

ENVIRONMENTAL ASSESSMENT

Presented
to the
Health, Environment & Human Services Committee
on
February 28, 2005

Environmental Assessment Budget

- Amount Budgeted 2004: \$494,573
- Amount Spent 2004: \$491,695
- Budget for 2005: \$566,469
- Areas Increased:
 - Chemicals: \$72,202
 - Pesticides (If needed)
 - Educational supplies: \$16,300
 - Video tapes, tape player, brochures, display
 - Advertisement: \$30,073
 - Newspaper, bus ads
 - Sprayer: \$7,000
 - Storm sewer fogger

Environmental Assessment Programs and Goals

I. Mosquito Control Program

- Reduce human exposure to mosquito borne disease through:
 - Disease Monitoring
 - Public Education
 - Source reduction
 - Larviciding
 - Adulticiding
 - Storm Sewer Treatment

II. Noise Control Program

- Reduce the impact of noise on individuals requesting service; especially in residential areas

Environmental Assessment Programs and Goals (cont'd)

III. Smoking Ordinance Response

- Ensure compliance with Chapter 41 as it applies to public areas, the work place and non-food related retail establishments

IV. Other Vector Control Activities

- Rat Control & Insect Control:
 - Entomologist & other staff provides verbal information and brochures on rat & insect control for home owners. Also answers questions concerning bees and type of mosquitoes predominate in this area.

V. Environmental Issues Response

- Assist citizens who have encountered environmental related problems
 - Contamination from mold; egret, grackle, pigeon, and cormorant roosts; etc.

Mosquito Control: Efficiency & Service Quality

Input	Output	Efficiency	Service Quality	Community Indicators
1. Program dollars \$443,570 2. 5.9 FTEs	1. Public Education Distribution of flyers, door to door & distribution of brochures	1. Number of flyers distributed for each case of mosquito borne disease (MBD). Goal 500 per case.	1. 10% increase in Home owners knowledge of how to prevent breeding mosquitos and avoid bites	1. Community is more aware of MBD reducing the number of human cases
	2. Disease Surveillance; 560 mosquito collections and bird surveillance, no testing	2. 15% increase in mosquito collections above average of last three years. (493)	2. 15% increase in number of mosquitoes per collection over base line of last 3 years, (23)	2. Reduction in the overall number of mosquito collections positive for MBD.
	3. Mosquito Control. Evaluate 6754 sites for control	3. 10% increase in number of sites checked for control over avg. for last three years. (6140)	3. 10% increase in number of sites treated for larval control	3. Reduction in number of mosquito collections positive for disease.

Environmental Hazards: Efficiency & Service Quality

Input	Output	Efficiency	Service Quality	Community Indicators
1. \$ 48,000 2. .6 FTE	1. Respond to environmental hazard complaints & requests (Avg. complaints & requests: 255)	1. Develop a library to enable staff to reference information needed to assist citizens. 2. Complaints closed within 22 days	1. Citizen contact within two working days.	1. Reduce the number of repeat complaints

Smoking Response: Efficiency & Service Quality

Input	Output	Efficiency	Service Quality	Community Indicators
1. \$24,000 2. .3 FTE	1. Respond to smoking complaints in workplace, retail & non-food commercial & situations. Average number last 3 years: 52	1. Complaint closed within an average of 22 days	1. Citizen contact within two working days.	1. Survey/inspect retail establishments to determine compliance with city code. Buildings with multiple retail outlets to be surveyed.

Noise Control: Efficiency and Service Quality

Input	Output	Efficiency	Service Quality	Community Indicators
1. \$50,000 2. .8 FTE	1. Respond to noise complaints Average over last 3 years: 353	1. Complaint Closed within an 22 days	1. Citizen contact within two working days.	1. Reduce the number of repeat complaints

I. Mosquito Control Program

I. Mosquito Control Program

- **Purpose: Reduce mosquito borne disease**
- **City of Dallas Mosquito Control Plan**
 - Establishes guidelines for the City's Mosquito Control Plan
 - Mosquito Control Plan approved by City Council
 - Any evaluation of mosquito control activities must consider the Mosquito Control Plan
 - See Appendix A – *Mosquito Control Plan*

I. Mosquito Control Program

Background: Why Mosquito Control?

Mosquito Borne Disease in Dallas

- 1966: St. Louis Encephalitis (SLE) afflicts 172 people, 20 deaths
 - Last aerial spraying in Dallas
 - CDC reports “bugless city” after aerial malathion spraying
 - Mosquito counts dropped to near zero for a week then slowly recovers
 - Infection rate in mosquitoes showed marked decrease
- 1976: Twenty cases of SLE, two deaths
- 1995: Twenty human cases of SLE, three deaths
 - Localized in Fair Park Area
 - Storm sewer spraying instrumental in stopping virus

I. Mosquito Control Program

Background: Why Mosquito Control?

(cont'd)

Mosquito Borne Disease in Dallas

- 2002: Advent of West Nile Virus (WNV)
 - 25 human cases, two deaths
 - Sprayed 72 Sq miles
- 2003: West Nile again
 - 41 human cases, three deaths
 - Sprayed 100 Sq miles
- 2004: West Nile continues
 - Seven human cases, no deaths
 - Sprayed 18 Sq miles

I. Mosquito Control Program

Background: Why Mosquito Control? (cont'd)

Mosquito Borne Disease

- West Nile Virus, a serious threat:
 - 1999: WNV found in New York and 3 other northeastern states
 - 2000: Spread to 8 other states in northeast and eastern U.S.
 - 2001: Virus had spread west to the Mississippi River and north to Maine, Michigan, and Wisconsin
 - 2002: 4,156 human cases reported, 254 deaths. Virus spreads west to Texas and along the Rocky Mountains
 - 2003: 9,862 human cases reported to CDC, 264 deaths
 - Virus reported in all states except Oregon and Washington
 - Cases in Texas?- 720 according to CDC or 439 per TDH, 37 human deaths
 - 2004: 2151 WNV cases reported to CDC with 68 deaths (Oct. 19, 2004)
 - Texas-95 human cases detected in 31 counties, eight deaths

I. Mosquito Control Program

Background: Why Mosquito Control?

(cont'd)

Emerging Infectious Diseases

- Malaria- (*See map- Appendix B*)
 - Disease was endemic in U.S. until eradication in the 1950s
 - 600,000 cases of Malaria in 1914
 - Many immigrants move here from Central America and southern Mexico where Malaria is endemic
 - Can only be passed from an infected human by *Anopheles* mosquito
 - *Anopheles* mosquito is common in Dallas
 - Three recent outbreaks in densely populated areas of New Jersey, New York and Texas

I. Mosquito Control Program

Background: Why Mosquito Control?

(cont'd)

Emerging Infectious Diseases (cont'd)

- Dengue/Dengue Hemorrhagic Fever- (*See map- Appendix B*)
 - Primarily a tropical urban disease
 - Small but significant risk in the continental U.S.
 - Two competent mosquito vectors, *Aedes aegypti* and *Aedes albopictus*
 - Two outbreaks in south Texas (1980, 1986) in last 15 years
 - Associated with dengue epidemics in northern Mexico
 - Numerous travelers from tropical areas where dengue is endemic
 - Southern Texas and southeastern U.S. are at risk for dengue transmission and sporadic outbreaks

Mosquito Control: Comparative Output

Activity	2001	2002	2003	2004
Mosquito Collections/Positives	404/0	419/18	505/33	557/17
Sites checked Stocked & treated	8627	8983	6905 Dry conditions	9523
Sq Miles Fogged	2	72	100	18
Storm Sewers Treated	117	164	108	543
Birds Tested/Positive	490 chicken blood samples 1 positive	530 blood/7 pos 32 birds/15 positive	39 birds/17 positive	68 birds/8 positive

Mosquito Control: Comparative Output (cont'd)

Activity	2001	2002	2003	2004
Complaints	986	2324	2116	1793
Notices	58	95	164	189
Citations	5	6	40	33

I. Mosquito Control Program Activities for '03-'04

- **Disease Monitoring**

- Mosquito collections (Analysis by Dallas County or Texas Department of State Health Services)
 - Aspirators
 - Traps
- Bird Testing
 - Testing dead blue jays and crows
 - VEC Test done in house
- Recording reports of dead jays and crows
 - Concentrations result in targeted mosquito collections

I. Mosquito Control Program Activities for '03-'04 (cont'd)

- **Public Education**

- Media Events

- Season kick off in May
 - News Conferences
 - Dallas County Weekly News Conference
 - Media interviews about WNV, spraying and mosquito control
 - Press Releases
 - Spraying
 - Human Cases of WNV and other mosquito borne diseases
 - Newspaper Ads
 - Bus Panels
 - Community Service TV
 - WNV tape
 - Available in libraries and to groups
 - Brochures
 - Libraries, recreation centers, Council Offices, etc.
 - Flyers
 - Distributed door to door in areas where WNV has been detected

I. Mosquito Control Program Activities for '03-'04 (cont'd)

- **Public Education (cont'd)**
 - Web Site
 - Spraying maps
 - Location of positive samples
 - Mosquito control information
 - Personal protection information
 - Contact information
 - Hot Line
 - Spraying information

I. Mosquito Control Program

Activities for '03-'04 (cont'd)

- **Mosquito Control –**
 - Source Reduction
 - Assisted by Street Department, Park Department, Water Utilities Department, Public Information Office and Code Compliance
 - With the input of citizens via complaints
 - By promoting elimination of standing water
 - Clean out ditches and creeks
 - Treat or drain unused swimming pools
 - Repair leaking water meters, fire hydrants, water and sewer pipes
 - Larval Control
 - Evaluate standing water sites and stock minnows in appropriate sites
 - » Sites evaluated in 2004-857
 - » Sites stocked-179
 - » Number of minnows stocked-37,395
 - Check and treat mosquito breeding water by applying a biological or chemical larval control
 - » Sites checked in 2004-5,985
 - » Sites larvicided-2,505

I. Mosquito Control Program Activities for '03-'04 (cont'd)

- **Mosquito Control (cont'd)**–
 - Control of adult mosquitoes (spraying)
 - Only when there are multiple positive disease samples or a human case
 - Goal is to reduce the number of infected adult mosquitoes with a minimal amount of spraying
 - In 2003 the program sprayed 79 times or 105 square miles
 - In 2004 sprayed 11 times or approximately 18 square miles
 - Storm Sewer Treatment (spraying)
 - Mosquitoes carrying disease breed and over winter in storm sewer
 - In 2003 treated 108 storm sewers
 - In 2004 treated 543 storm sewers

I. Mosquito Control Program

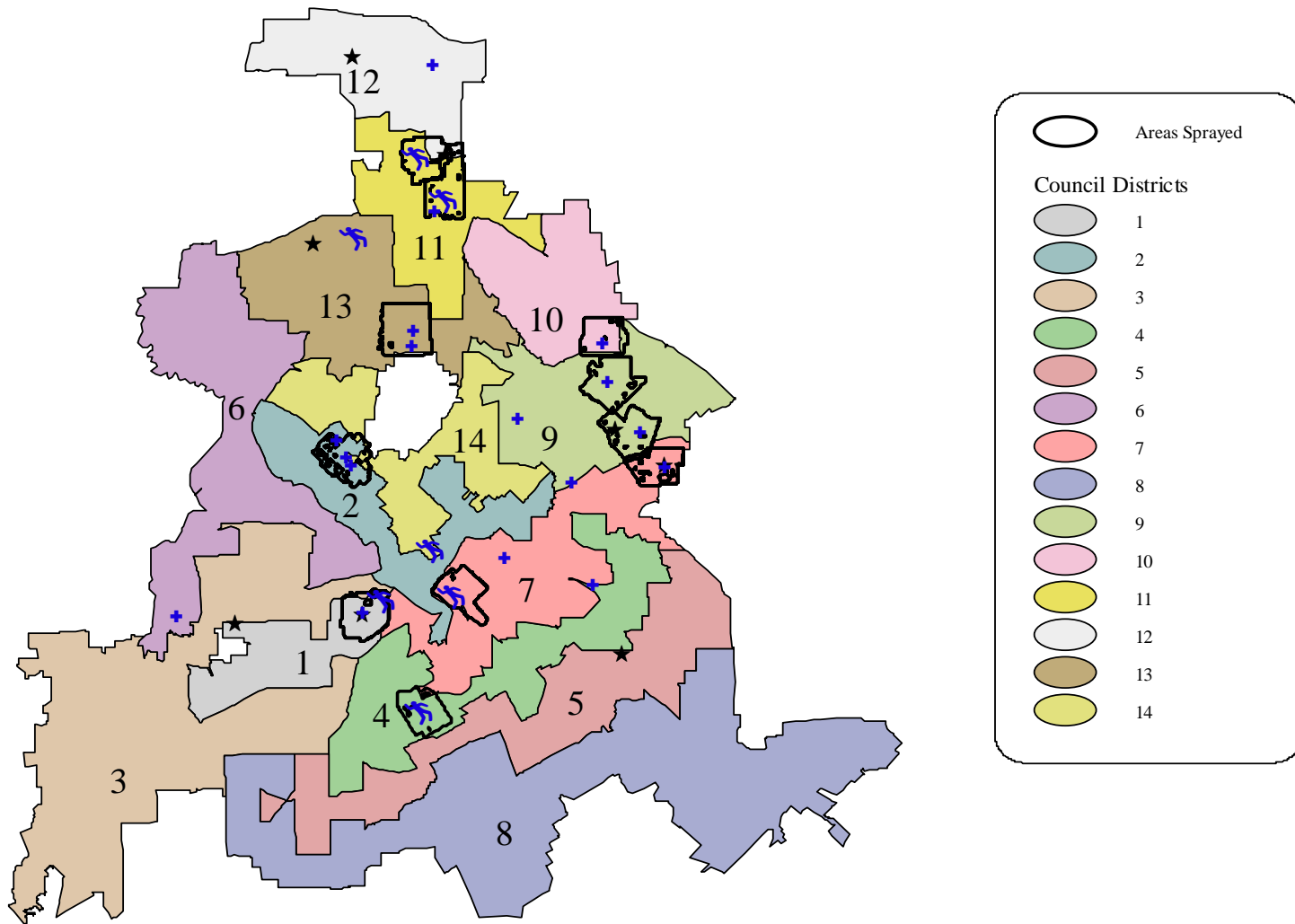
Activities for '03-'04 (cont'd)

- **Service Area**
 - Entire City: 385 square miles
 - Goal is to reduce the number of infected adult mosquitoes
 - 2003 the program sprayed 79 times or 105 square miles
 - 2004 sprayed 11 times or approximately 18 square miles
- **Client Selection**
 - Citizens call in complaints
 - Treatment areas selected by mosquito collections, observations and reports of disease

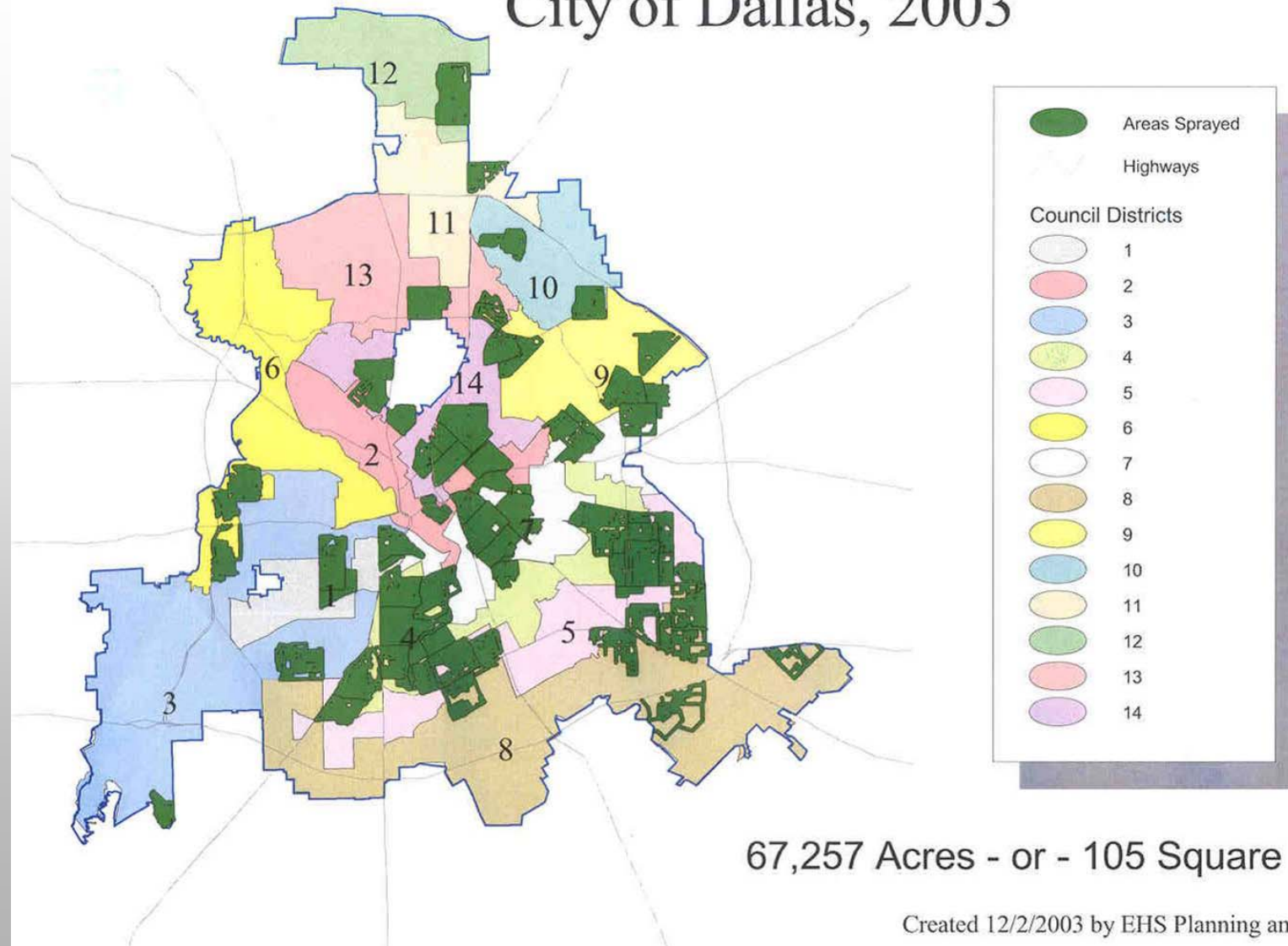
I. Mosquito Control Program Activities for '03-'04 (cont'd)

- **Inputs:**
 - FTEs: 5.9 including “borrowed help from Street Department
 - Bilingual Staff: None, utilize staff from Air Pollution and from EHS Administration
 - 2004 Expenditure: \$369,000 or 75% of budget
- **Output Measures: Special Goals**
 - 2003/04 goal
 - Increase mosquito traps 50%
 - Increase brochures from 15,000 to 22,000
- **Results**
 - Traps increased from 64 to 105, or 64%
 - Distributed 22,000 flyers & brochures
 - Human cases WNV decrease from 42 in 2003 to 7 in 2004

Areas Sprayed for Mosquitos by Council District City of Dallas, 2004



Areas Sprayed for Mosquitos by Council District City of Dallas, 2003



67,257 Acres - or - 105 Square Miles

Created 12/2/2003 by EHS Planning and Evaluation

I. Mosquito Control Program

Efficiencies, Effectiveness & Enhancements

- Areas For Efficiencies
 - Eliminate bird testing & substitute placing mosquito traps in locations with high concentrations of blue jay and crow deaths. We will still take bird calls but will not have to go out to pick up birds. Many of these calls are inaccurate as to species and time of death.
 - New storm sewer sprayer will reduce down time. Significant time was spent repairing the old storm sewer spray equipment. Reduce down time by 15%
- Effectiveness
 - Develop citizen survey cards to test knowledge of mosquito control and bite prevention. Base line survey this spring, follow-up survey next fall. Survey will be conducted in person by inspectors
 - Develop similar web survey. Can be more extensive than above
- Enhancements
 - Add additional spray equipment for storm sewer treatment
 - Evaluate costs/benefits of adding various levels of GPS to fog trucks
 - Increase % of traps to 25% of total mosquito collections

II. Noise Control Program

II. Noise Control Program

- Purpose: Reduce the impact of noise on individuals requesting service; especially in residential areas
 - Noise measurement and enforcement is done by citizen request only
 - Noise sources are investigated often at night
 - Trash pickup
 - Loud music from clubs and restaurants
 - Night time standards are lower
 - Enforcement
 - Notice of Violation
 - Citation if compliance is not achieved

II. Noise Control Program (cont'd)

- Loud & unreasonable noise regulated by Chapter 30 of the Dallas City Code
- Activities presumed offensive to the ordinary sensibilities of the citizens of the city
 - Construction activities between 8:00 P.M. and 7:00 A.M. weekdays and on Sunday in or adjacent to a residential area
 - Trash pickup in or within 300 feet of a residential property between 10:00 P.M. and 7:00 A.M.
 - Playing of any radio, phonograph, television or musical instrument with such volume to disturb the peace, comfort, repose....

II. Noise Control Program (cont'd)

- Environmental regulations regarding noise
- Chapter 51A, Dallas Development Code regarding noise
- Sound levels set according to zoning
 - Residential
 - Commercial
 - Industrial
- Applies to continuous noise from air conditioners, refrigeration units, compressors, music from night clubs and other sources of noise
- Requires measurement of noise source and of ambient background to determine compliance

II. Noise Control Program (cont'd)

Who Handles Noise Complaints

- Environmental and Health Services Department
 - Types of Complaints Enforced Against
 - Waste Haulers, Ch 30
 - Construction, Ch 30
 - Loud Music (clubs, parked cars, residences), Ch 30 and Ch 51A
 - Air Conditioners/Equipment, Ch 51A
 - Loading/Unloading, Ch 30
 - Loud Speakers (games & events) Ch 30 & Ch 51A

- Dallas Police Department
 - Types of complaints
 - Loud Music
 - Construction
 - Private Parties
 - Moving Vehicles

II. Noise Control Program (cont'd)

- Service area:
 - Entire city
- Inputs:
 - FTE- .8
 - Bilingual staff- none, utilize staff from Air Pollution Control
 - Budget- \$50,000

II. Noise Control Program (cont'd) Output Summary

- Complaints EHS

- 2002: 429

- Construction: 58
 - Loud Music: 37
 - Waste Haulers: 103
 - Parking Lot Sweepers: 14
 - Loading/Unloading: 13
 - Other(Air conditioners, air compressors, etc.) : 204

- 2003: 318

- Construction: 55
 - Loud Music: 18
 - Waste Haulers: 75
 - Parking Lot Sweepers: 9
 - Loading/Unloading: 13
 - Other: 148

- 2004: 325

- Construction: 47
 - Loud Music: 62
 - Waste Haulers: 88
 - Parking Lot Sweepers: 9
 - Loading/Unloading: 6
 - Other: 113

II. Noise Control Program Output Summary (cont'd)

- Enforcement
 - 2002
 - Notices: 178
 - Citations: 23
 - Corrections: 141
 - 2003
 - Notices: 100
 - Citations: 22
 - Corrections: 65
 - 2004
 - Notices: 113
 - Citations: 15
 - Corrections: 96

Noise Control: Comparative Output

Activity	2002	2003	2004
Complaints	429	318	325
Notices	178	100	153
Citations	23	22	16

II. Noise Control Program Efficiencies, Effectiveness & Enhancements

- Efficiencies
 - Enforcement action taken against property owner instead of, or in addition to waste management company
 - Continue to develop and expand computer data base on noise sources
- Effectiveness Measure
 - Measure number of repeat complaints & violation to correction ratio
- Enhancements
 - Changes to noise ordinance
 - Divide city into four inspector districts

III. Smoking Ordinance Response

III. Smoking Ordinance Response

- To ensure compliance with Chapter 41 as it applies to public areas, the work place and non food related retail establishments
 - Response to citizen request
 - On site investigation by staff
 - Work place required to have a smoking plan
 - A smoking plan must
 - Accommodate interests of smokers and non-smokers
 - Designate non-smoking areas to minimize exposure to second hand smoke
 - Establish a procedure for handling employee complaints
 - Provide signs in non-smoking areas
 - Enforcement by notice and citation

III. Smoking Ordinance Response (cont'd)

- Service Area
 - Entire city
- Inputs
 - FTEs - .3
 - Budget - \$24,000
- Outputs (Complaints)
 - 2002 – 27
 - 2003 – 79
 - 2004 – 50

III. Smoking Ordinance Response (cont'd)

- Efficiencies
 - Continue to develop a computer data base of all sources and complaints
- Effectiveness Measure
 - Measure number of repeat complaints
- Enhancements
 - Divide City into four inspection districts

IV. Other Vector Control Activities

IV. Other Vector Control Activities

- Rat Control & Insect Control
 - Entomologist & other staff provides verbal information and brochures on rat and insect control for home owners. Also answers questions concerning bees and “what kind of mosquitoes predominate in this area” (people who have just purchased a mosquito control device)
 - Staff responds to complaints concerning rats at non-food commercial establishments. Usually a trash containment or building integrity issue
 - 2002 -99 requests
 - 2003 -111 requests
 - 2004- 75 requests
 - Inputs included in mosquito control

V. Environmental Hazards Response

V. Environmental Hazards Response

- To assist citizens who have encountered environmental related problems
 - Respond only to citizen requests
 - Mold
 - Problems caused by birds
 - Bees, wasps, spiders, roaches, snakes, mammals
 - Contact responsible parties to effect cleanup
 - Provide information and referral
- Service Area
 - Entire City

V. Environmental Hazards Response (cont'd)

- Outcome Measures
 - 2003 Environmental Responses: 552
 - 2004 Environmental Responses: 460
- Areas for Enhancement
 - Provide training to staff to enhance responses on questions concerning mold, problems caused by birds, animals and insects
 - Develop better working relationships with other agencies to better serve the citizens by getting the best information to assist the citizen

V. Environmental Hazards Response (cont'd)

- Inputs:
 - FTEs: .6
 - Bilingual Staff: None, utilize staff from Air Pollution Control
 - Budget: \$48,000
- Outputs:
 - Environmental complaints, inspections & responses –
 - 2002 – 230
 - 2003 – 552
 - 2004 – 280

APPENDIX

- A. Mosquito Control Plan –(adopted by the City Council)
- B. Informational Maps on West Nile Virus and other life threatening diseases

APPENDIX A

CITY OF DALLAS

REVISED

MOSQUITO CONTROL PLAN

CITY OF DALLAS MOSQUITO BORNE DISEASE SURVEILLANCE & RESPONSE

Goals

- Minimize human illness through:
 - Public Education
 - Source Reduction
 - Surveillance
 - Mosquito Control

CITY OF DALLAS MOSQUITO BORNE DISEASE SURVEILLANCE & RESPONSE

Public Education

- Information Topics
 - Protect your property
 - Protect your family and yourself
 - The City Program
 - Sources of information
 - Reporting mosquito problems

CITY OF DALLAS MOSQUITO BORNE DISEASE SURVEILLANCE & RESPONSE

Public Education (cont'd)

- TOOLS
 - Public Service Announcements
 - Media advisories
 - Home Owners & Neighborhood Associations
 - Manned & unmanned displays
 - Brochures(\$4K)
 - Direct Mail
 - E-mail

CITY OF DALLAS MOSQUITO BORNE DISEASE SURVEILLANCE & RESPONSE

Public Education (cont'd)

- Concerned Citizens For Safer Mosquito Control
 - Packets for neighborhood groups
 - Dallas Pest Control Association
 - Develop volunteers to provide information to property owners.
 - Local scouting organizations, etc.

CITY OF DALLAS

MOSQUITO BORNE DISEASE

Source Reduction

- Public education and targeted enforcement to reduce sources at “home”
- We have compiled a list of sources on city right of way and submitted it to Street, Code and Park Departments for attention
- We continue to work with the above as well as Water and Sanitation to eliminate sources

CITY OF DALLAS

MOSQUITO BORNE DISEASE

Disease Surveillance

- Mosquitoes – Continue mosquito collections and trapping at 65–75 sites.
- Wild Birds – Collect and submit for testing.
- Reports of dead jays, crows and hawks recorded and tracked.
- Sentinel Chickens – discontinued, TDH no longer accepts blood for testing.

CITY OF DALLAS

MOSQUITO BORNE DISEASE

Disease Surveillance

- Track reports of equine, other animal and human cases as provided by TDH and Dallas County.
 - Began collection 3/28 to determine concentration and species.
 - TDH will accept mosquitoes for virology May 1.

CITY OF DALLAS

MOSQUITO BORNE DISEASE

Mosquito Control

- Breeding sites – Continue to check and larvicide known sites.
- Complaints – Check identified locations for compliance, take enforcement action, apply larvicide, and provide information to all parties.
- Continue Gambusia stocking program.
- Treating for adult mosquitoes in storm sewers if indicated by collections.

RESPONSE TO RISK LEVELS OF MOSQUITO BORNE DISEASE

- Guidelines for phased response to mosquito borne disease surveillance.
- Risk levels are related to the probability of human outbreak of disease.
- Developed with input and reference from Concerned Citizens, Texas A & M Entomology, CDC, other municipal mosquito programs.

RISK LEVEL 0

Off season; adult vectors inactive, climate unsuitable

- Response
 - Source reduction
 - Public education
 - Minnow Stocking

RISK LEVEL 1

- Probability of human outbreak remote. Early season, April, May, no positive birds or mosquitoes.
 - Public education
 - Complaint response
 - Surveillance– collect and trap from pre-selected locations
 - Collect and test jays and crows
 - Record locations of dead jays and crows
 - Control–larvicide and minnow stocking, source reduction

RISK LEVEL 2

- Probability of human outbreak low, no positive mosquito pools but with isolated high counts of *Culex quinquefasciatus*, or numerous bird deaths or isolated positive birds
 - Media release
 - Begin neighborhood public education
 - Surveillance–additional targeted collections
 - Birds–recording, testing from non positive areas
 - Control–increase larval surveillance, storm sewer treatments, targeted enforcement

RISK LEVEL 3

- Moderate probability of human outbreak. Positive mosquito pools and/or many positive or dead birds concentrated in a small area
 - Notify Council/City Manager's Office
 - Public Education–Press release, targeted information for local area
 - Surveillance–Targeted mosquito collections, continue bird testing in non-positive areas
 - Control–Targeted larval surveillance, storm sewer treatment, targeted enforcement including citations for standing water

RISK LEVEL 4

- High probability of human outbreak. Multiple positive mosquito pools, many positive birds, one or more human cases.
 - Notify Council/City Manager's Office
 - Public Education—press release and targeted communities
 - Surveillance—targeted and citywide continues
 - Control—targeted larviciding, storm sewer treatment, concentrated enforcement
 - Ground based adulting to begin in areas with multiple positive indicators (combination of mosquito pools, birds, horse and/or human cases).

RISK LEVEL 4 (cont'd)

- Spraying Triggers (for a defined area or neighborhood, a creek or storm sewer drainage system, etc. Spraying will only be done within approximately a 3,000 foot radius of the positive samples). The following may trigger spraying:
 - A human case
 - A positive mosquito pool and
 - a positive horse or other mammal
 - additional positive mosquito pools
 - several dead or positive birds

RISK LEVEL 5

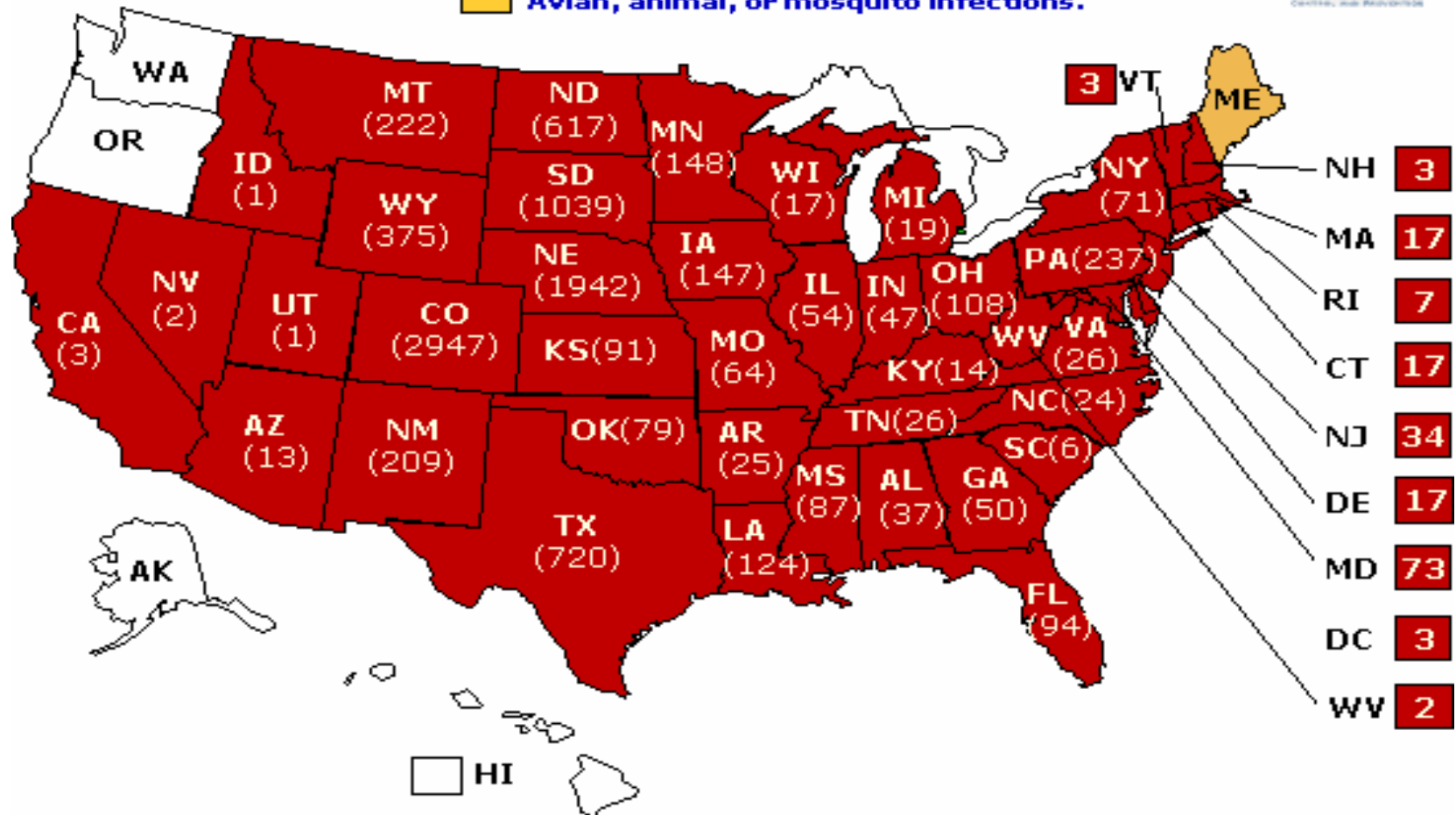
- **Human Outbreak; multiple human cases**
 - Notify Council and City Manager
 - Public Education—press releases and targeted communities
 - Surveillance – mosquito collection, bird recording and testing in non-positive areas
 - Control—Larviciding and enforcement in positive areas, storm sewer treatment as indicated
 - Continue to adulticide areas with multiple positive indicators or human cases

RISK LEVEL 6

- **Public Health Emergency**
 - Determined by Dallas County Medical Advisory Committee
 - Based on rapidly expanding numbers of human cases
 - Public education, surveillance and control work continues
 - Ground based adulticiding continues in areas where WNV is active
 - A plan for aerial spraying would be developed jointly with Dallas County, City of Dallas and other Dallas county Cities affected
 - On approval of the City Council, aerial spraying would take place in the areas of the city affected by the outbreak of mosquito borne disease

West Nile 2003

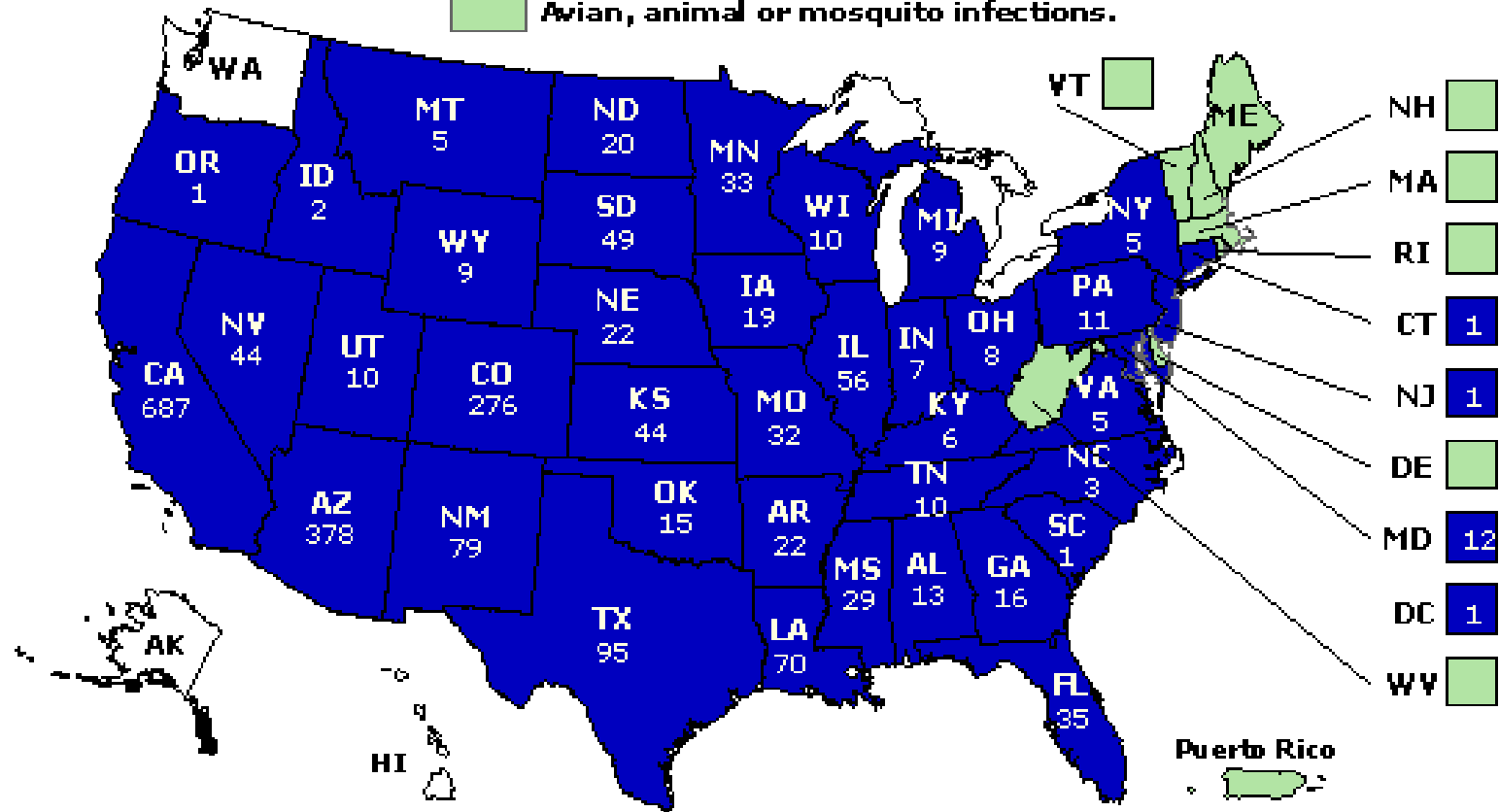
Indicates human disease case(s).
 Yellow indicates Avian, animal, or mosquito infections.



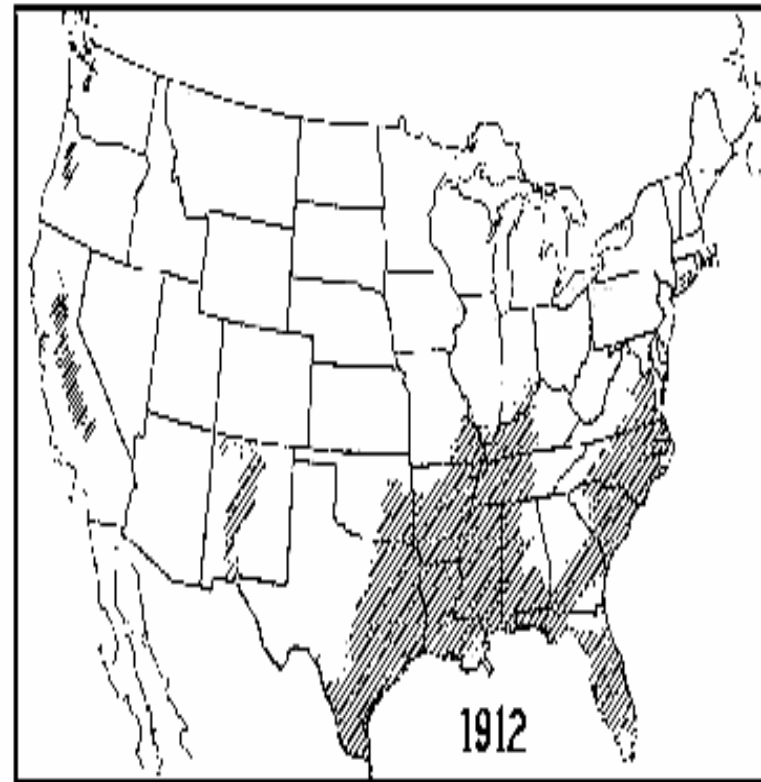
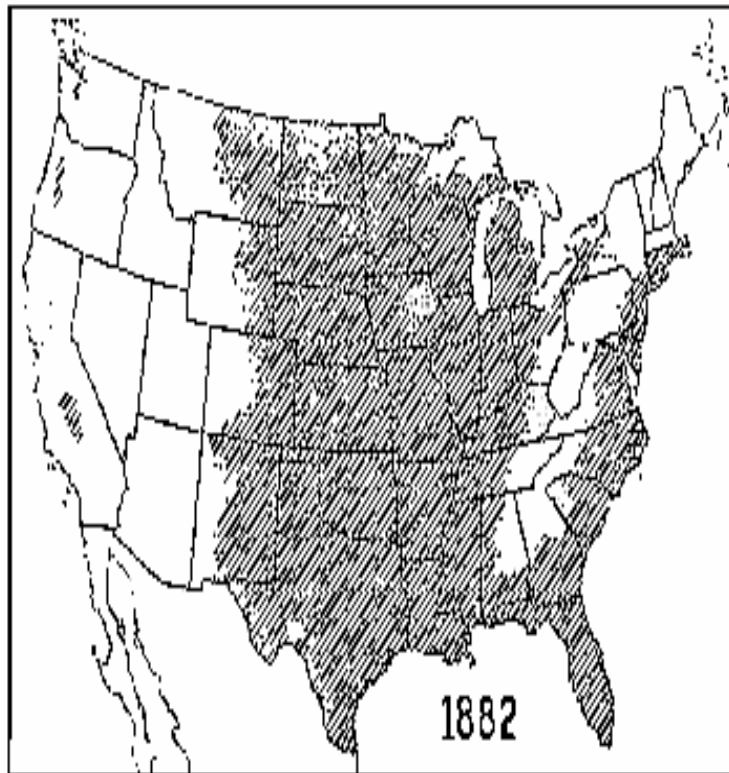
West Nile 2004



Indicates human disease case(s).
 Avian, animal or mosquito infections.

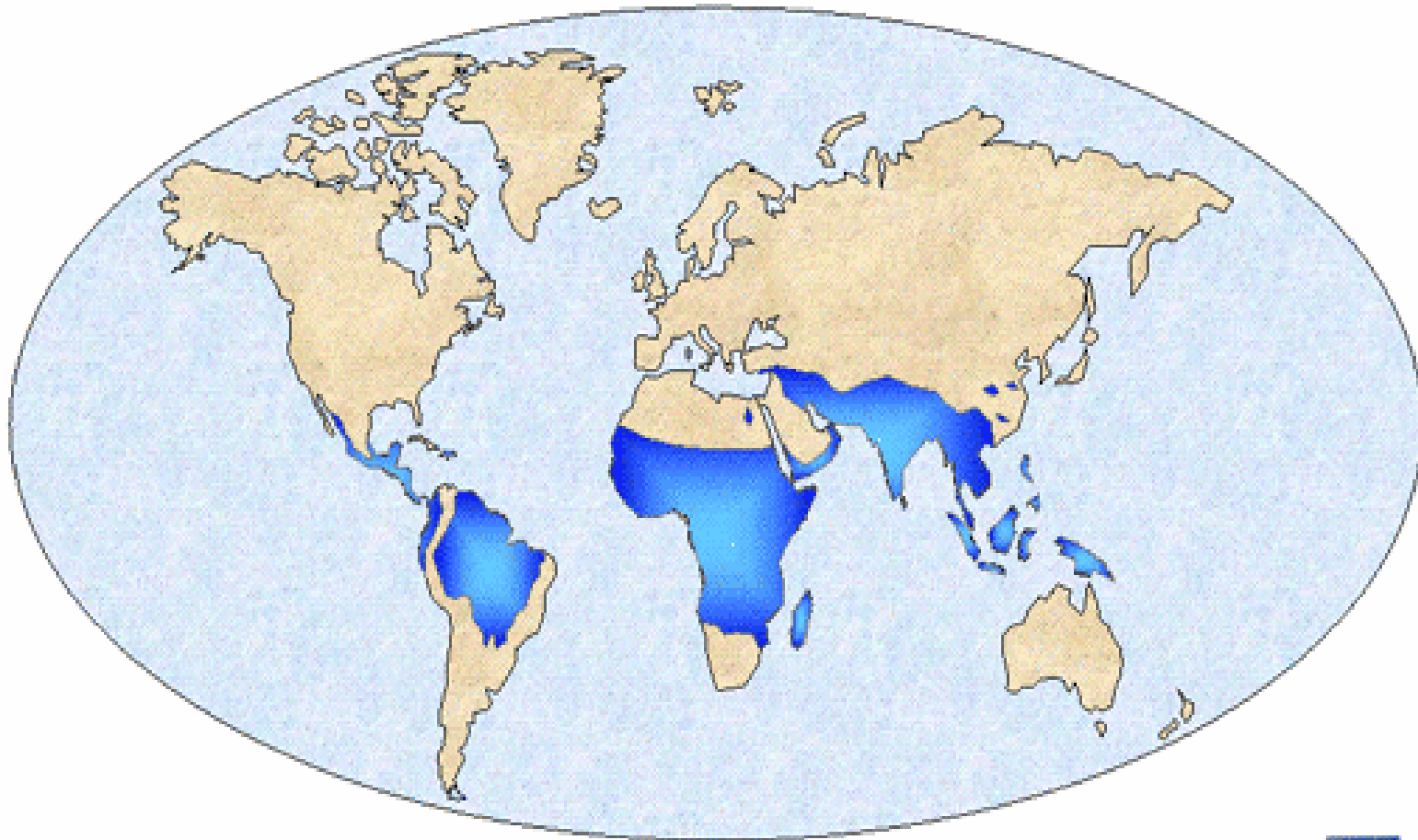


Endemic Malaria in the United States

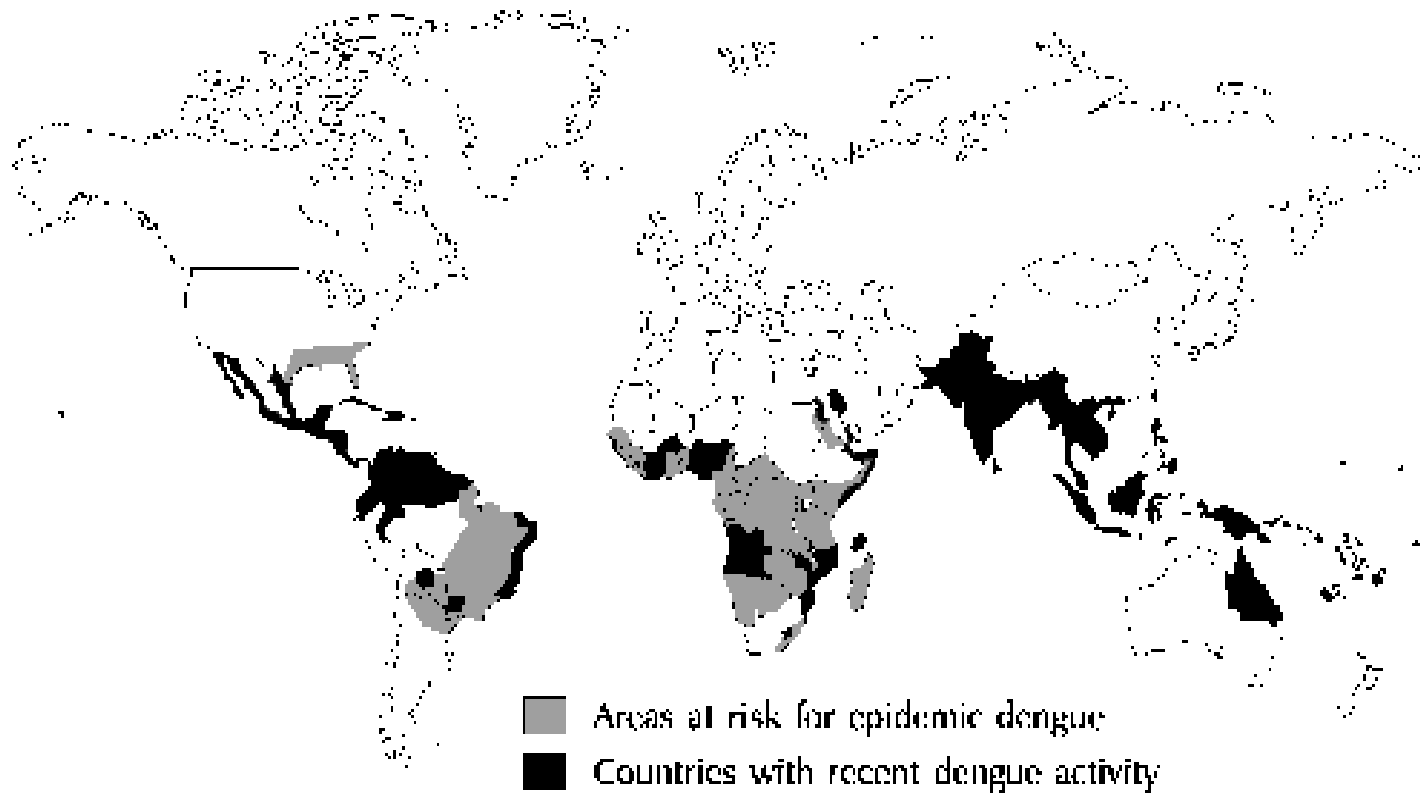


World Wide Distribution of Malaria

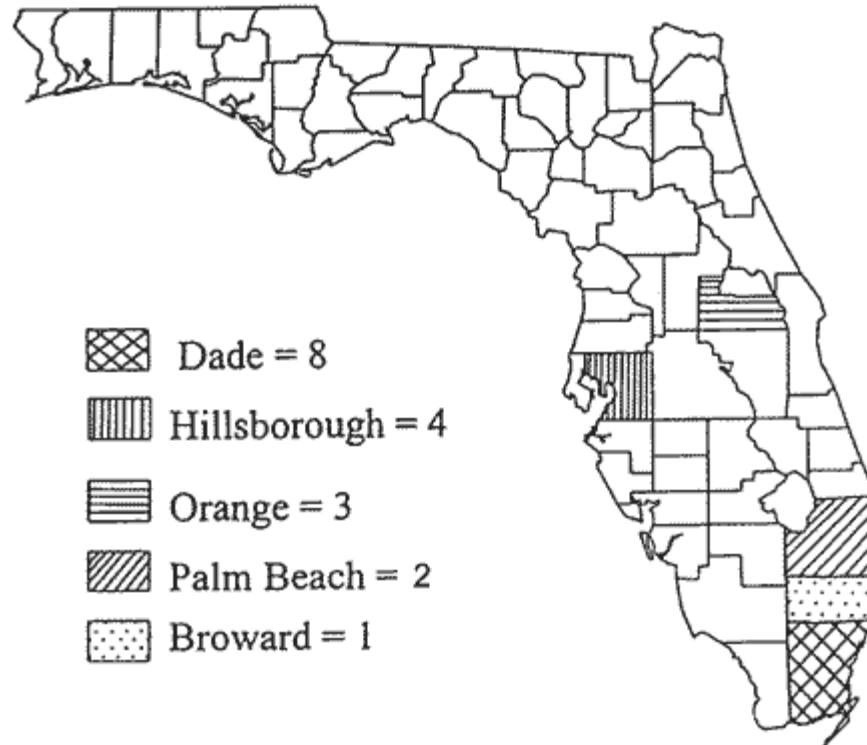
 Distribution of Malaria



WORLD DISTRIBUTION OF DENGUE - 1995



Mosquito Control Program



Dengue in Florida

1997,1998