bees.

- ✿ Less than half of the world's bees are capable of stinging. Only female bees sting.
- ✿ Foraging bees collect pollen and nectar to feed their young and themselves. They are not flying around looking for someone to sting!
- ✿ You are completely safe watching bees as they fly from flower to flower.
- ✿ Most bees only sting if you pinch or step on them, or they get caught in clothing.
- ✿ Honey bees and some bumble bees are defensive within 10 or 20 feet of their nests. Keep back.
- ✿ Keep children from disturbing bee or wasp nests.
- ✿ Ground-nesting yellow jackets are likely to sting and pollinating bees get the blame.
- ✿ Yellow jackets are minor pollinators. The best approach to eliminate yellow jackets is to set queen traps in the spring before they establish new nests.



The **North American Pollinator Protection Campaign (NAPPC)** is a collaborative body of over 140 organizations that work for the protection of pollinators across Mexico, Canada and the United States.

The **NAPPC Garden Task Force** produced this brochure for your use and information. Feedback is welcome. For more information and to learn about the fascinating lifestyles of native solitary bees and social bees like the bumble bees or the honey bees please contact info@pollinator.org or **415-362-1137** or visit www.pollinator.org.

Visit
www.pollinator.org/brochures.htm
to order copies of this brochure.



NAPPC

**POLLINATOR
PARTNERSHIP**

Inviting Bees to Your Property

No Fear of Stings!

**Prepared by the
Garden Task Force of the
North American Pollinator Protection
Campaign (NAPPC)**



Photo Paul Williams

Bees and Other Pollinators are Your Gardening Friends: But, Won't I Get Stung?

Humans could not exist without pollinating insects, especially solitary bees, bumble bees, and honey bees. Pollinators provide humankind with 35% of our diet along with beverages, fibers, and medicines. Colorful fruits and vegetables containing nutrients and health-giving anti-oxidants sustain us and give us pleasure. Without bees, our diets would be restricted to bland starchy foods, wind-pollinated cereal grains.

Many people are wary, if not fearful, of insects such as bees and wasps. We don't like to get stung. Only about 0.5% of children and 3% of adults have actual sting allergies from bees, wasps, and ants which could, if untreated, lead to systemic reactions. The risk of a sting from bees in your yard or garden is very small, especially with a bit of advance knowledge.

This brochure will help reduce your insect anxiety while promoting an outdoor lifestyle that could include walking, hiking, gardening, taking photographs, or appreciating the beauty of wildflowers and nature. By trying some of these simple tips you may come to appreciate the beauty and fascination of watching pollinators at work.

Photo Steve Buchmann

More About Bees and Avoiding Stings

Social vs. Solitary – Two Kinds of Bees

Social bees live together as a unit. This includes honey bees which form a colony and divide the work of the hive into different jobs and bumble bees who live in small colonies but do not have individualized job descriptions. Think of solitary bees, mostly ground-nesting bees, as single moms with families at home to feed. Male bees will also visit flowers but only collect nectar as flight fuel. Foraging bees are solely focused on gathering food.

The Stinging Truth

Unlike cartoons and Hollywood movies, bees are not flying around looking for people and pets to sting. You can safely get within inches of bees visiting flowers and not get stung. People get stung when they harass bees at their nests, step on or pinch them, or they become entangled in folds of clothing. Stay away from social bee nests (honey bees) which may be underground or in trees.



Visit
www.pollinator.org
or
www.nappc.org
for more information.

Photo Steve Buchmann

Non-Allergic Reactions

In most cases, bee stings are annoying, but do not require treatment. Swelling or pain at the sting site are not the result of allergic reactions and will diminish with time. Remove any stinger that remains by scraping it away (a credit card works perfectly) or removing it with a tweezer. Apply an ice pack to reduce swelling. Wash the area with soap and water and apply hydrocortisone. Take an antihistamine to reduce swelling.

Allergic Reactions

Some people may have an allergic reaction (even some who do not know they are allergic to stings). A very small proportion of the adult population (3%) and children (about 0.5%) are allergic to bee stings and are at risk of possible systemic reactions including anaphylactic shock. If someone experiences nausea, wheezing, or difficulty breathing following a sting, or if they are stung multiple times, they should seek immediate medical care. This is rare, but is an early systemic symptom of anaphylactic shock.

You are more at risk of being struck by lightning (about 700 fatalities per year) than dying from a bee sting. For example, in the U.S. population, only 40 people out of 310 million people die from stings in a typical year. Many of these incidents are actually from wasp or ant stings rather than native bees or honey bees. Ground-nesting yellow jacket wasps (*Vespula* species) are defensive around their populous nests.

What About “Killer Bees”?

African honey bees (*Apis mellifera scutellata*) were accidentally unleashed on the Americas

and have mated with the existing honey bees to form Africanized honey bees, a very effective pollinator which has a more defensive nature than other honey bees. These bees are making their way northward and can currently be found in about 6 southern border states in the U.S. and in Mexico. It is a good idea to give these bees (almost indistinguishable from other honey bees based on their looks) a much wider berth – keep away from their nests, and if a nest is accidentally disturbed or you encounter a swarm, leave the area.

Reduce that Risk – Safety Tips

Nests: Keep back from honey bee nests in the ground. Watch from a safe distance of 20 or 30 feet. Do not run over bee nests with a lawn mower. If you are barefoot, watch where you step. Do not ride horses near a known honey bee nest. Don’t let children throw rocks at their nests.

Actions: Try not to wear dark clothing, strong perfume, or move quickly when passing by honey bee nests. These actions, along with carbon dioxide in exhaled breath, could stimulate the guard bees to sting.

Help Bees and They will Help You

Garden tips: When we mulch pathways or landscape with large areas of concrete, we destroy the sunny flat bare ground areas that most nesting female bees need to raise their young. Leave bare patches for ground nesting bees. Provide bare ground, twigs, and dead limbs for nests and lots of flowers for nectar and pollen. Use few or no



Photo Steve Buchmann

pesticides in a pollinator garden, or spray when bees aren’t active. Try to use locally adapted native wildflowers or old-fashioned heirloom varieties, which produce more nectar and pollen than modern hybrids. Plant in enticing clumps of 5 or 6 plants of the same kind. In turn, you will be rewarded with bountiful healthy crops and lifestyle by being outdoors. If you are growing a vegetable garden, or have fruit trees, pollinating bees are your allies. They do the busy work, making thousands of trips moving pollen from flower to flower resulting in larger and tastier vegetables and fruits even in varieties that normally self-pollinate.



ORDINANCE NO. 3537 C.S.

AN ORDINANCE OF THE COUNCIL OF THE CITY OF MONTEREY

REPEAL MONTEREY CITY CODE SECTION 6-7 THAT PROHIBITS KEEPING OF BEES

THE COUNCIL OF THE CITY OF MONTEREY DOES ORDAIN, as follows:

SECTION 1:

WHEREAS, bees are beneficial to the environment and to a community's flora, increasing the health of its flower gardens, wildflowers, fruits, and vegetables;

WHEREAS, bee products benefit immune systems, hair and skin, and provide anti-bacterial properties;

WHEREAS, pesticides have wiped out many of the native varieties of honey bees in the U.S. and populations also suffer from parasites and disease;

WHEREAS, allowing beekeeping could result in these benefits to the community, and would be subject to the City's nuisance ordinance should nuisance issues occur;

WHEREAS, the County Office of the Agricultural Commission enforces state laws governing the keeping of bees and is available to respond to nuisance complaints;

WHEREAS, M.C.C. Section 6-7 currently prohibits the keeping of bees; and

WHEREAS, the City of Monterey determined that the proposed action is not a project as defined by the California Environmental Quality Act (CEQA)(CCR, Title 14, Chapter 3 ("CEQA Guidelines"), Article 20, Section 15378). In addition, CEQA Guidelines Section 15061 includes the general rule that CEQA applies only to activities which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA. Because the proposed action and this matter have no potential to cause any effect on the environment, or because it falls within a category of activities excluded as projects pursuant to CEQA Guidelines section 15378, this matter is not a project. Because the matter does not cause a direct or any reasonably foreseeable indirect physical change on or in the environment, this matter is not a project. Any subsequent discretionary projects resulting from this action will be assessed for CEQA applicability.

NOW THEREFORE, the Monterey City Council declares as follows:

SECTION 2: Monterey City Code, Chapter 6, Section 6-7 is hereby deleted.

SECTION 3: All ordinances and parts of ordinances in conflict herewith are hereby

repealed.

SECTION 4: This ordinance shall be in full force and effect thirty (30) days from and after its final passage and adoption.

PASSED AND ADOPTED BY THE COUNCIL OF THE CITY OF MONTEREY this 1st day of March, 2016, by the following vote:

AYES:	5	COUNCILMEMBERS:	Barrett, Downey, Haffa, Smith, Roberson
NOES:	0	COUNCILMEMBERS:	None
ABSENT:	0	COUNCILMEMBERS:	None
ABSTAIN:	0	COUNCILMEMBERS:	None

APPROVED:

ATTEST:



Mayor of said City



City Clerk thereof





CITY OF DEL REY OAKS

Staff Report

DATE: October 24, 2017

TO: Honorable Mayor and City Council

FROM: Danial D. Pick, City Manager

SUBJECT: Beekeeping in Del Rey Oaks

CEQA: This ordinance is not subject to the California Environmental Quality Act (CEQA) as it is not a project pursuant to Guidelines Section 15378 because it has no potential for resulting in physical change to the environment directly or indirectly. In addition, CEQA Guidelines Section 15061 includes the general rule that CEQA applies only to activities which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA. Because the proposed action and this matter have no potential to cause any effect on the environment, or because it falls within a category of activities excluded as projects pursuant to CEQA Guidelines section 15061(B)(3), this ordinance is not subject to CEQA review.

RECOMMENDATION: Introduce and hold a first reading of an ordinance repealing and replacing sections 6.12.010 and 6.12.020 of the Del Rey Oaks Municipal Code related to beekeeping.

BACKGROUND:

The honey bee (*Apis mellifera*) is a critical pollinator for flowers, fruits, and vegetables. Honey bees around the world. Unfortunately, bees are being driven to extinction by pesticides and other environmental toxins. This is known as Colony Collapse Disorder and is devastating wild and domestic honey bee populations, especially in North America and Europe.

SUMMARY AND DISCUSSION:

Due to Colony Collapse Disorder, cities in the United States and other parts of the world are increasing recognizing the importance of allowing beekeeping within their jurisdictions. Honey bees are being kept with great success in backyards, public gardens, and on balconies and rooftops in many urban areas.

Locally, the City of Monterey recently repealed its prohibition on beekeeping. Pacific Grove takes an informal approach, using the same process as it does for allowing chickens. Statements made by staff in both cities relate essentially problem-free results of beekeeping in their jurisdictions. In Seaside, Gloria Sterns, the Economic Development Program Manager, is working to relax that city's current restrictive ordinance. Carmel, Sand City, and Marina have no beekeeping ordinances.

The City of Milwaukee, Wisconsin originally had concerns that allowing beekeeping in its urban environment would create numerous problems, when in fact there have been none. Chicago has a number of successful beekeeping organizations; hives are kept in such diverse places as public schools, community gardens, parks and rooftops from restaurants to City Hall. Montreal, in addition to other beekeeping avenues, and in partnership with other social services, has a program teaching men who are currently homeless about beekeeping. Paris has over 700 honey bee hives on city roofs and in public gardens.

Given the importance of honey bees in our environment, the decimation of honey bee population in the industrialized world, and the success of beekeeping in places as diverse as Monterey, Chicago, and Paris, staff recommends allowing honey beekeeping within the City of Del Rey Oaks.

FISCAL IMPACTS:

This ordinance amendment will have no financial impact as the costs of its implementation and regulation will be funded by the permit fee required.

RECOMMENDED ACTION:

Introduce and hold a first reading of an ordinance repealing and replacing sections 6.12.010 and 6.12.020 of the Del Rey Oaks Municipal Code related to beekeeping.

ATTACHMENTS:

1. Ordinance

Respectfully Submitted,

Dino Pick
City Manager

ORDINANCE NO. 290
AN ORDINANCE REPEALING AND REPLACING DEL REY OAKS MUNICIPAL CODE
SECTIONS 6.12.010 AND 6.12.020 RELATED TO BEEKEEPING

WHEREAS: Del Rey Oaks Municipal Code Chapter 6.12, Sections 6.12.010 and 6.12.020 currently prohibit the keeping of honey bees; and

WHEREAS, honey bees (*Apis mellifera*) are beneficial to the environment and to a community's flora, increasing the health of its flower gardens, wildflowers, fruits, and vegetables;

WHEREAS, honey bee products such as honey and pollen benefit immune systems, hair and skin, and have antibacterial and wound-healing properties among other benefits;

WHEREAS, said products are high in nutritional value and, along with beeswax, are a local, renewable and a sustainable resource;

WHEREAS, pesticides and other environmental toxins have decimated many native honey bee colonies in the U.S., and many existing colonies are suffering from parasites and disease;

WHEREAS, honey bees are successfully kept in small backyards, on balconies, and on rooftops in urban areas with little, if any, impact upon adjacent property owners;

WHEREAS, allowing honey beekeeping will result in many benefits to the community and its residents, and be subject to the City's nuisance ordinance in case nuisance issues arise; and

WHEREAS, enactment of this ordinance is not subject to the California Environmental Quality Act (CEQA) as it is not a project pursuant to Guidelines Section 15378 because it has no potential for resulting in physical change to the environment directly or indirectly. In addition, CEQA Guidelines Section 15061 includes the general rule that CEQA applies only to activities which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA. Because the proposed action and this matter have no potential to cause any effect on the environment, or because it falls within a category of activities excluded as projects pursuant to CEQA Guidelines section 15061(B)(3), this ordinance is not subject to CEQA review.

NOW THEREFORE, BE IT ORDAINED BY THE COUNCIL OF THE CITY OF DEL REY OAKS as follows:

SECTION 1: Sections 6.12.010 and 6.12.020 are hereby repealed in their entirety and replaced by the following:

6.12.010 Beekeeping

A. **Limitation Generally.** No person shall keep any honey bees (*Apis millefera*) except as specifically authorized in this Section.

B. **Permit Required.** No person shall keep any honey bees without having first obtained a use permit from the City. Permits required by this Section shall be issued by the City Manager, or their designee, and shall be subject to a fee established by the resolution of the City Council. The permit of any person who fails to comply with the provisions of this Section may be suspended or revoked by the City Manager, or their designee. Any aggrieved person may appeal a suspension or revocation within fifteen (15) days of its issuance. Such appeal shall be subject to a fee established by the resolution of the City Council. **Neighbor Notification.** All neighbors within 200 feet of a proposed location where honey bees are to be kept shall be notified at least twenty (20) days before a permit is issued.

C. **Location of Beehives.** Beehives shall be located in side or rear yards only, and shall be situated behind solid screening or fencing that is at least six (6) feet in height. Bee keeping shall be considered an accessory use in all zones and beehives shall be considered accessory structures. All current zoning, building, and setback requirements for such structures shall apply to bee keeping and beehives.

D. **Water.** It shall be the duty of every person owning, controlling, or maintaining bees or a beehive to provide adequate water for the bees to prevent bees from seeking water in neighboring pools, birdbaths, ponds, or other bodies of water.

E. **Swarming.** It shall be the duty of every person owning, controlling, or maintaining bees or a beehive to maintain them in such a manner so as to prevent the swarming and aggressive behavior of bees.

F. Any person keeping bees or a beehive shall allow City administrative enforcement officers to enter the premises where bees or a beehive is kept to ensure compliance with this Chapter 6.12.

G. **Keeping Honey Bees for Commercial Purposes Prohibited.** Bees may be kept only for personal use, and no person shall keep any bees for the purpose of commercial activities.

6.12.020 Violation

Any violation of this Chapter 6.12 shall be deemed a nuisance and may be abated as provided for by law. Violations shall also be subject to administrative, civil, or criminal enforcement.

SECTION 2. Environmental Determination. The City Council finds the enactment of this ordinance is not subject to the California Environmental Quality Act (CEQA) as it is not a project pursuant to Guidelines Section 15378 because it has no potential for resulting in physical change to the environment directly or indirectly. In addition, CEQA Guidelines Section 15061 includes the general rule that CEQA applies only to activities which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA. Because the proposed action and this matter have no potential to cause any effect

on the environment, or because it falls within a category of activities excluded as projects pursuant to CEQA Guidelines section 15061(B)(3), this ordinance is not subject to CEQA review.

SECTION 3. This ordinance shall take effect thirty (30) days following its final adoption.

SECTION 4. The City Manager and City Clerk are directed to perform all tasks necessary to implement this ordinance.

SECTION 5. Severability. If any provision, section, paragraph, sentence, clause, or phrase of this ordinance, or any part thereof, or the application thereof to any person or circumstance is for any reason held to be invalid or unconstitutional by a court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this Ordinance, or any part thereof, or its application to other persons or circumstances. The City Council hereby declares that it would have passed and adopted each provision, section, paragraph, subparagraph, sentence, clause, or phrase thereof, irrespective of the fact that any one or more sections, paragraphs, subparagraphs, sentences, clauses, or phrases, or the application thereof to any person or circumstance, be declared invalid or unconstitutional.

SECTION 6. Publication. The City Clerk of the City of Del Rey Oaks, California, is hereby directed to publish in a newspaper of general circulation.

PASSED AND ADOPTED BY THE COUNCIL OF THE CITY OF DEL REY OAKS this _____ day of October, 2017 by the following vote:

AYES:

NOES:

ABSTAIN:

ABSENT:

Jerry B. Edelen, Mayor

ATTEST:

Danial Pick, City Manager



Permit #:

Application for Animal Keeping Permit

Address: _____

Description of Animal(s): _____

Reason for Animal Keeping Permit: _____

Number of Animals: _____

Length of Event requiring Animal Keeping Permit: _____

Owner Contact Information:

Address: _____

Phone: _____

Email: _____

Permit Findings, Per 10.08.030: (to be completed by planner)

Updated 2-27-14

10.08.030 Permit – Required for certain animals

In any of the following cases, animals may be maintained within the city limits upon first obtaining a permit from the city manager, or his/her designated representative, after a finding that the maintenance thereof will not be a public or private nuisance, nor detrimental to property values or human health or safety:

- (a) Cats and/or dogs in excess of the limits prescribed in PGMC [10.08.020](#);
- (b) Bees and bee swarms in boxes or hives;
- (c) Chickens;
- (d) Where the animal or animals will be used exclusively for educational and/or scientific purposes and that their presence in the city will not be contrary to the purposes of this chapter or offensive to the owners or occupants of any property within the city;
- (e) Where the restrictions and regulations of this chapter impose substantial hardship on the applicant which is singular and peculiar to him or her by reason of the nature of his or her property and his or her proposed use of the animal or animals (as distinguished from the characteristics or propensities of the applicant);
- (f) The animal or animals are to be used for a temporary period of time in connection with a promotion, display or theatrical-type exposition, circus or performance and appropriate safeguards will be employed to protect the public health, safety and welfare.

RESOLUTION NO. 13-86

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SEASIDE,
APPROVING A USE PERMIT APPLICATION FOR THE ISSUANCE OF
A BEE KEEPING PERMIT AT
2060 BALDWIN COURT.**

WHEREAS, Paul and Ellen Gaucher, property owners, and Ellen Gaucher, applicant, have applied for a use permit to allow the placement of three bee hive boxes on a residential parcel for the issuance of a bee keeping permit.

WHEREAS, in accordance with Section 6.04.165 of the Seaside Municipal Code it is the responsibility of the City Council to consider and weigh the merits of the requested bee keeping permit in relation to the policies, standards and intent of the Seaside General Plan and Seaside Municipal Code ; and

WHEREAS, the City Council held a duly noticed Public Hearing on October 17, 2013 and considered oral comments and written information concerning the requested bee keeping permit; and

WHEREAS, the project is exempt from environmental review subject to Class 1, Section 15301(a): based on the following evidence:

Evidence After visits to the site, City staff has concluded that granting the fence exception would not result in a traffic-related safety hazard, visible impairment at an intersection or an adjoining driveway, or compatibility issues with the surrounding neighborhood.

NOW, THEREFORE, BE IT RESOLVED, that the City Council adopts the following findings for Use Permit Application No. UP-13-06:

1. The proposed use is allowed within the applicable zone and complies with all other applicable provisions of this Zoning Ordinance and the Municipal Code; consistent with e General Plan, design, location, size and operating characteristics of the proposed activity, the site is physically suitable for the type, density, and intensity, and granting the permit would not be detrimental to the public interest, health, safety, convenience or welfare of the City.

Evidence: The location, size, design, and operating characteristics of the proposed bee hive boxes are compatible with the residential use on the project site and adjoining residential properties in which the proposed use is to be located; will not create significant noise, traffic, or other conditions or situations that may be objectionable or detrimental to other permitted uses in the vicinity or adverse to the public interest, health, safety, convenience, or welfare of the City.

Evidence: The proposed use is consistent and in harmony with the Low Density General Plan Land Use Designation and RS-8 (Single Family Residential) Zoning District.

2. The approval of the proposed project is in compliance with the requirements of the California Environmental Quality Act (CEQA).

Evidence: In accordance with Section 15303(d) (New Construction) of the California Environmental Quality Act (CEQA), the placement of limited new structures involving negligible or no expansion of use are categorically exempt from the provisions of CEQA. The proposed project will consist of establishing three bee hive boxes near the northeast corner of the residential parcel to accommodate a bee hive colony. All existing utilities (Electricity, Sewer, Water) are available to service the project.

BE IT FURTHER RESOLVED, that the Planning Commission approves Conditional Use Permit Application No. 13-06 subject to the following conditions:

1. Except as modified by the conditions of approval, the plans submitted for a Building Permit must be in compliance with the plans provided as Attachment 2.
2. The Conditional Use Permit approval is subject to revocation procedures contained in Section 17.70.090 SMC in the event any of the terms of this approval are violated or if the uses are conducted or carried out in a manner so as to adversely affect the health, welfare or safety of persons residing or working in the neighborhood.
3. The applicant agrees as a condition and in consideration of the approval of this discretionary permit that they will, pursuant to agreement and/or statutory provisions as applicable, including but not limited to Government Code Section 66474.9, defend, indemnify and hold harmless the City of Seaside or its agents, officers and employees from any claim, action or proceeding against the City or its agents, officers or employees to attack, set aside, void or annul this approval, which action is brought within the time period provided for under law, including but not limited to, Government Code Section 66499.37, as applicable. The applicant will reimburse the City for any court costs and attorney's fees which the City may be required by a court to pay as a result of such action. The City may, at its sole discretion, participate in the defense of such action; but such participation shall not relieve applicant of his obligations under this condition. An agreement to this effect shall be recorded upon demand of City Counsel or concurrent with the issuance of permits, use of the property, whichever occurs first and as applicable. The City shall promptly notify the applicant of any such claim, action or proceeding and the City shall cooperate fully in the defense thereof. If the City fails to promptly notify the applicant of any such claim, action or proceeding or fails to cooperate fully in the defense thereof, the applicant shall not thereafter be responsible to defend, indemnify or hold the City harmless.
4. No more than three bee hives may be maintained on the project site.
5. All bee colonies shall be kept in hive boxes consisting of moveable frames and combs.

6. Hive boxes must be kept in sound useable condition at all times.
7. Hive box entrances shall face away from side and rear property lines.
8. A six-foot fence or vegetative barrier must be maintained along the side and rear property lines of the residential parcel.
9. A water source for bees shall be provided at all times on the property near where the bees are kept to discourage bee visitation at swimming pools/hot tubs, hose bibs, and other water sources on adjacent public or private property.
10. Nuisance – bees or hives shall be considered a public nuisance when any of the following occurs:
 - a. Colonies of bees exhibit defensive or objectionable behavior or interfere with the normal use of neighboring properties.
 - b. Colonies of bees swarm.
 - c. Bees or hives do not conform to proper sanitary and property maintenance standards.
 - d. Hives become abandoned by resident bees or property owner.
11. Where it is necessary to make an inspection of the project site to enforce the provisions of the Seaside Municipal Code, or where there is reasonable cause to believe that there exists a violation of the Seaside Municipal Code which may cause health or safety hazards to the community, the Animal Control Officer is authorized to enter upon private property at reasonable times to inspect or to perform duties authorized by the Seaside Municipal Code. If entry is refused or if the owner could not be located, the Animal Control Officer shall have recourse to the remedies provided by law to secure entry and/or cause removal of the bee hives in protection of the general health, safety, and welfare of the community.
12. The project shall comply with the requirements and the applicable ordinances of the Monterey Peninsula Water Management District (MPWMD).
13. The permit shall have no force or effect unless and until accepted, and the terms thereof agreed to, in writing, by the applicant and property owner on the Signature Page provided as Attachment 1 within 15 days from the date of its approval.
14. Project approval will become null and void if a building permit is not obtained within one year from date of approval to begin construction on the project.
15. For purposes of assuring compliance, the applicant, agents, representatives or their assignees agree not to deny or impede access to the subject property by City employees in the performance of their duties.

PASSED AND ADOPTED at a regular meeting of the City Council of the City of Seaside duly held on the 17th day of October, 2013 by the following vote:

AYES:	4	COUNCIL MEMBERS	Alexander, Oglesby, Pacheco, Rubio
NOES:	0	COUNCIL MEMBERS	None
ABSENT:	1	COUNCIL MEMBERS	Edwards
ABSTAIN:	0	COUNCIL MEMBERS	None

Ralph Rubio, Mayor

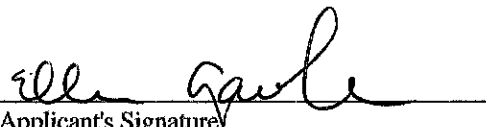
ATTEST:

Lesley E. Milton, City Clerk

Resolution No. 13-86
USE PERMIT APPLICATION NO. UP-13-06

These permits are hereby accepted upon the express terms and conditions hereof, and shall have no force or effect unless and until agreed to, in writing, by the applicant and property owner(s).

The undersigned hereby acknowledge the approved terms and conditions and agree to fully conform to, and comply with, said terms and conditions within the time frames approved by the City of Seaside Planning Commission.

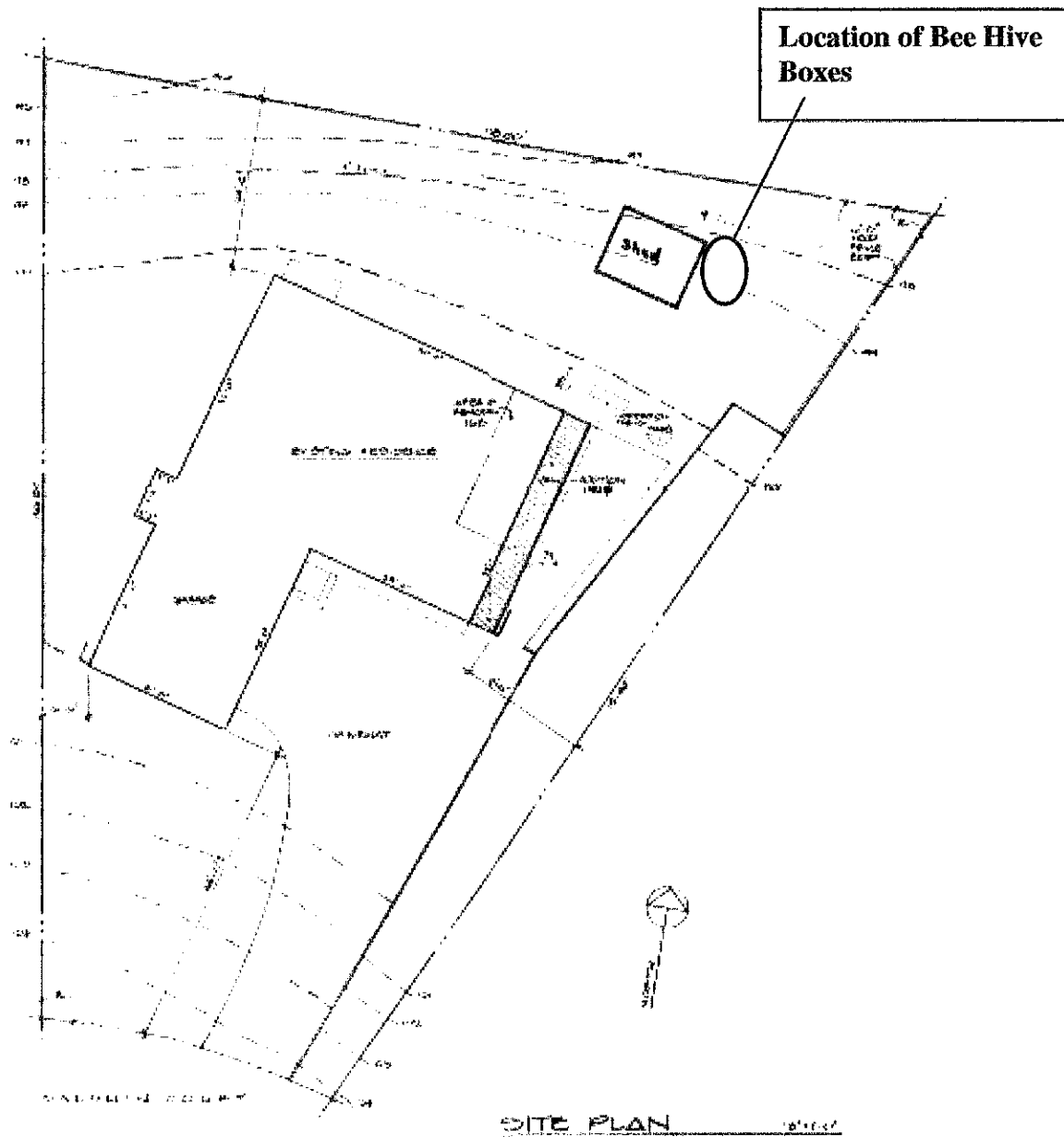

Applicant's Signature

10/29/13
Date


Property Owner's Signature

10/29/13
10/29/13
Date

Project Site Plan



http://www.montereycountyweekly.com/news/831_tales/anarchist-beekeeping-collective-builds-a-community-of-urban-pollinators/article_16a0174c-6aae-11e4-a714-ffe21fb5a613.html

Honey at Home

Anarchist Beekeeping Collective builds a community of urban pollinators.

Alexandra Videmsky Nov 13, 2014



Jake Reisdorf of Carmel is sectioning off a spot in his yard for his special project. He's done his homework and made it into a fifth-grade project on entrepreneurship as well. It's a bit risky, but his parents agreed to let him go for it.

Reisdorf is getting two beehives next spring. He'd rather start beekeeping right now, but it's too late in the season, so he's using the time to prepare.

"We can get so much while helping them," the 11-year-old says, brown eyes lighting up with excitement.

The seed was planted when Reisdorf and his family met Dale Hillard at the Monterey County Fair. Hillard had set up a demonstration hive to show the basics of beekeeping, and Reisdorf buzzed around it.

Hillard is a member of the Anarchist Beekeeping Collective, an informal gathering of beekeepers from around the county.

The group began in the late '90s as two friends, J.R. Githens and Doug Westphal, met for breakfast at Sarita's restaurant in Marina. Over the years, they started inviting friends and coworkers to join them. Word of mouth brought more beekeepers into the fold, and soon they had a name. The "anarchist" part is a joke, because Westphal actually likes order – and beehives are monarchies, loyal to the death to their queens. But the group lacks an official leader or charter, and anyone's welcome to drop in or drop out.

THE BIGGEST ISSUES ARE PESTS, PREDATORS AND DROUGHT.

During an October meeting, Reisdorf sat at the table in rapt attention. About 20 other beekeepers discussed their hives, passed around copies of *American Bee Journal*, worried about a black beetle invasion outside the county and struck up a lively debate over whether to feed bees supplemental pollen so late in the season.

In spring bees may swarm, following an old queen out of the original hive. The beekeeper places the queen into a new hive, lets a contingent of workers bees follow, then transports the whole setup to its new home. (This part's not too treacherous – swarming bees are docile and can be gently handled.)

A new beekeeper's other option is to order bees online, or pick them up at local supply stores. They come in mesh-screen crates that can be opened to pour the bees into the hive.

Anarchist Beekeepers hold harvest parties, sharing a centrifugal extractor that spins out the honey. But first, they have to apply smoke using a handheld smoker (shaped like a watering can with bellows) burning natural fibers to calm their bees, and then slowly and carefully reach in to remove the honey-filled frames. As soon as the smoke wears off, the bees feverishly search for their honey, so it is smart to harvest the honey somewhere or sometime else.

Juli Hofman, who keeps nine hives in Marina, says beekeeping is surprisingly easy. She wears a mesh hood and protective clothing to peek inside her hive, making sure it looks healthy. She also keeps a removable panel under the hive, which she occasionally pulls out to check for mites and other pests without disturbing the bees. Her bees support her native plant garden, which also attracts other native pollinators.

Tom Hughes keeps two hives in his bushy and well-cultivated Seaside backyard. Bees don't need a lot of space, he says; 10-20 square feet is enough for a box hive with removable frames that hold honeycombs. He stacks boxes to make taller, roomier hives near his vegetable patches. "You could even do it on a balcony," he says.

The biggest issues facing his backyard buzzers are pests, predators and drought. Both Hofman and Hughes have dealt with invasions of mites, which parasitize bees and carry viruses.

The record drought also weighs heavily because it impacts bees' primary food source: pollen from flowering plants. Bees go hungry and depend on keepers for supplemental food, such as sugar water or nutrient-rich pollen substitute. Without abundant pollen, Hughes isn't expecting to see much honey this year.

Bee societies sometimes fizzle out, and keepers don't always know why. High on the suspect list is colony collapse disorder, when many adult bees suddenly abandon the hive and die.

Scientists don't point to a single cause for colony collapse – they suspect a combination of pesticides, poor pollen quality, gut fungi and invasive Varroa mites.

But the backyard bee boom gives hope for the little pollinators. Hofman says the beekeeping community used to skew toward retirees, but new generations like Reisdorf's are leading the charge.

He joins a movement that, through "anarchy," creates a hive-like network of orderly cooperation.

ANARCHIST BEEKEEPER COLLECTIVE meets 8am the first Saturday of each month at The Black Bear Diner, 2450 N. Fremont St., Monterey, montereybaybeekeepers.org



Annalise Frank/Crain's Detroit Business

Brian Peterson-Roest, co-founder of the nonprofit Bees in the D (left), explains the process by which he'll transfer around 10,000 bees into a hive on top of the Bedrock LLC-owned former Detroit News building on Lafayette Boulevard. Bees in the D board member Andrea Washington (center) uses smoke to calm the bees for the transition; co-founder and Peterson-Roest's husband, Brian Roest-Peterson, assists.

BEE LOSS

More than a third of crop production requires pollination from insects such as honey bees, but colony populations are on the decline, according to the U.S. Department of Agriculture. The U.S. has gone from 6 million hives in the 1940s to 2.5 million in 2017.

Bees in the D, a nonprofit that wants to show Detroit why bees matter, placed about 20,000 of the tiny pollinators in two hives Thursday atop the former *Detroit News* building.

The 2-year-old Detroit-based group expects to be maintaining 100 hives across Southeast Michigan by this summer, including on the **Bedrock LLC-owned** historic structure at 615 W. Lafayette Blvd., co-founder Brian Peterson-Roest said.

Bees in the D sets up deals with businesses, other nonprofits and individuals to bring bees — up to 60,000 per

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Annalise Frank/Crain's Detroit Business

Brian Peterson-Roest, co-founder of Bees in the D, places a flat of honey bees into a hive that he will maintain on the roof of the Bedrock LLC-owned former Detroit News building on Lafayette Boulevard. Bedrock plans to place more hives on other buildings.

"We find that pairing with businesses really allows us a stage to help educate about honeybees," Peterson-Roest said. "It allows them to also give back and to help with the conservation and sustainability. And I mean if it's a restaurant or bar that's using honey for drinks, people are loving to know they're getting local products."

Some honey produced at Bedrock's total of six hives on the Lafayette rooftop could go straight to its tenant downstairs, the Press Room Café, but Bedrock is still working out those details, spokeswoman Sam West said. It will likely spread hives across other buildings, as well, but isn't sure.

Bees in the D's agreements range from solely maintaining the hives — hosts keep all the honey — to letting Bees in the D keep and sell it, Peterson-Roest said. Yearly fees per hive range from around \$250 to \$1,200, depending on the nature of the deal.

Proceeds from maintenance fees go straight back to the bees, he said. The nonprofit's funding also comes from individual donors, ticketed events, honey and beeswax products, and services such as speaking engagements.

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**Bees In The D**

about 8 months ago

Setting up some hives at [#detroit Eastern Market](#) atop Eastern Market Brewing Co.

[#urbanbeekeeping](#) [#savethebees](#) [#beer](#) [#rainorshine](#) [#beesinthed](#) [#craftbeer](#) Brian Brian



82

7

26

Businesses hosting or planning to host Bees in the D hives include Bon Bon Bon, Downtown Boxing Gym, Detroit's Outdoor Adventure Center, Detroit Abloom, five of Southfield-based Farman Group's buildings, Anew Life prosthetics, Eastern Market Brewing Co., Detroit City Distillery and the Detroit Foundation Hotel. The nonprofit also placed four hives on Cobo Center's [green roof](#) in June.

Bees in the D is going international, too: It's placing hives with a veterinary equipment supplier in Windsor.

Bees in the D and Bedrock

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FOOD

That Buzzing Could Sweeten Tomorrow's Tea

JAIME GROSS MARCH 26, 2010

If you spy a dark-haired woman gliding down Mission Street, past the taquerias and bodegas, in a white, head-to-toe bee suit — picture a hazmat suit crossed with a fencing mask — chances are it's Cameo Wood, en route to a beehive. Ms. Wood, the 32-year-old proprietor of the Mission District shop Her Majesty's Secret Beekeeper, cares for 15 hives in "borrowed spaces" around San Francisco. These are hidden away in friends' backyards, in a restaurant garden, and on the roofs of government buildings and apartment complexes.

Urban beekeeping, or backyard beekeeping, is taking off in a major way in the Bay Area, as a growing brood of city dwellers is raising bees on rooftops, patios and small plots of land; harvesting the honey; and, in some cases, selling the yields in local shops and bakeries.

Ms. Wood started beekeeping in late 2008 and is a trailblazer in this growing movement, which is drawing a new crowd to a very old trade. At her nine-month-old shop, she sells beeswax candles, native honey, beekeeping supplies and a \$200 starter kit that includes a two-tier cypress hive with a shiny copper roof. Since the shop opened last July, she has sold 130 kits and 450 pounds of bees, and hosted 21 beginner-level classes. In October 2009, she started a meet-up club, the San Francisco Urban Beekeeping Group, which attracts up to 60 attendees at each gathering.

Paul Koski, a retired schoolteacher and the current secretary of the San Francisco Beekeepers Association, a club that promotes responsible urban beekeeping, estimates that in 2000 there were about 50 beekeepers in the city. Today, according to Ms. Wood, there are "at least 400."

Beekeeping is thriving in cities across the nation, from Washington to Chicago to New York (where, on March 16, it was re-legalized). But compared with most urban areas, San Francisco offers a particularly hospitable habitat. It has a temperate climate, abundant plant life and legions of residents obsessed with local and sustainable food.

Even better, it happens to be "one of the most permissive places in the country to keep bees," said Karen Peteros, a part-time employment lawyer and a former president of the beekeepers association. "Not only is it legal, but it's totally unregulated — which means that as long as your bees don't present a public nuisance, you can keep them wherever you want."

According to Ms. Peteros, the current beekeeping boom dates to 2007, when reports of colony collapse disorder, or C.C.D. (the still-unexplained phenomenon of honeybees disappearing en masse), hit the media, sparking interest right around the time the local food and urban greening movement was taking off.

“C.C.D. is the worst and best thing that’s happened to honeybees in the last 50 years,” Ms. Peteros said. People saw beekeeping as “a chance to be close to wild nature in the city and participate directly in the production of food,” as Ms. Peteros put it. She speaks from experience: the first year she kept a hive in her backyard, in 2006, her neighbors’ previously anemic fruit trees produced an epic harvest. “One plum tree was so bursting, my neighbor made plum jam for the first time,” she said. “Someone else’s apple tree was so weighed down, its branches started breaking.”

On the national level, beekeeping remains a commercial, male-dominated industry, entwined with agribusiness, with thousands of hives trucked in to pollinate sprawling fruit and nut orchards across the country. But in cities, among hobby-level and sideline beekeepers, that demographic is swiftly changing. When Mr. Koski started attending the local bee association meetings in the early ’90s, there were just a dozen members, “mostly middle-aged and older, mostly men,” he said. “Now it’s a wider demographic, pretty much a cross-section of who lives in San Francisco” — including unprecedented numbers of women.

What everyone has in common, he observed, is an interest in food and sustainability, the environment and “making the city a greener, more favorable place for humans to live.” Last year, the association’s membership peaked at 207.

So, what’s the draw? As far as urban agriculture goes, beekeeping is accessible, inexpensive and low-maintenance, Ms. Wood said. And it “yields a rather large and delicious reward.” Harvests vary year to year and colony to colony, but a typical hive of 60,000 bees will produce, on average, between 40 and 60 pounds of honey.

Some of that honey ends up on the shelves at Mission Pie, a bakery and cafe in the Mission District that focuses on local, seasonal and sustainably grown produce. Krystin Rubin, a co-owner, said the shop sells between three and eight different varieties at any given time, each hailing from a different neighborhood, and each with its own particular flavor, depending on the bees’ favored foraging spots (most often groves of eucalyptus trees, blackberry bushes or clumps of wild anise).

San Francisco’s newfound bee love thrills Ms. Rubin, who attributes it to residents’ growing desire to connect with their food sources and counterbalance increasingly high-tech lives.

“There’s only so much FarmVille you can play on Facebook before you want to grow your own real radish,” she said. “We’ve got so much contact with the virtual world that we’re hungry to come back to earth.”

A version of this article appears in print on March 26, 2010, on Page A21B of the National edition with the headline: That Buzzing Could Sweeten Tomorrow’s Tea.

FEATURE

The Insect Apocalypse Is Here

What does it mean for the rest of life on Earth?

By Brooke Jarvis

Nov. 27, 2018

Sune Boye Riis was on a bike ride with his youngest son, enjoying the sun slanting over the fields and woodlands near their home north of Copenhagen, when it suddenly occurred to him that something about the experience was amiss. Specifically, something was *missing*.

It was summer. He was out in the country, moving fast. But strangely, he wasn't eating any bugs.

For a moment, Riis was transported to his childhood on the Danish island of Lolland, in the Baltic Sea. Back then, summer bike rides meant closing his mouth to cruise through thick clouds of insects, but inevitably he swallowed some anyway. When his parents took him driving, he remembered, the car's windshield was frequently so smeared with insect carcasses that you almost couldn't see through it. But all that seemed distant now. He couldn't recall the last time he needed to wash bugs from his windshield; he even wondered, vaguely, whether car manufacturers had invented some fancy new coating to keep off insects. But this absence, he now realized with some alarm, seemed to be all around him. Where had all those insects gone? And when? And why hadn't he noticed?

Riis watched his son, flying through the beautiful day, not eating bugs, and was struck by the melancholy thought that his son's childhood would lack this particular bug-eating experience of his own. It was, he granted, an odd thing to feel nostalgic about. But he couldn't shake a feeling of loss. "I guess it's pretty human to think that everything was better when you were a kid," he said. "Maybe I didn't like it when I was on my bike and I ate all the bugs, but looking back on it, I think it's something everybody should experience."

I met Riis, a lanky high school science and math teacher, on a hot day in June. He was anxious about not having yet written his address for the school's graduation ceremony that evening, but first, he had a job to do. From his garage, he retrieved a large insect net, drove to a nearby intersection and stopped to strap the net to the car's roof. Made of white mesh, the net ran the length of his car and was held up by a tent pole at the front, tapering to a small, removable bag in back. Drivers whizzing past twisted their heads to stare. Riis eyed his parking spot nervously as he adjusted the straps of the contraption. "This is not 100 percent legal," he said, "but I guess, for the sake of science."

Riis had not been able to stop thinking about the missing bugs. The more he learned, the more his nostalgia gave way to worry. **Insects are the vital pollinators and recyclers of ecosystems and the base of food webs everywhere.** Riis was not alone in noticing their decline. **In the United States, scientists recently found the population of monarch butterflies fell by 90 percent in the last 20 years, a loss of 900 million individuals; the rusty-patched bumblebee, which once lived in 28 states, dropped by 87 percent over the same period.** With other, less-studied insect species, one butterfly researcher told me, "all we can do is wave our arms and say, 'It's not here anymore!'" Still, the most disquieting thing wasn't the disappearance of certain species of insects; it was the deeper worry, shared by Riis and many others, that a whole insect world might be quietly going missing, a loss of abundance that could alter the planet in unknowable ways. "We notice the losses," says David Wagner, an entomologist at the University of Connecticut. "It's the diminishment that we don't see."

Because insects are legion, inconspicuous and hard to meaningfully track, the fear that there might be far fewer than before was more felt than documented. People noticed it by canals or in backyards or under streetlights at night — familiar places that had become unfamiliarly empty. The feeling was so common that entomologists developed a shorthand for it, named for the way many people first began to notice that they weren't seeing as many bugs. They called it the windshield phenomenon.

To test what had been primarily a loose suspicion of wrongness, Riis and 200 other Danes were spending the month of June roaming their country's back roads in their outfitted cars. They were part of a study conducted by the Natural History Museum of Denmark, a joint effort of the University of Copenhagen, Aarhus University and North Carolina State University. The nets would stand in for windshields as Riis and the other volunteers drove through various habitats — urban areas, forests, agricultural tracts, uncultivated open land and wetlands — hoping to quantify the disorienting sense that, as one of the study's designers put it, "something from the past is missing from the present."

When the investigators began planning the study in 2016, they weren't sure if anyone would sign up. But by the time the nets were ready, a paper by an obscure German entomological society had brought the problem of insect decline into sharp focus. The German study found that, measured simply by weight, the overall abundance of flying insects in German nature reserves had decreased by 75 percent over just 27 years. If you looked at midsummer population peaks, the drop was 82 percent.

Riis learned about the study from a group of his students in one of their class projects. They must have made some kind of mistake in their citation, he thought. But they hadn't. The study would quickly become, according to the website Altmetric, the sixth-most-discussed scientific paper of 2017. Headlines around the world warned of an "insect Armageddon."

Within days of announcing the insect-collection project, the Natural History Museum of Denmark was turning away eager volunteers by the dozens. It seemed there were people like Riis everywhere, people who had noticed a change but didn't know what to make of it. How could something as fundamental as the bugs in the sky just disappear? And what would become of the world without them?

Anyone who has returned to a childhood haunt to find that everything somehow got smaller knows that humans are not great at remembering the past accurately. This is especially true when it comes to changes to the natural world. It is impossible to maintain a fixed perspective, as Heraclitus observed 2,500 years ago: It is not the same river, but we are also not the same people.

A 1995 study, by Peter H. Kahn and Batya Friedman, of the way some children in Houston experienced pollution summed up our blindness this way: "With each generation, the amount of environmental degradation increases, but each generation takes that amount as the norm." In decades of photos of fishermen holding up their catch in the Florida Keys, the marine biologist Loren McClenachan found a perfect illustration of this phenomenon, which is often called "shifting baseline syndrome." The fish got smaller and smaller, to the point where the prize catches were dwarfed by fish that in years past were piled up and ignored. But the smiles on the fishermen's faces stayed the same size. The world never feels fallen, because we grow accustomed to the fall.

By one measure, bugs are the wildlife we know best, the nondomesticated animals whose lives intersect most intimately with our own: spiders in the shower, ants at the picnic, ticks buried in the skin. We sometimes feel that we know them rather too well. In another sense, though, they are one of our planet's greatest mysteries, a reminder of how little we know about what's happening in the world around us.

We've named and described a million species of insects, a stupefying array of thrips and firebrats and antlions and caddis flies and froghoppers and other enormous families of bugs that most of us can't even name. (Technically, the word "bug" applies only to the order Hemiptera, also known as true bugs, species that have tubelike mouths for piercing and sucking — and there are as many as 80,000 named varieties of those.) The ones we think we do know well, we don't: There are 12,000 types of ants, nearly 20,000 varieties of bees, almost 400,000 species of beetles, so many that the geneticist J.B.S. Haldane reportedly quipped that God must have an inordinate fondness for them. A bit of healthy soil a foot square and two inches deep might easily be home to 200 unique species of mites, each, presumably, with a subtly

different job to do. And yet entomologists estimate that all this amazing, absurd and understudied variety represents perhaps only 20 percent of the actual diversity of insects on our planet — that there are millions and millions of species that are entirely unknown to science.

With so much abundance, it very likely never occurred to most entomologists of the past that their multitudinous subjects might dwindle away. As they poured themselves into studies of the life cycles and taxonomies of the species that fascinated them, few thought to measure or record something as boring as their number. Besides, tracking quantity is slow, tedious and unglamorous work: setting and checking traps, waiting years or decades for your data to be meaningful, grappling with blunt baseline questions instead of more sophisticated ones. And who would pay for it? Most academic funding is short-term, but when what you're interested in is invisible, generational change, says Dave Goulson, an entomologist at the University of Sussex, "a three-year monitoring program is no good to anybody." This is especially true of insect populations, which are naturally variable, with wide, trend-obscuring fluctuations from one year to the next.

When entomologists began noticing and investigating insect declines, they lamented the absence of solid information from the past in which to ground their experiences of the present. "We see a hundred of something, and we think we're fine," Wagner says, "but what if there were 100,000 two generations ago?" Rob Dunn, an ecologist at North Carolina State University who helped design the net experiment in Denmark, recently searched for studies showing the effect of pesticide spraying on the quantity of insects living in nearby forests. He was surprised to find that no such studies existed. "We ignored really basic questions," he said. "It feels like we've dropped the ball in some giant collective way."



If entomologists lacked data, what they did have were some very worrying clues. Along with the impression that they were seeing fewer bugs in their own jars and nets while out doing experiments — a windshield phenomenon specific to the sorts of people who have bug jars and nets — there were documented downward slides of well-studied bugs, including various kinds of bees, moths, butterflies and beetles. In Britain, as many as 30 to 60 percent of species were found to have diminishing ranges. Larger trends were harder to pin down, though a 2014 review in *Science* tried to quantify these declines by synthesizing the findings of existing studies and found that a majority of monitored species were declining, on average by 45 percent.

Entomologists also knew that climate change and the overall degradation of global habitat are bad news for biodiversity in general, and that insects are dealing with the particular challenges posed by herbicides and pesticides, along with the effects of losing meadows, forests and even weedy patches to the relentless expansion of human spaces. There were studies of other, better-understood species that suggested that the insects associated with them might be declining, too. People who studied fish found that the fish had fewer mayflies to eat. Ornithologists kept finding that birds that rely on insects for food were in trouble: eight in 10 partridges gone from French farmlands; 50 and 80 percent drops, respectively, for nightingales and turtledoves. Half of all farmland birds in Europe disappeared in just three decades. At first, many scientists assumed the familiar culprit of habitat destruction was at work, but then they began to wonder if the birds might simply be starving. In Denmark, an ornithologist named Anders Tottrup was the one who came up with

the idea of turning cars into insect trackers for the windshield-effect study after he noticed that rollers, little owls, Eurasian hobbies and bee-eaters — all birds that subsist on large insects such as beetles and dragonflies — had abruptly disappeared from the landscape.

The signs were certainly alarming, but they were also just signs, not enough to justify grand pronouncements about the health of insects as a whole or about what might be driving a widespread, cross-species decline. “There are no quantitative data on insects, so this is just a hypothesis,” Hans de Kroon, an ecologist at Radboud University in the Netherlands, explained to me — not the sort of language that sends people to the barricades.

Then came the German study. Scientists are still cautious about what the findings might imply about other regions of the world. But the study brought forth exactly the kind of longitudinal data they had been seeking, and it wasn’t specific to just one type of insect. The numbers were stark, indicating a vast impoverishment of an entire insect universe, even in protected areas where insects ought to be under less stress. The speed and scale of the drop were shocking even to entomologists who were already anxious about bees or fireflies or the cleanliness of car windshields.

The results were surprising in another way too. The long-term details about insect abundance, the kind that no one really thought existed, hadn’t appeared in a particularly prestigious journal and didn’t come from university-affiliated scientists, but from a small society of insect enthusiasts based in the modest German city Krefeld.

Krefeld sits a half-hour drive outside Düsseldorf, near the western bank of the Rhine. It’s a city of brick houses and bright flower gardens and a *stadtwald* — a municipal forest and park — where paddle boats float on a lake, umbrellas shade a beer garden and (I couldn’t help noticing) the afternoon light through the trees illuminates small swarms of dancing insects.

Near the center of the old city, a paper sign, not much larger than a business card, identifies the stolid headquarters of the society whose research caused so much commotion. When it was founded, in 1905, the society operated out of another building, one that was destroyed when Britain bombed the city during World War II. (By the time the bombs fell, members had moved their precious records and collections of insects, some of which dated back to the 1860s, to an underground bunker.) Nowadays, the society uses more than 6,000 square feet of an old three-story school as storage space. Ask for a tour of the collections, and you will hear such sentences as “This whole room is Lepidoptera,” referring to a former classroom stuffed with what I at first took to be shelves of books but which are in fact innumerable wooden frames containing pinned butterflies and moths; and, in an even larger room, “every bumblebee here was collected before the Second World War, 1880 to 1930”; and, upon opening a drawer full of sweat bees, “It’s a new collection, 30 years only.”

On the shelves that do hold books, I counted 31 clearly well-loved volumes in the series “Beetles of Middle Europe.” A 395-page book that cataloged specimens of spider wasps — where they were collected; where they were stored — of the western Palearctic said “1948-2008” on the cover. I asked my guide, a society member named Martin Sorg, who was one of the lead authors of the paper, whether those dates reflected when the specimens were collected. “No,” Sorg replied, “that was the time the author needed for this work.”

Sorg, who rolls his own cigarettes and wears John Lennon glasses and whose gray hair grows long past his shoulders, is not a freewheeling type when it comes to his insect work. And his insect work is really all he wants to talk about. “We think details about nature and biodiversity declines are important, not details about life histories of entomologists,” Sorg explained after he and Werner Stenmans, a society member whose name appeared alongside Sorg’s on the 2017 paper, dismissed my questions about their day jobs. Leery of an article that focused on him as a person, Sorg also didn’t want to talk about what drew him to entomology as a child or even what it was about certain types of wasps that had made him want to devote so much of his life to studying them. “We normally give life histories when someone is dead,” he said.

There was a reason for the wariness. Society members dislike seeing themselves described, over and over in news stories, as “amateurs.” It’s a framing that reflects, they believe, a too-narrow understanding of what it means to be an expert or even a scientist — what it means to be a student of the natural world.

Amateurs have long provided much of the patchy knowledge we have about nature. Those bee and butterfly studies? Most depend on mass mobilizations of volunteers willing to walk transects and count insects, every two weeks or every year, year after year. The scary numbers about bird declines were gathered this way, too, though because birds can be hard to spot, volunteers often must learn to identify them by their sounds. Britain, which has a particularly strong tradition of amateur naturalism, has the best-studied bugs in the world. As technologically advanced as we are, the natural world is still a very big and complex place, and the best way to learn what's going on is for a lot of people to spend a lot of time observing it. The Latin root of the word "amateur" is, after all, the word "lover."

Some of these citizen-scientists are true beginners clutching field guides; others, driven by their own passion and following in a long tradition of "amateur" naturalism, are far from novices. Think of Victorians with their butterfly nets and curiosity cabinets; of Vladimir Nabokov, whose theories about the evolution of *Polyommatus* blue butterflies were ignored until proved correct by DNA testing more than 30 years after his death; of young Charles Darwin, cutting his classes at Cambridge to collect beetles at Wicken Fen and once putting a live beetle in his mouth because his hands were already full of other bugs.

The Krefeld society is volunteer-run, and many members have other jobs in unrelated fields, but they also have an enormous depth of knowledge about insects, accumulated through years of what other people might consider obsessive attention. Some study the ecology or evolutionary taxonomy of their favorite species or map their populations or breed them to study their life histories. All hone their identification skills across species by amassing their own collections of carefully pinned and labeled insects like those that fill the society's storage rooms. Sorg estimated that of the society's 63 members, a third are university-trained in subjects such as biology or earth science. Another third, he said, are "highly specialized and highly qualified but they never visited the university," while the remaining third are actual amateurs who are still in the process of becoming "real" entomologists: "Some of them may also have a degree from the university, but in our view, they are beginners."

The society members' projects often involved setting up what are called malaise traps, nets that look like tents and drive insects flying by into bottles of ethanol. Because of the scientific standards of the society, members followed certain procedures: They always employed identical traps, sewn from a template they first used in 1982. (Sorg showed me the original rolled-up craft paper with great solemnity.) They always put them in the same places. (Before GPS, that meant a painstaking process of triangulating with surveying equipment. "We are not sure about a few centimeters," Sorg granted.) They saved everything they caught, regardless of what the main purpose of the experiment was. (The society bought so much ethanol that it attracted the attention of a narcotics unit.)

Those bottles of insects were gathered into thousands of boxes, which are now crammed into what were once offices in the upper reaches of the school. When the society members, like entomologists elsewhere, began to notice that they were seeing fewer insects, they had something against which to measure their worries.

"We don't throw away anything, we store everything," Sorg explained. "That gives us today the possibility to go back in time."

In 2013, Krefeld entomologists confirmed that the total number of insects caught in one nature reserve was nearly 80 percent lower than the same spot in 1989. They had sampled other sites, analyzed old data sets and found similar declines: Where 30 years earlier, they often needed a liter bottle for a week of trapping, now a half-liter bottle usually sufficed. But it would have taken even highly trained entomologists years of painstaking work to identify all the insects in the bottles. So the society used a standardized method for weighing insects in alcohol, which told a powerful story simply by showing how much the overall mass of insects dropped over time. "A decline of this mixture," Sorg said, "is a very different thing than the decline of only a few species."

The society collaborated with de Kroon and other scientists at Radboud University in the Netherlands, who did a trend analysis of the data that Krefeld provided, controlling for things like the effects of nearby plants, weather and forest cover on fluctuations in insect populations. The final study looked at 63 nature preserves, representing almost 17,000

sampling days, and found consistent declines in every kind of habitat they sampled. This suggested, the authors wrote, “that it is not only the vulnerable species but the flying-insect community as a whole that has been decimated over the last few decades.”

For some scientists, the study created a moment of reckoning. “Scientists thought this data was too boring,” Dunn says. “But these people found it beautiful, and they loved it. They were the ones paying attention to Earth for all the rest of us.”

The current worldwide loss of biodiversity is popularly known as the sixth extinction: the sixth time in world history that a large number of species have disappeared in unusually rapid succession, caused this time not by asteroids or ice ages but by humans. When we think about losing biodiversity, we tend to think of the last northern white rhinos protected by armed guards, of polar bears on dwindling ice floes. Extinction is a visceral tragedy, universally understood: There is no coming back from it. The guilt of letting a unique species vanish is eternal.

But extinction is not the only tragedy through which we’re living. What about the species that still exist, but as a shadow of what they once were? In “The Once and Future World,” the journalist J.B. MacKinnon cites records from recent centuries that hint at what has only just been lost: “In the North Atlantic, a school of cod stalls a tall ship in midocean; off Sydney, Australia, a ship’s captain sails from noon until sunset through pods of sperm whales as far as the eye can see. ... Pacific pioneers complain to the authorities that splashing salmon threaten to swamp their canoes.” There were reports of lions in the south of France, walruses at the mouth of the Thames, flocks of birds that took three days to fly overhead, as many as 100 blue whales in the Southern Ocean for every one that’s there now. “These are not sights from some ancient age of fire and ice,” MacKinnon writes. “We are talking about things seen by human eyes, recalled in human memory.”

What we’re losing is not just the *diversity* part of biodiversity, but the *bio* part: life in sheer quantity. While I was writing this article, scientists learned that the world’s largest king penguin colony shrank by 88 percent in 35 years, that more than 97 percent of the bluefin tuna that once lived in the ocean are gone. The number of Sophie the Giraffe toys sold in France in a single year is nine times the number of all the giraffes that still live in Africa.

Finding reassurance in the survival of a few symbolic standard-bearers ignores the value of abundance, of a natural world that thrives on richness and complexity and interaction. Tigers still exist, for example, but that doesn’t change the fact that 93 percent of the land where they used to live is now tigerless. This matters for more than romantic reasons: Large animals, especially top predators like tigers, connect ecosystems to one another and move energy and resources among them simply by walking and eating and defecating and dying. (In the deep ocean, sunken whale carcasses form the basis of entire ecosystems in nutrient-poor places.) One result of their loss is what’s known as trophic cascade, the unraveling of an ecosystem’s fabric as prey populations boom and crash and the various levels of the food web no longer keep each other in check. These places are emptier, impoverished in a thousand subtle ways.

Scientists have begun to speak of functional extinction (as opposed to the more familiar kind, numerical extinction). Functionally extinct animals and plants are still present but no longer prevalent enough to affect how an ecosystem works. Some phrase this as the extinction not of a species but of all its former interactions with its environment — an extinction of seed dispersal and predation and pollination and all the other ecological functions an animal once had, which can be devastating even if some individuals still persist. The more interactions are lost, the more disordered the ecosystem becomes. A 2013 paper in *Nature*, which modeled both natural and computer-generated food webs, suggested that a loss of even 30 percent of a species’ abundance can be so destabilizing that other species start going fully, numerically extinct — in fact, 80 percent of the time it was a secondarily affected creature that was the first to disappear. A famous real-world example of this type of cascade concerns sea otters. When they were nearly wiped out in the northern Pacific, their prey, sea urchins, ballooned in number and decimated kelp forests, turning a rich environment into a barren one and also possibly contributing to numerical extinctions, notably of the Steller’s sea cow.

Conservationists tend to focus on rare and endangered species, but it is common ones, because of their abundance, that power the living systems of our planet. Most species are not common, but within many animal groups most individuals — some 80 percent of them — belong to common species. Like the slow approach of twilight, their declines can be hard to see. White-rumped vultures were nearly gone from India before there was widespread awareness of their

disappearance. Describing this phenomenon in the journal *BioScience*, Kevin Gaston, a professor of biodiversity and conservation at the University of Exeter, wrote: “Humans seem innately better able to detect the complete loss of an environmental feature than its progressive change.”

In addition to extinction (the complete loss of a species) and extirpation (a localized extinction), scientists now speak of defaunation: the loss of individuals, the loss of abundance, the loss of a place’s absolute animalness. In a 2014 article in *Science*, researchers argued that the word should become as familiar, and influential, as the concept of deforestation. In 2017 another paper reported that major population and range losses extended even to species considered to be at low risk for extinction. They predicted “negative cascading consequences on ecosystem functioning and services vital to sustaining civilization” and the authors offered another term for the widespread loss of the world’s wild fauna: “biological annihilation.”

It is estimated that, since 1970, Earth’s various populations of wild land animals have lost, on average, 60 percent of their members. Zeroing in on the category we most relate to, mammals, scientists believe that for every six wild creatures that once ate and burrowed and raised young, only one remains. What we have instead is ourselves. A study published this year in the *Proceedings of the National Academy of Sciences* found that if you look at the world’s mammals by weight, 96 percent of that biomass is humans and livestock; just 4 percent is wild animals.

We’ve begun to talk about living in the Anthropocene, a world shaped by humans. But E.O. Wilson, the naturalist and prophet of environmental degradation, has suggested another name: the Eremocene, the age of loneliness.

Wilson began his career as a taxonomic entomologist, studying ants. Insects — about as far as you can get from charismatic megafauna — are not what we’re usually imagining when we talk about biodiversity. Yet they are, in Wilson’s words, “the little things that run the natural world.” He means it literally. Insects are a case study in the invisible importance of the common.

Scientists have tried to calculate the benefits that insects provide simply by going about their business in large numbers. Trillions of bugs flitting from flower to flower pollinate some three-quarters of our food crops, a service worth as much as \$500 billion every year. (This doesn’t count the 80 percent of wild flowering plants, the foundation blocks of life everywhere, that rely on insects for pollination.) If monetary calculations like that sound strange, consider the Maoxian Valley in China, where shortages of insect pollinators have led farmers to hire human workers, at a cost of up to \$19 per worker per day, to replace bees. Each person covers five to 10 trees a day, pollinating apple blossoms by hand.

By eating and being eaten, insects turn plants into protein and power the growth of all the uncountable species — including freshwater fish and a majority of birds — that rely on them for food, not to mention all the creatures that eat those creatures. We worry about saving the grizzly bear, says the insect ecologist Scott Hoffman Black, but where is the grizzly without the bee that pollinates the berries it eats or the flies that sustain baby salmon? Where, for that matter, are we?

Bugs are vital to the decomposition that keeps nutrients cycling, soil healthy, plants growing and ecosystems running. This role is mostly invisible, until suddenly it’s not. After introducing cattle to Australia at the turn of the 19th century, settlers soon found themselves overwhelmed by the problem of their feces: For some reason, cow pies there were taking months or even years to decompose. Cows refused to eat near the stink, requiring more and more land for grazing, and so many flies bred in the piles that the country became famous for the funny hats that stockmen wore to keep them at bay. It wasn’t until 1951 that a visiting entomologist realized what was wrong: The local insects, evolved to eat the more fibrous waste of marsupials, couldn’t handle cow excrement. For the next 25 years, the importation, quarantine and release of dozens of species of dung beetles became a national priority. And that was just one unfilled niche. (In the United States, dung beetles save ranchers an estimated \$380 million a year.) We simply don’t know everything that insects do. Only about 2 percent of invertebrate species have been studied enough for us to estimate whether they are in danger of extinction, never mind what dangers that extinction might pose.

When asked to imagine what would happen if insects were to disappear completely, scientists find words like chaos, collapse, Armageddon. Wagner, the University of Connecticut entomologist, describes a flowerless world with silent forests, a world of dung and old leaves and rotting carcasses accumulating in cities and roadsides, a world of “collapse or

decay and erosion and loss that would spread through ecosystems” — spiraling from predators to plants. E.O. Wilson has written of an insect-free world, a place where most plants and land animals become extinct; where fungi explodes, for a while, thriving on death and rot; and where “the human species survives, able to fall back on wind-pollinated grains and marine fishing” despite mass starvation and resource wars. “Clinging to survival in a devastated world, and trapped in an ecological dark age,” he adds, “the survivors would offer prayers for the return of weeds and bugs.”

But the crux of the windshield phenomenon, the reason that the creeping suspicion of change is so *creepy*, is that insects wouldn’t have to disappear altogether for us to find ourselves missing them for reasons far beyond nostalgia. In October, an entomologist sent me an email with the subject line, “Holy [expletive]!” and an attachment: a study just out from Proceedings of the National Academy of Sciences that he labeled, “Krefeld comes to Puerto Rico.” The study included data from the 1970s and from the early 2010s, when a tropical ecologist named Brad Lister returned to the rain forest where he had studied lizards — and, crucially, their prey — 40 years earlier. Lister set out sticky traps and swept nets across foliage in the same places he had in the 1970s, but this time he and his co-author, Andres Garcia, caught much, much less: 10 to 60 times less arthropod biomass than before. (It’s easy to read that number as 60 percent less, but it’s sixtyfold less: Where once he caught 473 milligrams of bugs, Lister was now catching just eight milligrams.) “It was, you know, devastating,” Lister told me. But even scarier were the ways the losses were already moving through the ecosystem, with serious declines in the numbers of lizards, birds and frogs. The paper reported “a bottom-up trophic cascade and consequent collapse of the forest food web.” Lister’s inbox quickly filled with messages from other scientists, especially people who study soil invertebrates, telling him they were seeing similarly frightening declines. Even after his dire findings, Lister found the losses shocking: “I didn’t even know about the earthworm crisis!”

The strange thing, Lister said, is that, as staggering as they are, all the declines he documented would still be basically invisible to the average person walking through the Luquillo rain forest. On his last visit, the forest still felt “timeless” and “phantasmagorical,” with “cascading waterfalls and carpets of flowers.” You would have to be an expert to notice what was missing. But he expects the losses to push the forest toward a tipping point, after which “there is a sudden and dramatic loss of the rain-forest system,” and the changes will become obvious to anyone. The place he loves will become unrecognizable.

The insects in the forest that Lister studied haven’t been contending with pesticides or habitat loss, the two problems to which the Krefeld paper pointed. Instead, Lister chalks up their decline to climate change, which has already increased temperatures in Luquillo by two degrees Celsius since Lister first sampled there. Previous research suggested that tropical bugs will be unusually sensitive to temperature changes; in November, scientists who subjected laboratory beetles to a heat wave reported that the increased temperatures made them significantly less fertile. Other scientists wonder if it might be climate-induced drought or possibly invasive rats or simply “death by a thousand cuts” — a confluence of many kinds of changes to the places where insects once thrived.

Like other species, insects are responding to what Chris Thomas, an insect ecologist at the University of York, has called “the transformation of the world”: not just a changing climate but also the widespread conversion, via urbanization, agricultural intensification and so on, of natural spaces into human ones, with fewer and fewer resources “left over” for nonhuman creatures to live on. What resources remain are often contaminated. Hans de Kroon characterizes the life of many modern insects as trying to survive from one dwindling oasis to the next but with “a desert in between, and at worst it’s a poisonous desert.” Of particular concern are neonicotinoids, neurotoxins that were thought to affect only treated crops but turned out to accumulate in the landscape and to be consumed by all kinds of nontargeted bugs. People talk about the “loss” of bees to colony collapse disorder, and that appears to be the right word: Affected hives aren’t full of dead bees, but simply mysteriously empty. A leading theory is that exposure to neurotoxins leaves bees unable to find their way home. Even hives exposed to low levels of neonicotinoids have been shown to collect less pollen and produce fewer eggs and far fewer queens. Some recent studies found bees doing better in cities than in the supposed countryside.

The diversity of insects means that some will manage to make do in new environments, some will thrive (abundance cuts both ways: agricultural monocultures, places where only one kind of plant grows, allow some pests to reach population levels they would never achieve in nature) and some, searching for food and shelter in a world nothing like

the one they were meant for, will fail. While we need much more data to better understand the reasons or mechanisms behind the ups and downs, Thomas says, “the average across all species is still a decline.”

Since the Krefeld study came out, researchers have begun searching for other forgotten repositories of information that might offer windows into the past. Some of the Radboud researchers have analyzed long-term data, belonging to Dutch entomological societies, about beetles and moths in certain reserves; they found significant drops (72 percent, 54 percent) that mirrored the Krefeld ones. Roel van Klink, a researcher at the German Center for Integrative Biodiversity Research, told me that before Krefeld, he, like most entomologists, had never been interested in biomass. Now he is looking for historical data sets — many of which began as studies of agricultural pests, like a decades-long study of grasshoppers in Kansas — that could help create a more thorough picture of what’s happening to creatures that are at once abundant and imperiled. So far he has found forgotten data from 140 old data sets for 1,500 locations that could be resampled.

In the United States, one of the few long-term data sets about insect abundance comes from the work of Arthur Shapiro, an entomologist at the University of California, Davis. In 1972, he began walking transects in the Central Valley and the Sierras, counting butterflies. He planned to do a study on how short-term weather variations affected butterfly populations. But the longer he sampled, the more valuable his data became, offering a signal through the noise of seasonal ups and downs. “And so here I am in Year 46,” he said, nearly half a century of spending five days a week, from late spring to the end of autumn, observing butterflies. In that time he has watched overall numbers decline and seen some species that used to be everywhere — even species that “everyone regarded as a junk species” only a few decades ago — all but disappear. Shapiro believes that Krefeld-level declines are likely to be happening all over the globe. “But, of course, I don’t cover the entire globe,” he added. “I cover I-80.”

There are also new efforts to set up more of the kind of insect-monitoring schemes researchers wish had existed decades ago, so that our current level of fallenness, at least, is captured. One is a pilot project in Germany similar to the Danish car study. To analyze what is caught, the researchers turned to volunteer naturalists, hobbyists similar to the ones in Krefeld, with the necessary breadth of knowledge to know what they’re looking at. “These are not easy species to identify,” says Aletta Bonn, of the German Center for Integrative Biodiversity Research, who is overseeing the project. (The skills required for such work “are really extreme,” Dunn says. “These people train for decades with other amateurs to be able to identify beetles based on their genitalia.”) Bond would like to pay the volunteers for their expertise, she says, but funding hasn’t caught up to the crisis. That didn’t stop the “amateurs” from being willing to help: “They said, ‘We’re just curious what’s in there, we would like to have samples.’”

Goulson says that Europe’s tradition of amateur naturalism may account for why so many of the clues to the falloff in insect biodiversity originate there. (Tottrup’s design for the car net in Denmark, for example, was itself adapted from the invention of a dedicated beetle-collecting hobbyist.) As little as we know about the status of European bugs, we know significantly less about other parts of the world. “We wouldn’t know anything if it weren’t for them,” the so-called amateurs, Goulson told me. “We’d be entirely relying on the fact that there’s no bugs on the windshield.”

Thomas believes that this naturalist tradition is also why Europe is acting much faster than other places — for example, the United States — to address the decline of insects: Interest leads to tracking, which leads to awareness, which leads to concern, which leads to action. Since the Krefeld data emerged, there have been hearings about protecting insect biodiversity in the German Bundestag and the European Parliament. European Union member states voted to extend a ban on neonicotinoid pesticides and have begun to put money toward further studies of how abundance is changing, what is causing those changes and what can be done. When I knocked on the door of de Kroon’s office, at Radboud University in the Dutch city Nijmegen, he was looking at some photos from another meeting he had that day: Willem-Alexander, the king of the Netherlands, had taken a tour of the city’s efforts to make its riverside a friendlier habitat for bugs.

Stemming insect declines will require much more than this, however. The European Union already had some measures in place to help pollinators — including more strictly regulating pesticides than the United States does and paying farmers to create insect habitats by leaving fields fallow and allowing for wild edges alongside cultivation — but insect populations dropped anyway. New reports call for national governments to collaborate; for more creative approaches

such as integrating insect habitats into the design of roads, power lines, railroads and other infrastructure; and, as always, for more studies. The necessary changes, like the causes, may be profound. “It’s just another indication that we’re destroying the life-support system of the planet,” Lister says of the Puerto Rico study. “Nature’s resilient, but we’re pushing her to such extremes that eventually it will cause a collapse of the system.”

Scientists hope that insects will have a chance to embody that resilience. While tigers tend to give birth to three or four cubs at a time, a ghost moth in Australia was once recorded laying 29,100 eggs, and she still had 15,000 in her ovaries. The fecund abundance that is insects’ singular trait should enable them to recover, but only if they are given the space and the opportunity to do so.

“It’s a debate we need to have urgently,” Goulson says. “If we lose insects, life on earth will. ...” He trailed off, pausing for what felt like a long time.

In Denmark, Sune Boye Riis’s transect with his car net took him past a bit of woods, some suburban lawns, some hedges, a Christmas-tree farm. The closest thing to a meadow that we passed was a large military property, on which the grass had been allowed to grow tall and golden. Riis had received instructions not to drive too fast, so traffic backed up behind us, and some people began to honk. “Well,” Riis said, “so much for science.” After three miles, he turned around and drove back toward the start. His windshield stayed mockingly clean.

Riis had four friends who were also participating in the study. They had a bet going among them: Who would net the biggest bug? “I’m way behind,” Riis said. “A bumblebee is in the lead.” His biggest catch? “A fly. Not even a big one.”

At the end of the transect, Riis stopped at another parlous roadside spot, unfastened the net and removed the small bag at its tip. Some volunteers, captivated by what the study revealed about the world around them, asked the organizers for extra specimen bags, so they could do more sampling on their own. Some even asked if they could buy the entire car-net apparatus. Riis, though, was content to peer through the mesh, inside of which he could make out a number of black specks of varying tininess.

There was also a single butterfly, white-winged and delicate. Riis thought of the bet with his friends, for which the meaning of bigness had not been defined. He wondered how it might be reckoned. What gave a creature value?

“Is it weight?” he asked, staring down at the butterfly. In the big bag, it looked small and sad and alone. “Or is it grace?”

Correction: November 26, 2018

An earlier version of this article misidentified, on first reference, the location of Radboud University. It is in the Netherlands, not Denmark.

Correction: November 27, 2018

An earlier version of this article misspelled the name of an extinct species. It is Steller’s sea cow, not Stellar’s.

Brooke Jarvis is a contributing writer for the magazine. She last wrote about American children of undocumented parents.

Photo illustrations by Matt Dorfman

A version of this article appears in print on Dec. 1, 2018, on Page 41 of the Sunday Magazine with the headline: The Insect Apocalypse Is Here

COMMENT OF THE MOMENT



Linda

Oklahoma | Nov. 28

Times Pick

Think of all the things we'll miss. Frogs singing in the night. Kids seeing tadpoles in puddles. Butterflies in our gardens. Birdsong. The flash of red as a cardinal flies by. Bats flying out of caves at dusk.
What have we done to the world?

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MEMORANDUM

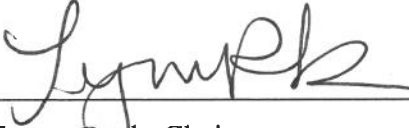
City of Seaside
Environmental Committee

Date: 11/13/18
To: Seaside Planning Commission
From: City of Seaside Environmental Committee
Subject: **Proposed Beekeeping Amendments**

Seaside's Environmental Committee would like to express our support of the text amendments proposed to the Seaside Municipal Code regarding beekeeping in the city. Currently, City Council approval is required for beekeeping in the city, which is an expensive and overly regulated process for an activity that is beneficial to the environment. The proposed amendments would make beekeeping permitted by-right, citywide. Bees can be maintained within populated areas in reasonable densities without causing a nuisance if the honey bees are properly managed. Due to their selective breeding for traits such as honey production, tendency not to swarm, and non-aggressive behavior, beekeeping is not likely to result in a nuisance. Bees and other pollinators have experienced population declines due to a combination of habitat loss, use of pesticides, and the spread of pests and diseases. Therefore, the Environmental Committee considers beekeeping to be an opportunity that will positively impact the City of Seaside by contributing to a healthier, more sustainable, and resilient environment.

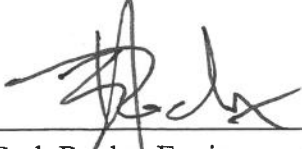
Supported at a regular meeting of the Environmental Committee of the City of Seaside, State of California, on the 13th day of November, 2018, by the following vote:

AYES: Raak, Revelas, Murphy, Molle, Abraham-Panni
NOES: None
ABSENT: Coble
ABSTAIN: Wizard

 12.3.18

Lacey Raak, Chairperson

ATTEST:

 12.3.18

Beth Rocha, Environmental Committee Staff Liaison/
Associate Planner