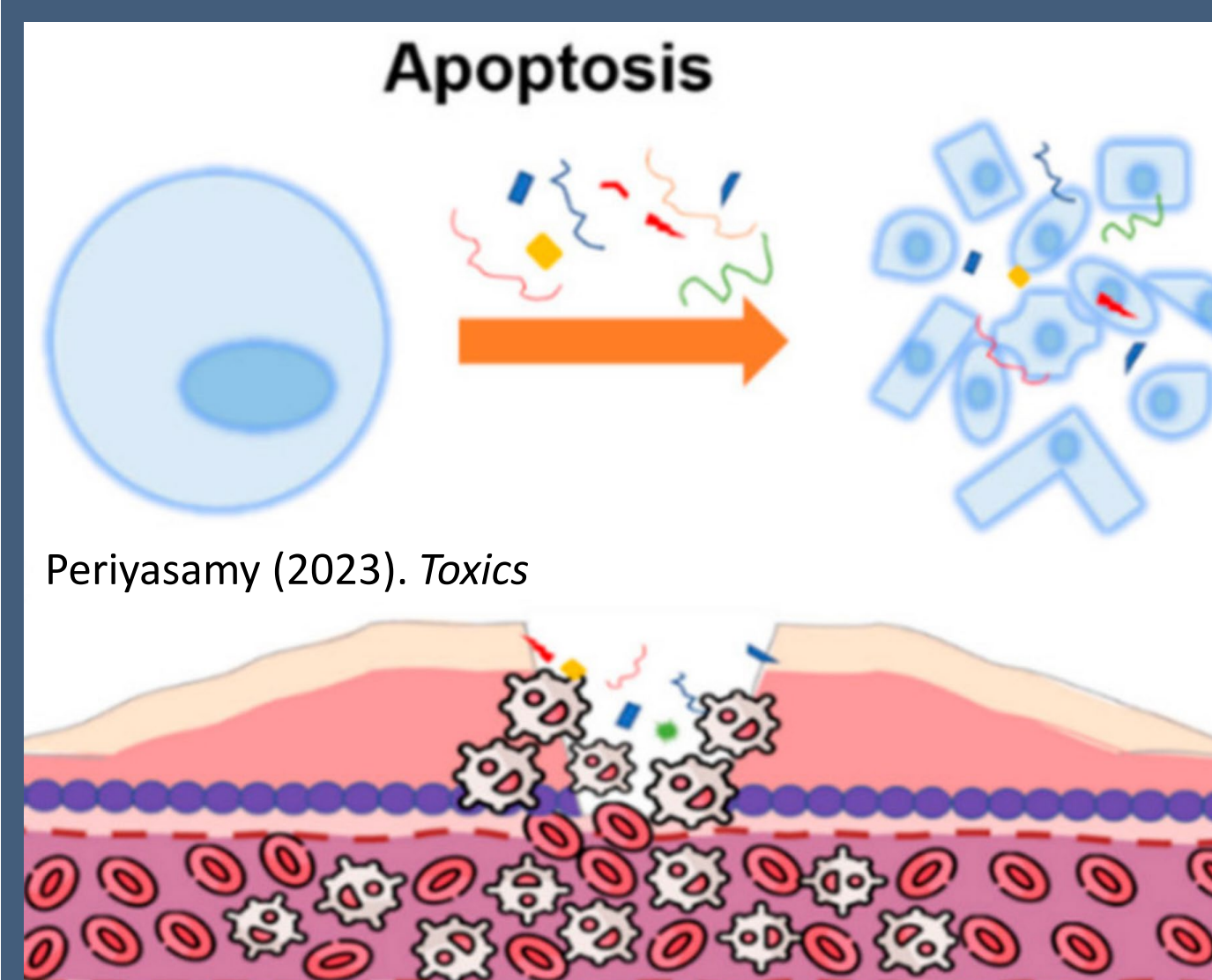
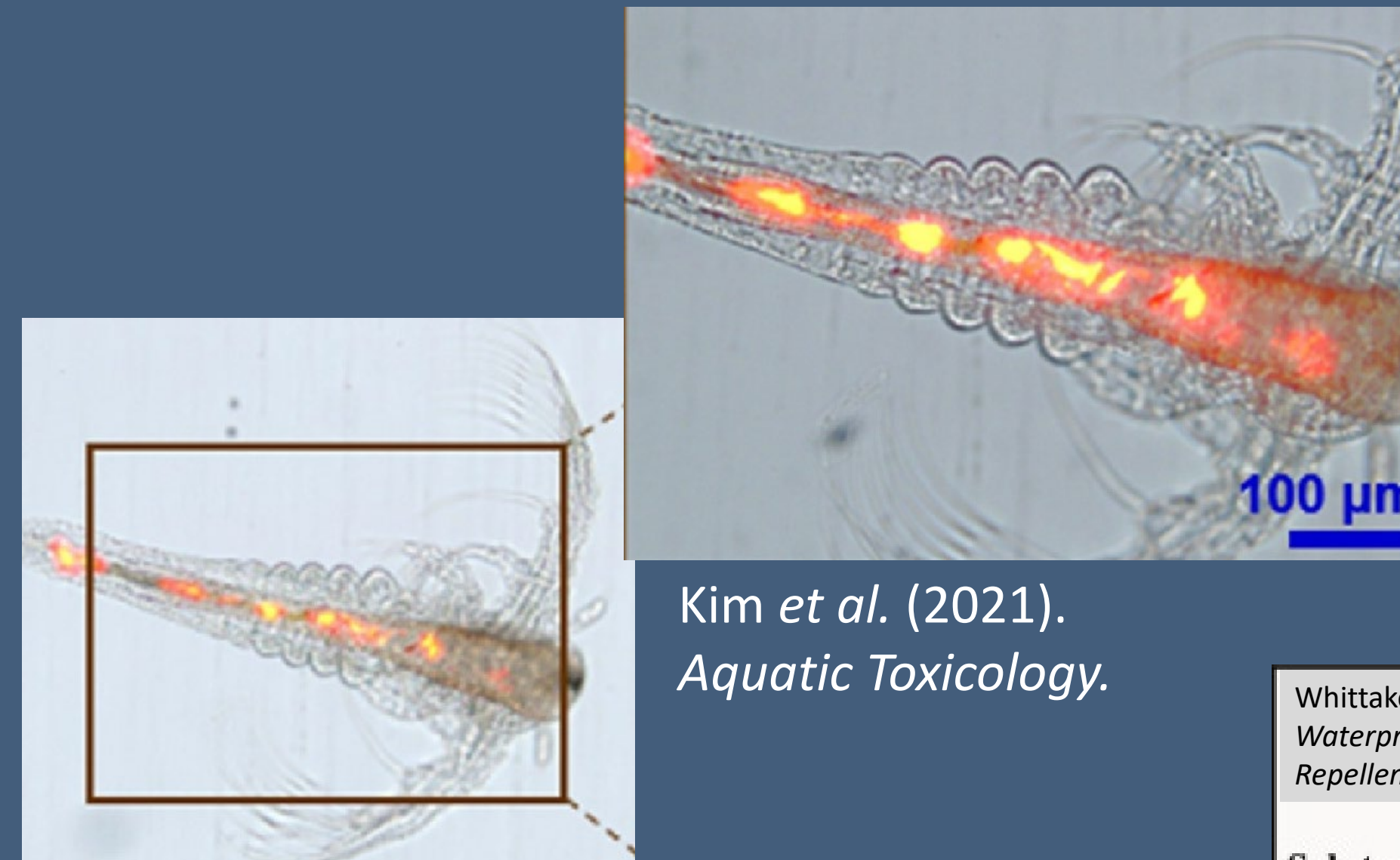


## Physical Ecological Impacts

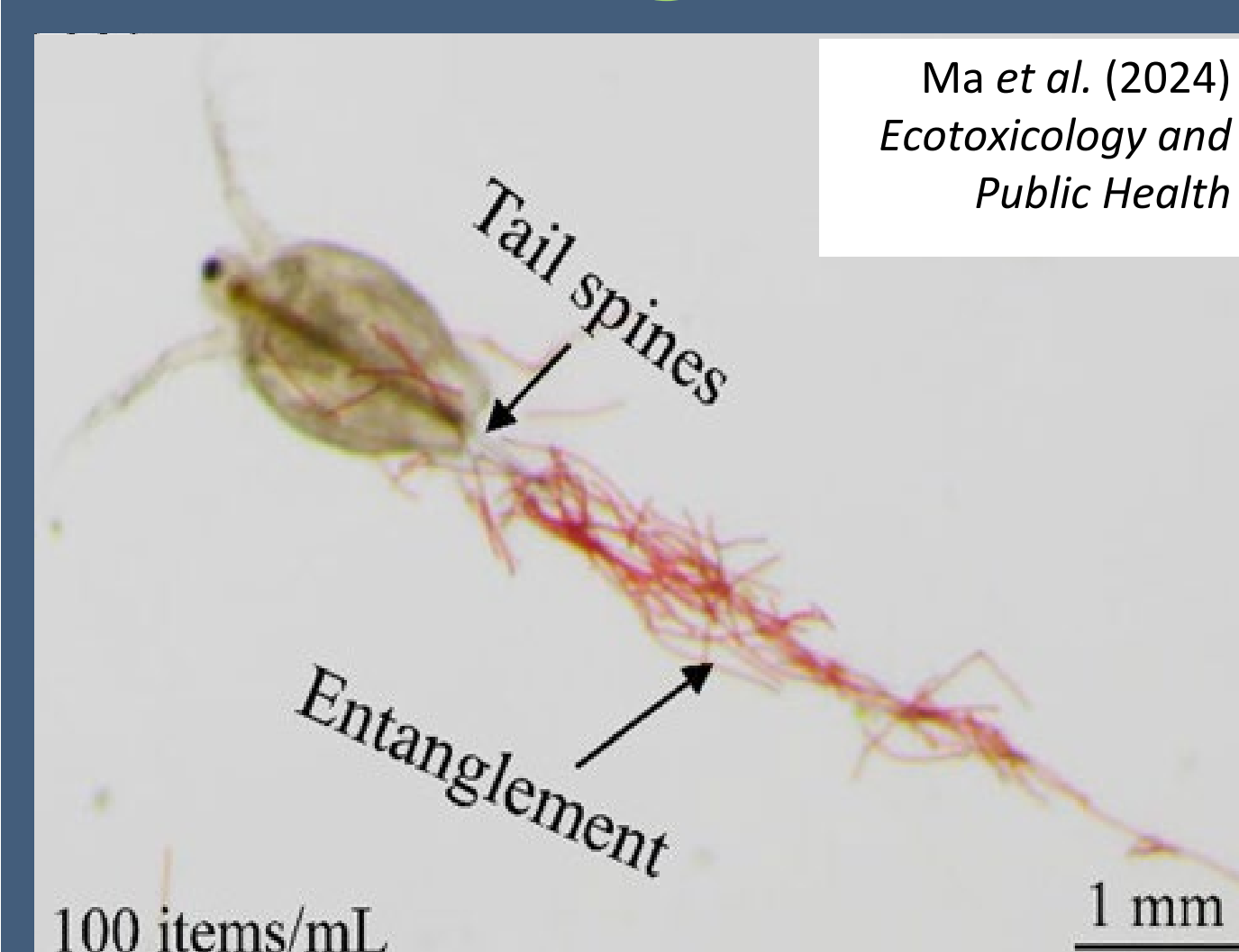
### Cellular Impacts



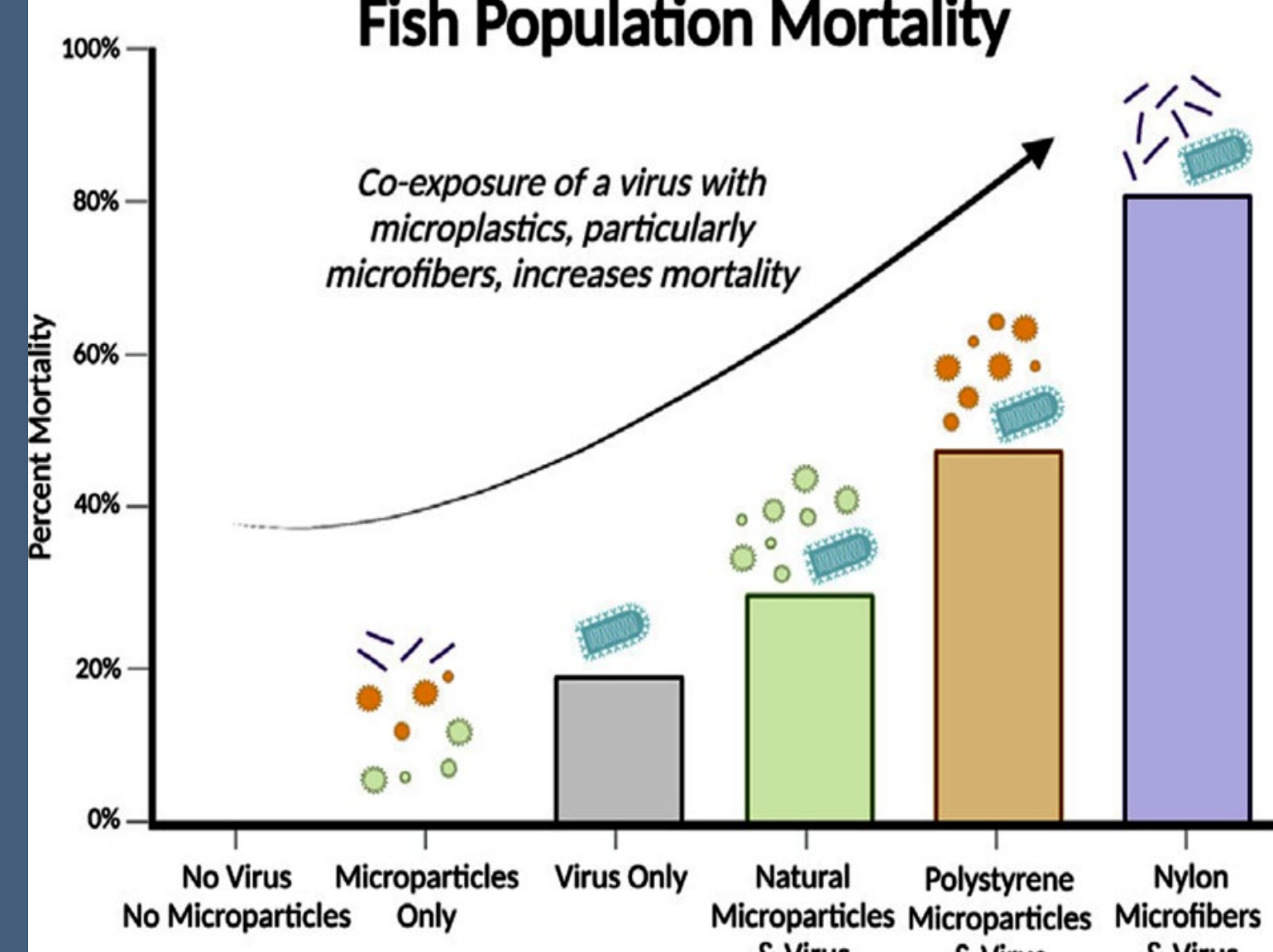
### Food Dilution



### Entanglement

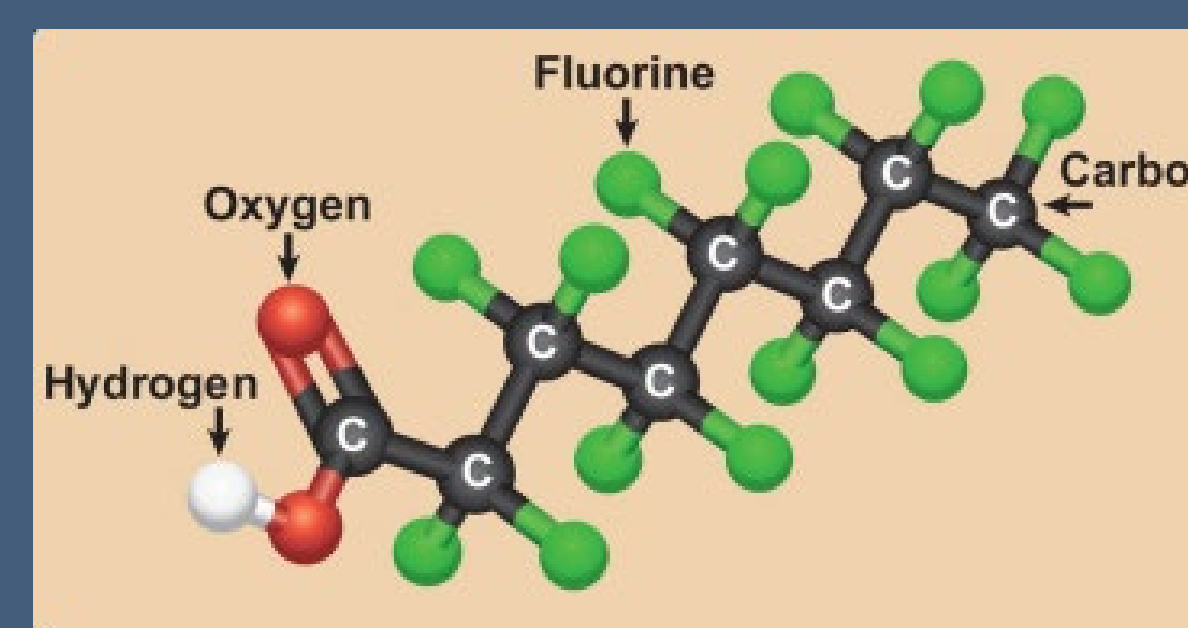


### Immune Suppression

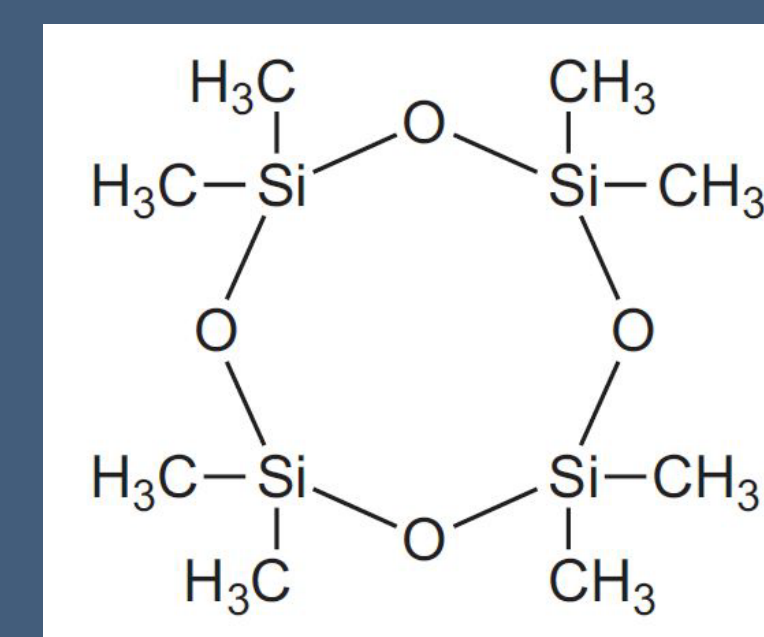


## Chemical Impacts

### PFAS



### Silicones



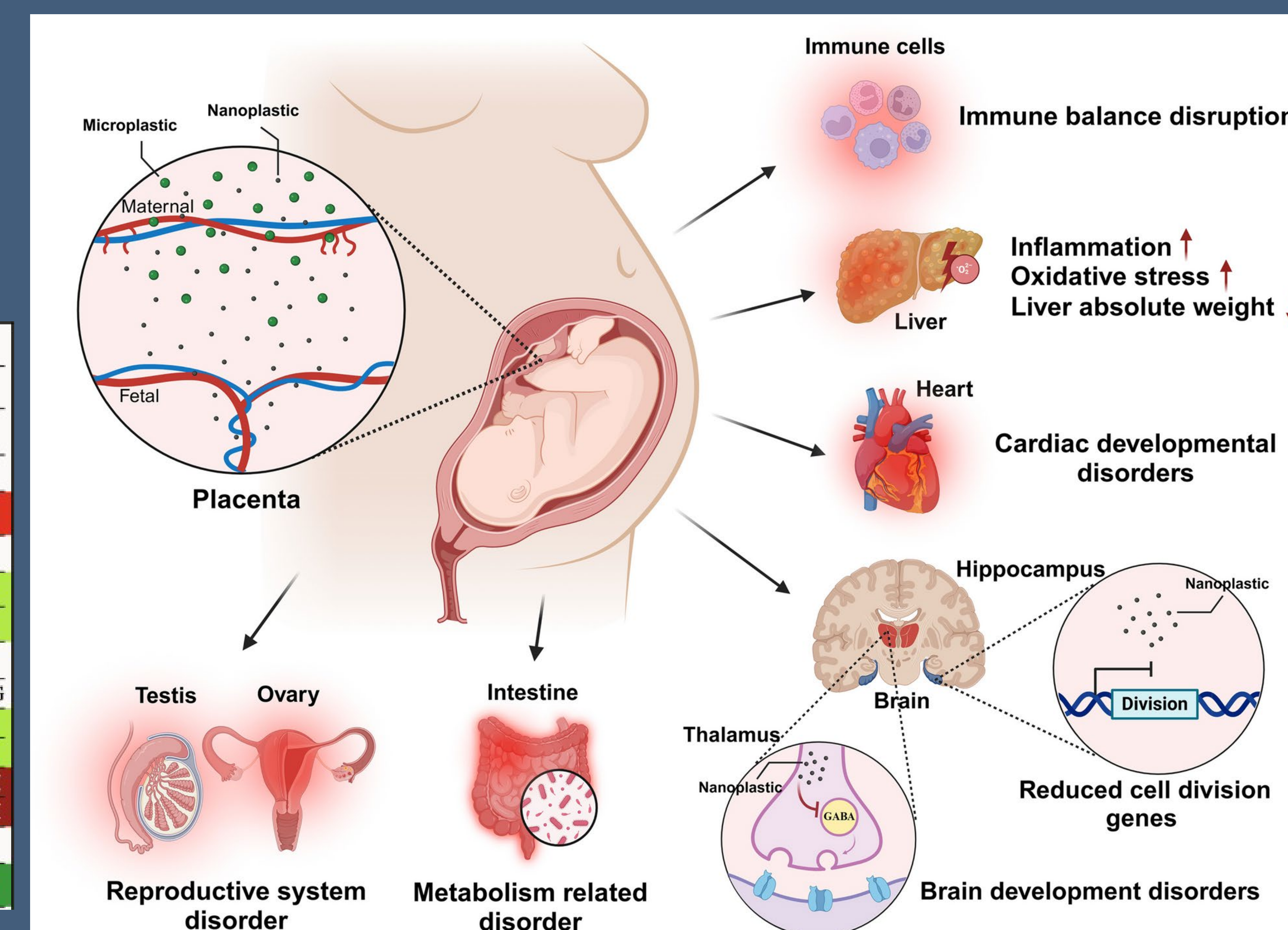
Many stain-resistant chemicals are toxic and/or persistent. Some

|                                                                                     |                                    |    |    |    |     |    |    |    |             |    |      |   |  |
|-------------------------------------------------------------------------------------|------------------------------------|----|----|----|-----|----|----|----|-------------|----|------|---|--|
| Whittaker et al. (2018).<br>Waterproof and Water<br>Repellent Textiles and Clothing | Hazard classification per endpoint |    |    |    |     |    |    |    |             |    |      |   |  |
|                                                                                     | Human health                       |    |    |    |     |    |    |    | Ecotoxicity |    | Fate |   |  |
| Substance                                                                           | C                                  | M  | R  | D  | E   | AT | ST | N  | AA          | CA | P    | B |  |
| Benchmark chemical                                                                  |                                    |    |    |    |     |    |    |    |             |    |      |   |  |
| PFOA # *                                                                            | H                                  | L  | H  | H  | PEA | M  | H  | DG | L           | L  | vH   | H |  |
| Side-chain fluorinated polymers                                                     |                                    |    |    |    |     |    |    |    |             |    |      |   |  |
| PFHxA # *                                                                           | L                                  | L  | L  | M  | DG  | M  | H  | DG | M           | L  | vH   | L |  |
| PFBS # *                                                                            | DG                                 | L  | L  | L  | PEA | L  | L  | DG | L           | L  | vH   | L |  |
| Silicones                                                                           |                                    |    |    |    |     |    |    |    |             |    |      |   |  |
| Short-chain silanols #                                                              | DG                                 | DG | DG | DG | DG  | DG | DG | DG | DG          | DG | DG   | D |  |
| Dimethylsilane diol #                                                               | DG                                 | DG | DG | DG | DG  | DG | M  | DG | DG          | DG | vH   | L |  |
| Trimethyl silanol #                                                                 | DG                                 | L  | DG | L  | DG  | M  | M  | DG | L           | DG | DG   | L |  |
| D4 *                                                                                | NA                                 | NA | M  | NA | NA  | NA | NA | NA | NA          | vH | vH   | v |  |
| D5 *                                                                                | M                                  | L  | L  | L  | DG  | L  | M  | DG | L           | L  | vH   | v |  |
| Hydrocarbons                                                                        |                                    |    |    |    |     |    |    |    |             |    |      |   |  |
| Paraffin Wax #                                                                      | L                                  | L  | L  | L  | DG  | L  | M  | DG | L           | L  | L    |   |  |

Find safer alternatives at [chemsec.org](https://chemsec.org)

## Human Health Impacts

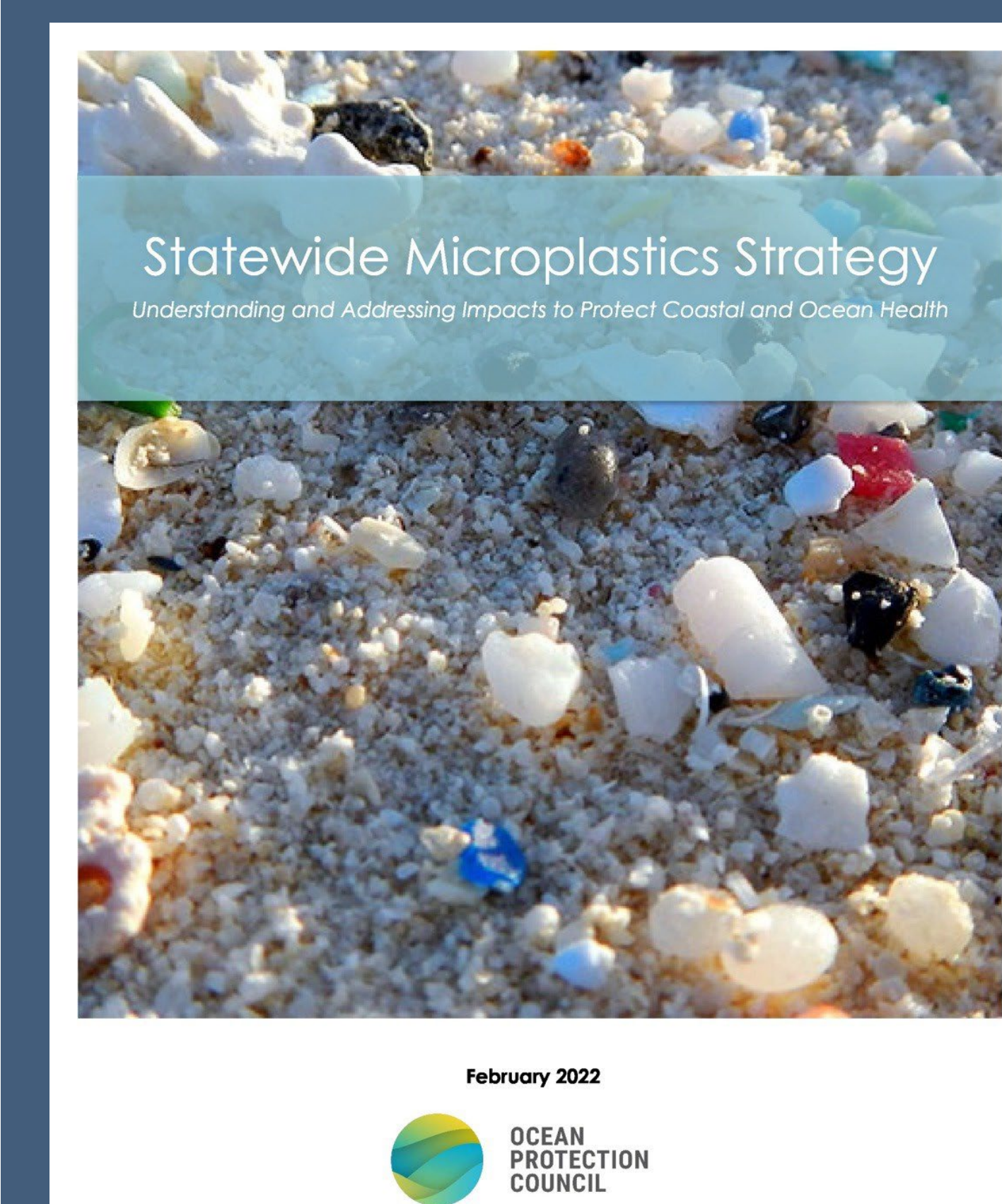
### Diverse and Poorly Understand Impacts



Balali et al. (2024). *Reproductive Biology and Endocrinology*

## Strategic & Adaptive Management

### Two-track approach



Learn more about California's microplastics strategy at [opc.ca.gov](https://opc.ca.gov)

### 1. "No-regrets" solutions

- Pollution Prevention
- Pathway Interventions
- Outreach & Education

### 2. Science to Inform Future Action



## Ecological Risk Assessment

### Monitoring



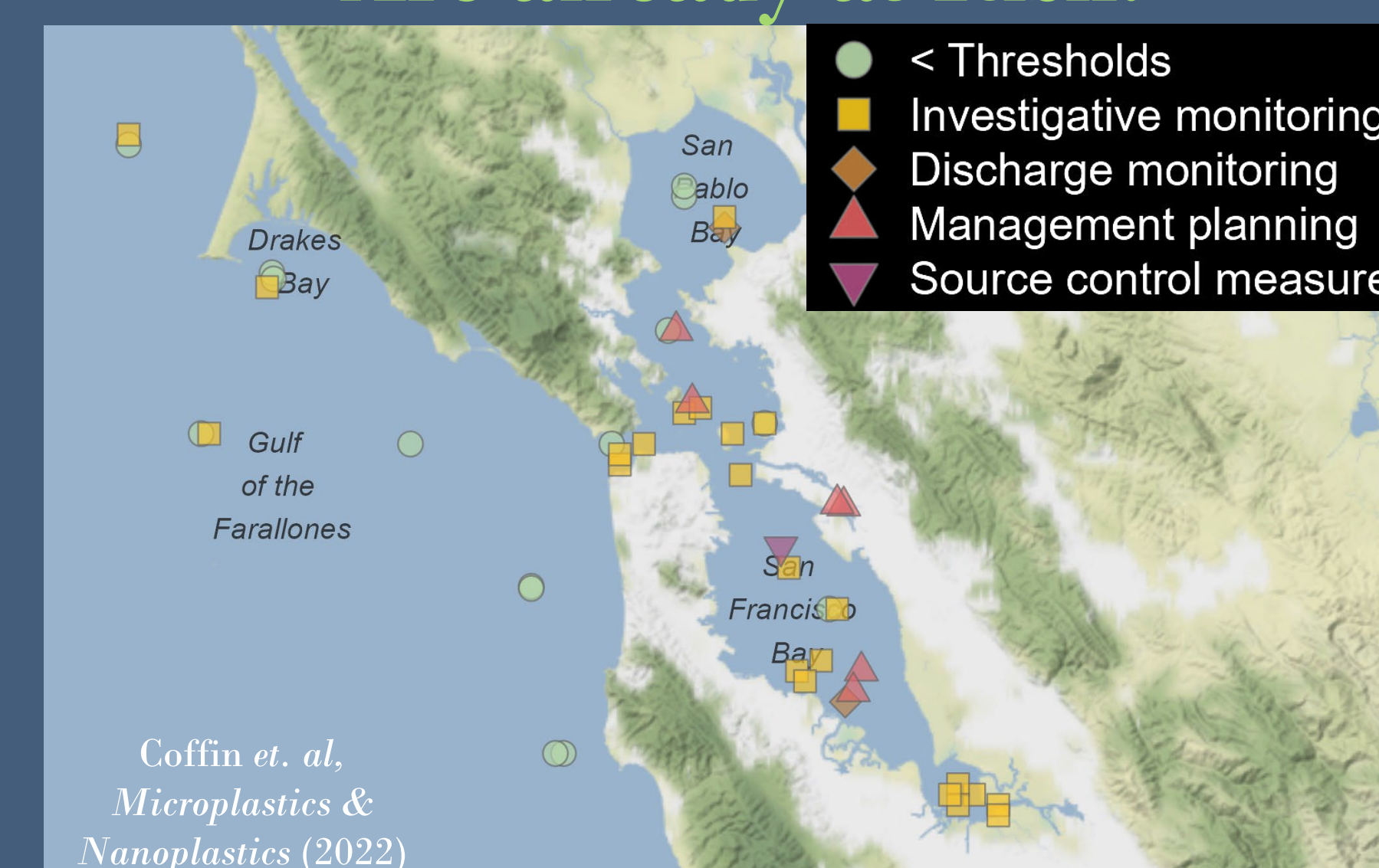
### Hazard Assessment

| Threshold                   | Food Dilution (particles/L) | Tissue Translocation (particles/L) |
|-----------------------------|-----------------------------|------------------------------------|
| 1- Investigative monitoring | 0.3                         | 60                                 |
| 2- Discharge monitoring     | 3.0                         | 320                                |
| 3- Management planning      | 5.0                         | 890                                |
| 4- Source control measures  | 34                          | 4,100                              |

Mehinto et al. (2022). *Microplastics & Nanoplastics*

### San Francisco Bay Waterbodies

### Are already at Risk!



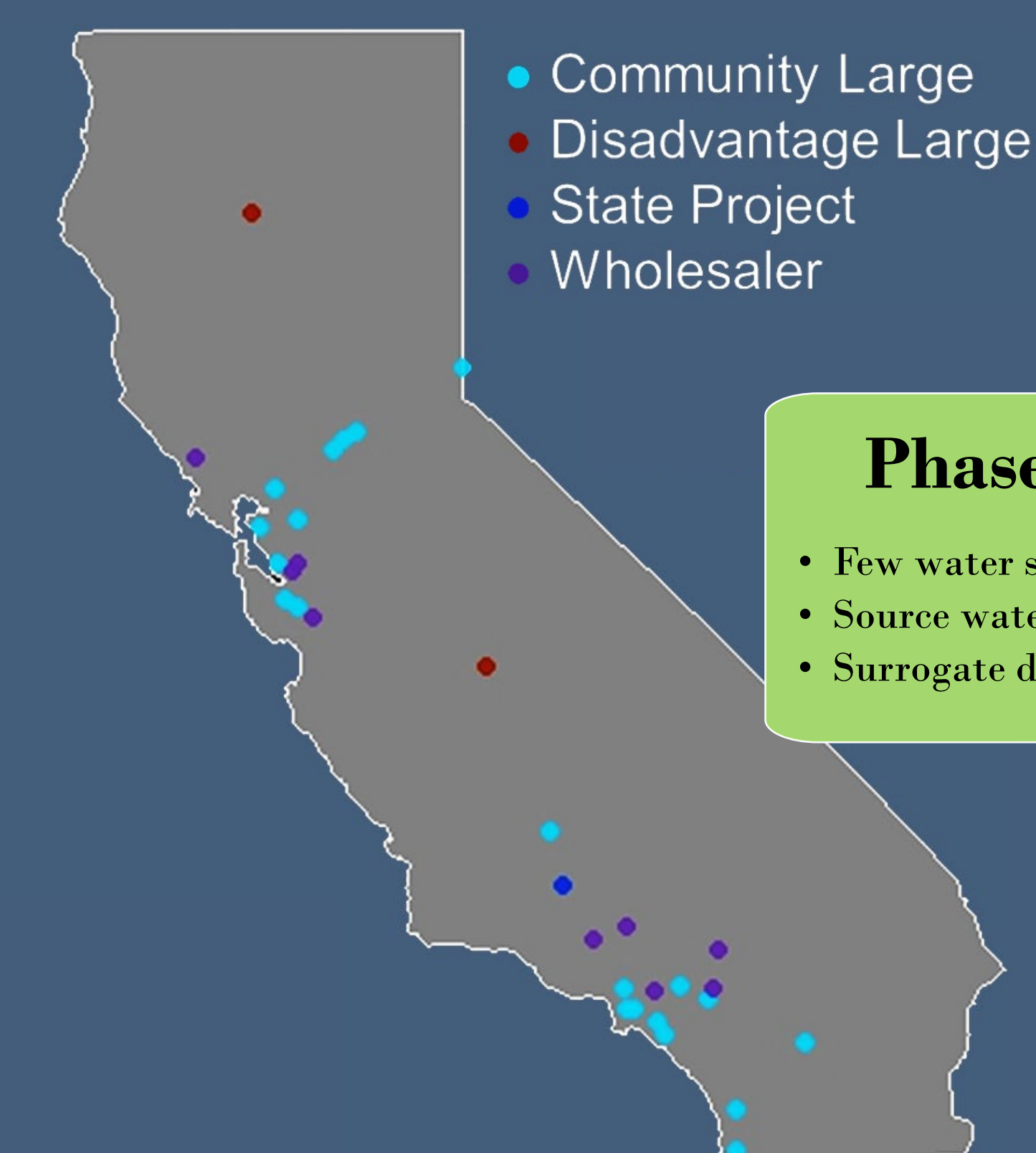
### Regulatory Implications

| 1                                                                                  | 2                                                             | 3                                                                                                                                                       | 4                                                                                                                                                                                                                                                                                                         | 5                                                                                                                                |
|------------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| • At least one core beneficial use is supported and none are known to be impaired. | • Not enough information to determine beneficial use support. | • Not enough information to determine beneficial use support; but there is information that indicates that indicates beneficial uses may be threatened. | • 4A: All 303(d) listings in the waterbody are being addressed and at least one is being addressed by a USEPA approved TMDL.<br>• 4B: All 303(d) listings in the waterbody are being addressed by actions other than a TMDL.<br>• 4C: Impairment is the result of pollution and not a specific pollutant. | • There are one or more 303(d) listings in the waterbody, and at least one of the listings has not yet been addressed by a TMDL. |

State Water Resources Control Board 2024 Integrated Report. Recommended *draft* ruling under the United State Clean Water Act.

## Drinking Water Monitoring

### Statewide Source Water Monitoring



### Phase One

- Few water systems
- Source waters only
- Surrogate development

### Pilot Phase

- Sampling method comparison
- Range-finding
- Sample training

### Phase Two

- Additional systems
- Treated waters
- Tiered monitoring

Learn more about California's microplastics drinking water monitoring at: [waterboards.ca.gov/drinking\\_water/certific/drinkingwater/microplastics.html](https://waterboards.ca.gov/drinking_water/certific/drinkingwater/microplastics.html)

[Approximate dates]