

Public Health Implications of Marine Harmful Algal Blooms in Florida

Environmental Protection Agency
Harmful Algal Bloom Webinar - May 23, 2019



Andrew Reich, MS, MSPH, RRT
Scientific Advisor
Bureau of Environmental Health

Division of Disease Control and Health Protection



Fun in Florida



Potential Exposure Pathways



Direct Skin Contact



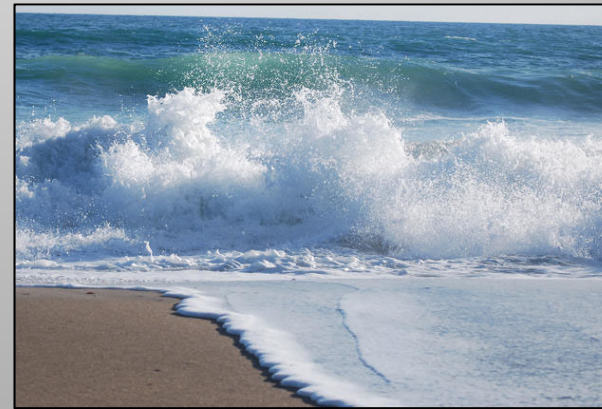
Ingestion of Food



Incidental Ingestion



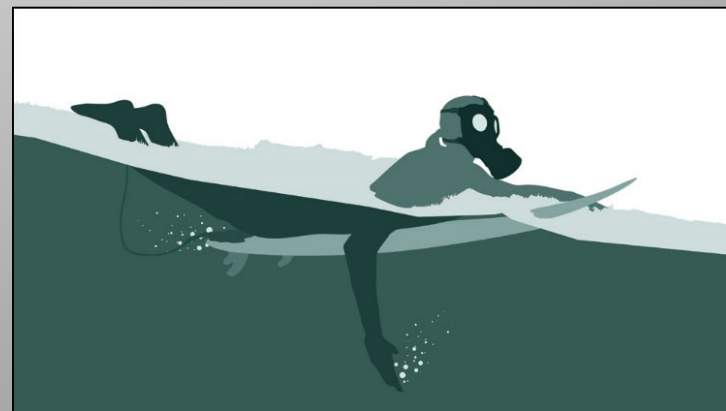
Drinking Water



Inhalation of Aerosols

Aquatic Toxins from Harmful Algal Blooms (HABs)

- Microscopic organisms (mostly)
- Brevetoxins, saxitoxins, ciguatoxins, et al
- Characteristics
 - ✓ No taste or smell
 - ✓ Heat, acid stable
 - ✓ Very potent



Reportable Diseases in Florida

Reportable Diseases/Conditions in Florida

Practitioner List (Laboratory Requirements Differ)

Per Rule 64D-3.029, Florida Administrative Code, promulgated October 20, 2016

Florida Department of Health

Did you know that you are required* to report certain diseases to your local county health department (CHD)?

You are an invaluable part of disease surveillance in Florida! Please visit www.FloridaHealth.gov/DiseaseReporting for more information. To report a disease or condition, contact your CHD epidemiology program (www.FloridaHealth.gov/CHDEpiContact). If unable to reach your CHD, please call the Department's Bureau of Epidemiology at (850) 245-4401.

! Report immediately 24/7 by phone upon initial suspicion or laboratory test order

☎ Report immediately 24/7 by phone

• Report next business day

+ Other reporting timeframe

<ul style="list-style-type: none"> ! Outbreaks of any disease, any case, cluster of cases, or exposure to an infectious or non-infectious disease, condition, or agent found in the general community or any defined setting (e.g., hospital, school, other institution) not listed that is of urgent public health significance + Acquired immune deficiency syndrome (AIDS) ☎ Amebic encephalitis ! Anthrax • Arsenic poisoning ! Arboviral diseases not otherwise listed • Babesiosis ! Botulism, foodborne, wound, and unspecified • Botulism, infant ! Brucellosis • California serogroup virus disease • Campylobacteriosis + Cancer, excluding non-melanoma skin cancer and including benign and borderline intracranial and CNS tumors • Carbon monoxide poisoning • Chancroid • Chikungunya fever ☎ Chikungunya fever, locally acquired • Chlamydia ! Cholera (<i>Vibrio cholerae</i> type O1) • Ciguatera fish poisoning + Congenital anomalies • Conjunctivitis in neonates <14 days old • Creutzfeldt-Jakob disease (CJD) • Cryptosporidiosis • Cyclosporiasis ! Dengue fever ! Diphtheria • Eastern equine encephalitis • Ehrlichiosis/anaplasmosis • <i>Escherichia coli</i> infection, Shiga toxin-producing • Giardiasis, acute ! Glanders • Gonorrhea • Granuloma inguinale 	<ul style="list-style-type: none"> ! <i>Haemophilus influenzae</i> invasive disease in children <5 years old • Hansen's disease (leprosy) ☎ Hantavirus infection ☎ Hemolytic uremic syndrome (HUS) ☎ Hepatitis A • Hepatitis B, C, D, E, and G • Hepatitis B surface antigen in pregnant women and children <2 years old ☎ Herpes B virus, possible exposure • Herpes simplex virus (HSV) in infants <60 days old with disseminated infection and liver involvement; encephalitis; and infections limited to skin, eyes, and mouth; anogenital HSV in children <12 years old + Human immunodeficiency virus (HIV) infection • HIV-exposed infants <18 months old born to an HIV-infected woman • Human papillomavirus (HPV)-associated laryngeal papillomas or recurrent respiratory papillomatosis in children <6 years old; anogenital papillomas in children ≤12 years old ! Influenza A, novel or pandemic strains ☎ Influenza-associated pediatric mortality in children <18 years old • Lead poisoning (blood lead level ≥5 µg/dL) • Legionellosis • Leptospirosis ☎ Listeriosis • Lyme disease • Lymphogranuloma venereum (LGV) • Malaria ! Measles (rubeola) ! Melioidosis • Meningitis, bacterial or mycotic ! Meningococcal disease • Mercury poisoning • Mumps + Neonatal abstinence syndrome (NAS) ☎ Neurotoxic shellfish poisoning ☎ Paratyphoid fever (<i>Salmonella</i> serotypes Paratyphi A, Paratyphi B, and Paratyphi C) ☎ Pertussis 	<ul style="list-style-type: none"> • Pesticide-related illness and injury, acute ! Plague ! Poliomyelitis • Psittacosis (ornithosis) • Q Fever ☎ Rabies, animal or human ! Rabies, possible exposure ! Ricin toxin poisoning • Rocky Mountain spotted fever and other spotted fever rickettsioses ! Rubella • St. Louis encephalitis • Salmonellosis • Saxitoxin poisoning (paralytic shellfish poisoning) ! Severe acute respiratory disease syndrome associated with coronavirus infection • Shigellosis ! Smallpox ☎ Staphylococcal enterotoxin B poisoning ☎ Staphylococcus aureus infection, intermediate or full resistance to vancomycin (VISA, VRSA) • Streptococcus pneumoniae invasive disease in children <6 years old • Syphilis • Syphilis in pregnant women and neonates • Tetanus • Trichinellosis (trichinosis) • Tuberculosis (TB) ! Tularemia ☎ Typhoid fever (<i>Salmonella</i> serotype Typhi) ! Typhus fever, epidemic ! Vaccinia disease • Varicella (chickenpox) ! Venezuelan equine encephalitis • Vibriosis (infections of <i>Vibrio</i> species and closely related organisms, excluding <i>Vibrio cholerae</i> type O1) ! Viral hemorrhagic fevers • West Nile virus disease ! Yellow fever ! Zika fever
---	---	---

Coming soon: "What's Reportable?" app for iOS and Android

*Subsection 381.0031(2), Florida Statutes, provides that "Any practitioner licensed in this state to practice medicine, osteopathic medicine, chiropractic medicine, naturopathy, or veterinary medicine; any hospital licensed under part I of chapter 395, or any laboratory licensed under chapter 483 that diagnoses or suspects the existence of a disease of public health significance shall immediately report the fact to the Department of Health." Florida's county health departments serve as the Department's representative in this reporting requirement. Furthermore, subsection 381.0031(4), Florida Statutes, provides that "The Department shall periodically issue a list of infectious or noninfectious diseases determined by it to be a threat to public health and therefore of significance to public health and shall furnish a copy of the list to the practitioners."

- Rule 64D-3.029, Florida Administrative Code
- Required to notify the Florida Department of Health of diseases and conditions of public health significance
- Practitioners, hospitals, medical facilities, laboratories, schools, nursing homes, state institutions, and other locations providing health services in Florida



Reportable Diseases in Florida

Reportable Diseases/Conditions in Florida

Practitioner List (Laboratory Requirements Differ)

Per Rule 64D-3.029, Florida Administrative Code, promulgated October 20, 2016

Florida Department of Health

Did you know that you are required* to report certain diseases to your local county health department (CHD)?

You are an invaluable part of disease surveillance in Florida! Please visit www.FloridaHealth.gov/DiseaseReporting for more information. To report a disease or condition, contact your CHD epidemiology program (www.FloridaHealth.gov/CHDEpiContact). If unable to reach your CHD, please call the Department's Bureau of Epidemiology at (850) 245-4401.

Report immediately 24/7 by phone upon initial suspicion or laboratory test order

Report immediately 24/7 by phone

Report next business day

Other reporting timeframe

<ul style="list-style-type: none"> ! Outbreaks of any disease, any case, cluster of cases, or exposure to an infectious or non-infectious disease, condition, or agent found in the general community or any defined setting (e.g., hospital, school, other institution) not listed that is of urgent public health significance + Acquired immune deficiency syndrome (AIDS) ! Amebic encephalitis ! Anthrax + Arsenic poisoning ! Arboviral diseases not otherwise listed + Babesiosis ! Botulism, foodborne, wound, and unspecified + Botulism, infant ! Brucellosis + California serogroup virus disease + Campylobacteriosis + Cancer, excluding non-melanoma skin cancer and including benign and borderline intracranial and CNS tumors + Carbon monoxide poisoning + Chancroid + Chikungunya fever ! Chikungunya fever, locally acquired + Chlamydia ! Cholera (<i>Vibrio cholerae</i> type O1) + Ciguatera fish poisoning + Congenital anomalies + Conjunctivitis in neonates <14 days old + Creutzfeldt-Jakob disease (CJD) + Cryptosporidiosis + Cyclosporiasis ! Dengue fever ! Diphtheria + Eastern equine encephalitis + Ehrlichiosis/anaplasmosis + <i>Escherichia coli</i> infection, Shiga toxin-producing + Giardiasis, acute ! Glanders + Gonorrhea + Granuloma inguinale 	<ul style="list-style-type: none"> ! <i>Haemophilus influenzae</i> invasive disease in children <5 years old + Hansen's disease (leprosy) ! Hantavirus infection ! Hemolytic uremic syndrome (HUS) ! Hepatitis A + Hepatitis B, C, D, E, and G + Hepatitis B surface antigen in pregnant women and children <2 years old ! Herpes B virus, possible exposure + Herpes simplex virus (HSV) in infants <50 days old with disseminated infection and liver involvement; encephalitis; and infections limited to skin, eyes, and mouth; anogenital HSV in children <12 years old + Human immunodeficiency virus (HIV) infection + HIV-exposed infants <18 months old born to an HIV-infected woman + Human papillomavirus (HPV)-associated laryngeal papillomas or recurrent respiratory papillomatosis in children <6 years old; anogenital papillomas in children ≤12 years old ! Influenza A, novel or pandemic strains ! Influenza-associated pediatric mortality in children <18 years old + Lead poisoning (blood lead level ≥5 µg/dL) + Legionellosis + Leptospirosis ! Listeriosis + Lyme disease + Lymphogranuloma venereum (LGV) + Malaria ! Measles (rubeola) ! Melioidosis + Meningitis, bacterial or mycotic ! Meningococcal disease + Mercury poisoning + Mumps + Neonatal abstinence syndrome (NAS) ! Neurotoxic shellfish poisoning ! Paratyphoid fever (<i>Salmonella</i> serotypes Paratyphi A, Paratyphi B, and Paratyphi C) ! Pertussis 	<ul style="list-style-type: none"> + Pesticide-related illness and injury, acute ! Plague ! Poliomyelitis + Psittacosis (ornithosis) + Q Fever ! Rabies, animal or human ! Rabies, possible exposure ! Ricin toxin poisoning + Rocky Mountain spotted fever and other spotted fever rickettsioses ! Rubella + St. Louis encephalitis + Salmonellosis + Saxitoxin poisoning (paralytic shellfish poisoning) ! Severe acute respiratory disease syndrome associated with coronavirus infection + Shigellosis ! Smallpox ! Staphylococcal enterotoxin B poisoning ! Staphylococcus aureus infection, intermediate or full resistance to vancomycin (VISA, VRSA) + Streptococcus pneumoniae invasive disease in children <6 years old + Syphilis ! Syphilis in pregnant women and neonates + Tetanus + Trichinellosis (trichinosis) + Tuberculosis (TB) ! Tularemia ! Typhoid fever (<i>Salmonella</i> serotype Typhi) ! Typhus fever, epidemic ! Vaccinia disease + Varicella (chickenpox) ! Venezuelan equine encephalitis + Vibriosis (infections of <i>Vibrio</i> species and closely related organisms, excluding <i>Vibrio cholerae</i> type O1) ! Viral hemorrhagic fevers + West Nile virus disease ! Yellow fever ! Zika fever
---	---	---

Coming soon: "What's Reportable?" app for iOS and Android

*Subsection 381.0031(2), Florida Statutes, provides that "Any practitioner licensed in this state to practice medicine, osteopathic medicine, chiropractic medicine, naturopathy, or veterinary medicine; any hospital licensed under part I of chapter 395; or any laboratory licensed under chapter 483 that diagnoses or suspects the existence of a disease of public health significance shall immediately report the fact to the Department of Health." Florida's county health departments serve as the Department's representative in this reporting requirement. Furthermore, subsection 381.0031(4), Florida Statutes, provides that "The Department shall periodically issue a list of infectious or noninfectious diseases determined by it to be a threat to public health and therefore of significance to public health and shall furnish a copy of the list to the practitioners."

Neurotoxic Shellfish Poisoning (NSP) Brevetoxin (*Karenia brevis*)



Reportable Diseases in Florida

Reportable Diseases/Conditions in Florida

Practitioner List (Laboratory Requirements Differ)

Per Rule 64D-3.029, Florida Administrative Code, promulgated October 20, 2016

Florida Department of Health

Did you know that you are required* to report certain diseases to your local county health department (CHD)?

You are an invaluable part of disease surveillance in Florida! Please visit www.FloridaHealth.gov/DiseaseReporting for more information. To report a disease or condition, contact your CHD epidemiology program (www.FloridaHealth.gov/CHDEpiContact). If unable to reach your CHD, please call the Department's Bureau of Epidemiology at (850) 245-4401.

- ! Report immediately 24/7 by phone upon initial suspicion or laboratory test order
- 📞 Report immediately 24/7 by phone
- Report next business day
- + Other reporting timeframe

<ul style="list-style-type: none"> ! Outbreaks of any disease, any case, cluster of cases, or exposure to an infectious or non-infectious disease, condition, or agent found in the general community or any defined setting (e.g., hospital, school, other institution) not listed that is of urgent public health significance + Acquired immune deficiency syndrome (AIDS) 📞 Amebic encephalitis ! Anthrax • Arsenic poisoning ! Arboviral diseases not otherwise listed • Babesiosis ! Botulism, foodborne, wound, and unspecified • Botulism, infant ! Brucellosis • California serogroup virus disease • Campylobacteriosis + Cancer, excluding non-melanoma skin cancer and including benign and borderline intracranial and CNS tumors • Carbon monoxide poisoning • Chancroid • Chikungunya fever 📞 Chikungunya fever, locally acquired • Chlamydia ! Cholera (<i>Vibrio cholerae</i> type O1) • Ciguatera fish poisoning + Congenital anomalies • Conjunctivitis in neonates <14 days old • Creutzfeldt-Jakob disease (CJD) • Cryptosporidiosis • Cyclosporiasis ! Dengue fever ! Diphtheria • Eastern equine encephalitis • Ehrlichiosis/anaplasmosis • <i>Escherichia coli</i> infection, Shiga toxin-producing • Giardiasis, acute ! Glanders • Gonorrhea • Granuloma inguinale 	<ul style="list-style-type: none"> ! <i>Haemophilus influenzae</i> invasive disease in children <5 years old • Hansen's disease (leprosy) 📞 Hantavirus infection 📞 Hemolytic uremic syndrome (HUS) 📞 Hepatitis A • Hepatitis B, C, D, E, and G • Hepatitis B surface antigen in pregnant women and children <2 years old 📞 Herpes B virus, possible exposure • Herpes simplex virus (HSV) in infants <50 days old with disseminated infection and liver involvement; encephalitis; and infections limited to skin, eyes, and mouth; anogenital HSV in children <12 years old + Human immunodeficiency virus (HIV) infection • HIV-exposed infants <18 months old born to an HIV-infected woman • Human papillomavirus (HPV)-associated laryngeal papillomas or recurrent respiratory papillomatosis in children <6 years old; anogenital papillomas in children ≤12 years old ! Influenza A, novel or pandemic strains 📞 Influenza-associated pediatric mortality in children <18 years old • Lead poisoning (blood lead level ≥5 µg/dL) • Legionellosis • Leptospirosis 📞 Listeriosis • Lyme disease • Lymphogranuloma venereum (LGV) • Malaria ! Measles (rubeola) ! Melioidosis • Meningitis, bacterial or mycotic ! Meningococcal disease • Mercury poisoning • Mumps • Neonatal abstinence syndrome (NAS) 📞 Neurotoxic shellfish poisoning 📞 Shiga toxin-producing <i>Escherichia coli</i> infection, acute ! Shigellosis • Syphilis • Syphilis in pregnant women and neonates • Tetanus • Trichinellosis (trichinosis) • Tuberculosis (TB) ! Tularemia 📞 Typhoid fever (<i>Salmonella</i> serotype Typhi) ! Typhus fever, epidemic ! Vaccinia disease • Varicella (chickenpox) ! Venezuelan equine encephalitis • Vibriosis (infections of <i>Vibrio</i> species and closely related organisms, excluding <i>Vibrio cholerae</i> type O1) ! Viral hemorrhagic fevers • West Nile virus disease ! Yellow fever ! Zika fever 	<ul style="list-style-type: none"> • Pesticide-related illness and injury, acute ! Plague ! Poliomyelitis • Psittacosis (ornithosis) • Q Fever 📞 Rabies, animal or human ! Rabies, possible exposure ! Ricin toxin poisoning • Rocky Mountain spotted fever and other spotted fever rickettsioses ! Rubella • St. Louis encephalitis • Salmonellosis • Saxitoxin poisoning (paralytic shellfish poisoning) ! Severe acute respiratory disease syndrome associated with coronavirus infection • Shigellosis ! Smallpox 📞 Staphylococcal enterotoxin B poisoning 📞 <i>Staphylococcus aureus</i> infection, intermediate or full resistance to vancomycin (VISA, VRSA) • <i>Streptococcus pneumoniae</i> invasive disease in children <6 years old • Syphilis • Syphilis in pregnant women and neonates • Tetanus • Trichinellosis (trichinosis) • Tuberculosis (TB) ! Tularemia 📞 Typhoid fever (<i>Salmonella</i> serotype Typhi) ! Typhus fever, epidemic ! Vaccinia disease • Varicella (chickenpox) ! Venezuelan equine encephalitis • Vibriosis (infections of <i>Vibrio</i> species and closely related organisms, excluding <i>Vibrio cholerae</i> type O1) ! Viral hemorrhagic fevers • West Nile virus disease ! Yellow fever ! Zika fever
---	--	---

Coming soon: "What's Reportable?" app for iOS and Android

*Subsection 381.0031(2), Florida Statutes, provides that "Any practitioner licensed in this state to practice medicine, osteopathic medicine, chiropractic medicine, naturopathy, or veterinary medicine; any hospital licensed under part I of chapter 395; or any laboratory licensed under chapter 483 that diagnoses or suspects the existence of a disease of public health significance shall immediately report the fact to the Department of Health." Florida's county health departments serve as the Department's representative in this reporting requirement. Furthermore, subsection 381.0031(4), Florida Statutes, provides that "The Department shall periodically issue a list of infectious or noninfectious diseases determined by it to be a threat to public health and therefore of significance to public health and shall furnish a copy of the list to the practitioners."

Neurotoxic Shellfish Poisoning (NSP) Brevetoxin (*Karenia brevis*)



Regulated Shellfish Harvesting Areas



Neurotoxic Shellfish Poisoning

- *Karenia brevis* Red Tide
Brevetoxins



Ben Depp, National Geographic 8/8/18



Reportable Diseases in Florida

Reportable Diseases/Conditions in Florida

Practitioner List (Laboratory Requirements Differ)

Per Rule 64D-3.029, Florida Administrative Code, promulgated October 20, 2016

Florida Department of Health

Did you know that you are required* to report certain diseases to your local county health department (CHD)?

You are an invaluable part of disease surveillance in Florida! Please visit www.FloridaHealth.gov/DiseaseReporting for more information. To report a disease or condition, contact your CHD epidemiology program (www.FloridaHealth.gov/CHDEpiContact). If unable to reach your CHD, please call the Department's Bureau of Epidemiology at (850) 245-4401.

! Report immediately 24/7 by phone upon initial suspicion or laboratory test order

📞 Report immediately 24/7 by phone

- Report next business day
- Other reporting timeframe

<ul style="list-style-type: none"> ! Outbreaks of any disease, any case, cluster of cases, or exposure to an infectious or non-infectious disease, condition, or agent found in the general community or any defined setting (e.g., hospital, school, other institution) not listed that is of urgent public health significance + Acquired immune deficiency syndrome (AIDS) 📞 Amebic encephalitis ! Anthrax • Arsenic poisoning ! Arboviral diseases not otherwise listed • Babesiosis ! Botulism, foodborne, wound, and unspecified • Botulism, infant ! Brucellosis • California serogroup virus disease • Campylobacteriosis + Cancer, excluding non-melanoma skin cancer and including benign and borderline intracranial and CNS tumors • Carbon monoxide poisoning • Chancroid • Chikungunya fever 📞 Chikungunya fever, locally acquired • Chlamydia ! Cholera (<i>Vibrio cholerae</i> type O1) • Ciguatera fish poisoning + Congenital anomalies • Conjunctivitis in neonates <14 days old • Creutzfeldt-Jakob disease (CJD) • Cryptosporidiosis • Cyclosporiasis ! Dengue fever ! Diphtheria • Eastern equine encephalitis • Ehrlichiosis/anaplasmosis • <i>Escherichia coli</i> infection, Shiga toxin-producing • Giardiasis, acute ! Glanders • Gonorrhea • Granuloma inguinale 	<ul style="list-style-type: none"> ! <i>Haemophilus influenzae</i> invasive disease in children <5 years old • Hansen's disease (leprosy) 📞 Hantavirus infection 📞 Hemolytic uremic syndrome (HUS) 📞 Hepatitis A • Hepatitis B, C, D, E, and G • Hepatitis B surface antigen in pregnant women and children <2 years old 📞 Herpes B virus, possible exposure • Herpes simplex virus (HSV) in infants <50 days old with disseminated infection and liver involvement; encephalitis; and infections limited to skin, eyes, and mouth; anogenital HSV in children <12 years old + Human immunodeficiency virus (HIV) infection • HIV-exposed infants <18 months old born to an HIV-infected woman • Human papillomavirus (HPV)-associated laryngeal papillomas or recurrent respiratory papillomatosis in children <6 years old; anogenital papillomas in children ≤12 years old ! Influenza A, novel or pandemic strains 📞 Influenza-associated pediatric mortality in children <18 years old • Lead poisoning (blood lead level ≥5 µg/dL) • Legionellosis • Leptospirosis 📞 Listeriosis • Lyme disease • Lymphogranuloma venereum (LGV) • Malaria ! Measles (rubeola) ! Melioidosis • Meningitis, bacterial or mycotic ! Meningococcal disease • Mercury poisoning • Mumps + Neonatal abstinence syndrome (NAS) 📞 Neurotoxic shellfish poisoning 📞 Paratyphoid fever (<i>Salmonella</i> serotypes Paratyphi A, Paratyphi B, and Paratyphi C) 📞 Pertussis 	<ul style="list-style-type: none"> • Pesticide-related illness and injury, acute ! Plague ! Poliomyelitis • Psittacosis (ornithosis) • Q Fever 📞 Rabies, animal or human ! Rabies, possible exposure ! Ricin toxin poisoning • Rocky Mountain spotted fever and other spotted fever rickettsioses ! Rubella • St. Louis encephalitis • Salmonellosis • Saxitoxin poisoning (paralytic shellfish poisoning) • Severe acute respiratory disease syndrome associated with coronavirus infection • Shigellosis ! Smallpox 📞 Staphylococcal enterotoxin B poisoning 📞 <i>Staphylococcus aureus</i> infection, intermediate or full resistance to vancomycin (VISA, VRSA) • Streptococcus pneumoniae invasive disease in children <6 years old • Syphilis 📞 Syphilis in pregnant women and neonates • Tetanus • Trichinellosis (trichinosis) • Tuberculosis (TB) ! Tularemia 📞 Typhoid fever (<i>Salmonella</i> serotype Typhi) ! Typhus fever, epidemic ! Vaccinia disease • Varicella (chickenpox) ! Venezuelan equine encephalitis • Vibriosis (infections of <i>Vibrio</i> species and closely related organisms, excluding <i>Vibrio cholerae</i> type O1) ! Viral hemorrhagic fevers • West Nile virus disease ! Yellow fever ! Zika fever
---	---	--

Coming soon: "What's Reportable?" app for iOS and Android

*Subsection 381.0031(2), Florida Statutes, provides that "Any practitioner licensed in this state to practice medicine, osteopathic medicine, chiropractic medicine, naturopathy, or veterinary medicine; any hospital licensed under part I of chapter 395; or any laboratory licensed under chapter 483 that diagnoses or suspects the existence of a disease of public health significance shall immediately report the fact to the Department of Health." Florida's county health departments serve as the Department's representative in this reporting requirement. Furthermore, subsection 381.0031(4), Florida Statutes, provides that "The Department shall periodically issue a list of infectious or noninfectious diseases determined by it to be a threat to public health and therefore of significance to public health and shall furnish a copy of the list to the practitioners..."

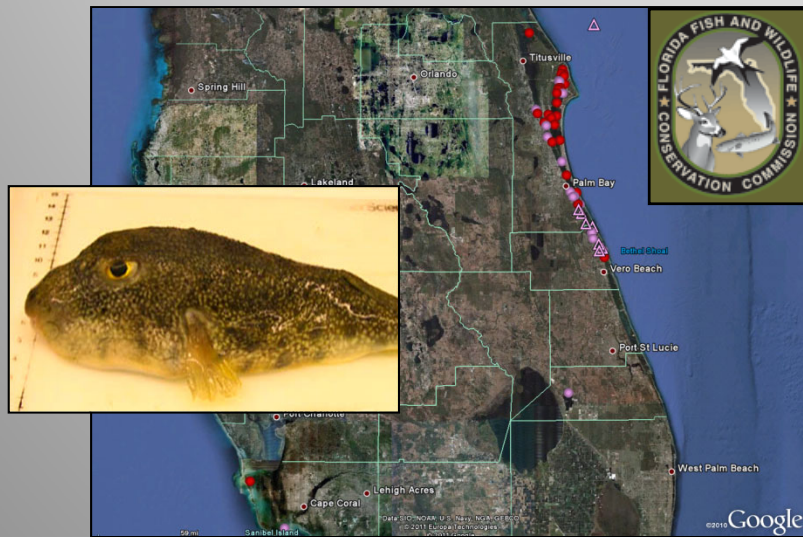
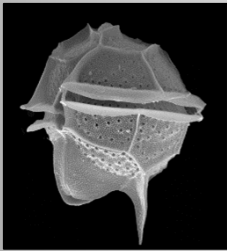
Neurotoxic Shellfish Poisoning (NSP)
Brevetoxin (*Karenia brevis*)

Paralytic Shellfish Poisoning (PSP)
Saxitoxin (*Pyrodinium bahamense*) including Puffers



Paralytic Shellfish Poisoning

- *Pyrodinium bahamense*
✓ Saxitoxin



Contaminated Puffer Fish



Division of
Aquaculture

PRECAUTIONARY CLOSURE STATEMENT

Date: 7/28/17

The Florida Department of Agriculture and Consumer Services is temporarily closing the following shellfish area at sunset on Friday July 28, 2017 for the harvest of oysters, clams, and mussels. In this context, shellfish does not include scallops, shrimp, or crabs.

Area(s): #7812/7822 Body B Zones 1 and 2 Shellfish Harvest Areas

Affected

Counties: Brevard

Basis for action: Precautionary closure due to presence of *Pyrodinium bahamense* and conditions defined in Chapter 5L-1.003 (8), Florida Administrative Code and The Biotoxin Contingency Plan.



Paralytic Shellfish Poisoning

“Bioluminescence”



Reportable Diseases in Florida

Reportable Diseases/Conditions in Florida

Practitioner List (Laboratory Requirements Differ)

Per Rule 64D-3.029, Florida Administrative Code, promulgated October 20, 2016

Florida Department of Health

Did you know that you are required* to report certain diseases to your local county health department (CHD)?

You are an invaluable part of disease surveillance in Florida! Please visit www.FloridaHealth.gov/DiseaseReporting for more information. To report a disease or condition, contact your CHD epidemiology program (www.FloridaHealth.gov/CHDEpiContact). If unable to reach your CHD, please call the Department's Bureau of Epidemiology at (850) 245-4401.

! Report immediately 24/7 by phone upon initial suspicion or laboratory test order

📞 Report immediately 24/7 by phone

• Report next business day

+ Other reporting timeframe

<ul style="list-style-type: none"> ! Outbreaks of any disease, any case, cluster of cases, or exposure to an infectious or non-infectious disease, condition, or agent found in the general community or any defined setting (e.g., hospital, school, other institution) not listed that is of urgent public health significance + Acquired immune deficiency syndrome (AIDS) 📞 Amebic encephalitis ! Anthrax • Arsenical poisoning ! Arboviral diseases not otherwise listed • Babesiosis ! Botulism, foodborne, wound, and unspecified • Botulism, infant ! Brucellosis • California serogroup virus disease • Campylobacteriosis + Cancer, excluding non-melanoma skin cancer and including benign and borderline intracranial and CNS tumors • Carbon monoxide poisoning • Chancroid • Chikungunya fever 📞 Chikungunya fever, locally acquired • Chlamydia ! Ciguatera (<i>Vibrio cholerae</i> type O1) • Ciguatera fish poisoning + Congenital anomalies • Cryptosporidium parvum <14 days old • Creutzfeldt-Jakob disease (CJD) • Cryptosporidiosis • Cyclosporiasis ! Dengue fever ! Diphtheria • Eastern equine encephalitis • Ehrlichiosis/anaplasmosis • <i>Escherichia coli</i> infection, Shiga toxin-producing • Giardiasis, acute ! Glanders • Gonorrhea • Granuloma inguinale 	<ul style="list-style-type: none"> ! <i>Haemophilus influenzae</i> invasive disease in children <5 years old • Hansen's disease (leprosy) 📞 Hantavirus infection 📞 Hemolytic uremic syndrome (HUS) 📞 Hepatitis A • Hepatitis B, C, D, E, and G • Hepatitis B surface antigen in pregnant women and children <2 years old 📞 Herpes B virus, possible exposure • Herpes simplex virus (HSV) in infants <50 days old with disseminated infection and liver involvement; encephalitis; and infections limited to skin, eyes, and mouth; anogenital HSV in children <12 years old + Human immunodeficiency virus (HIV) infection • HIV-exposed infants <18 months old born to an HIV-infected woman • Human papillomavirus (HPV)-associated laryngeal papillomas or recurrent respiratory papillomatosis in children <6 years old; anogenital papillomas in children ≤12 years old ! Influenza A, novel or pandemic strains 📞 Influenza-associated pediatric mortality in children <18 years old • Lead poisoning (blood lead level ≥5 µg/dL) • Legionellosis • Leptospirosis 📞 Listeriosis • Lyme disease • Lymphogranuloma venereum (LGV) • Malaria ! Measles (rubeola) ! Melioidosis • Meningitis, bacterial or mycotic ! Meningococcal disease • Mercury poisoning • Mumps + Neonatal abstinence syndrome (NAS) 📞 Neurotoxic shellfish poisoning 📞 Paratyphoid fever (<i>Salmonella</i> serotypes Paratyphi A, Paratyphi B, and Paratyphi C) 📞 Pertussis 	<ul style="list-style-type: none"> • Pesticide-related illness and injury, acute ! Plague ! Poliomyelitis • Psittacosis (ornithosis) • Q Fever 📞 Rabies, animal or human ! Rabies, possible exposure ! Ricin toxin poisoning • Rocky Mountain spotted fever and other spotted fever rickettsioses ! Rubella • St. Louis encephalitis • Salmonellosis • Saxitoxin poisoning (paralytic shellfish poisoning) ! Severe acute respiratory disease syndrome associated with coronavirus infection • Shigellosis ! Smallpox 📞 Staphylococcal enterotoxin B poisoning 📞 <i>Staphylococcus aureus</i> infection, intermediate or full resistance to vancomycin (VISA, VRSA) • Streptococcus pneumoniae invasive disease in children <6 years old • Syphilis • Syphilis in pregnant women and neonates • Tetanus • Trichinellosis (trichinosis) • Tuberculosis (TB) ! Tularemia 📞 Typhoid fever (<i>Salmonella</i> serotype Typhi) ! Typhus fever, epidemic ! Vaccinia disease • Varicella (chickenpox) ! Venezuelan equine encephalitis • Vibriosis (infections of <i>Vibrio</i> species and closely related organisms, excluding <i>Vibrio cholerae</i> type O1) ! Viral hemorrhagic fevers • West Nile virus disease ! Yellow fever ! Zika fever
---	---	--

Coming soon: "What's Reportable?" app for iOS and Android

*Subsection 381.0031(2), Florida Statutes, provides that "Any practitioner licensed in this state to practice medicine, osteopathic medicine, chiropractic medicine, naturopathy, or veterinary medicine; any hospital licensed under part I of chapter 395; or any laboratory licensed under chapter 483 that diagnoses or suspects the existence of a disease of public health significance shall immediately report the fact to the Department of Health." Florida's county health departments serve as the Department's representative in this reporting requirement. Furthermore, subsection 381.0031(4), Florida Statutes, provides that "The Department shall periodically issue a list of infectious or noninfectious diseases determined by it to be a threat to public health and therefore of significance to public health and shall furnish a copy of the list to the practitioners."

Neurotoxic Shellfish Poisoning (NSP)
Brevetoxin (*Karenia brevis*)

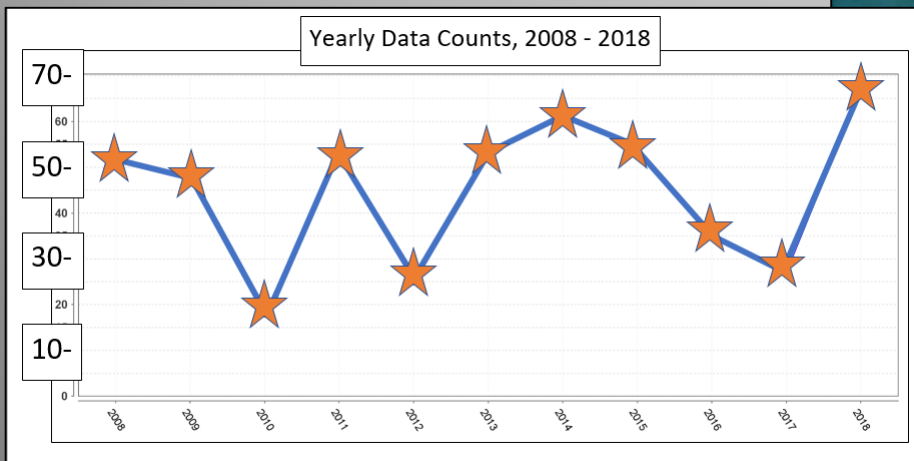
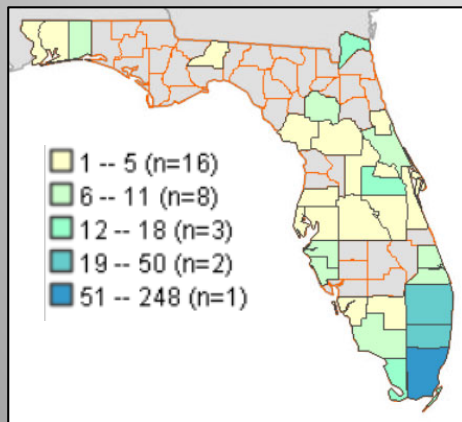
Paralytic Shellfish Poisoning (PSP)
Saxitoxin (*Pyrodinium bahamense*) including Puffers

Ciguatera Fish Poisoning
Ciguatoxins (*Gambierdiscus toxicus*)



Reportable Diseases in Florida

- Ciguatera Fish Poisoning



Reportable Diseases in Florida

- Ciguatera Fish Poisoning

The New York Times

Fish Poisoning More Common Than Believed

Fish Toxin Cited as Cause of Poisonings in '10 and '11



Ciguatera fish poisoning - New York City, 2010-2011.



marine drugs



Review

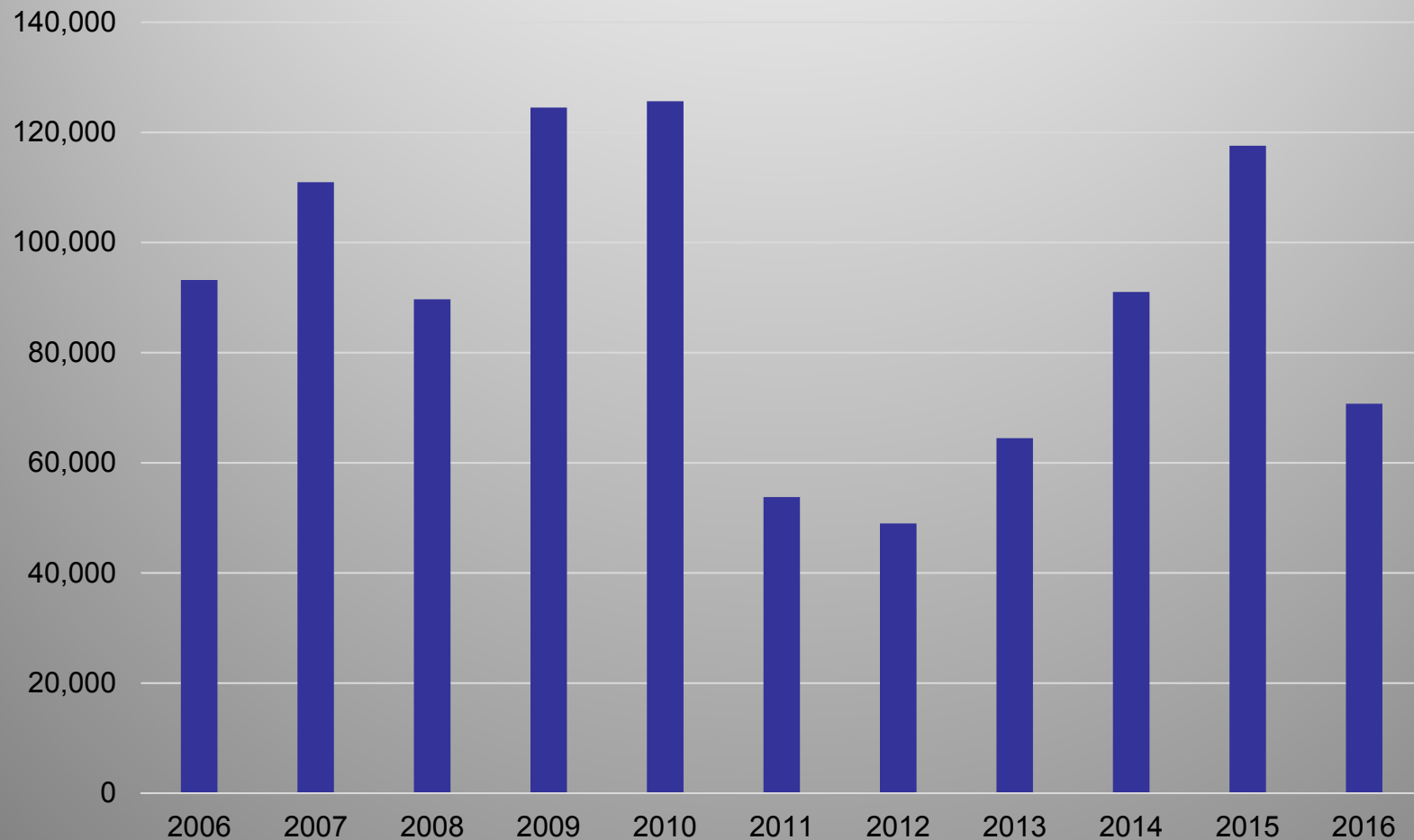
**An Updated Review of Ciguatera Fish Poisoning:
Clinical, Epidemiological, Environmental, and Public
Health Management**

Mar. Drugs 2017, 15, 72; doi:10.3390/md15030072



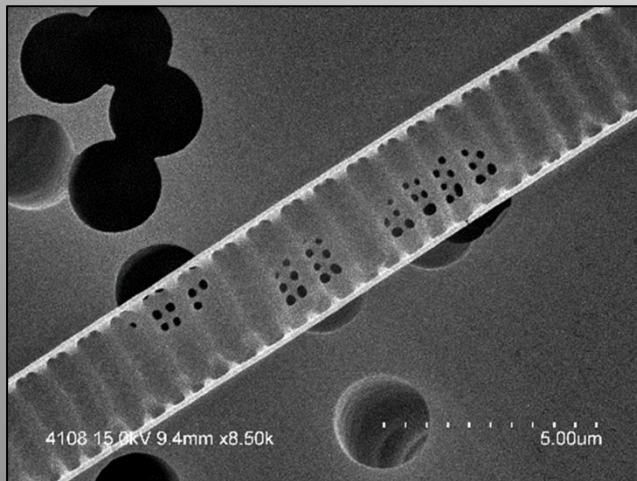
Reportable Diseases in Florida

- Commercial Barracuda Landings in Florida (Pounds)



Emerging HAB Threats

- *Pseudo-nitzschia*
 - ✓ *Domoic Acid (DA)*
 - ✓ *Amnesiac Shellfish Poisoning*



Emerging HAB Threats

- *Pseudo-nitzschia*

PRECAUTIONARY CLOSURE STATEMENT

Date: Friday April 12, 2019

The Florida Department of Agriculture and Consumer Services is temporarily closing the following shellfish area at sunset on Friday April 12, 2019 for the harvest of oysters, clams, and mussels. In this context, shellfish does not include scallops, shrimp, or crabs.

Area(s): #4802 Lower Tampa Bay Shellfish Harvest Area (AUZ and Leases Remain Open)

Affected Counties: Manatee and Hillsborough

Basis for action:

PRECAUTIONARY CLOSURE STATEMENT

Date: Thursday May 9th 2019

The Florida Department of Agriculture and Consumer Services is temporarily closing the following shellfish area at sunset on Thursday May 9th 2019 for the harvest of oysters, clams, and mussels. In this context, shellfish does not include scallops, shrimp, or crabs.

Area(s): #5602 Lemon Bay Shellfish Harvest Area

Affected Counties: Charlotte and Sarasota

Basis for action:

PRECAUTIONARY CLOSURE STATEMENT

Date: 5/11/19

The Florida Department of Agriculture and Consumer Services is temporarily closing the following shellfish area(s) at sunset on Saturday May 11, 2019 for the harvest of oysters, clams, and mussels. In this context, shellfish does not include scallops, shrimp, or crabs.

Area(s): #1401 St. Joe Bay Approved Shellfish Harvest Area

Affected Counties: Gulf

Basis for action: Precautionary closure due to presence of *Pseudo-nitzschia* and conditions defined in Chapter 5L-1.003 (8), Florida Administrative Code and The Biotxin Contingency Plan.

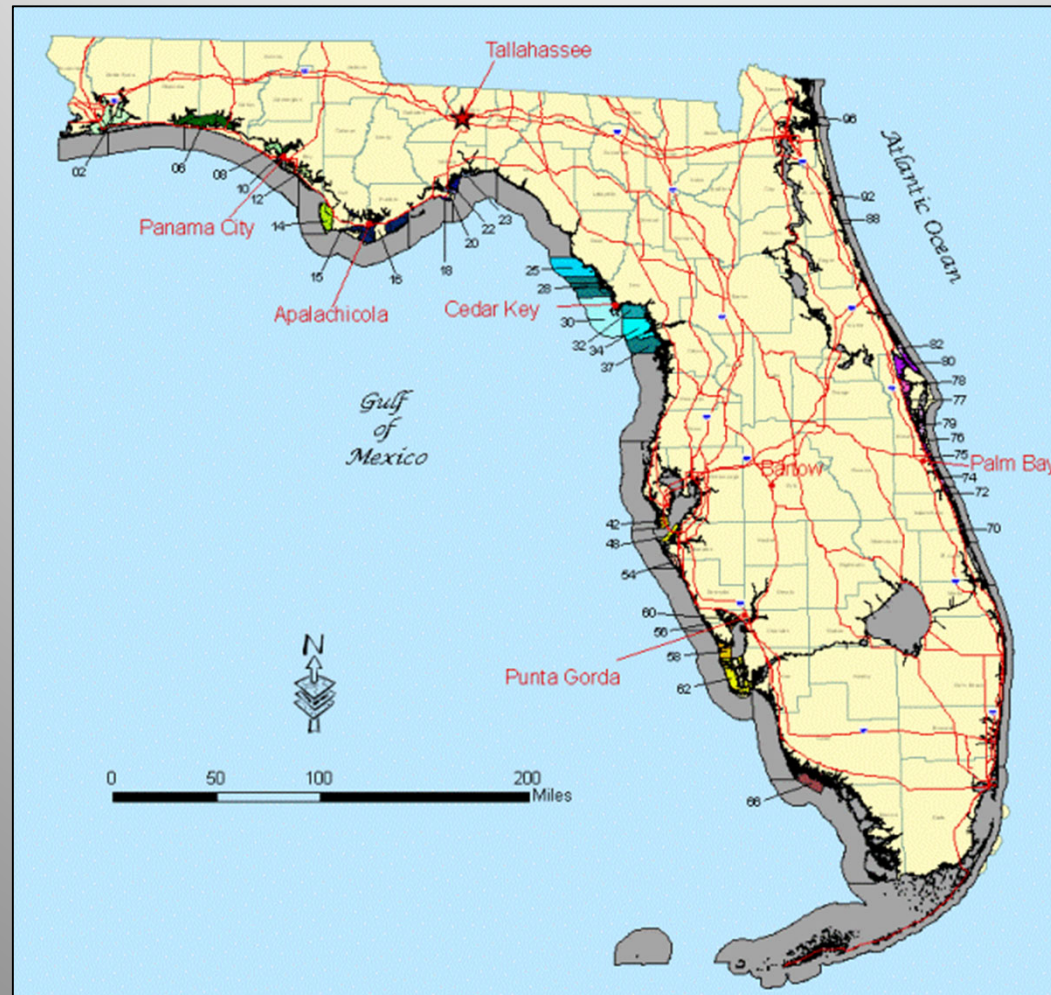


Division of Aquaculture



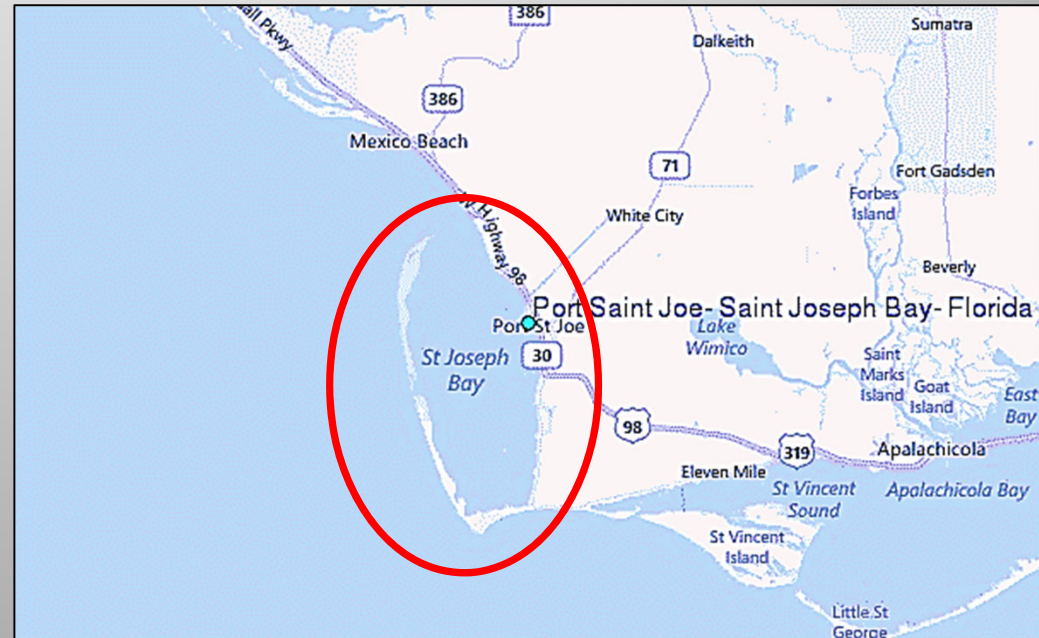
Emerging HAB Threats

- *Pseudo-nitzschia*



Emerging HAB Threats

- *Pseudo-nitzschia*



Emerging HAB Threats

- Shellfish harvesting



Local Economies



Local Economies

FWC Postpones Scallop Season

By: Kara Murphy

Updated: Jul 25, 2017 01:01 PM EDT



Scallop season up in the air

CHRIS PHILLIPS, News Journal correspondent Published 7:29 p.m. CT May 19, 2016 | Updated 7:35 p.m. CT May 19, 2016

St. Joseph Bay Scallop Season Remains Closed

By: Kirsten Mitchell

Updated: Aug 22, 2017 11:58 PM EDT

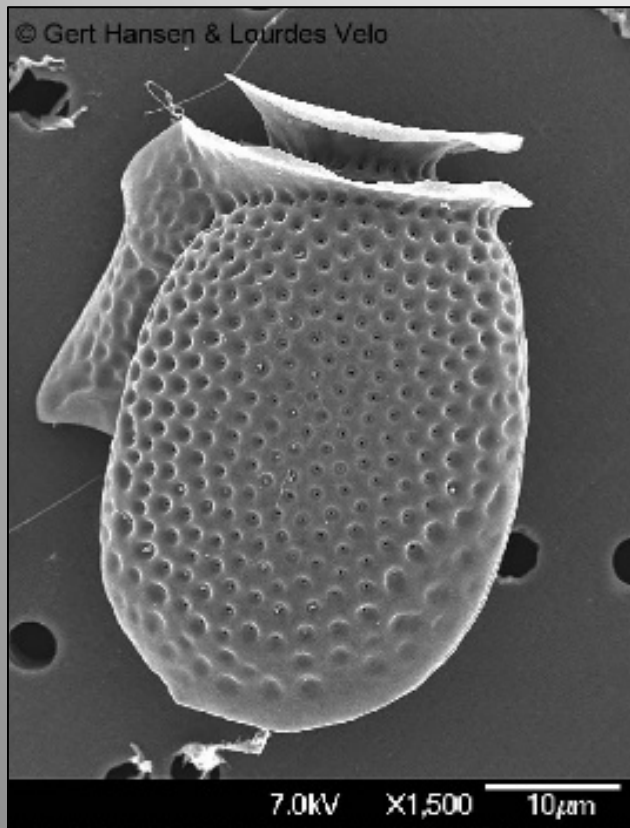


After Two-Month Postponement Due To Algae Bloom, Gulf Co. Bay Scallop Season Now Opens



Emerging HAB Threats

- *Dinophysis*



- ✓ *Domoic Acid (DA)*
- ✓ *Amnesiac Shellfish Poisoning*
- ✓ *Found in Gulf of Mexico*
- ✓ *Not documented in Florida*

Emerging HAB Threats

- Diverse taxa of cyanobacteria
 - ✓ Beta-methylamino-L-alanine (BMAA)
 - ✓ Neuro-degenerative Diseases?

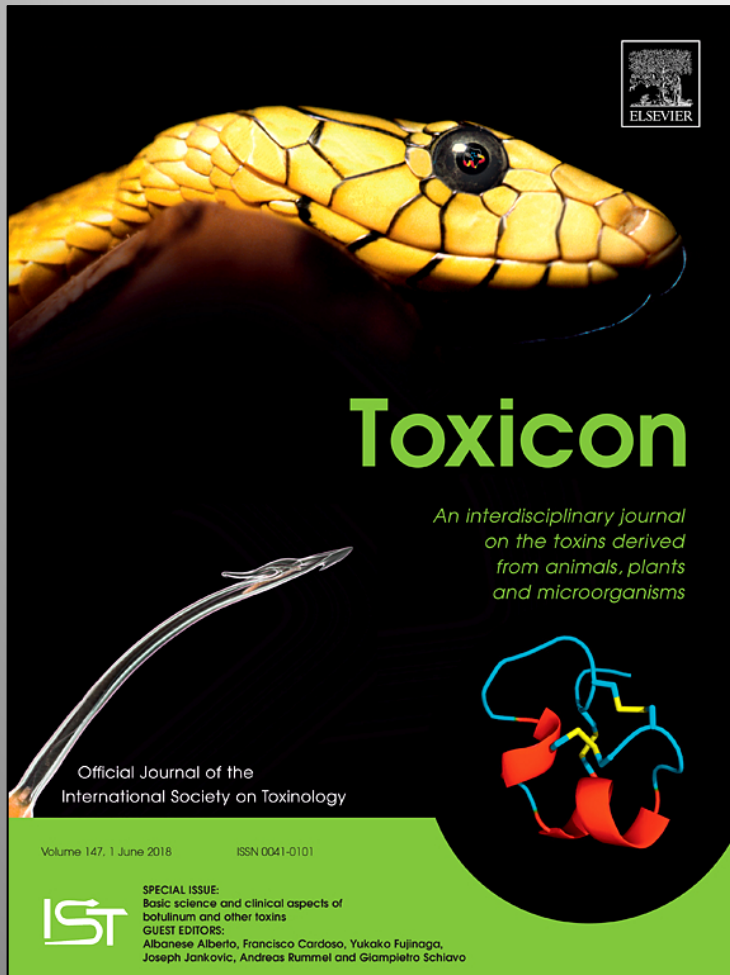


Guam



“Chamorro” people

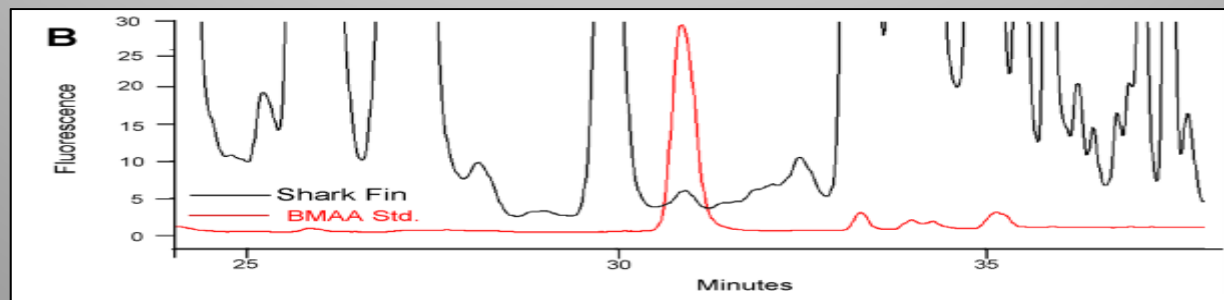
Emerging HAB Threats



- *Detection of cyanobacterial neurotoxin β -N-methylamino-L-alanine within shellfish in the diet of an ALS patient in Florida; Banack et al. 2014.07.018*

Emerging HAB Threats

- BMAA
- ✓ Little consensus of its ubiquitous occurrence
- ✓ Uncertainty on concentrations reported
- ✓ Problems with replication of study findings
- ✓ Analytical methodology variable



- ✓ Chernoff et al: *A Critical Review ...*
Journal of Tox. And Env. Health 2017

Emerging HAB Threats

- Zoanthids
 - ✓ Palytoxin: *Limu-make-o-Hana*
 - ✓ “The toxic seaweed of Hana”



Contact Information

Andrew Reich MS, MSPH, RRT
andy.reich@flhealth.gov

(813) 307-8015 x 5961

www.floridahealth.gov/environmental-health/

