APPENDIX A: LIST OF APPROVED PESTICIDES FOR USE IN SARASOTA COUNTY GOVERNMENT

APPENDIX A:
LIST OF APPROVED PESTICIDES FOR USE BY SARASOTA COUNTY GOVERNMENT AND CONTRACTORS

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County personnel and contractors involved in the application of pesticides must only use products on the approved list in the approved target area. Use of products other than those on this list is prohibited on any county-owned property or facilities. Products for inclusion in the IPM program must be submitted to and approved by the IPM Coordinator in consultation with the IPM Advisory Board. Chemicals in red text are "restricted use pesticides" (RUPs).

Note on biological controls and "bio-rational" pesticides.

The release of any biological control organisms approved by the US Federal government (e.g. APHIS)/State of Florida is permitted under the county IPM plan. Please notify the IPM coordinator before release.

"Bio-rational" pesticides are favored over traditional chemical control and permitted under the IPM plan. County employees are encouraged to seek these out first and notify the IPM coordinator who will then determine if they qualify as "bio-rational". County employees are also encouraged to document usage and efficacy of these substances.

INSECT REPELLENTS
- DEET 29%ł - insect repellent*
- Oil of lemon eucalyptus 30%
- Picaridin 15%

INSECTICIDES (Mosquito Management)
Adult mosquito- chemical control
- Deltamethrin 2% (DeltaGuard)
- Etofenprox 20% (Zenivex or equivalent) Aerial and Ground ULV
- Lemon grass oils 3% (Aerosol sprays or equivalent)--indoor sprays County Buildings only after hours
- ♦ Naled 87.4% (Dibrom®Concentrate) - aerial applications
- Permethrin 4%, Piperonyl Butoxide 4% (Biomist® ULV 4+4 or equivalent) - ground applications
- Sumithrin 10% (Anvil® 10 + 10 ULV or equivalent) - aerial applications
- Sumithrin® 5%, Prallethrin 1 % (Duet FM Dual-action) - ground applications

Larval Mosquito- biological control
- *Gambusia holbrooki* (mosquito fish) - for use in isolated non-environmentally sensitive areas with permanent water including abandoned pools

Biocides: reduced risk natural biocides such as *Bacillus species* and derivatives the soil bacterium *Saccharopolyspora spinosa*

- *Bacillus thuringiensis israelensis* 1.2% (VectoBac® 12 AS or equivalent)
- *Bacillus thuringiensis israelensis* 2.80% (VectoBac® G or equivalent)
- *Bacillus thuringiensis israelensis* 2.86% (Mosquito Bits® or equivalent)
- *Bacillus sphaericus* 6%, B. *thuringiensis* 1 % (Four Star™ Briquettes or equivalent)
- *Bacillus sphaericus* 7.5% (Vectolex® CG or equivalent) • *Bacillus sphaericus* 51.2% (Vectolex® WDG or equivalent)
- *Bacillus thuringiensis israelensis* 37.4% (VectoBac WDG)
- Spinosad 0.5% (Natular™ G or equivalent)
- Spinosad 6.25% (Natular™ XRT or equivalent)

Larval mosquitoes- chemical control
Insect Growth Regulators (IGRs): are in the bio-pesticide class, the use of juvenile hormone analogs interfere with the mosquito life cycle and prevents emergence of the adult mosquito with minimal non-target effects

- (S)-Methoprene 1.5% (Altosid® XRG Pre-Strike pouches or Altosid® PRO-G
- (S)-Methoprene 2.1 % (Altosid® XR Extended Residual Briquettes)
- (S)-Methoprene 4.25% (Altosid® Pellets)

Larvicide/Pupacide

- Agnique® MMF† 100%
- Aliphatic Petroleum Distillate 98.7% (Golden Bear 1111 or equivalent)
- Agnique ® MMF G 32% (granular pupacide)

†Monomolecular Surface Film for Control of Immature Mosquitoes and Midges
ǂ 29% or less recommended. Increased active ingredient does not increase repellency
*Brand and/or concentration not specified. Choose most appropriate least toxic option

INSECTICIDES (Building Structures, Interior/Exterior) Ants, Cockroaches

- 2- Phenethyl Propionate 4.50%, Eugenol 1.75% (EcoEXEMPT® D) - dust for cracks and crevices
- Boric acid dusts*
- Diatomaceous Earth*
- Eugenol 2.90%, Thyme oil 0.6% (EcoEXEMPT® G) - granules for ants, cockroaches, crawling insects
- Silica gel*
- Thiamethoxam 0.010% (Optigard™) - ant gel bait
- Abamectin, Borax, Orthoboric Acid, Hydramethylnon, Hydropene, Indoxacarb, Methoprene, Pyriproxyfen, Spinosad, Sufluramid - (Solid, liquid, granular and gel baits*)

Crawling Insects/Foliar Pests/Flying Insects

- 2-Phenethyl Proprionate 0.1 % (EcoPCO® ACU) - crawling and flying Insects
- 2-Phenethyl Propionate 1.0%, 0.4% Pyrethrins - (EcoPCO® AR X) - crawling and flying insects
- 2-Phenethyl Propionate 1.0%, Piperonyl Butoxide 3.0% (EcoPCO® Jet X) - aerosol jet spray wasp nests

• Potassium Salts of Fatty Acids 49% (M-Pede®) - insecticidal soaps
• Rosemary Oil1 0%, Peppermint oil 2% (EcoExempt® IC2) -liquid spray, crawling insects
• Zylam (Dinofeturan 10% or equivalent) injection for control of Rugose Spiraling Whitefly (*Aleurodicus rugioperculatus*) on Gumbo Limbo trees maintained by Sarasota County.

Wood Destroying Organisms (WDOs): Bait stations and under-slab treatments only address one form of WDOs thus; only offer limited pest management. For that reason borate pretreatments are preferred, *see more in IPM Procedures, Section 10.*
• Termites (Subterranean) monitoring/baiting systems
• Termite baits Stations* (Sentricon® or the equivalent)
• Borate Compounds* (liquid spray, mist, and foam injection) - primary control option
• 0.25% Diflubenzuron (Labyrinth ™ or equivalent) Termites (Dry wood)
♦ Fipronil 9.1 % (Termidor® SC or equivalent) - gallery injection only as a last resort for historical buildings (pre 1940 construction) and with facilities management approval.
• Premise®* or equivalent (Imidacloprid) - gallery injection only
♦ Vikane (Sulfuryl Fluoride 99.8%) for fumigation by contractor to eliminate termites in County buildings deemed to be of historic significance.
Note: Trenching & barrier treatments are not allowed without a special exception for IPM
Coordinator

INSECTICIDES (Landscapes)
Beetles, Caterpillars
• *Bacillus thuringiensis subspp. B.t. aizawai, B.t.kurstaki, B.t.tenebrionis* - liquid sprays*

Foliar Pests (Aphids, Scales, Mealybugs)
• Refined Oils* (Horticultural Oils)
• Salts of Fatty Acids* (Insecticidal Soaps)
• Spinosad 11.6% (Conserve® SC) - liquid spray for crawling insects

Ants
• Abamectin, Borax, Orthoboric Acid, Hydramethylnon, Hydropene, Indoxacarb, Methoprene, Pyriproxyfen, Spinosad - solid, liquid, granular and gel baits*
Caribbean Crazy Ants (CCAs): an emerging issue at several parks with potential to predate on native wildlife and damage utilities. Past efforts and reports statewide indicate this species is difficult to control. Current CCA management strategy is as follows:
• Pressure washing of designated areas
• Sanitation (esp. pad/dumpster- scheduled routine)
• Baiting with boric acid (monitored/cleaned/re-charged)
• Use of "knock down" product(s) as last resort (need approval of product(s))

INSECTICIDES (Athletic Fields)

Fall armyworms, sod webworms
• Indoxacarb 30% (Provaunt® or equivalent) – granular insecticide
• Spinosad 11.6% (Conserve® SC) - liquid spray for crawling insects

Fire ants
• Hydramethylnon 0.73% (Amdro® or equivalent) - fire ant bait
• Indoxacarb 0.045% (Advion® or equivalent) - fire ant bait
• (S)-Methoprene 0.5% (Extinguish® or equivalent) - fire ant bait
• (S)- Methoprene 0.250% + Hydramethylnon 0.365% (Extinguish Plus® or equivalent)

Nematodes

Mole crickets-Biological control
• Larra wasps, *Larra analis,* ectoparasitoid of adult mole crickets and last stage nymphs
• Nematodes, *Steinernema scapterisci* 27% (Nematac® S or equivalent), parasitic nematode of adult mole crickets and last stage nymphs

Mole Crickets- chemical control
• Bifenthrin 7.9% (Talstarone™ Multi-Insecticide or equivalent)
♦ Fipronil 0.0142% - 0.1% (Chipco Choice or Top Choice) –when control has failed with IPM approved Imidacloprid products and Indoxacarb application protocols and it is necessary to stop infestation and avoid replacement of turf. Subsequent or back-to-back treatments with Fipronil are prohibited. Fipronil may also be used to stop mole cricket infestation on fields used as test plots for biological or cultural control test sites.
• Indoxacarb 0.22% (Advion® or equivalent) - granular bait
• Indoxacarb 30% (Provaunt® or equivalent) – granular insecticide
• Imidacloprid 75% (Merit® 75W or equivalent) - primary liquid systemic spray for newly hatched mole cricket nymphs

VERTEBRATE CONTROL Cultural methods (i.e. preventative and exclusion methods) are preferred. See *more in IPM Procedures, Section 4.*
Mole Control
• Bromethalin 0.025% (Talpirid or equivalent) - bait

Rodent control
• Brodifacoum 0.005% - (Talon®, Havoc® or equivalent) - bait
• Anticoagulant rat control baits* in secure boxes - (Brodifacoum, Bromadiolone, Difethialone)

FUNGICIDES/ALGAECIDES/EQUIPMENT DISINFECTANTS (terrestrial)
• Methoxy-acetyl-amino-proprionic acid 22% (Subdue® Maxx or equivalent)
• Peroxyacetic acid/ acetic acid/ hydrogen peroxide (Zerotol 5.0 or equivalent)
• n-Alkyl (60%C14, 30%C16, 5%C12, 5%C18) dimethyl benzyl ammonium chloride/ n-Alkyl (68%C12, 32%C14) dimethyl ethylbenzyl ammonium chloride 10% (R-D-20® or equivalent)

HERBICIDES (Landscapes in Parks, Medians, Street Trees)
• 2- Phenethyl Propionate 21.4%, Eugenol 21.4% (EcoEXEMPT® HC) - nonselective burndown

• Fluazifop-butyl 24.5% (Fusilade® II or equivalent) - grass control in broad leaf beds
• Glyphosate 53.8% (Rodeo® or equivalent) - nonselective control

HERBICIDES (Ditches, Rights-of-way, Roadsides)
Annual and Perennial weeds
• Glyphosate 53.8% (Rodeo® or equivalent) - roadside curbs and sidewalks
• Sulfometuron methyl 75% (Oust® XP or equivalent) - weeds in bullheads and medians

HERBICIDES (Athletic Fields, Non-Desirable Species in Athletic Turf Grass)
Nonselective weed control
• 2- Phenethyl Propionate 21.4%, Eugenol 21.4% (EcoEXEMPT® HC) - nonselective burn down/weed control in turf
• Glyphosate 53.8% (Rodeo® or equivalent) - nonselective control
• Foramsulfuron 2.34% (Revolver™ or equivalent) - spot treatment
• Imazaquin 70% (Image® 70 OG or equivalent)
• Metasulfuron 60% (Manor® or equivalent - spot treatment)
• Metribuzin 75% (Sencor® 75 or equivalent)
• Prodiamine 40.7% (Barricade® 4FL or equivalent) - pre-emergent

Broadleaf weed control
• Carfentrazone-ethyl 0.54%, 2, 4-D 10.49%, Mecoprop 2.66%, Dicamba 0.67% (Speed
Zone® Southern or equivalent)
• Carfentrazone-ethyl 0.62%, 2, 4-D 28%, Mecoprop 5.88%, Dicamba 1.71 % (Speed Zone® or equivalent)

Yellow and purple nutsedge
• Halosulfuron 75% (SedgeHammer™ or equivalent)

Grassy weeds- e.g. crab grass, torpedo grass
• Dimethylamine (DMA) Salt of Quinclorac 18.92% (Drive XLR8® or equivalent)

Athletics weed pre-emergents
Dithiopyr 24% (Dimension® or equivalent)
Indaziflam 7.4% (Specticle® or equivalent)
Oxadiazon 34.1% (Ronstar® Flo or equivalent)

Athletics turf growth regulator
Trinexepac- ethyl 11.3% (Primo Maxx®, T-NEX® or equivalent)

HERBICIDES (Canals, Storm water Ponds, and Aquatic Natural Areas)

Algae
• Copper 8.0% (K-Tea™ or equivalent) - algae control

Aquatic Weeds: Submerged
• Dipotassium Salt of Endothall 40.3% (Aquathol® K or equivalent), short-term pretreatment before planting
• Flouridone 5.0% (Sonar™ PR, Sonar™ Q, Sonar™ SPR or equivalent) - long-term hydrilla and other submerged weed species control
• Flouridone 41.7% (Sonar™ AS or equivalent) - long-term hydrilla control

Aquatic Weeds: Emerged †
• 2, 4-D 46.8% (Weedar® 64 or equivalent) - woody vegetation and water hyacinth control
• 2, 4-D 47.3% (Platoon™ or equivalent) - woody vegetation and water hyacinth control
• Diquat Dibromide 37.3% (Reward® or equivalent) - contact, aquatic weed control
Broadleaf Aquatic Vegetation†††
• Glyphosate 53.8% (Rodeo® or equivalent) - nonselective, emergent aquatic weed control
• Imazapyr 28.7% (Habitat® or equivalent) - nonselective, emergent aquatic weed control for problematic species in monocultures††

† Whenever possible the use of Glyphosate is preferred
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HERBICIDES (Natural Areas, Upland Parks)

Melaleuca, Brazilian Pepper, and other woody invasive species
• Glyphosate 53.8% (Rodeo® or equivalent) - nonselective control in upland areas or associated with wetlands or aquatic areas
• Imazapyr 28.7% (Habitat® or equivalent) - melaleuca or other exotics associated with wetlands or aquatic areas
• Imazapyr 28.7% (Arsenal® or equivalent) - cut stump treatment of melaleuca and other exotics
• Triclopyr 60.45% (Garlon® 4 Ultra[1] or equivalent) - cut stump and basal bark control of

[1]"Garlon 4® Ultra" replaces "Garlon 4®" which may be used while available

Brazilian peppers and other exotics
• Triclopyr 13.6% (Pathfinder® II or equivalent), ready to use cut-stump/basal bark for Brazilian Peppers and other exotics
- Triclopyr 44.4%: 2-((3,5,6-trichloro-2-pyridinyl) oxy) acetic acid, triethylamine salt (Garlon 3A or equivalent)
- Triclopyr choline 54.72%: 2-((3,5,6-trichloro-2-pyridinyl) oxy) acetic acid, choline salt (Vastlan).

Invasive grasses, vines, and other herbaceous species
•4-amino-3, 6-dichloro tri-iso-propanol-ammonium salt of 2-pyridine carboxylic acid 40.6% (Milestone® or equivalent) (Rosary pea, etc)
• Glyphosate 53.8% (Rodeo® or equivalent) - nonselective control in upland areas or associated with wetlands or aquatic areas
• Imazapic 23.3% (Panoramic 2SL or equivalent)
• Imazapyr 28.7% (Arsenal® or equivalent) - upland areas
• Imazapyr 28.7% (Habitat® or equivalent) - in areas or associated with wetlands or aquatic areas
•Metsulfuron ethyl 60% (Escort® XP or equivalent)

PESTICIDES REMOVED

- Temephos 5% (Skeeter Abate®) (organophosphate)
- Oryzalin 40.4% (Surflan AS)- pre-emergent, not available on market
- Iprodione 23.3% (Lesco® 18 Plus or equivalent), not available on market