

# INTEGRATED PEST MANAGEMENT PLAN FOR THE CITY'S STORMWATER CONVEYANCE SYSTEM



9/8/21

# SUB-COMMITTEE MEMBERS

## City Staff:

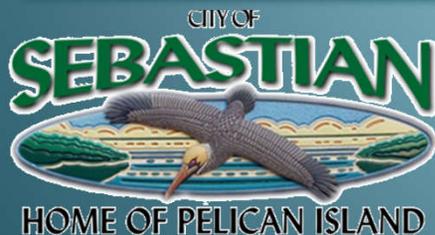
Brian Benton, Leisure Services Director  
Kimberly Haigler, Environmental Planner

## Natural Resource Board:

Thomas Carrano  
Jessica Lovell  
Charles Stadelman

## Scientific Consultants:

Nickole Munroe, UF IFAS IRC Extension Office  
Dr. Graham Cox, Pelican Island Audubon Society  
Ruth Callaghan, CEAC (Certified Environmental Analytical Chemist)



# PUBLIC INPUT PROCESS

## IPM WORKSHOPS (2)

## SW IPM SUB-COMMITTEE MEETINGS (17)

ADDITIONAL UPDATES PROVIDED AT:

Natural Resource Board Meetings

City Council Meetings



# GOALS OF THE IPM PROGRAM

- Reducing the amount of pollutants entering surface and ground water
- Minimizing effects on native plants, animals and habitats
- Ensure effective, economic pest management
- Minimizing health risks to the public, City staff, and the environment
- Promote the transparency of the City's pest management activities
- Increase public awareness of IPM methods and benefits



# ELEMENTS OF THE IPM PROGRAM

- **IPM Policy, established with R-21-14**
- **Program Coordination**
- **Tracking Herbicide Use**
- **Public Outreach**
- **Contractor Provisions**
- **Annual Review**



# PUBLIC OUTREACH

- CITY'S STORMWATER IPM WEBSITE
- SOCIAL MEDIA
- COMMUNITY EVENTS
- "NEW HOMEOWNER" FOLDERS
- IPM PLAN ANNUAL REVIEW PROCESS



# STORMWATER IPM WEBSITE

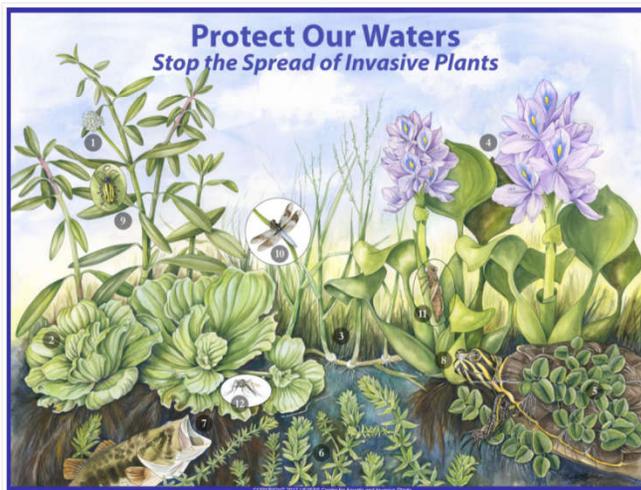
Other NRB  
Pages with  
Great  
Environmental  
Information

- NRB Home
- Parks IPM
- Stormwater IPM
- Florida Landscaping
- Recycling
- Litter Quitter
- Annual Earth Day & Arbor Day Celebration
- Community Oyster Garden

[Home](#) • [Government](#) • [Boards & Committees](#) • [Natural Resources Board](#) • [Stormwater IPM](#)

## INTEGRATED PEST MANAGEMENT FOR STORMWATER ASSETS

The IPM Sub-Committee for stormwater assets consists of three members of the City's Natural Resources Board, three local scientific advisers, and three members of City Staff. Their goal is to create an IPM Plan that will apply to all pest management activities within the City's stormwater conveyance system. It is the goal of the Sub-Committee to assist City Staff in developing a plan to control pests so that the treatment, transportation, and storage capacity of the entire conveyance system is preserved, while also ensuring the health and safety of staff, residents, structures, wildlife, and the surrounding natural waterways.



Poster Key

<https://www.cityofsebastian.org/415/Stormwater-IPM>



### Stormwater IPM Plan

- [SW IPM Plan DRAFT 9.1.21](#)
- [City Stormwater Map](#)
- [Table of Herbicides and Adjuvants](#)
- [Table of Non-Chemical Controls](#)

### Aquatic IPM Resources

- [Stormwater 101](#)
- [SW Dept IPM Projects](#)
- [Key Aquatic Pests](#)
- [Aquatic Weeds Workbook](#)
- [Intro to Aquatic Herbicides](#)
- [Intro to Adjuvants](#)
- [Spraying Program Summary 1.11.21](#)

### Coastal Resiliency Plan

- [Coastal Resiliency 2019](#)
- [Coastal Resiliency Pres](#)

### Further Information

[Click to access all Sub-Committee agendas and minutes](#)

The IPM Plan,  
Resolution, &  
Tables

Map of City's  
Stormwater  
System

Educational  
Presentations  
& Resources

Links for Sub-  
Committee  
Agendas &  
Minutes

Program  
Contacts

ALL DOCUMENTS ARE VIEWABLE, DOWNLOADABLE, & PRINTABLE!!



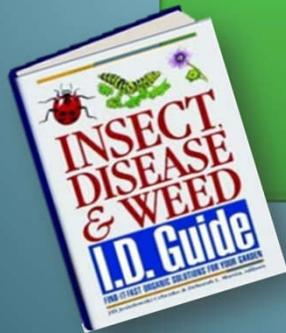
## INSPECTION & MONITORING



- Staff monitor properties regularly for evidence of pests.
- Residents may call the Citizen Request Line to report infestations.
- City's Spraying Contractor also logs species populations on their "Field Treatment Sheets."



## IDENTIFICATION



- Correct identification and understanding life history attributes is KEY.
- IPM Coordinator will utilize expert resources to assist staff with precise ID.



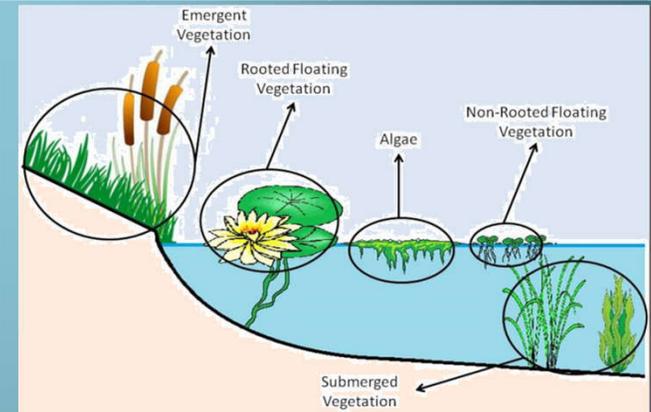
# IDENTIFICATION

## Nuisance Aquatic Vegetation:

COMMON NAME	SCIENTIFIC NAME	CLASS	STATUS
Hydrilla	<i>Hydrilla verticillata</i>	Submersed	Invasive, Non-Native
Water Hyacinth	<i>Eichornia crassipies</i>	Floating	Invasive, Non-Native
Primrose Willow	<i>Ludwigia sp.</i>	All	Native
Spatterdock	<i>Nuphar advena</i>	Floating	Native
Duckweed	<i>Lemna minor</i>	Floating	Native
Cattail	<i>Typha sp.</i>	Emergent	Native
Torpedo Grass	<i>Panicum repens</i>	All	Invasive, Non-Native
Green Algae	<i>Chlorophyta sp.</i>	Submersed	All
Salvinia	<i>Salvinia molesta</i>	Floating	Invasive, Non-Native
Alligator Weed	<i>Alternanthera philoxeroides</i>	All	Invasive, Non-Native



*Hydrilla*



*Aquatic Vegetation Classes*

- Why do we need to control vegetation?

# WHY MANAGE AQUATIC PLANTS?

- Reduced Water Storage Capacity
- Impeded Water Flow
- Damaged Infrastructure
- Spread Invasive Species

WHICH LEADS TO

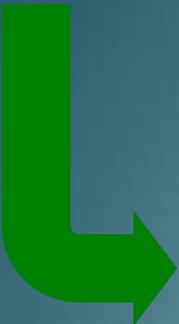


- Reduced Storm Protection
- Localized Flooding
- Expensive Repairs/ Replacements
- Natural Habitat Damage

**BECAUSE IT'S THE LAW!**



*Sunset over Canal*



# PLANNING

- Tolerance threshold is determined by the asset's purpose

- Structures
- Canals
- Ponds
- Ditches



*Stormwater Treatment Area Pond*



*Concha Dam*

# ASSET CLASSIFICATION

STRUCTURES	CANALS	PONDS	DITCHES
Dams	Elkcam Waterway	Retention Ponds	ROWs
Weirs	Collier Waterway	Detention Ponds	Dry DAs
Spillways	Schumann Lake	Retention Areas	Swales
Catch Basins	Hardee Lake	Treatment Areas	
Baffle Boxes	Harbor Waterway	Stormwater Basins	
Culvert Pipes	Schumann Waterway		
Inlets	Harbor Pt. Waterway		
Outlets	Joy Haven Waterway		
Outfalls	Seawall Perimeter		

## ASSET SUMMARY

- Canals: 9 miles
- Ditches: 80 miles
- Basins: 22
- Baffle Boxes: 7
- Weirs/ Dams: 12
- Bridges: 4
- IRL Outfalls: 10
- SSR Outfalls: 8

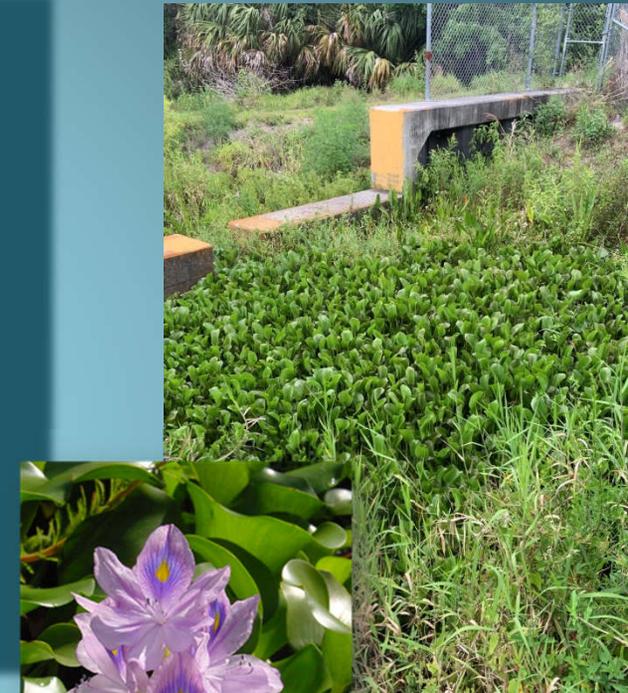
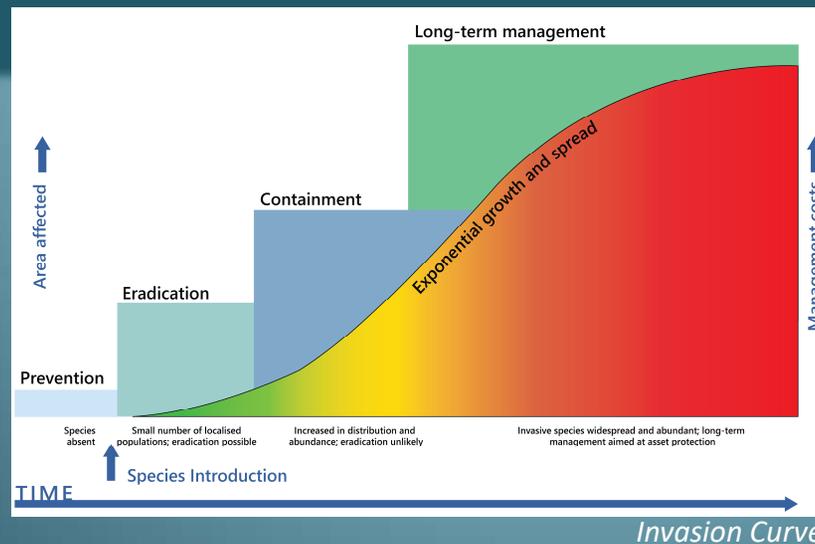


*Staff removing vegetation from ditch*

**MAINTAINING  
OUR  
STORMWATER  
SYSTEM IS A  
BIG JOB!**

# UNIQUE CHALLENGES

- Water is fluid!
- Accessibility
- Limited Pesticide Options
- Herbicide Resistance
- Adjuvants are Needed
- Exponential Growth!!



*Water Hyacinth*

*Hyacinth invasion at weir*



**IMPLEMENT  
IPM STRATEGY**

1

**BIOLOGICAL  
CONTROL**



2

**CULTURAL  
CONTROL**



3

**MECHANICAL  
CONTROL**



4

**CHEMICAL  
CONTROL**



## IMPLEMENT IPM STRATEGY

### NON-CHEMICAL CONTROLS



- Each asset class is assigned its own set of non-chemical methods
- These are conducted as part of the regular maintenance of these areas
- All activities are recorded on “Monthly IPM Log” Form
- Creation of a table detailing every sub-committee recommended method
- Further method recommendations have been made which will be considered during future reviews



*Vacuum removal of sediments from baffle box*

# NON-CHEMICAL PLANT MANAGEMENT PROJECTS

## HARDEE LAKE PROJECT

- Cost \$27K
- Mechanically removed 170 cubic yards of vegetation from 1,800 linear feet of canal



*Vegetation waits to be carried to the dump*

## COLLIER CREEK CANAL PROJECT

- Mechanical vegetation removal and bank re-grade
- 8,735 linear feet of canal was excavated
- Over 3,500 cubic yards of brush, vegetation and muck were removed



*Staff use rental equipment to stabilize the canal bank*

# NON-CHEMICAL PLANT MANAGEMENT PROJECTS

## SOUTH DITCHES PROJECT

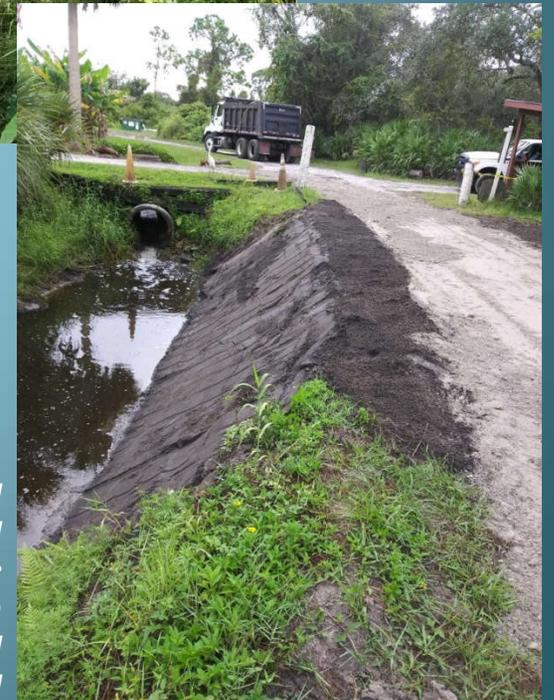
- Mechanical vegetation removal and ditch excavation project.
- In Potomac, Melrose, and Tulip areas
- 17,057 linear feet excavated
- 10,799 cubic yards of aquatic vegetation and muck removed



*Tulip area ditch after excavation*



*Staff work hard to maintain the stormwater system*



*A stabilized bank will soon be covered in hay and grass seed*

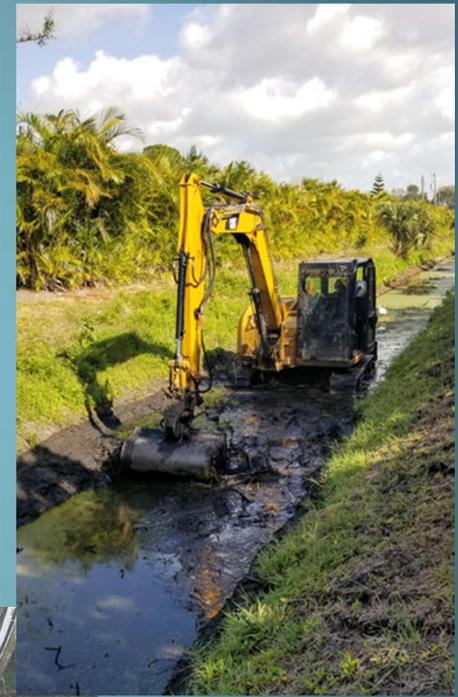
# NON-CHEMICAL PLANT MANAGEMENT PROJECTS



*Water flow inhibited by vegetation and muck*

## 512 DRAINAGE PROJECT

- Excavation of vegetative overgrowth and muck accumulation
- Ditch parallel to 512
- 5,000 linear feet excavated
- 100 cubic yards of aquatic vegetation and muck removed
- \$16K in equipment repair



*Water begins to flow through the ditch again*

*Inconsistent muck swallows up tractor*

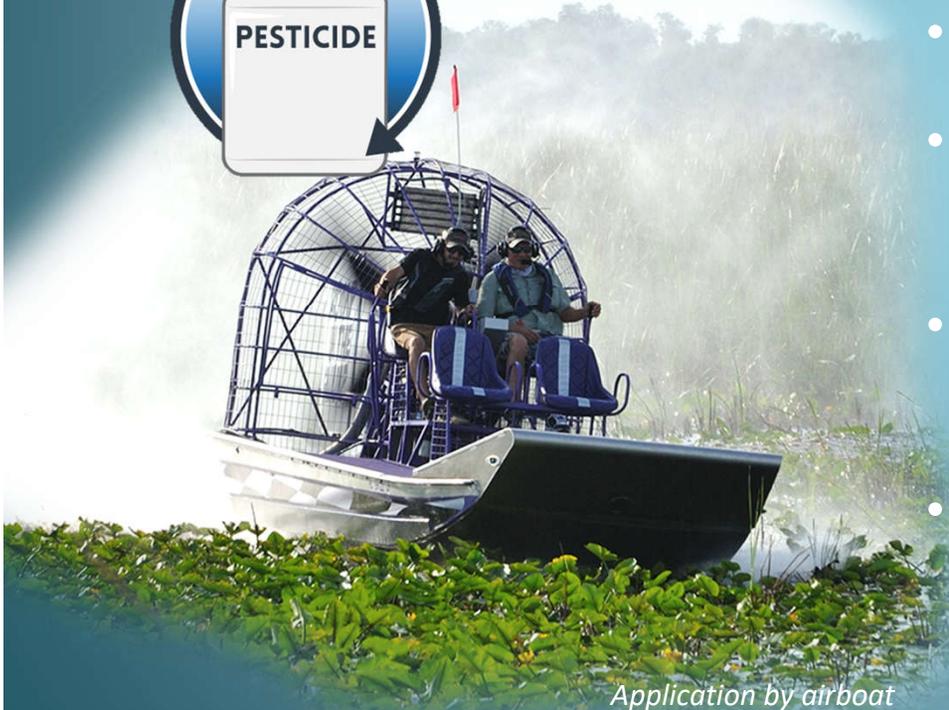


## IMPLEMENT IPM STRATEGY

### CHEMICAL CONTROL



- Carefully weigh environmental costs & benefits.
- Choose the least-toxic option available that will do the job.
- The LABEL IS THE LAW!
- Create a comparison table for all herbicides and adjuvants.
- Develop an Aquatic Herbicide Use Methodology.
- Ensure public transparency and notification.

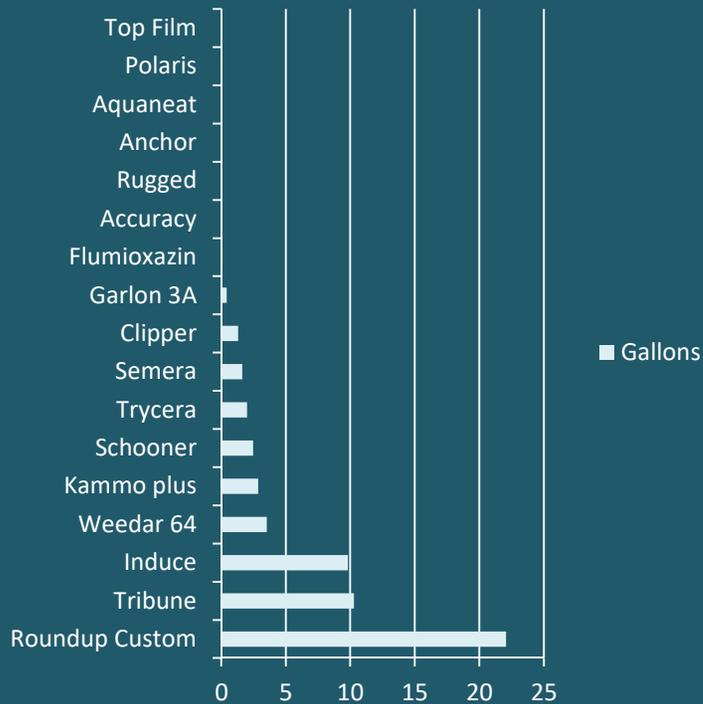


*Application by airboat*

# PREVIOUS HERBICIDE USE

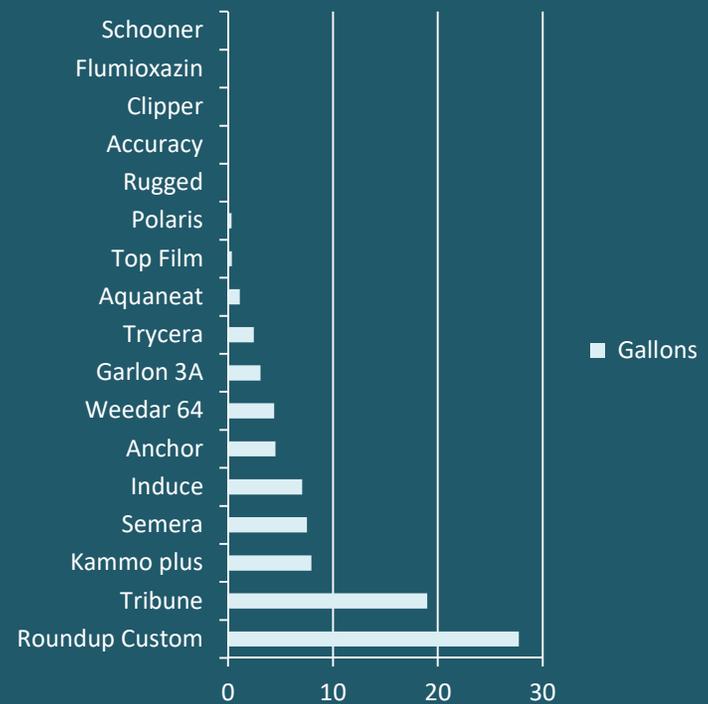
The 2 year average for herbicides applied across the entire stormwater system is 55 gallons

FY18- Amount of Chemicals Applied



FY2018	Total Gallons	43.6
	Adjuvants	13
	Total Cost	\$24,381.72

FY19- Amount of Chemicals Applied



FY2019	Total Gallons	66.156
	Adjuvants	19.5
	Total Cost	\$26,023.25

WE CAN DO BETTER



# HERBICIDE USE METHODOLOGY

- Applications by a licensed contractor, not City staff.
- Avoid routine and broadcast applications
- Herbicides to be rotated and/or mixed according to their Mode of Action (MOA) to protect from herbicide resistance.
- Adjuvants will be utilized to increase efficacy and safety
- Safety Data Sheets (SDS) will be on site at all times
- Notification signage must be posted
- Field Data Sheets will be completed and submitted monthly
- All methods of application are according to the product label!

**THE LABEL IS THE LAW!**



# APPROVED HERBICIDES & ADJUVANTS TABLE

- 17 herbicide active ingredients approved for use in Florida
- 5 commonly used adjuvants
- Also: active ingredients and their percentages, EPA Registration #, targeted pest, WSSA Resistance Group, and the target species
- Selection of pesticides for use are based upon a combination of a low Environmental Impact Quotient (EIQ), low cost, resistance management, and maximum efficacy.

ACTIVE INGREDIENT	ACTION	TRADE NAME	EPA REG. #	WSSA RESISTANCE MGT. GROUP	ACTIVE INGREDIENT	LABELED SIGNAL WORD*	EIQ	Maximum Use Rate	FIELD USE EIQ	EIQ ECOLOGICAL COMPONENT**	TRAITS	TARGET CLASS	TARGET SPECIES	PRODUCT COST	COST RATING/ACRE ***
Alkanolamide	adjuvant	Cohere	NA	NA	90.00%	warning	NA	NA	NA	NA	spreader, sticker	NA	NA	\$138 per 2.5 gals	\$
methelated seed oil	adjuvant	Alligare MSO 1 SunEnergy	NA	NA	100.00%	warning	30.9	NA	NA	NA	surfactant	NA	NA	\$61.25 per 2.5 gals	\$
polyacrylamide	adjuvant	Accuracy Polycontrol 2	NA	NA	30%	warning	NA	NA	NA	NA	deposition & drift retardant	NA	NA	\$129.77 per 1 gal	\$
D-limonene	adjuvant	Kammo Plus	NA	NA	100%	warning	NA	NA	NA	NA	surfactant	NA	NA	\$92.51 per 1 gal	\$
polyoxlkane ethers	adjuvant	Induce	NA	NA	90%	warning	NA	NA	NA	NA	wetter, spreader	NA	NA	\$136.39 per 2.5 gals	\$
Bispyribac	herbicide	Tradewind (powder)	59639-165	2	80%	caution	11.47	2oz/acre	1.1	2.3	systemic, selective	submersed, floating	Hydrilla	\$1,175.95 per 2 lbs	\$\$\$\$
Carfentrazone	herbicide	Stingray Speedzone	279-3279-67690 2217-833	14	21.3% 28.6%	caution	20.2	13.5 oz/acre 5 pints/acre	3.6 28.9	8.5 68.0	contact, selective	emergent, floating	Primrose, Water Lettuce, Hyacinth	\$205.95 per 1 qt	\$\$
Copper	herbicide, algaecide	copper sulfate (crystals)	56576-1	NA	99%	danger	61.9	1.75 lbs/acre	107.2	256.8	contact, non-selective	submersed	algae	\$45.95 per 1 gal	\$
Diquat	herbicide	Tribune Reward	100-1390 100-1091	22	37.30%	caution	39.2	.5 gal/acre	58.5	111.3	contact, non-selective	submersed, emergent floating	hyacinth, water lettuce, salvinia, mosquito fern	\$221.95 per 1 gal	\$

Excerpt from Approved Herbicide & Adjuvant Table

# ENVIRONMENTAL IMPACT QUOTIENT (EIQ)

$$EIQ = \{C[(DT*5)+(DT*P)] + [(C*((S+P)/2)*SY)+(L)] + [(F*R) + (D*((S+P)/2)*3) + (Z*P*3) + (B*P*5)]\} / 3$$



- toxicity to humans
- leachability to groundwater
- runoff potential
- soil persistence
- wildlife toxicity
- risk to pollinators
- effects on aquatic species

**EIQ FIELD USE RATING =  
EIQ x % ACTIVE INGREDIENT x APPLICATION RATE**

# SPRAYING NOTIFICATION

- Notification of planned spraying to be posted on City's website at least 24 hours prior
- Notification Signage to be completed by applicators and posted at all major public points of entry

## RESTORATION IN PROGRESS

### CAUTION

As a part of Sebastian's work to restore and maintain a healthy and functional stormwater conveyance system, noxious aquatic vegetation is being treated with approved herbicides by state-licensed applicators, in compliance with the City's Integrated Pest Management Policy.

Thank you for your cooperation.

TARGET PLANT(S): \_\_\_\_\_

AREA TREATED: \_\_\_\_\_

HERBICIDE(S): \_\_\_\_\_

RE-ENTRY PERIOD: \_\_\_\_\_

APPLICATION DATE: \_\_\_\_\_

APPLICATION TIME: \_\_\_\_\_

For more information, contact the City's Citizen Request Line:

(772) 581-0111



To learn more about Sebastian's IPM Program and other Sustainable Sebastian initiatives please visit the Natural Resources Board Website:





## RECORD KEEPING

- All data forms and purchase orders are submitted to IPM Coordinator monthly
- Program transparency



## EVALUATE EFFECTIVENESS

- Compile Data into an annual report
- Sub-Committee reconvenes to assess
- Report data and assessment to Boards and City Council



Return to  
INSPECTION &  
MONITORING

# ANY QUESTIONS?



© photoxscapes

*Rainbow over Blossom Pond*

FOR MORE INFORMATION  
REGARDING THE  
CITY'S IPM PROGRAM,  
PLEASE VISIT OUR WEBSITE:



<https://www.cityofsebastian.org/415/Stormwater-IPM>