

HARDCOPY FOR BEACH 101

NATIONAL BEACHES CONFERENCE
OCTOBER 11 - 13, 2006

TRENDS IN GOVERNMENT

- DO MORE, SPEND LESS
- USE MORE TECHNOLOGY
- MORE ENVIRONMENTAL
MONITORING AND TRACKING
- USE DATA FOR DECISION
SUPPORT
- MORE REPORTING

WHAT WE DO

1. Identify our beaches
2. Monitor our beaches
3. Stay in touch
4. Collect, manage and use beach data
5. Keep our inventories up to date
6. Stay current
7. Answer questions about our beaches

WHAT ELSE IS THERE TO KNOW?

- **Better Indicators**
- **Methods Analysis**
- **Epidemiology**
- **Predictive models**
- **Remediation**
- **Tools of the trade**

WEB PAGES OF INTEREST TO BEACH MANAGERS

The Beach Network

Listserv, Forums, Science, Information, News & Events, Related Links

<http://www.beachnet.info>

Enterococcus Infections

<http://www.emedicine.com/med/topic680.htm>

Centers for Disease Control and Prevention

<http://www.cdc.gov/healthyswimming/>

National Beach guidance

<http://www.epa.gov/waterscience/beaches/grants/guidance/index.html>

EMPACT Beaches project

http://www.epa.gov/nerlcwww/empact_beaches.htm

<http://www.epa.gov/microbes/empact.pdf>

EMPACT Beaches Project: Results from a Study on Microbiological Monitoring in Recreational Waters.

<http://www.epa.gov/waterscience/beaches/technical.html>

Washtenaw County Health Department

http://www.ewashtenaw.org/government/departments/environmental_health/swimming_pools/eh_eisbeach.html

Michigan Department of Environmental Quality

Beach Water Monitoring

http://www.michigan.gov/deq/0,1607,7-135-3313_3686_3730---,00.html

United States Environmental Protection Agency

BEACON - Beach Advisory and Closing On-line Notification

http://oaspub.epa.gov/beacon/beacon_national_page.main

Natural Resources Defense Council

<http://www.nrdc.org/>

Clean Beaches Council

<http://www.cleanbeaches.org/>

Environmental Health Perspectives

<http://www.ehponline.org/>

International Journal of Environmental Health Research

<http://www.tandf.co.uk/journals/titles/09603123.html>

Dr. Joan Rose, Michigan State University

Public Health Risks Associated with Wastewater Blending

http://www.waterandhealth.org/wastewater/chair_testifies.html

NOAA Coastal Resources Center SWIMCAST

<http://www.csc.noaa.gov/magazine/2005/01/article3.html>

Ohio NOWCASTING Beach Advisories

<http://www.ohionowcast.info/index.asp>

USGS Great Lakes Science Center PROJECT S.A.F.E.

<http://www.glsc.usgs.gov/projectSAFE.php>

Dr. Julie Kinzleman, University of Wisconsin - Racine

<http://www.aqua.wisc.edu/SOLM/ConferenceOverviewandAgenda/tabid/196/Default.aspx>

Population Trends Along the Coastal United States: 1980-2008

See: <http://marineeconomics.noaa.gov/socioeconomics/Assesment/population/welcome.html>

Also see: <http://oceanservice.noaa.gov/topics/coasts/dmtools/welcome.html>

Coastal Cities Living on the Edge

<http://ehp.niehs.nih.gov/members/2002/110-11/EHP110pa674PDF.PDF>

Manny articles available at EHP. Run a search on the word "coastal" to retrieve about 380 articles.

US EPA Beach Grants

<http://www.epa.gov/waterscience/beaches/grants/>

Rapidly Measured Indicators of Recreational Water Quality are Predictive of Swimming Associated Gastrointestinal Illness

<http://ehp.niehs.nih.gov/docs/2005/8273/abstract.html>

Keep your eye on GOOGLE EARTH - a great way to explore the coastline

<http://earth.google.com/>

JOIN THE BEACH NET

<http://www.beachnet.info>

The Beach Network is:

- **Individuals**
- **Institutions & Government Representatives**
- **Beach Managers & Technicians**
- **Scientists**
- **Concerned Citizens**

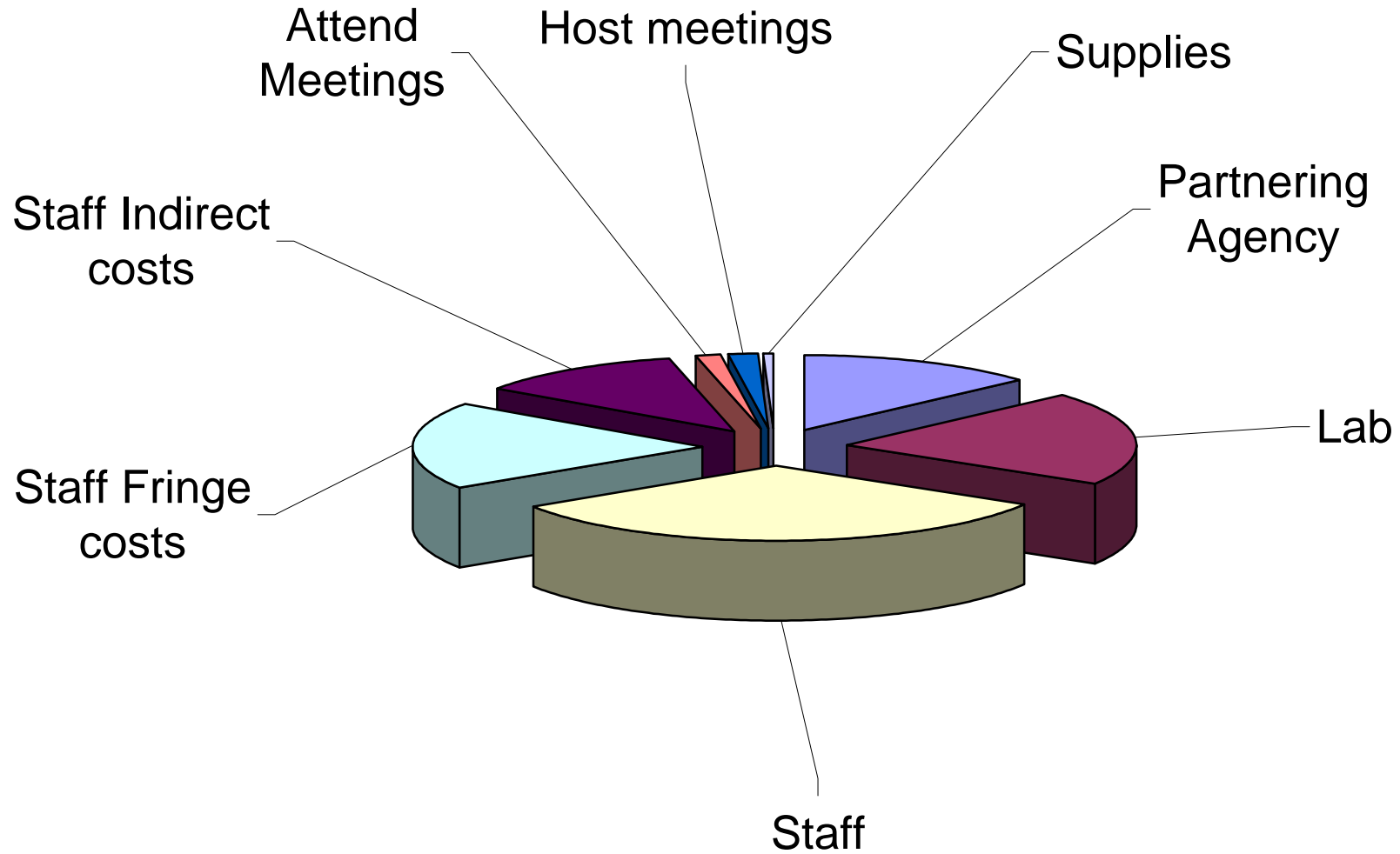
Share information on all aspects of:

- **Beach safety**
- **Public health**
- **Management**
- **Restoration**
- **Protection**

The Beach Network will provide:

- **Listserv**
- **Forums**
- **Science**
- **Information**
- **News & Events**
- **Related Links**

ONE STATE'S ANNUAL BEACH GRANT DISBURSEMENT



SWIMMING ASSOCIATED ILLNESS AND THE DENSITY OF INDICATOR ORGANISMS

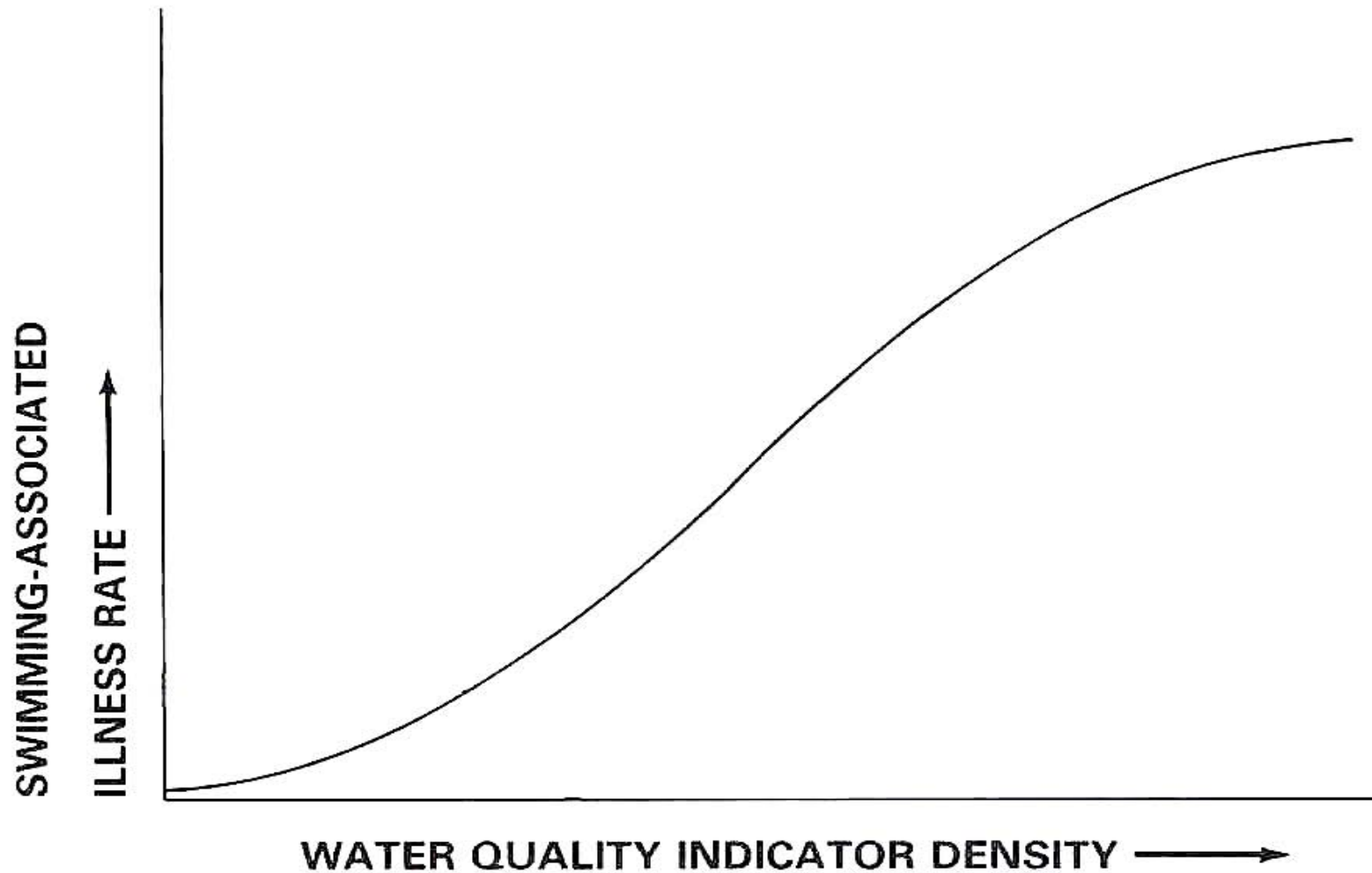


Figure 1. Graphic representation of the desired recreational water quality criteria.

US EPA STANDARDS FOR FECAL INDICATOR ORGANISMS

FECAL INDICATOR ORGANISM: E. COLI		
	SINGLE SAMPLE	GEOMETRIC MEAN
FRESHWATER	235 cfu/100ml	126 cfu/100ml
MARINE	N/A	N/A

FECAL INDICATOR ORGANISM: ENTEROCOCCI		
	SINGLE SAMPLE	GEOMETRIC MEAN
FRESHWATER	62 cfu/100ml	33 cfu/100ml
MARINE	104 cfu/100ml	35 cfu/100ml

cfu: An individual viable cell that is able to clone itself into an entire colony of identical cells.

geometric mean: the n^{th} root of the product of n numbers. $G = \sqrt[n]{(x_1)(x_2)(x_3)...(X_n)}$

FECAL CONTAMINATION OF RECREATIONAL WATERS

SOURCES:

- **HUMAN FECES**
- **ANIMAL FECES**
- **NATURALLY OCCURRING ON OCEAN BOTTOM**

ARRIVAL:

- **STORM WATER RUNOFF**
- **PETS**
- **WILDLIFE**
- **HUMAN SEWAGE** (WASTE WATER TREATMENT, BYPASS, MALFUNCTION)
- **OCEAN WIND/TURBULENCE**

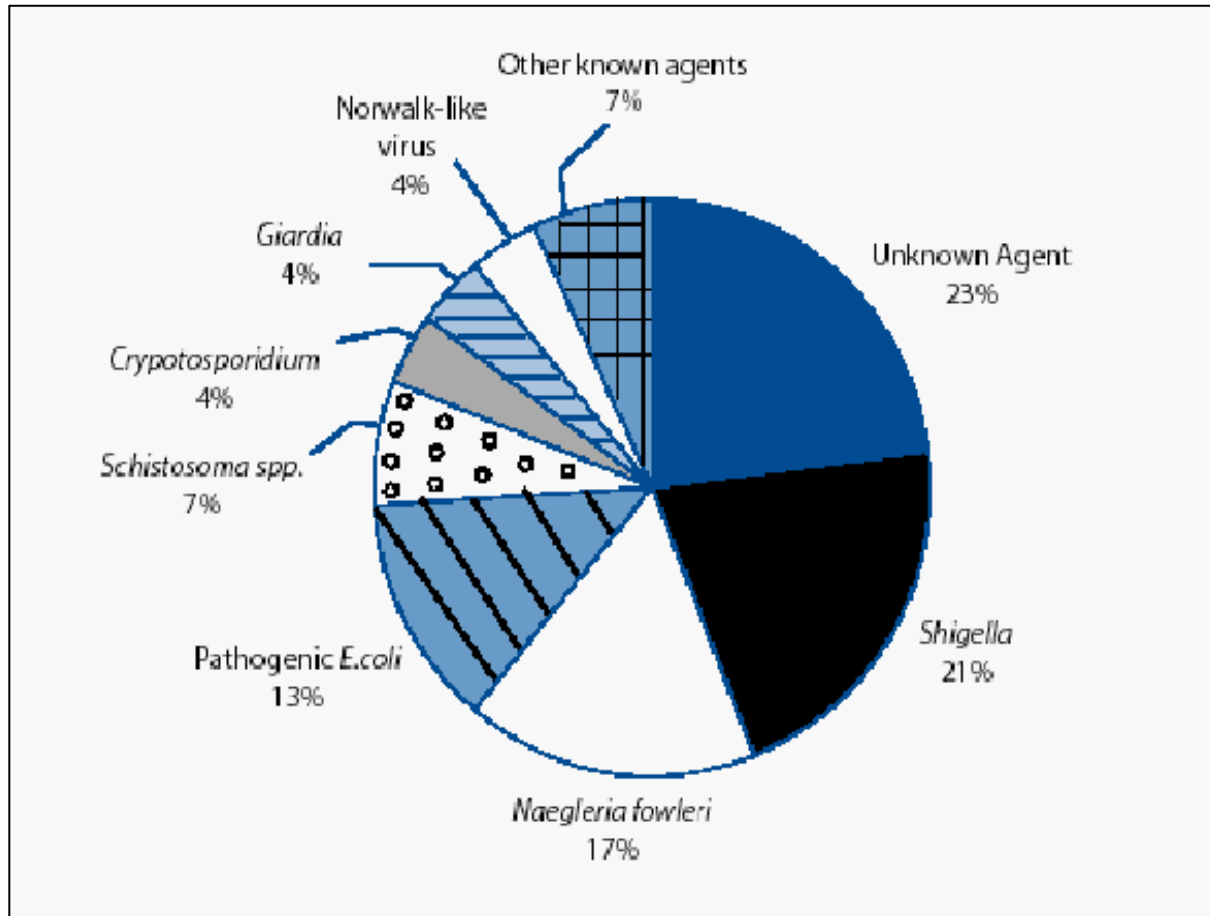
SYMPTOMS OF ILLNESS

- **INFECTIONS OF THE EYES, EARS, SKIN, BLOOD STREAM (BACTEREMIA), HEART VALVES (ENDOCARDITIS), BRAIN FLUID (MENINGITIS)**
- **GASTRO-ENTERITIS: VOMITING, DIARRHEA, NAUSEA, OR STOMACH ACHE**

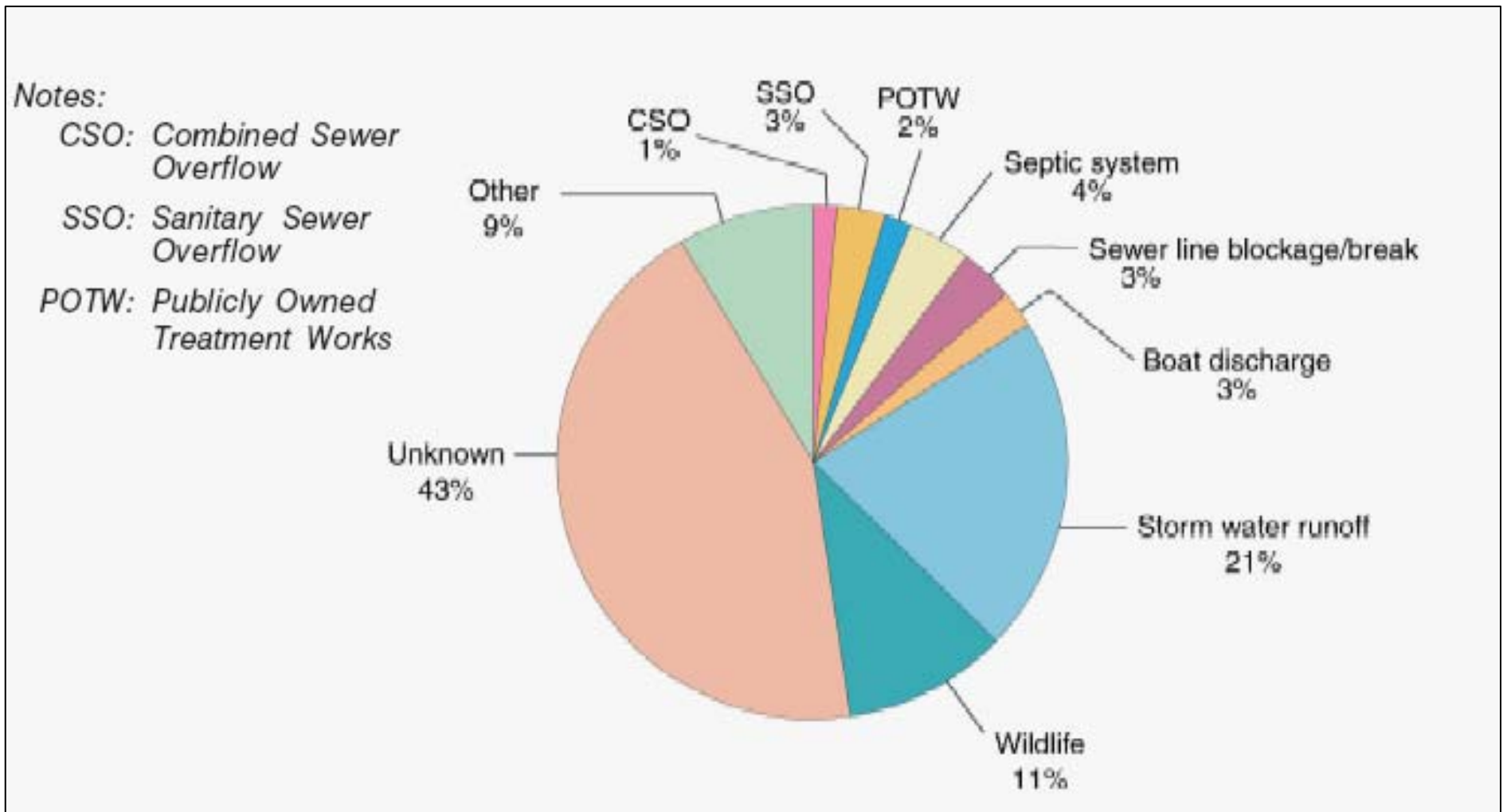
A subset of potential waterborne pathogens

Pathogen	Disease	Effects
Enteropathogenic <i>E. coli</i>	Gastroenteritis	Vomiting, diarrhea, death in susceptible populations
Shigella	Shigellosis	Dysentery
<i>Vibrio cholerae</i>	Cholera	Extreme diarrhea, dehydration
Cryptosporidium	Cryptosporidiosis	Diarrhea
<i>Naegleria fowleri</i>	Amoebic meningoencephalitis	Inflammation of the brain
Adenovirus	Respiratory disease	Eye infections, diarrhea
Enteroviruses (67 types, e.g. polio, echo, and coxsackie viruses)	Gastroenteritis	Diarrhea, heart anomalies and meningitis are rare
Caliciviruses (e.g. Norwalk viruse)	Gastroenteritis	Vomiting, diarrhea
Heptatitis	Infectious hepatitis	Jaundice, fever

Pathogens linked to outbreaks in recreational waters, 1985–2000 (USEPA, 2004, from CDC surveillance reports)



The major known cause of beach closures is storm water



(source, EPA 2002 national beach watch survey)

**BE SURE THAT YOU REVIEW
THE FECAL INDICATOR
ORGANISM STANDARDS
ADOPTED BY YOUR STATE**

Some of the *E. coli* Analytic Methods approved by the US EPA

Each method requires incubation time

- m-Tec 24 to 48 hours
- Colilert 24 hours
- Colilert-18 18 hours

Some of the *Enterococci* Analytic Methods approved by the US EPA

Each method requires incubation time

- USEPA Method 1600 (mEI agar) 24 hours
- IDEXX Enterolert 24 hours

Inland lake beaches

**may be regulated by state laws and
local ordinances**

Coastal beaches

**may have all that *and* they must
comply with the federal
BEACH ACT**

Inland lake beaches
are not eligible to use BEACH
ACT funds

Coastal beaches
are eligible to use BEACH ACT
funds for monitoring

SWIMMER'S PERSPECTIVE

Immediate: I want to know what I am swimming in now.

Long term: I want to know that the beach will be open next time that I come.

BEACH MANAGER'S PERSPECTIVE

Immediate: Am I protecting public health by keeping beach open or should I close it?

Long term: What can be done to improve water quality to protect public health everyday?