

Mosquito-borne Disease in Georgia: Connecting Our Past to the Future



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Mosquitoes in Georgia

- 55 species in 12 genera
- Recent introductions include
 - *Aedes albopictus*
 - *Aedes japonicus*
 - *Culex coronator*

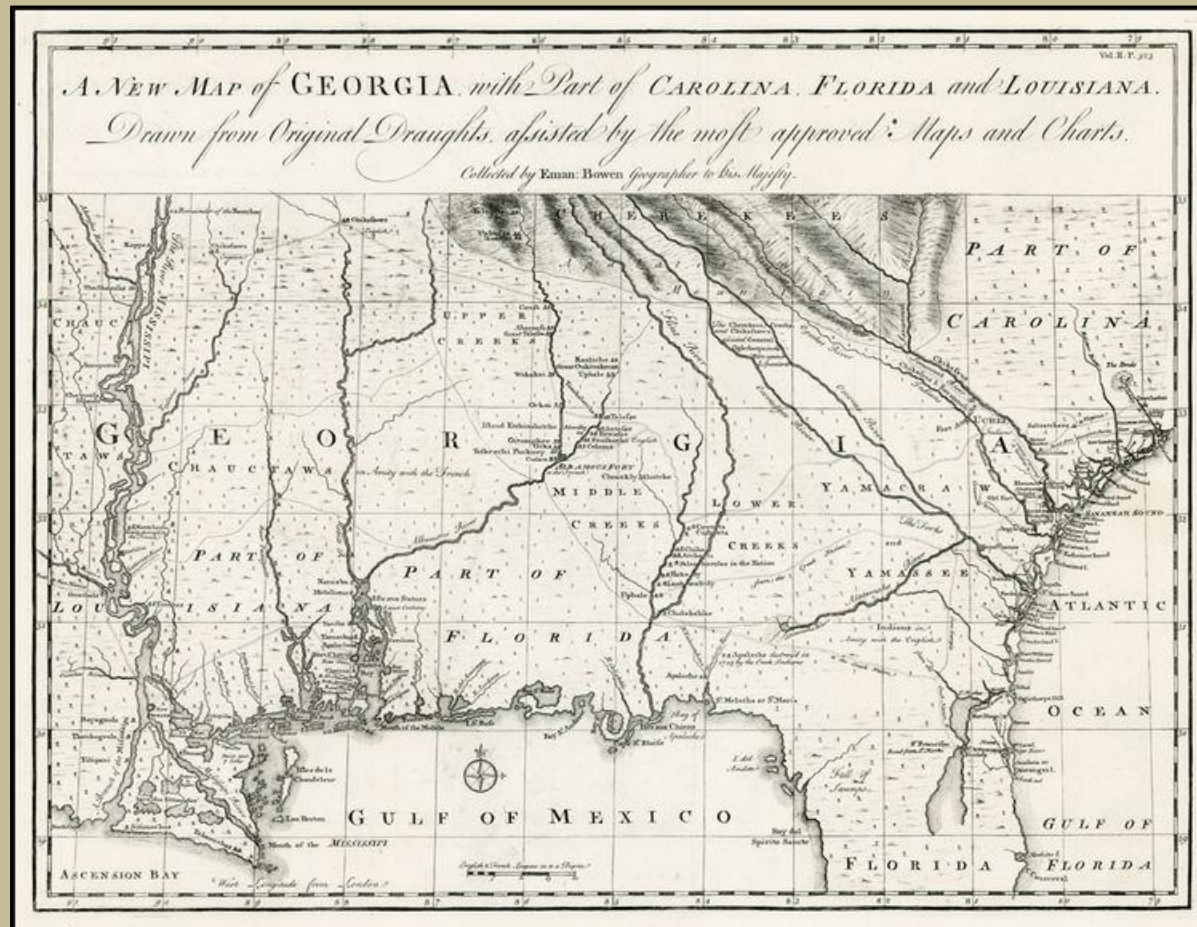


Principal Vectors of Concern

- *Aedes aegypti* – YF, DEN, CHIK
- *Aedes albopictus* – CHIK
- *Aedes triseriatus* – LAC
- *Anopheles quadrimaculatus s. l.* – malaria
- *Coquilletidia perturbans* – EEE
- *Culex quinquefasciatus* – WNV
- *Culiseta melanura* – EEE

Historical Perspective

- Mosquito-borne disease in Pre-colonial period
- 1733-1940 – Era of Malaria and Yellow Fever



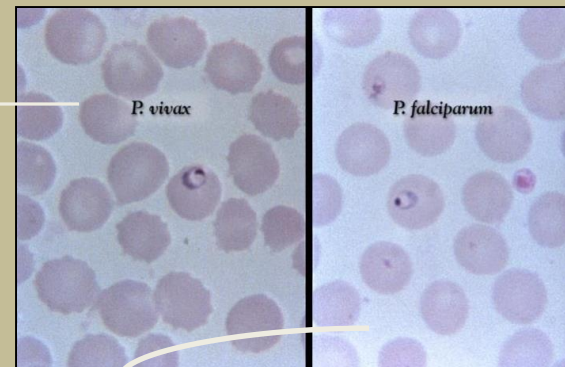
Circa 1748

Lessons

- Malaria – pathogen introduced to environment with competent vector
- Establishment possible
 - Altering landscape
 - Demographic patterns
- Yellow Fever
 - Vector introduced
 - Reintroduction of pathogen

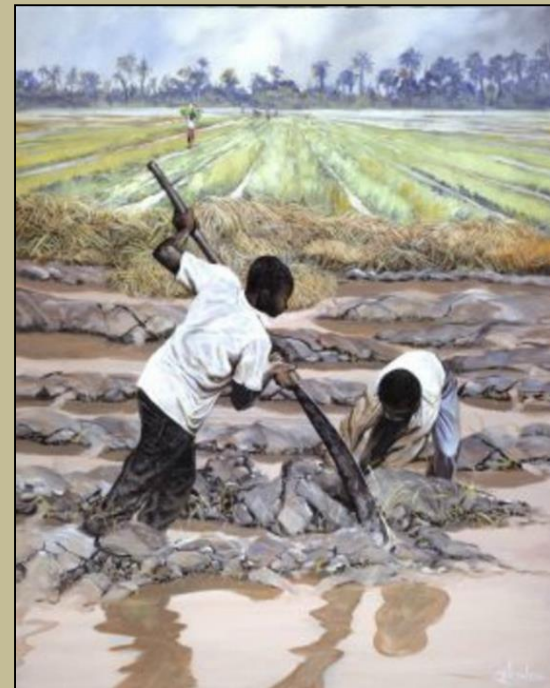
Malaria

- Two species established in North America
 - *Plasmodium vivax* from Europe
 - *Plasmodium falciparum* from West Africa
 - Below 35° N



Geographic & Sociological Factors Affect Malaria Epidemiology

- European and African coastal settlements
- Rice & indigo labor-intensive crops
- Impoundments increase *Anopheles* habitat
- Susceptibility differences
 - Africans versus Europeans
 - Consequences



The Curse of the Frontier

- Small farms & plantations took malaria inland
- Deforestation increased *Anopheles* habitat



Civil War Georgia

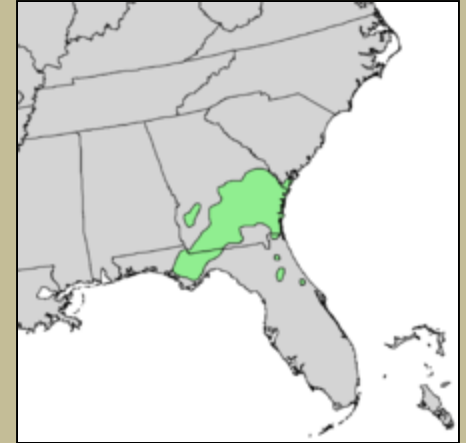
- “Malarial pesthole”
- Atlanta campaign (1864)
 - High morbidity
 - 18,000 cases total
 - Relatively low mortality
 - 16/month Union
 - 34/month CSA
- Quinine big factor





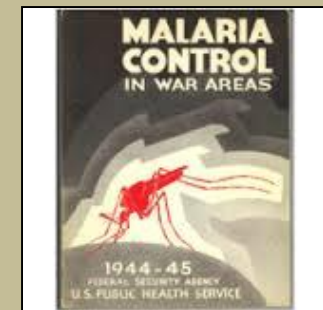
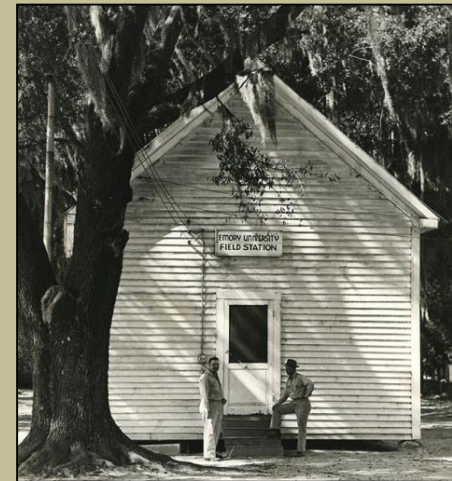
Looking for Local Alternatives

- Dogwood (*Cornus florida*)
 - Georgia Bark (*Pinckneya pubens*)
- “the indigenous remedy most highly recommended as the substitute for the Cinchona Bark” - Samuel Preston Moore – Confederate Surgeon General 1862



“Kicking a Dying Dog”

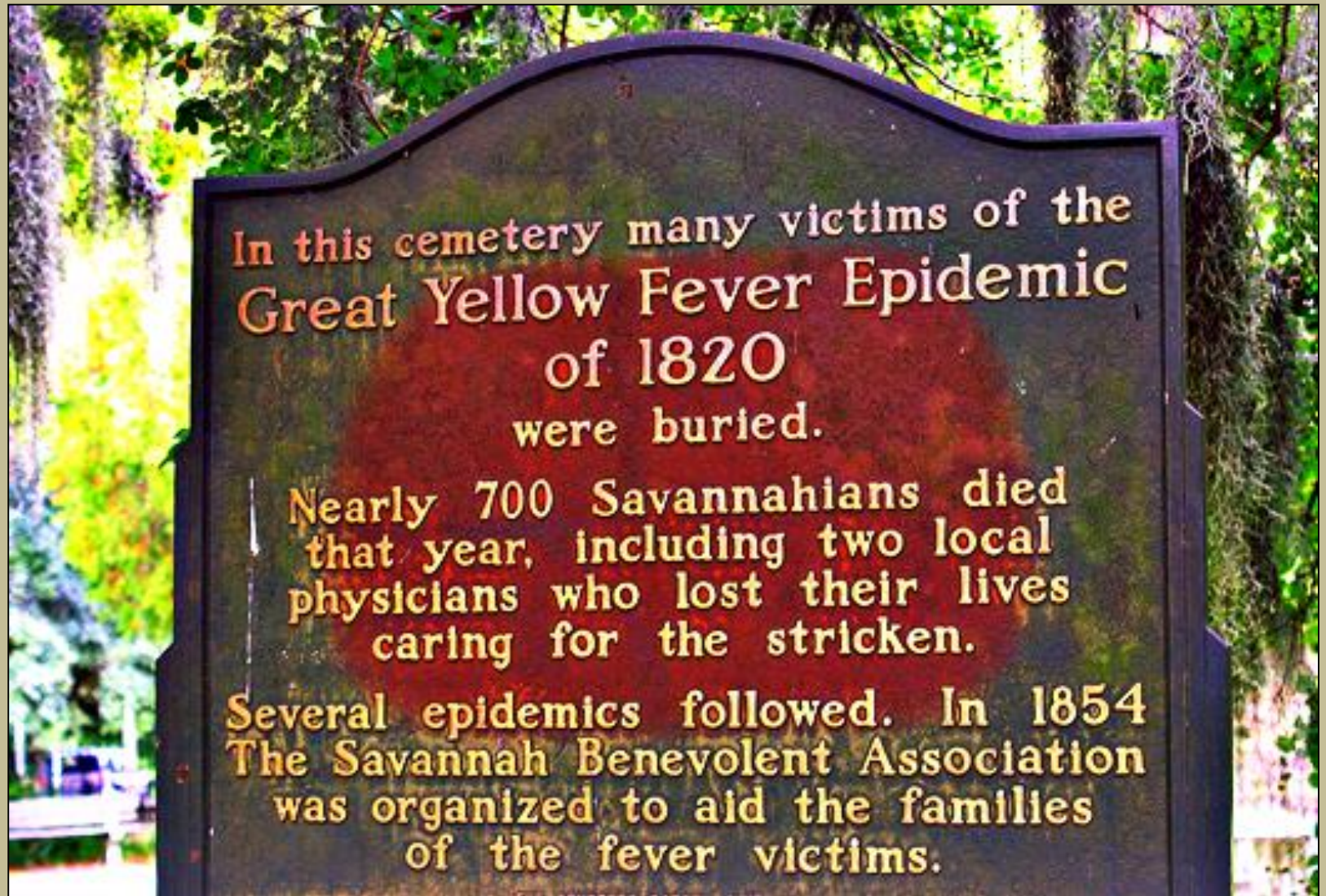
- Over 9,600 cases in southern WWI training camps
- Resurgence 1934-36 & TVA
- USPHS station in Baker County
- MCWA (1942)
 - set up to protect soldiers
 - protect workers from returning vets
- CDC and DDT



Yellow Fever



“A Scary and Mysterious Disease”



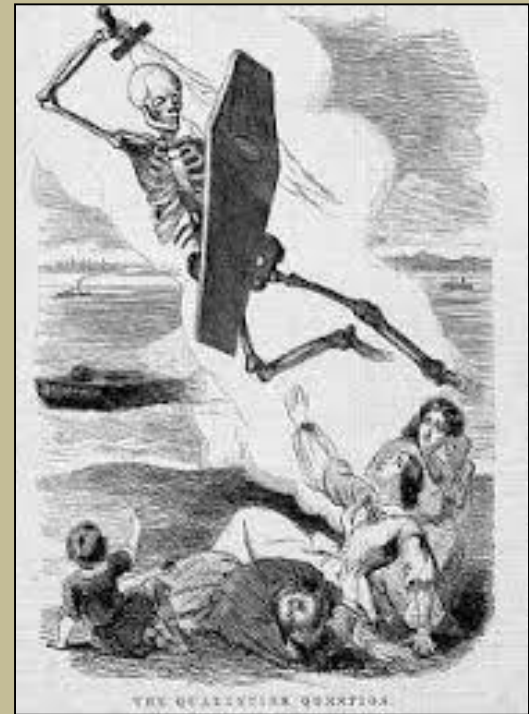
In this cemetery many victims of the
Great Yellow Fever Epidemic
of 1820
were buried.

Nearly 700 Savannahians died
that year, including two local
physicians who lost their lives
caring for the stricken.

Several epidemics followed. In 1854
The Savannah Benevolent Association
was organized to aid the families
of the fever victims.

Epidemiology

- Mostly coastal & urban
- Quick & deadly
- Highly disruptive
 - During one outbreak 2/3 of population fled & most of those who stayed got sick
- Cause?



Savannah Outbreaks

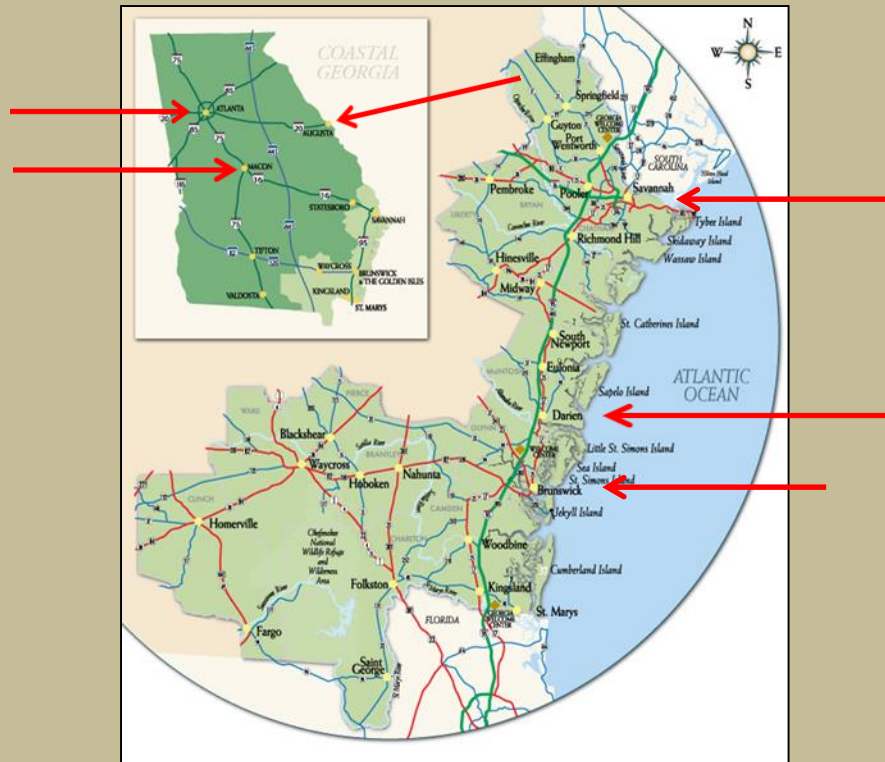


- 1820: 666 dead (9%)
- 1854: 1040 dead (6%)
- 1858: 114 dead (0.6%)
- 1876: 896 dead (3%)



Miasmas or Infectious Disease?

- Major Ely McClellan, MD US Army analyzed simultaneous 1876 epidemics in Savannah, Brunswick, Darien, Augusta, Macon, Atlanta

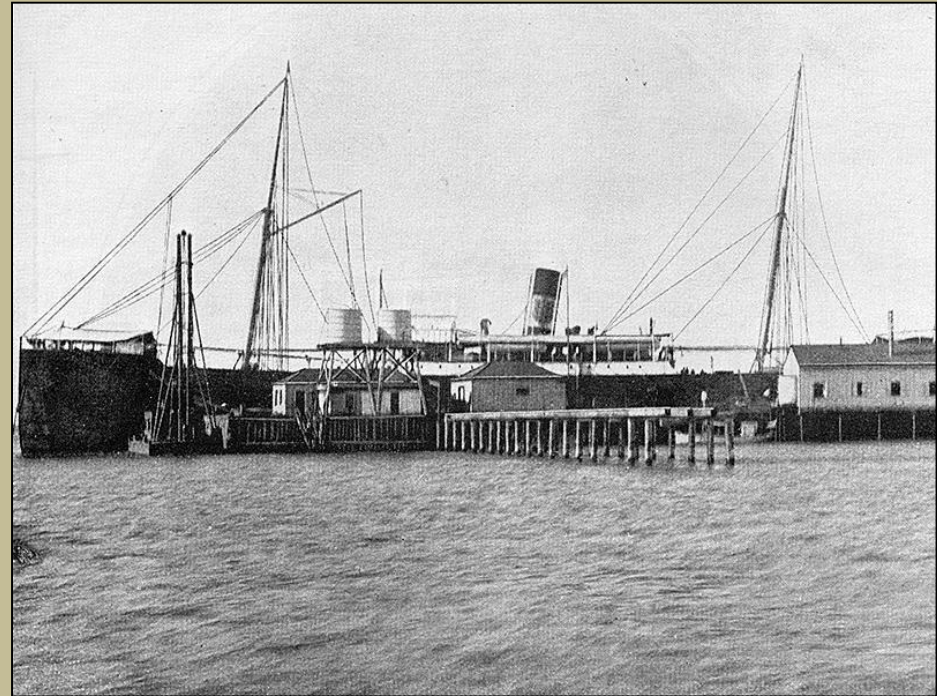


McClellan's Conclusions

- Most severe in ports
- After ships arrive from Havana, Cuba
- Starts at waterfront & radiates
- Inland cities situated on major road or rail lines
 - Lower incidence
 - Refugees from coast



US Marine Hospital Service Establishes Quarantine Station on Blackbeard Island



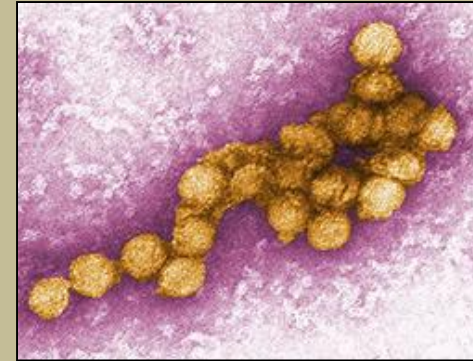
What Happened to Yellow Fever?

- 1881 – Carlos Finlay & *Aedes aegypti*
- 1900 – Reed Commission demonstrates transmission
- 1905 – Last outbreak in New Orleans
- 1936 – Max Theiler develops vaccine

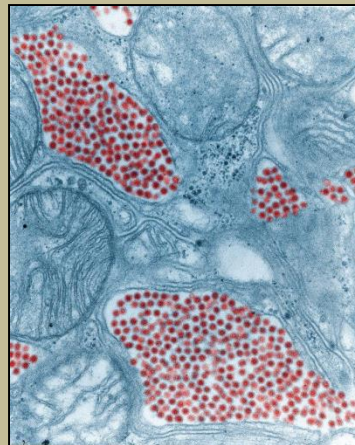


Mosquito-borne Disease in Georgia Today

- Endemic Arboviruses
 - West Nile Virus



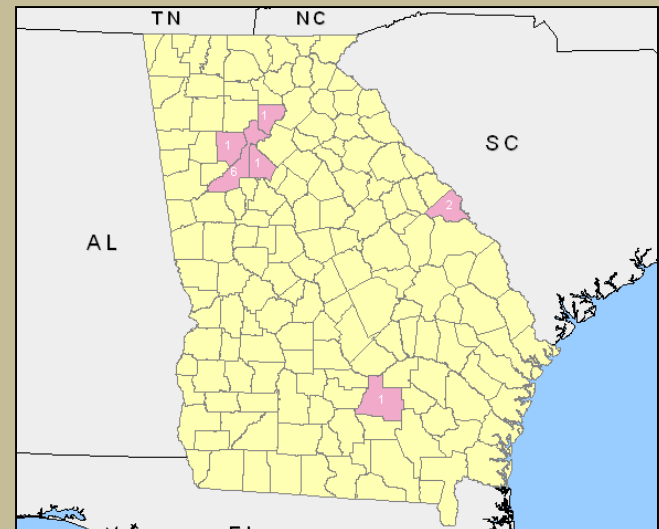
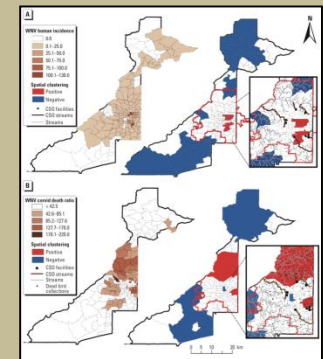
- Eastern Equine Encephalitis Virus



West Nile Virus in Georgia




- First detected in 2001
- Widespread in birds & mosquitoes
- *Culex quinquefasciatus* main vector
- Highest incidence associated with CSO sites in metro Atlanta
- 12 human cases in 2014



Future?

- Waiting at the door
 - Dengue
 - Chikungunya virus


WERE YOU RECENTLY IN THE CARIBBEAN?




MOSQUITOES spread diseases such as **CHIKUNGUNYA** and **DENGUE**.

Watch for fever with joint pains or rash in the next 2 weeks. If you get sick, see a doctor.


2 WEEKS						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4



Tell the doctor you traveled to the Caribbean.



For more information: call 800-CDC-INFO (232-4636) or visit www.cdc.gov/travel.



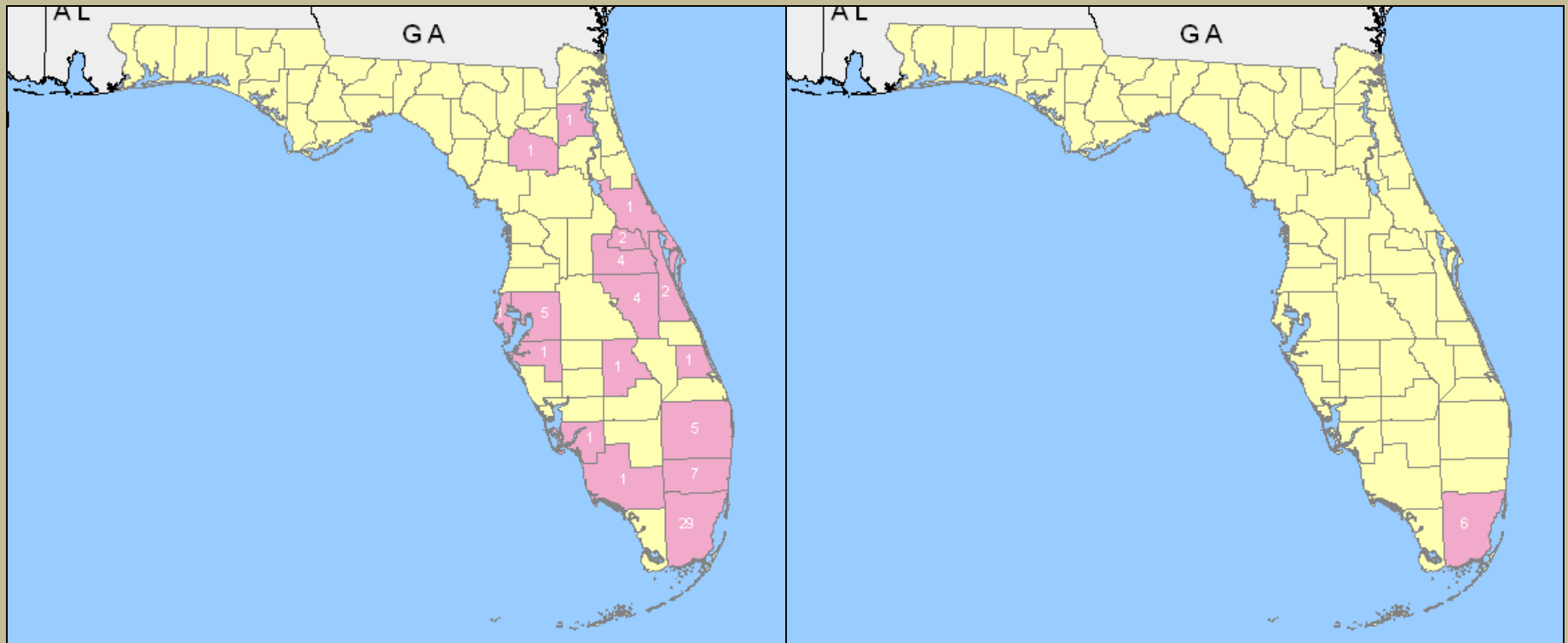
U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Chikungunya Virus

- Togaviridae
- Originally African (2 lineages)
- *Aedes aegypti* main vector
- Recently spread to Caribbean
- Nucleotide change makes ECSA strain 40 x more efficient in *Aedes albopictus*

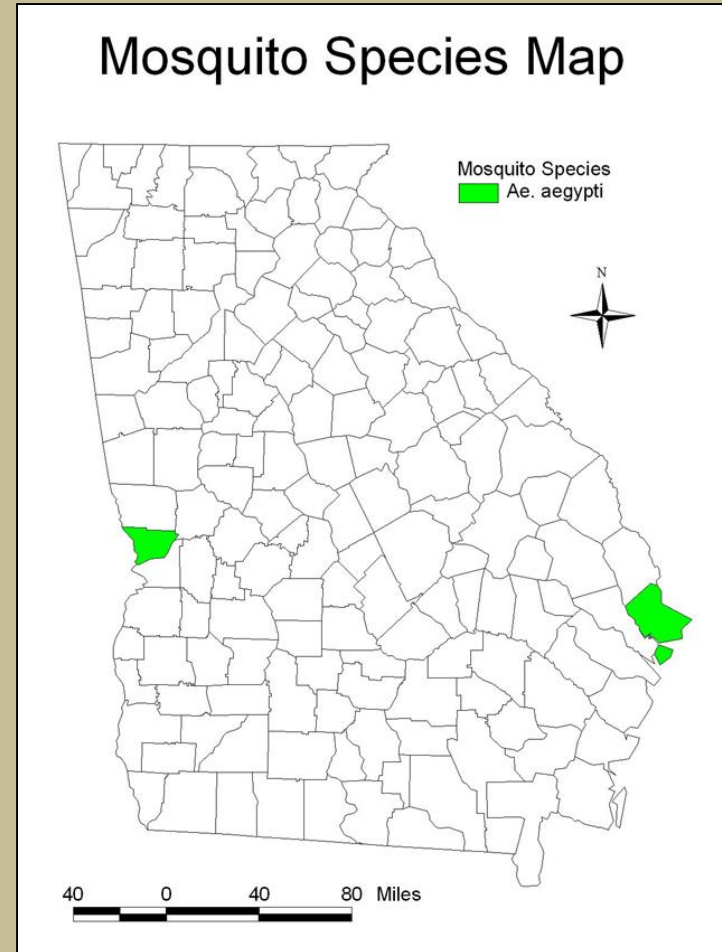
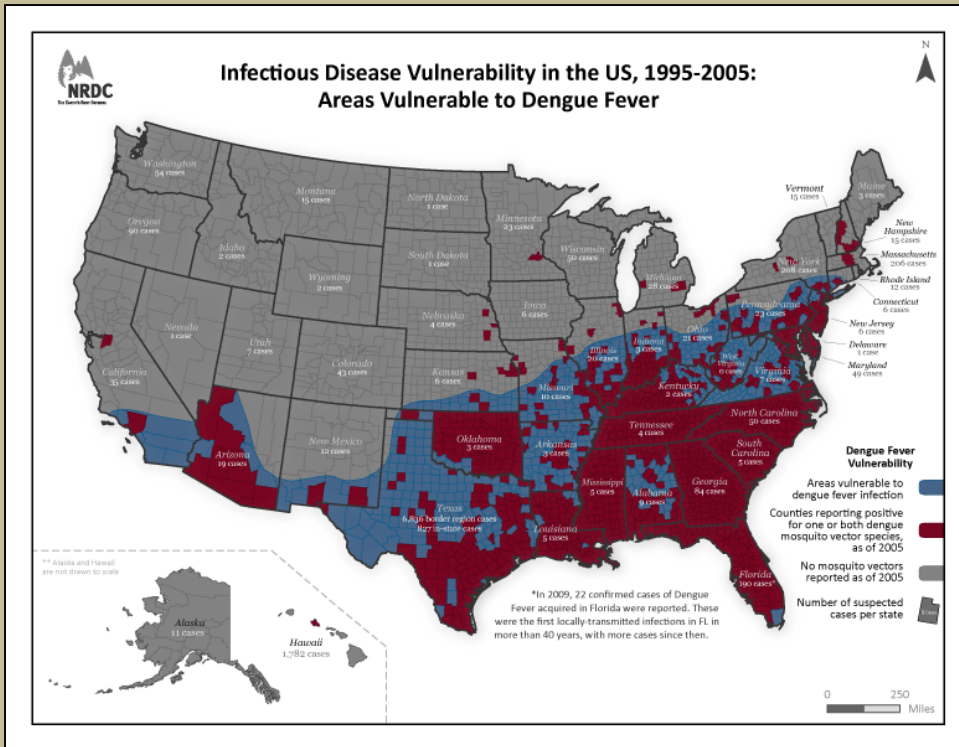


How likely is YF, CHIK or Dengue Outbreak?



- Dengue in Florida

In Georgia...



Comparing Vectors

- *Aedes aegypti*
 - Highly anthropophilic
 - Bite indoors
 - Container breeder
 - Nearly eliminated in Georgia

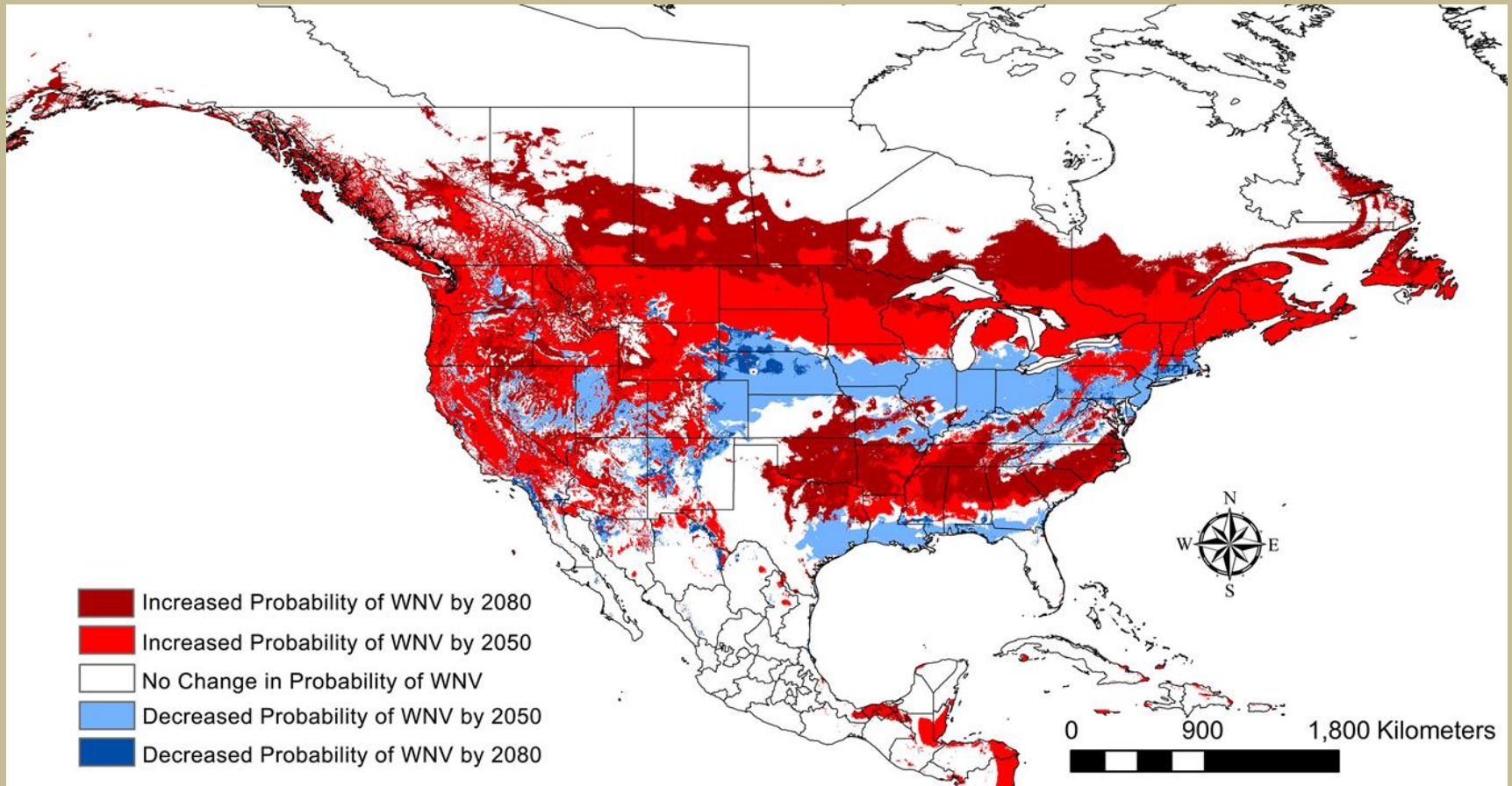


- *Aedes albopictus*
 - Abundant but not host specific



Climate Change

- Dire predictions



Reality

- Disease transmission complicated
- Temperature, rainfall, weather patterns affect
- Vectors, vertebrate hosts, cultural and economic factors

But you never know ...

