Environmental stewardship along Florida's Indian River Lagoon: balancing mosquito control and natural resource interests

Doug Carlson Indian River MCD Vero Beach, FL

Pesticide Environmental Stewardship Program (PESP)

In 1994, the EPA initiated the PESP program with the goal of: "reducing pesticide risk".

In 1995, the AMCA was encouraged by the EPA to apply to become a "partner" in this program.

Pesticide Environmental Stewardship Program (PESP)

A PESP Working Group was formed which developed a *Strategy Document* demonstrating how AMCA members are carrying out sound environmental stewardship.

In 1997, the AMCA became a "partner" with the EPA in this program.

Indian River Lagoon "Estuary of National Significance"

• Lagoonal estuary – where fresh and salt water mix

- 156 miles long;
 =40% of Florida's east coast
- 5 inlets connect the IRL to the Atlantic Ocean

Indian River Lagoon "Estuary of National Significance"

• America's most diverse estuary with 4,000+ species of plants & animals

• Salt marshes & mangrove swamps occur on the east & west banks, also on islands within the IRL

MOSQUITO CONTROL TECHNIQUES (used in IPM program)

- Source reduction
 - Elimination of mosquito producing sites (typically most effective).
- Larviciding
 - Chemical applications to kill mosquito larvae.
- Adulticiding
 - Chemical applications to kill adult mosquitoes.

SOURCE REDUCTION IN FLORIDA'S SALT MARSH WETLANDS

- Dates back to 1920's when ditching networks were extensively installed either by hand, heavy equipment or explosives.
- Dredging in the mid-1900's filled salt marshes thus eliminating habitat.
- In the 1950's and 60's along the IRL, 40,000 acres of impoundments were created by building earthen dikes around mosquito-producing high marsh.

LOW MARSH VS. HIGH MARSH

Low marsh:

Flooded twice-daily by tides.

DOES NOT PRODUCE MOSQUITOES.

LOW MARSH VS. HIGH MARSH

High marsh:

- Flooded by exceptionally high tides and rainfall.
- DOES PRODUCE MOSQUITOES!!

HIGH MARSH VEGETATION

Typically includes:

- Black mangroves
- Batis (saltwort)
- Salicornia (glasswort)
- Distichlis (salt grass)

DITCHING IN SALT MARSHES

Ditching controls mosquitoes by enhancing circulation on the marsh surface thus:

- Making the marsh less ovipositionally attractive.
- Allowing mosquito-eating (larvivorous) fish access to larvae.

DRAWBACKS TO DITCHING

- Ditches can become clogged with silt and other debris.
- Ditches can become filled with vegetation.
- The ditch-estuary interface can become blocked restricting circulation.

IMPOUNDMENT MANAGEMENT

- Of the 40,000 acres of impoundments created, 20,000 acres occur on the Merritt Island National Wildlife Refuge near the Kennedy Space Center.
- Flooding high marsh impoundments eliminates egg-laying sites for salt-marsh mosquitoes.

 Effective and economical mosquito control method greatly reducing need for pesticide applications in the impounded marsh.

IRC salt marsh mosquitoes in the 1950's & 60's

IMPOUNDMENT MANAGEMENT (cont'd)

ENVIRONMENTAL PROBLEMS OF IMPOUNDING:

- Interferes with movement of water and organisms between marsh and estuary.
- Deep flooding can kill native vegetation.

IMPOUNDMENT MANAGEMENT (cont'd)

OTHER BENEFITS OF IMPOUNDING:

- Eliminates larvicide treatments
- Benefits resident fish (those living entire life-cycle within the marsh).

- Large fish populations feed wading birds.
- Can also allow for waterfowl (duck) management.

CONFLICTING MANDATES

- In late 1970's, impoundment management conflicts arose between mosquito control & natural resource agencies.
- Resulted in creation of:
 Fla. Coordinating Council on Mosquito Control
 Subcommittee on Managed Marshes (SOMM)

STRUCTURE OF COMMITTEES

- Originally created in 1983 by Governor (later Senator) Graham.
- Established in Florida Statutes (Chapter 388) in 1986.
- Created to provide guidance and review for salt marsh management plans.

STRUCTURE OF COMMITTEES

- Agencies responsible for wetlands resources (Federal, State, Local)
- Mosquito control agencies (State, Local)
- Research/environmental organizations

COMMITTEES' REPRESENTATION

U.S. Fish & Wildlife Service **Environmental Protection Agency NOAA - Fisheries** Fla. Dept. of Environmental Protection St. Johns River Water Management District Fla. Dept. of Agriculture Fla. Dept. of Health Audubon Society University of Florida Florida A&M University Local mosquito control offices (Indian River, Fla. Keys, Lee, Manatee)

CURRENT MANAGEMENT

Research since the early 1980's has led to the environmentally acceptable salt marsh technique:

Rotational Impoundment Management (RIM)

ROTATIONAL IMPOUNDMENT MANAGEMENT (RIM)

RIM involves:

 Installing culverts with water control structures through impoundment dikes.

Culverts are closed in Spring (usually May).

ROTATIONAL IMPOUNDMENT MANAGEMENT (RIM; cont'd)

RIM involves:

 Mosquito control minimally floods the marsh from May to Sept./Oct.

 Culverts are opened in Sept./Oct. and remain open until next Spring.

ROTATIONAL IMPOUNDMENT MANAGEMENT (RIM; cont'd)

RIM allows for:

- Source reduction mosquito control with a minimum of pesticide use.
- Reestablishment of most natural marsh functions during Fall/Winter/Spring.
 - Organism transport
 - Soil oxidation/consolidation
 - Vegetative regrowth

SURFACE WATER IMPROVEMENT & MANAGEMENT ACT (SWIM)

- Established by Florida Legislature in 1987.
- Now managed by Water Management Districts
 - St. Johns River WMD
 - South Fla. WMD

Aggressively funding improved salt marsh management practices: (RIM & salt marsh restoration)

Over 27,000 acres of impoundments have been re-integrated into the IRL

In northern Brevard and Volusia Counties, SWIM is funding the restoration of impacted marshes.

To date this work has resulted in:

- returning over 110 acres to marsh elevation
- removing over 15 miles of non-functional dikes
- natural hydrology has been re-established to 650 acres of impacted salt marsh wetlands.

Mosquito control on refuges along the Indian River Lagoon

Merritt Island NWR & Pelican Island NWR

Refuge Overviews

| | Pelican Island NWR | Merritt Island NWR |
|------------------------------------|--|--|
| | (Within the Indian River MCD, created 1903) | (Within the Brevard Co. MCD, created 1963, NASA property, USFWS is land manager) |
| Size | 5300 acres | 140K ac. = total |
| | ***** | ***** |
| | 1000 ac. = mangrove swamps | 70K ac. = estuarine habitat and marshes |
| Mosquito- producing habitats | Mangrove swamps (includes islands)Disturbed uplands | Salt marshes |
| | | Maple bay swamps |
| | | Spartina bakerii marshes |

Primary concerns w/draft policy

- What constitutes a "health threat"
- Determination of "no economic impact"

Adjacent Development

Pesticide Environmental Stewardship Program (PESP)

The AMCA thanks you for your ongoing efforts in achieving the PESP goal of: reducing pesticide risk

