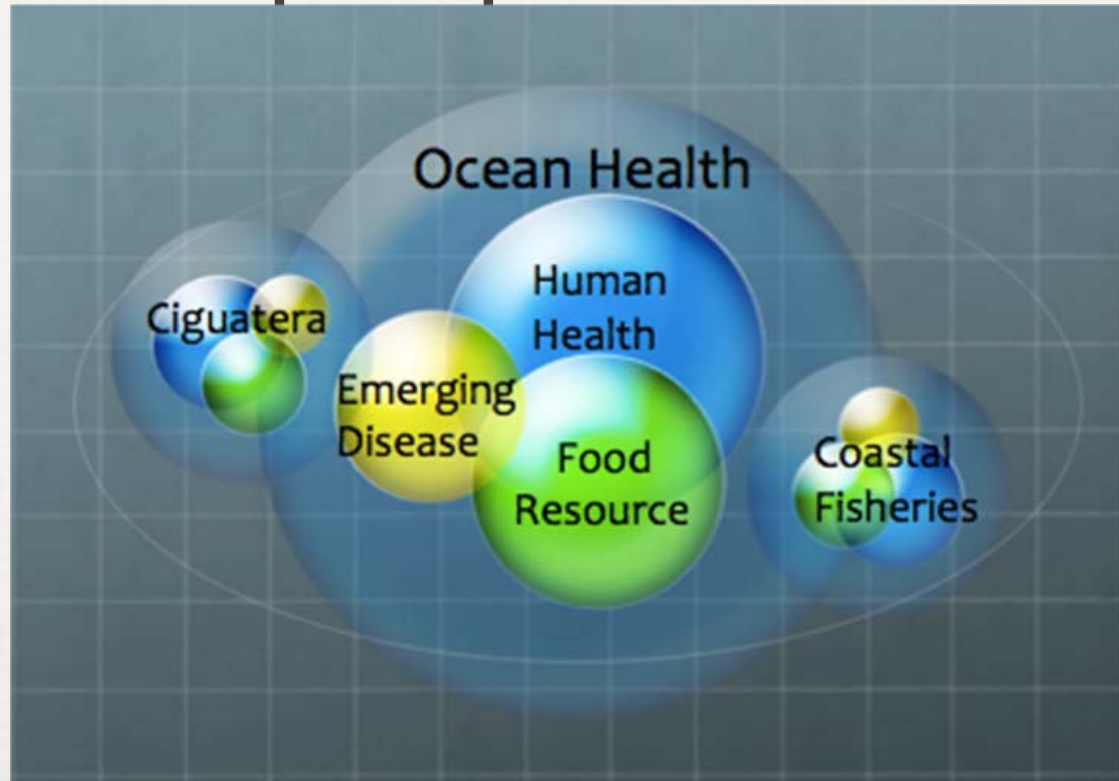


HABs and Ciguatera Poisoning: emerging methodological perspectives



Charles Trick & Danielle Beausoleil

Western University - Canada

Ciguatera

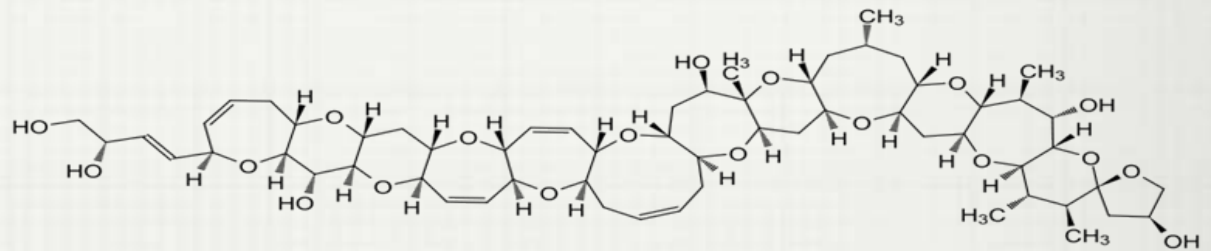
- Emerging marine food-borne illness.
- Globally common in tropical waters, but presently unpredictable.
- Example of proactive management of a seafood vector and a need for coastal sea surveillance resulting from environmental changes.

Ciguatera - epidemiology

- Exposure: humans eat fish that has been contaminated with natural toxins
- Total cases is poorly known but estimates range from 50,000 to 500,000 cases per year. Caribbean and US Virgin Islands report 20,000 – 30,000 cases per year.
- Symptoms: generalized gastrointestinal (vomiting, nausea, diarrhea) and neurological (headaches, muscle aches, lassitude, asthenia) poisoning; ranges from 5-10 day illness, year long rehabilitation, death.

Ciguatera – exposure pathway known

- Main causative organism: *Gambierdiscus toxicus* (a benthic marine dinoflagellate).



- Ciguatoxin production in the benthic dinoflagellate is environmentally stimulated.
- Ciguatoxin usually accumulates in skin, head, viscera, and roe of the fish.
- Not destroyed by cooking.

Ciguatera – Public Health Surveillance

- Incidence is on the rise: increased population? Increased frequency of exposure? Increased production of either the causative agent (*Gambierdiscus toxicus*) or level of ciguatoxin?
- *Incidence increase* corresponds to disturbances in environment (nutrients released into coastal waters, land-use changes, warmer coastal waters)
- Incidence can be reduced best through toxin surveillance programs.
- **Public health is best protected through an algal based coastal forensics program: “plankton watch, followed by toxin watch”**

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Scientist's role in Public Health Surveillance



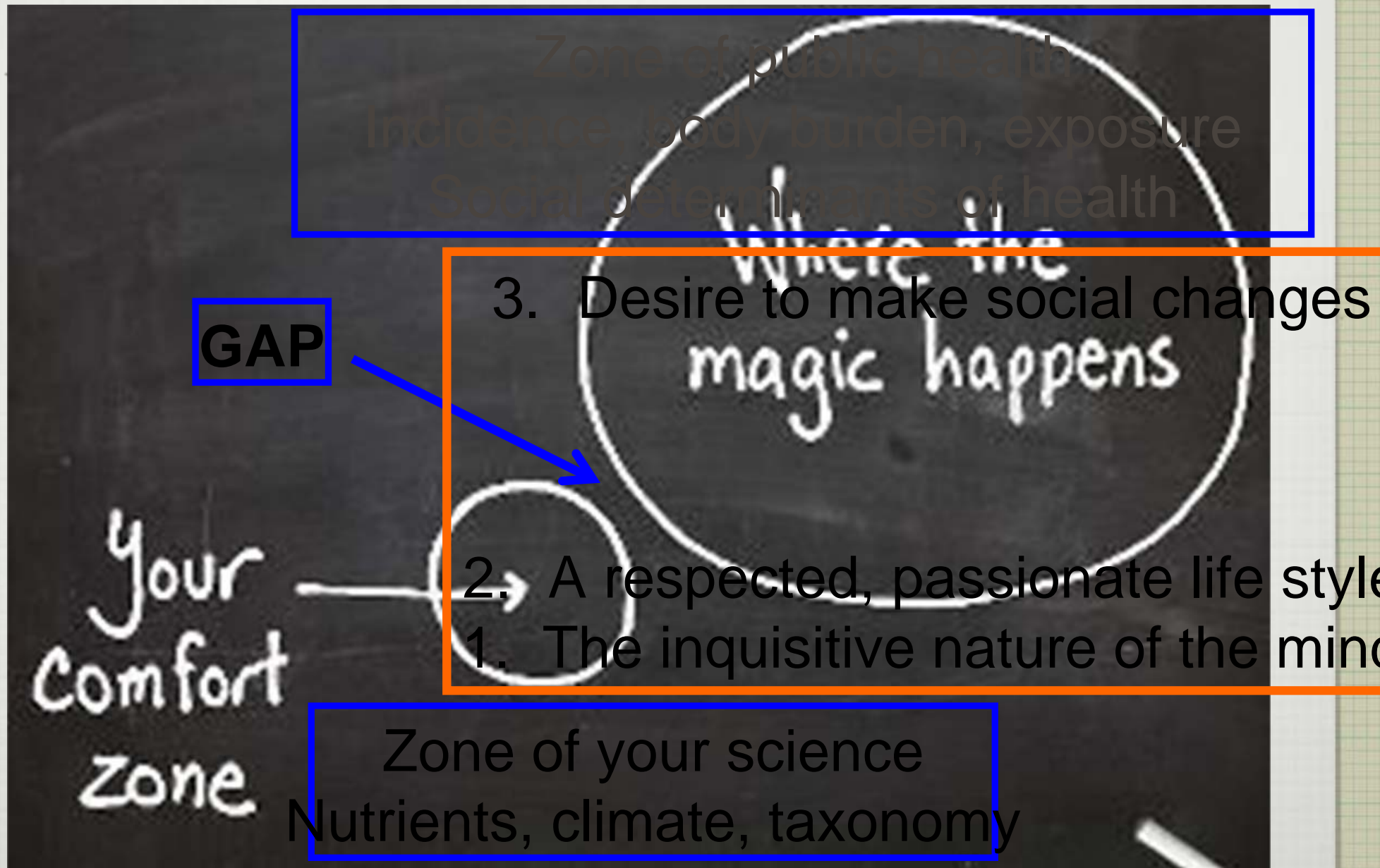
Scientist's role in Public Health Surveillance



Scientist's role in Public Health Surveillance



Scientist's role in Public Health Surveillance



Scientist's role in Public Health Surveillance Ciguatera Fish Poisoning (CFP)

- Millennium Ecosystem Assessment Strategy – responsible for ecological determinants of health (quality of water, fisheries, food, etc.)
- PICES – FUTURE, Human Dimension Group, Government of Japan MAFF projects.
- “Social” Statements from grants – “Our work will increase the knowledge to educate the managers and public about the risks of CFP”.

How does one bridge the gap?

Models for Bridging the Gap in

Public Health Surveillance

More than one model to consider in designing your program:

- Social Ecology Models (Driven models)

environment provides wealth → nutritional & psychological benefits → Individual behaviours → Health (physical, psychological, social well-being)

- Ecosystem Health Model – (Feedback models)

**“Healthy environment means healthy people.
Healthy people demand healthy environments”**

Ecosystem Health Model (Feedback model)

~~Human health and environmental stability are key.~~

Community goals and scientific goals and economic goals must match.

Human health and environmental stability are equal values.

Humans must accept the notion of responsibility and acceptability.

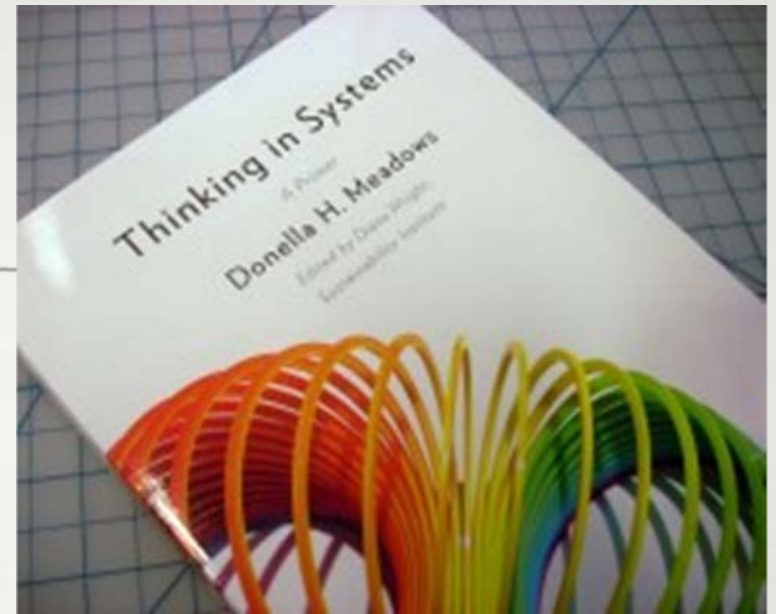
Participatory research WITH communities.

*Ciguatera – **Step one.** THINK!
Define the Influences of the Problem



*Systems Thinking

Systems thinking is the process of understanding how things influence one another within a whole.

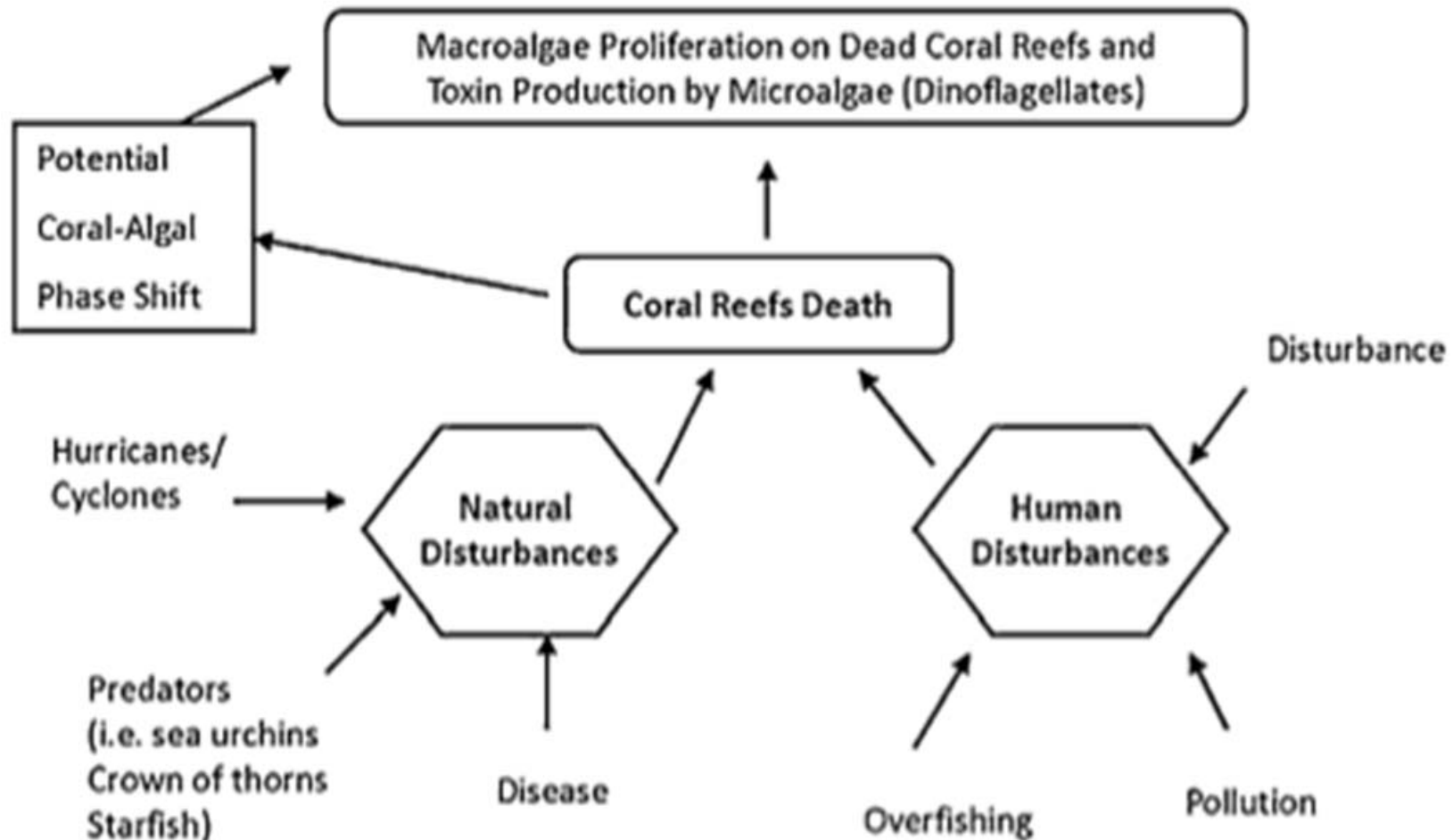


In Ecosystem Health ... influences between people – environment, including:

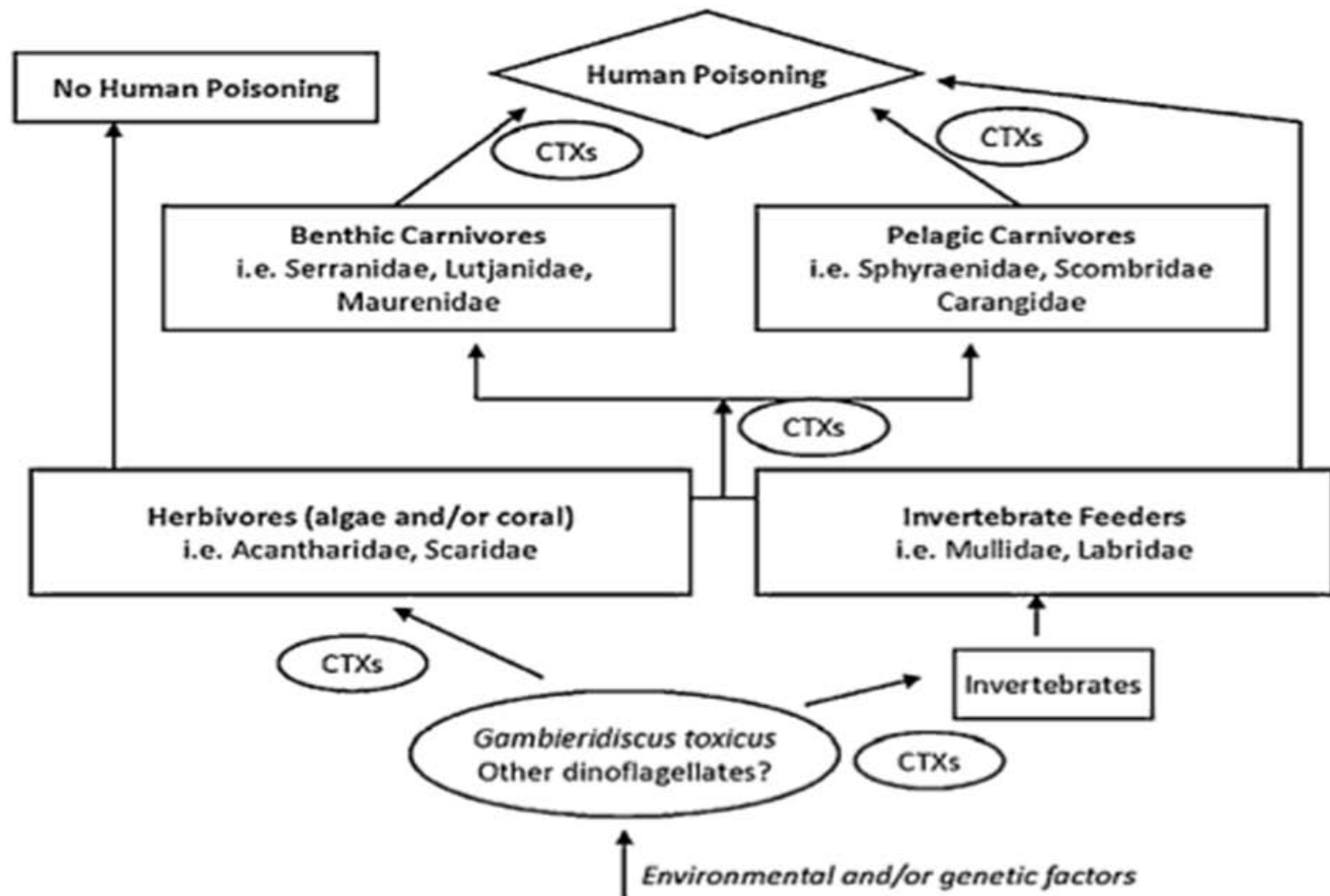
- Personal & economic choices,
- Lifestyle & Environmental changes
- Human and environmental exposure
- Routes and rates of transmission
- Consequences of action/inaction.

*Influence Diagrams

FACTORS THAT INFLUENCE DINOFLAGELLATE PRESENCE



FACTORS THAT INFLUENCE HUMAN EXPOSURE



FACTORS THAT INFLUENCE DINOFLAGELLATE PRESENCE

***Ciguatera – Step Two. SHARE THE CRITICAL POINTS**

Participatory research WITH communities.

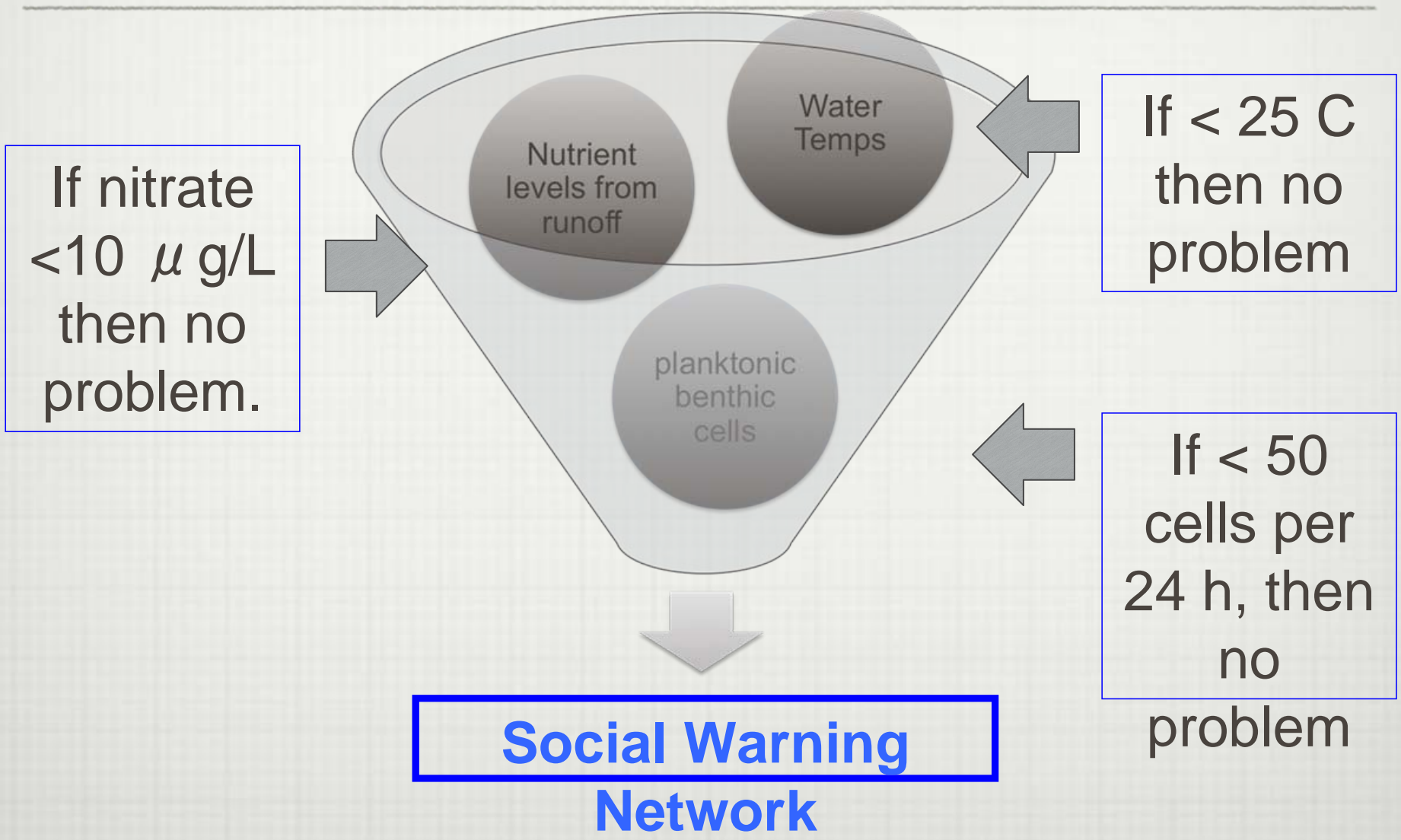
- Extend your ideas to your peer community in the affected region.**
- Dedicated plan to engage community members (study “with” not “of” communities)**
- Discuss with local peers the influence diagram + local social-ecological systems.**
- Engage Stakeholders in a definition & partnership workshop**

*Ciguatera – **Step Three**. Redefine.

- **Reevaluate your influence diagram**
-

- **Who is sick? What do they know about CFP? What is the pathway? (Semi-structured interviews).**
- **Observation on interactions, leadership and power. Who is receptive to your ideas? (Walkabout reflections)**
- **Collect secondary data (nutrients, dinoflagellate cover, etc.) to build foundation, and access or burden levels by communities. (Structured interviews & Research)**
- **Reevaluate your influence diagram.**

*Ciguatera – **Step Four**. Make it happen by keeping it simple..



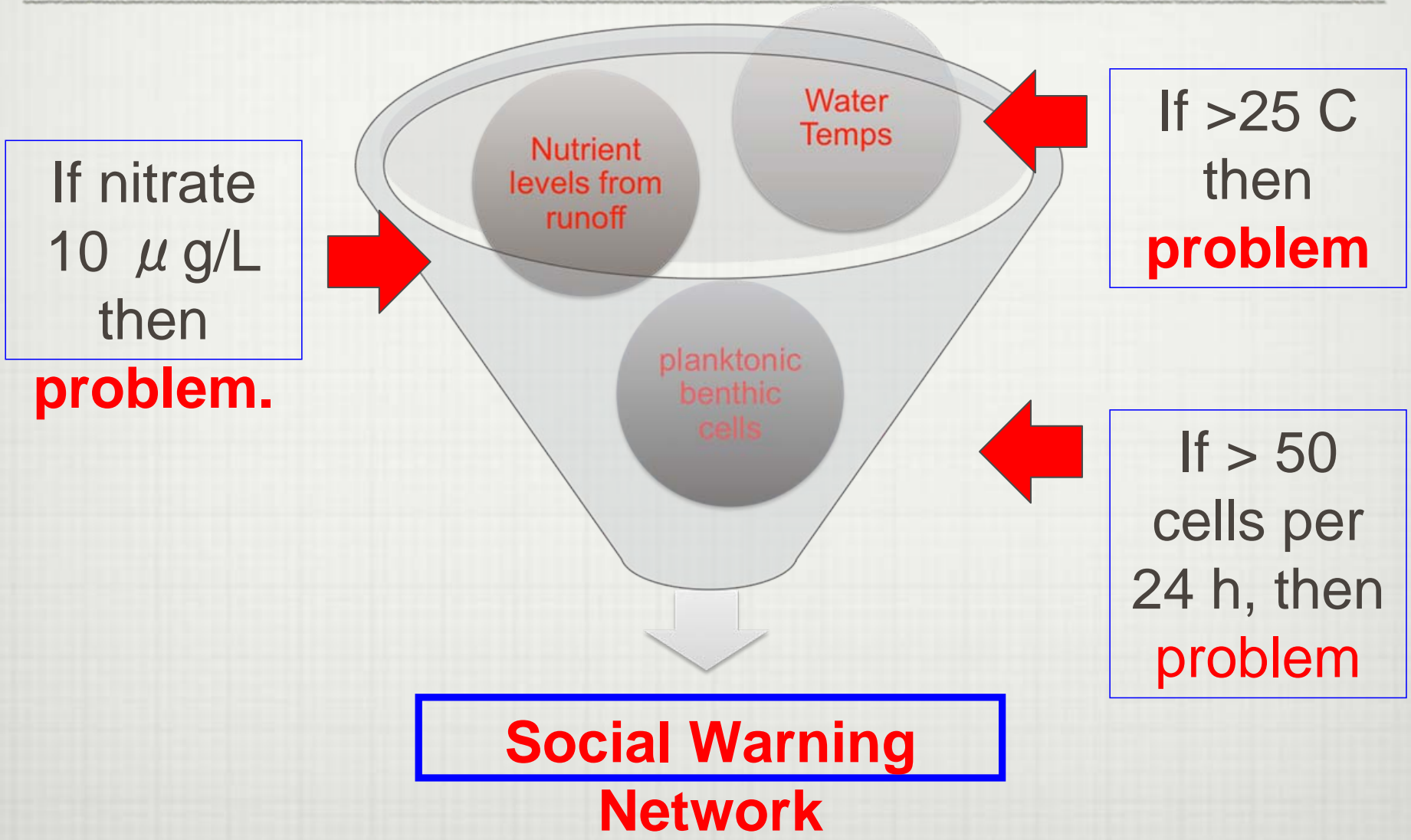
If nitrate < 10 µg/L then no problem.

If < 25 C then no problem

If < 50 cells per 24 h, then no problem

Social Warning Network

*Ciguatera – **Step Four**. Make it happen by keeping it simple..



*Ciguatera – **Step Five.** Present changes.

- **Pathway: Research, education and action.**
- **Initiate change – monitoring, knowledge transfer, information, sentinel study.**
- **Stakeholder workshop to get “buy in”**
- **Scenario analysis – insight into what happens if successful or not successful.**

*Ciguatera – Final Thoughts

One of Einstein's common themes:

!! "The problems that exist in the world today cannot be solved by the level of thinking that created them."

✓ "Everything in your world is created by what you think."
"

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Oprah Winfrey