



# POTW Pesticides Annual Update

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# BAPPG/BACWA Pesticides Workgroup

*Monthly meetings to guide pesticides work*



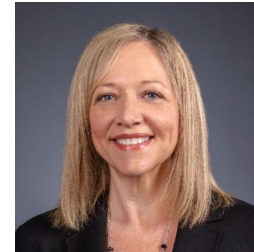
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# POTW Pesticides Conundrum

- 100s of Pesticides used and discharged
- Many pass through POTWs
- Some toxic as low as ng/L
- Toxicity in CA surface waters nearly always linked to current pesticides
- Potable reuse/RO Concentrate disposal challenge
- POTW treatment changes unrealistic
  - So many pesticides, such low concentrations!
- **State law prohibits local pesticide regulation**



# Municipal wastewater has many uses – including as an upcoming water supply

Sewer



Municipal wastewater treatment plant

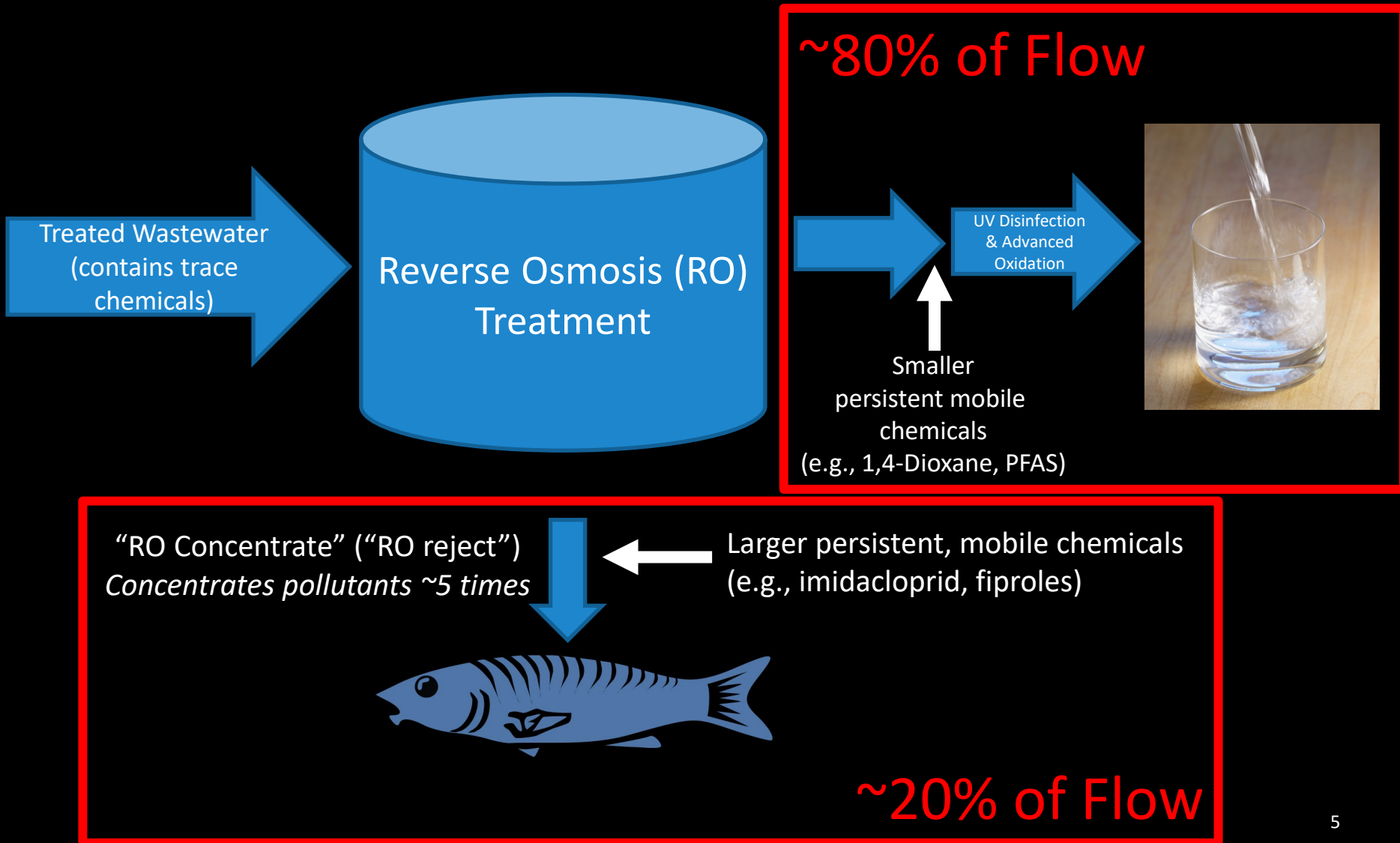


Effluent

Continuous discharges



# US EPA Pesticides Modeling, WaterReuse, ACS & SETAC presentations highlight challenges pesticides pose for potable reuse



# Pesticides in RO concentrate likely to exceed toxicity thresholds

Pesticide	RO Concentrate (ng/L)	Toxicity Threshold (ng/L)	Reduction Needed
Imidacloprid	53 – 1080	10	81.1 – 99%
Fipronil	12 – 280	7.5	37.5 – 97.3%
Fipronil Sulfone	15 – 49	2.6	82.7 – 94.7%
Fipronil Sulfide	<1 – 13.2	4.6	0 – 65%
Bifenthrin	<i>5 – 50 (est.)</i>	0.05	<i>99 – 99.9% (est.)</i>
Permethrin	<i>5 – 100 (est.)</i>	2.4	<i>52 – 97.6% (est.)</i>
Cypermethrin	<1 – 85 (est.)	0.05	75 – 99.7%

# Other pesticides that may exceed toxicity thresholds in RO concentrate

*Based on municipal wastewater effluent monitoring data*

- Carbaryl
- Chlorpyrifos
- Clothianidin
- Cyfluthrin
- Cypermethrin
- Deltamethrin
- Diazinon
- Diuron
- Esfenvalerate
- Imazapyr
- Lambda-cyhalothrin
- Propiconazole

*Most pesticides have not been monitored.  
Antimicrobials are the biggest data gap.*



# BAPPG/BACWA is being proactive on pesticides

## *Monitoring partnerships (RMP, DPR)*

- Data → science-based pesticide regulatory programs

## *Regulatory engagement (Pesticide workgroup)*

- Advocate POTWs be addressed
- Educate regulators about POTWs & CWA
- Formal = Letters to EPA/DPR
- Informal = Meetings & Science conferences

# Regulatory Program Context

- Track pesticide registration schedule
- Evaluation of new pesticides
- Rank and prioritize pesticides
- Communicate with DPR and EPA
- Partner with CASQA and NACWA

**BAPPG/BACWA Wastewater Pesticides Watch List**  
Currently registered pesticides that may occur in wastewater

Priority	Basis for Priority Assignment	Pesticides
1 – High Concern	a) POTW effluent monitoring data <sup>1</sup> exceeding benchmarks b) Known cause of process interference c) Present in recycled water or biosolids at concentrations that limit use d) SF Bay area receiving water 303(d) listing for the pesticide or degradate	Pyrethroids <sup>#</sup> (21 chemicals <sup>2</sup> ) Fipronil <sup>#</sup> Imidacloprid <sup>#</sup>
2 – Moderate Concern	a) Pesticide contains a Clean Water Act Priority Pollutant b) SF Bay area receiving water 303(d) listing for the pesticide, degradate or contaminant that also has non-pesticide sources	Copper pesticides <sup>+</sup> Silver pesticides <sup>+</sup> Zinc pesticides (including Ziram) <sup>+</sup>
3 – Possible Concern	Monitoring data <sup>1</sup> approaching or wastewater discharge modeling predicting: a) effluent or receiving water benchmark exceedances b) process interference c) limitations on use of recycled water or biosolids or used for pet flea control	ADBAC <sup>+</sup> Amitraz <sup>#</sup> 1,2-Benzisothiazolin-3-one (BIT) Bronopol (Bioban) Carbazim (MBC) Chlorhexidine Chlorinated isocyanurates <sup>+</sup> Clothianidin DDAC <sup>+</sup> Dichlobenil <sup>+</sup> Dinotefuran <sup>#</sup> Indoxacarb <sup>#</sup> IPBC Malathion (lice) Metam sodium <sup>+</sup> Methoprene <sup>#</sup> Nanopesticides (all) o-Benzyl-p-chlorophenol Othilnone o-Phenyl phenol Polyhexamethylenebiguanidine (PHMB) <sup>+</sup> Pyriproxyfen <sup>#</sup>

**Pesticides Regulatory Action Items – April 2021**

UP3 Priority	Pesticide or Topic	Use of Interest	Item	Due Date	Wastewater (🏠) / Stormwater (☁️)	Water Quality Issue
1	Fipronil	Structural insects (outdoors); pet fleas	DPR: Draft Risk Characterization Document (Human Health/Worker Safety)	April 20	🏠☁️	Monitoring data; Anticipated 303(d) listings
2	Creosote	Utility poles/railroad ties	EPA: PID	May 4	☁️	303(d) listings (PAHs); Contains CWA Priority Pollutants (PAHs)
2	Pentachlorophenol	Utility poles/railroad ties	EPA: PID	May 4	☁️	303(d) listings (Pentachlorophenol, Dioxins); Contains CWA Priority Pollutants (Pentachlorophenol, Dioxins);
2	Zinc pyrithione	Antimicrobial used in paints, laundered products	EPA: RA	May 7	☁️	Toxicity; 303(d) listings (zinc); TMDLs (zinc); Contains CWA Priority Pollutant (Zinc)
3	Diuron	Antimicrobial (paint/coating additive), herbicide	EPA: RA	May 7	☁️	303(d) listings; DPR interest list; DPR monitoring priority
4	Busan 77	Pool & hot tubs	EPA: PID	May 17	🏠☁️	Pool chemical
4	Novaluron	Indoors (off-pet flea control); Mosquitoes; Structural insects (outdoors); Pools	EPA: PID	May 17	🏠☁️	Toxicity; Pyrethroids alternative; Pool water discharges

Key: RA = Risk Assessment; PID = Proposed Interim Decision; BE (ESA) = Biological Evaluation (Endangered Species Act)

# Pathway to success requires knowledge and persistence: a recent example



# BACWA's suggested label language and pictogram will be on thousands of products across the country

**Stewardship statement that includes a Spanish translation (Stewardship statement not required for products applied to pets)**

Note to registrants: If adding stewardship statements on end-use consumer products, the following language is required and placed in a prominent location:

For products without drain treatment uses:

“Do not allow to enter indoor or outdoor drains”

*“No permita la entrada a desagües internos o externos.”*

For products with drain treatment uses:

“Do not allow to enter indoor or outdoor drains unless labeled for drain treatments.”

*“No permita la entrada a desagües internos o externos a menos que el etiquetado indique que está permitido el uso del producto para tratamiento de desagües.”*

For products with and without drain treatment uses:

“Follow proper disposal procedures on this label”

*“Siga las indicaciones del etiquetado para el desecho apropiado del producto.”*

Graphic on the product package showing an image of a diagonal strikethrough over a drain. The pictogram must be legible (i.e. no smaller than 1.5 square centimeters or 0.25 square inches unless this size is greater than 10% of the size of the label).

**Use the following pictogram on product labels:**



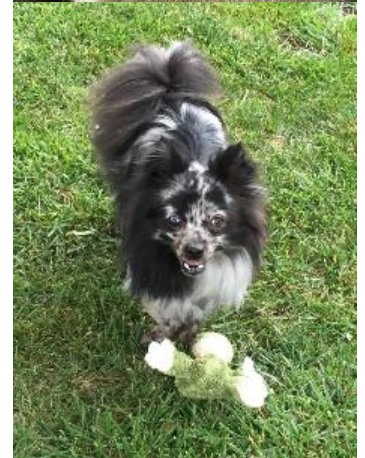
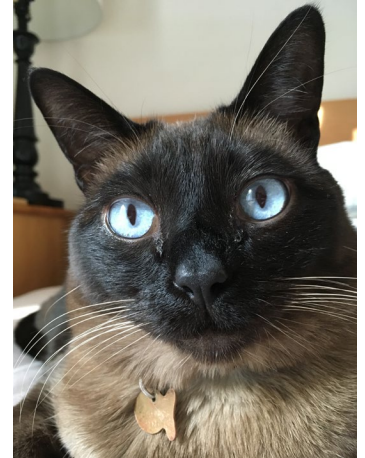
# Key 2020-2021 Regulatory Outcomes

- Reviewed >100 EPA science assessments; wrote > 20 comment letters to EPA
  - Pet flea control/Misc. indoor
    - Outcome: Small wins, but discouraging (pyrethroids, imidacloprid, fipronil, others)
  - Swimming pools/hot tubs/fountains (discharge language)
    - Outcome: Excellent; must contact local agency and follow discharge instructions
- Ongoing engagement with DPR and EPA
- Science: Journals/Conferences (limited)
  - DPR/Manufacturer/AVMA - Potable Reuse



# BACWA Concerns- Specific to Flea and Tick Control

- Pesticides from common flea and tick control products are reaching the sewer systems.
- Pesticide concentrations subsequently discharged into San Francisco Bay can exceed toxicity thresholds for aquatic invertebrates.
- Flea/tick control pesticides appear to be the biggest barrier to disposal of the byproduct of advanced wastewater treatment to create potable water supply



# How Pet Treatments Travel to Sewer Systems and San Francisco Bay



**INDOOR PET FLEA  
CONTROL PRODUCT**



**WASHING OF PETS, HANDS,  
PET BEDDING, FLOORS,  
CARPETS, AND CLOTHING**



**TRANSPORT TO SANITARY  
SEWER SYSTEM**

**DISCHARGE TO WATER BODY,  
RECYCLED WATER, AND/OR BIOSOLIDS**



Pesticides of concern are those that exhibit aquatic toxicity and persist in the environment

Bifenthrin

Deltamethrin

Fipronil \*

Imidacloprid \*

Indoxacarb

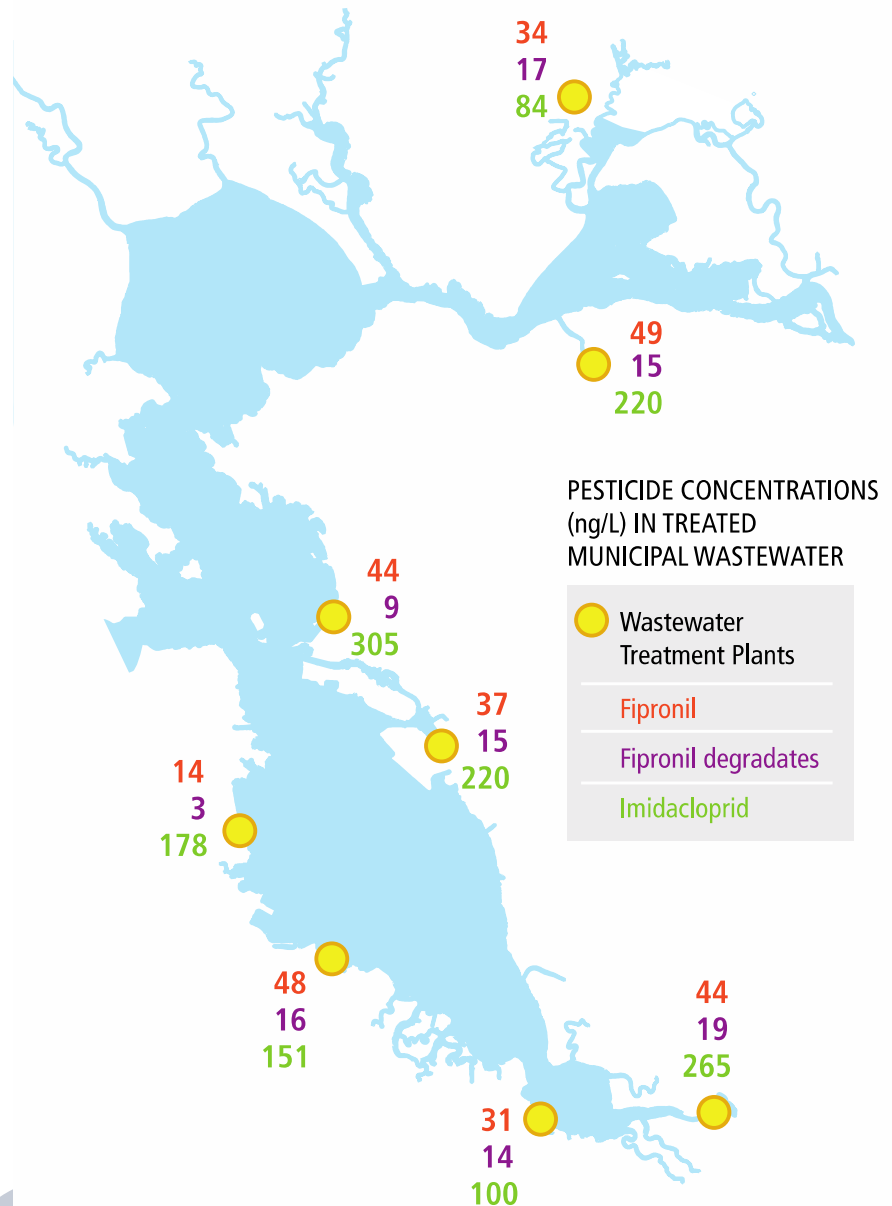
Permethrin



\* Uses of fipronil and imidacloprid are currently under review by the California Department of Pesticide Regulation due to possible health risks posed to adults and children.

# Focus on Fipronil

- Common “spot on” topical treatments
- Fipronil and degradates found in wastewater effluent sometimes at concentrations exceeding toxicity thresholds for sensitive aquatic organisms.



# Fipronil is being evaluated by California's Department of Pesticide Regulation



- DPR recently completed its Draft Fipronil (human) Risk Characterization Report
- Findings showed various adverse health effects
- Significant risks found for people who contact treated areas/pets after application of fipronil pet product
- Detailed analysis even considered risk of exposure from bathing pets who were treated with fipronil pet products
- Considering **significant** mitigation measures to reduce consumer and child exposure

**BACWA's Key Goal:** to make sure that actions by the State avoid regrettable substitutions. For example, if one pesticide is banned by the State, another potentially more dangerous pesticide could replace it. It is best if categories of pesticides (i.e., pet flea treatments) are evaluated as a group instead of one-by-one.

# BACWA's Flea/Tick Control Outreach Messages

**Most Important:** mechanical controls (vacuuming, bed washing)

**Avoid:** topical collars and spot products

**Avoid:** fipronil, indoxacarb, imidacloprid, bifenthrin, deltamethrin, and permethrin

**Consider:** talking to your vet about oral medication





**GIVE YOUR PUP FLEA  
AND TICK CHEWABLES!**

**[CLICK HERE](#) TO FIND OUT WHY**

## BACWA Outreach Efforts

- Communication with CVMA
- Outreach to local VMAs
  - Provide newsletter articles
  - Speak at monthly meetings
- Social media campaigns
- Educational web pages

Web pages  
for vets:

## VETERINARY RESOURCES

### Help Pet Owners Avoid Exposure to Toxic Chemicals in Topical Flea & Tick Control Products

#### *Indoor Pet Flea and Tick Treatments Leading to Environmental and Public Health Concerns*

To avoid exposing pets, their owners and Bay Area waterways to toxic pesticides, members of the Bay Area Clean Water Agencies (BACWA) are encouraging professionals to recommend their clients to use oral medications to control fleas and ticks, and to discourage the use of topical treatments.

There is increasing evidence that pesticides from external flea and tick control products including spot-on treatments, collars, indoor foggers and sprays are finding their way into our local waterways, sometimes at concentrations above toxicity thresholds for aquatic species. The California Department of Pesticide Regulation (DPR) is also currently reviewing uses of fipronil and imidacloprid, the active ingredients in most spot-on topical treatments, due to possible human health risks.



**INDOOR PET FLEA  
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AVMA Committee reached out to BACWA because of the Baywise.org vet page!

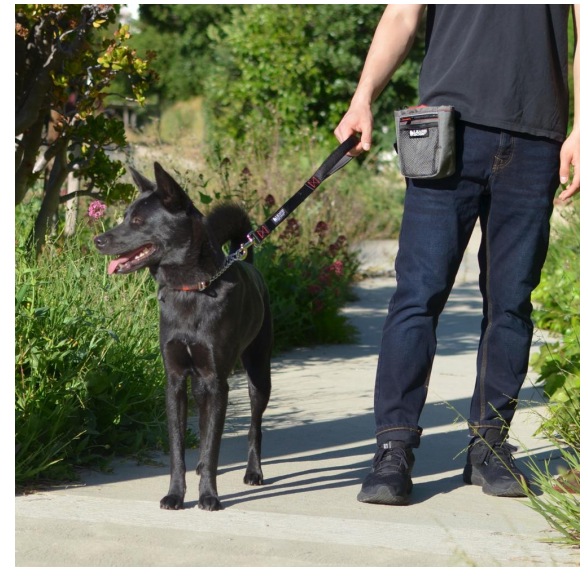
## AVMA Committee on Environmental Issues

- Camille Fischer, DVM, local veterinarian
- Warren J. Hess, DVM, Assistant Director, AVMA Division of Animal and Public Health
- Judith Marteniuk, DVM, Professor Emeritus, Michigan State University
- Mike Murphy, DVM, Director of the AVMA Division of Animal and Public Health
- Tina Wismer, DVM, Senior Director, ASPCA Animal Poison Control Center

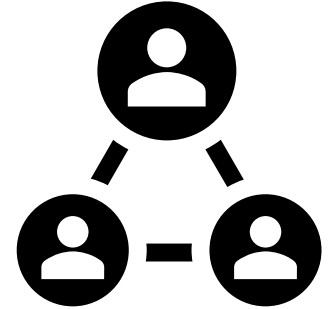


While we share our water quality concerns with AVMA, the dialogue has also enhanced our understanding of pet parasite control

- Pet parasite issues are highly complex.
- Some of our pesticides of concern may need to be a tool in the veterinarian's toolkit (perhaps by prescription only)
- Ticks deserve thoughtful analysis and have different physical control messages



Unique opportunity to make connections...



- BACWA-Pesticides Workgroup jumped at the opportunity to foster relationship with AVMA on pet flea/tick product issues, focused on POTW issues
- Goal to expand that relationship
  - To connect AVMA with NACWA
  - To connect DPR with AVMA to discuss pet flea/tick product issues from the public health perspective

# Key 2020-2021 Outreach outcomes

- Presentations at local vet association meetings
- Presentations at Vet Tech Community College classes
- Communications with the Environmental Issues Committee of national vet association (AVMA)
- Interviews published in national and international vet articles (VIN, JAVMA)
- Vet specific updates to baywise.org



## Researchers suspect spot-on flea products pollute water

UK and US studies might lead veterinarians to rethink recommendations

January 27, 2021 (published)

By Ross Kelly

Some scientists are urging veterinarians to weigh the potential environmental risks of spot-on flea products' active ingredients are contaminating waterways.



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Media Links:

# FY 2021/2022 Recommended BACWA Priorities

## 1. DPR – Pet flea control mitigation

- DPR Fipronil human risk characterization
  - Mitigation action likely in 2022/2023
- Share information with DPR management
  - Not just fipronil – POTW needs – potable reuse challenges
- Assemble non-scientific information for DPR
  - POTW costs & Water quality regulatory information

## 2. Veterinarians

- Continue to build relationships
- Enhance outreach messaging per AVMA recommendations
- Explore NACWA partnership with AVMA

## 3. US EPA reviews

- Uncertainty due to administration change (schedule/approach)
- BACWA Priority - Fipronil mitigation
- Continue swimming pools + root control effort
- New info - EPA antimicrobials (“CECs”) reviews (the flood continues!)

## 4. Pesticides/CECs monitoring synergies



# 2021/2022 Challenges

- EPA changes – many unknowns
- DPR competing priorities
  - Budget/fees revision
  - Non-water initiatives
  - Our new “asks” of them (cumulative/alternatives)
- CASQA/Partner funding situation



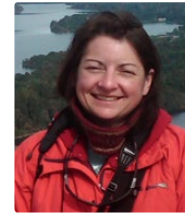


# 2021/2022 OPPORTUNITIES

- Contractor team transition
  - Kelly Moran => SFEI



- Recently selected team:  
Stephanie Hughes and  
Tammy Qualls



- Potential NACWA/AVMA  
partnership

# Future is Promising

- It's a marathon – not a sprint
- Change will only occur with active POTW engagement
- POTW monitoring partnerships are crucial



A wide-angle photograph of the Golden Gate Bridge in San Francisco, California. The bridge's two iconic red towers are prominent against a clear blue sky. The bridge deck stretches across the frame, supported by numerous suspension cables. Below the bridge, the dark blue waters of the San Francisco Bay are visible, with several small white sailboats scattered across the surface. In the foreground, the dark green, needle-covered branches of a tree are visible on the right side, partially obscuring the view. The overall scene is bright and clear, suggesting a sunny day.

# Questions?

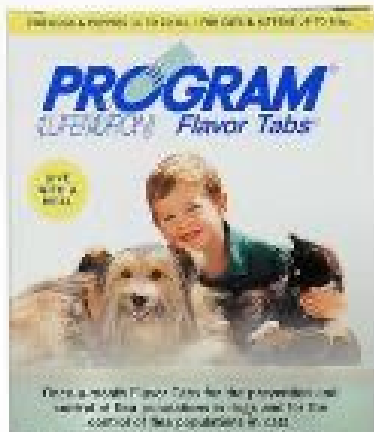
Extra slides

# Antimicrobials – what are they?

## EPA definition

*An antimicrobial pesticide is intended to **disinfect, sanitize, reduce, or mitigate growth or development** of microbiological organisms or protect inanimate objects, industrial processes or systems, surfaces, water, or other chemical substances from contamination, fouling, or deterioration caused by bacteria, viruses, fungi, protozoa, algae, or slime.*





# On-Pet Controls: Oral Medications

- Systemic
  - Requires adult flea to bite the animal
- Active ingredient in most are adulticides
  - The active ingredient in Program is an insect growth regulator
- Typically monthly or quarterly doses
- Although rare, adverse reactions can include vomiting, lethargy
- Prescription rather than OTC (therefore regulated by FDA, not EPA)



# What about effectiveness of systemics versus topicals?

- Might systemics be more effective?
  - More accurate application method
  - More direct approach (flea bites animal rather than happens upon the topical application)
  - The active ingredient is within the pet's bloodstream rather than being licked off or diluted around the home

*"In this study systemically acting insecticides such as nitenpyram, and the topically applied but systemically active insecticide selamectin, were **more effective** in interfering with flea blood feeding **than were imidacloprid and fipronil.**"*

"Flea blood feeding patterns in cats treated with oral nitenpyram and the topical insecticides imidacloprid, fipronil and selamectin,"  
McCoy, c., et al., Veterinary Parasitology, Vol. 156, pp 293-301, 2008.

Of course, the flea pyramid suggests that relying on on-pet treatments may not be most effective



"Flea Control Failure? Myths and Realities," Halos, L., et al.,  
Trends in Parasitology, May 2014.

# AVMA outreach materials highlight this issue

*“Because much of the flea’s life cycle is spent off of your pet, **treating only your pet will not eliminate the problem.** If you kill the adult fleas and do not kill the eggs, larvae and pupae, your pet will become reinfested when these fleas become adults and the cycle will start all over again. Therefore, in addition to treating your pet, **reduce the flea population in your house by thoroughly cleaning your pet’s sleeping quarters and vacuuming floors and furniture that your pet comes in contact with frequently. Careful and regular vacuuming/ cleaning of the pet’s living area helps to remove and kill flea eggs, larvae, and pupae.**”*

American Veterinary Medical Association, "External Parasites" brochure from AVMA web site, January 2016.

## EXTERNAL PARASITES

Brought to you by your veterinarian  
and the American Veterinary Medical Association

