The Future of HAB Sampling and Analysis in a Resource Limited Program

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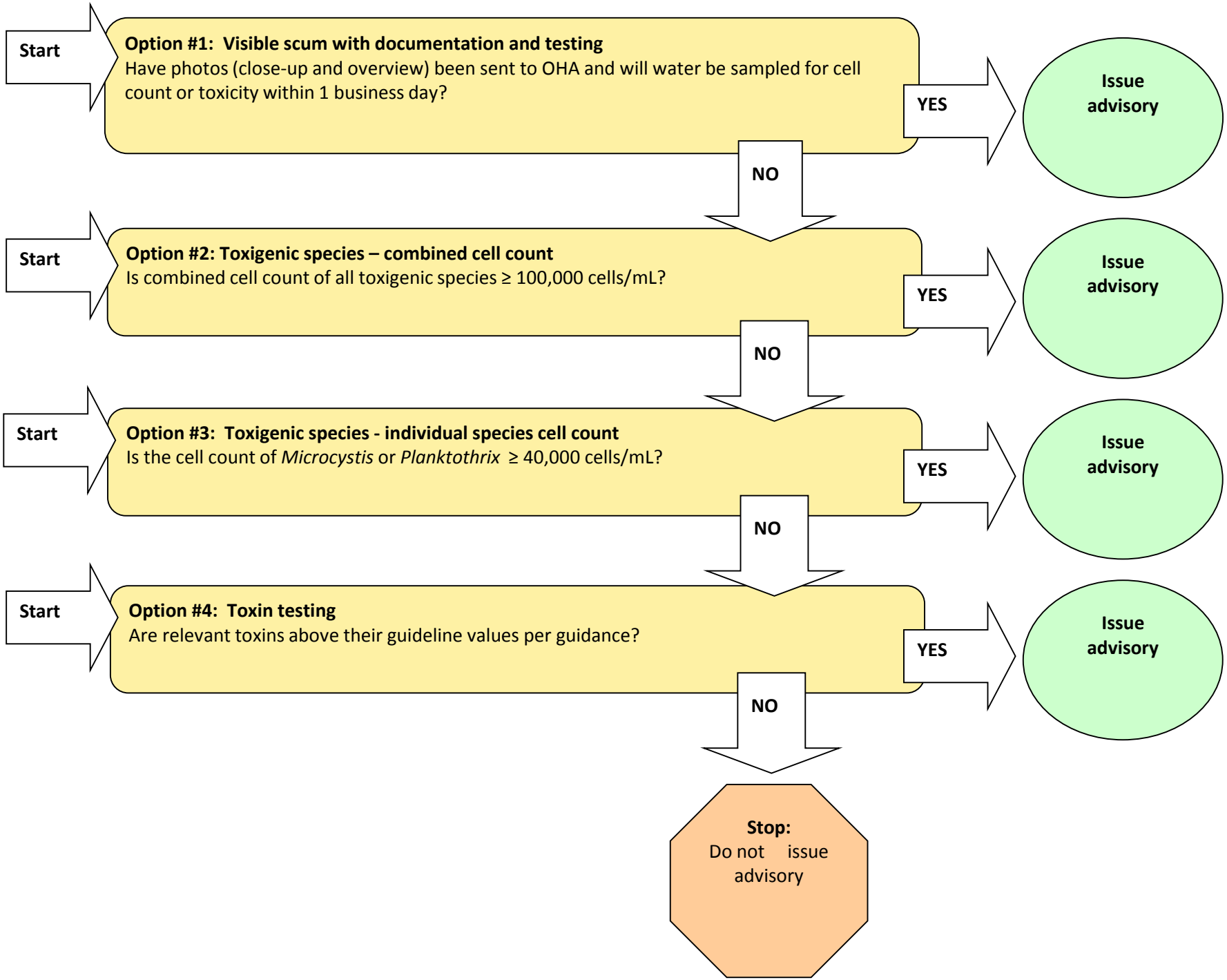
Photo courtesy of Victor von Salza

OHA HABs: current monitoring guidance

Monitored waterbodies (WB) where bloom identified

- Sample collected by WB manager (not OHA) and analyzed
  - Genera ID & cell counts, cell counts/toxins or just toxins (TBM)
- OHA receives data
  - Determines if levels over guideline values (GV)
  - If under – No advisory issued
  - If over – Advisory issued
- If no advisory issued
  - WB manager posts education/warning signs at WB
- If advisory issued
  - Public/stakeholders notified in several ways
  - Advisory signs posted alerting recreational users of advisory
- Lifting of advisory
  - When bloom gone, sample taken and analyzed for both CC and toxins
  - If both below GV, advisory is lifted
  - Public and stakeholders notified


Start
Option #1: Visible scum with documentation and testing
Have photos (close-up and overview) been sent to OHA and will water be sampled for cell count or toxicity within 1 business day?
YES
Issue advisory
NO
Start
Option #2: Toxigenic species – combined cell count
Is combined cell count of all toxigenic species ≥ 100,000 cells/mL?
YES
Issue advisory
NO
Start
Option #3: Toxigenic species - individual species cell count
Is the cell count of *Microcystis* or *Planktothrix* ≥ 40,000 cells/mL?
YES
Issue advisory
NO
Start
Option #4: Toxin testing
Are relevant toxins above their guideline values per guidance?
YES
Issue advisory
NO
Stop:
Do not issue advisory

Flexibility w/o compromising health

“Flexible”

Ability to…

- Change to cope with variable situations
- Adjust to meet specific and/or diverse needs
- Adapt to new, different, or changing requirements

“Flexible monitoring”

Ability to use dip stick testing for toxins to reduce cost and increase timeliness of decision making

- Flexible monitoring not yet covered in guidance
- Deviations from guidance must be evaluate
- If proposed plan feasible, flexibility could be used
- Currently an MOU in place with ODEQ to do flexible monitoring

Flexible monitoring makes sense

- OHA would prefer full TBM monitoring but understands burden on managers/vendors during peak season
- WB managers cannot use w/o OHA approval
- Initial monitoring/analysis still completed for identification & toxins
- Flexible monitoring w/dip sticks helps reduce cost
  - Minimizes number of fully analyzed toxin samples
  - Minimizes labor costs while increasing decision efficiency
  - Minimizes economic burden while protecting public health
  - Allows for other non-governmental entities to sample

Full analysis necessary if density of bloom increases, the appearance changes, or potential exposures increase

What's the criteria?

Since 2012 TBM has been encouraged to determine real vs. potential exposure to reduce advisories when not necessary. In 2015 flexible monitoring was conceived to reduce cost.

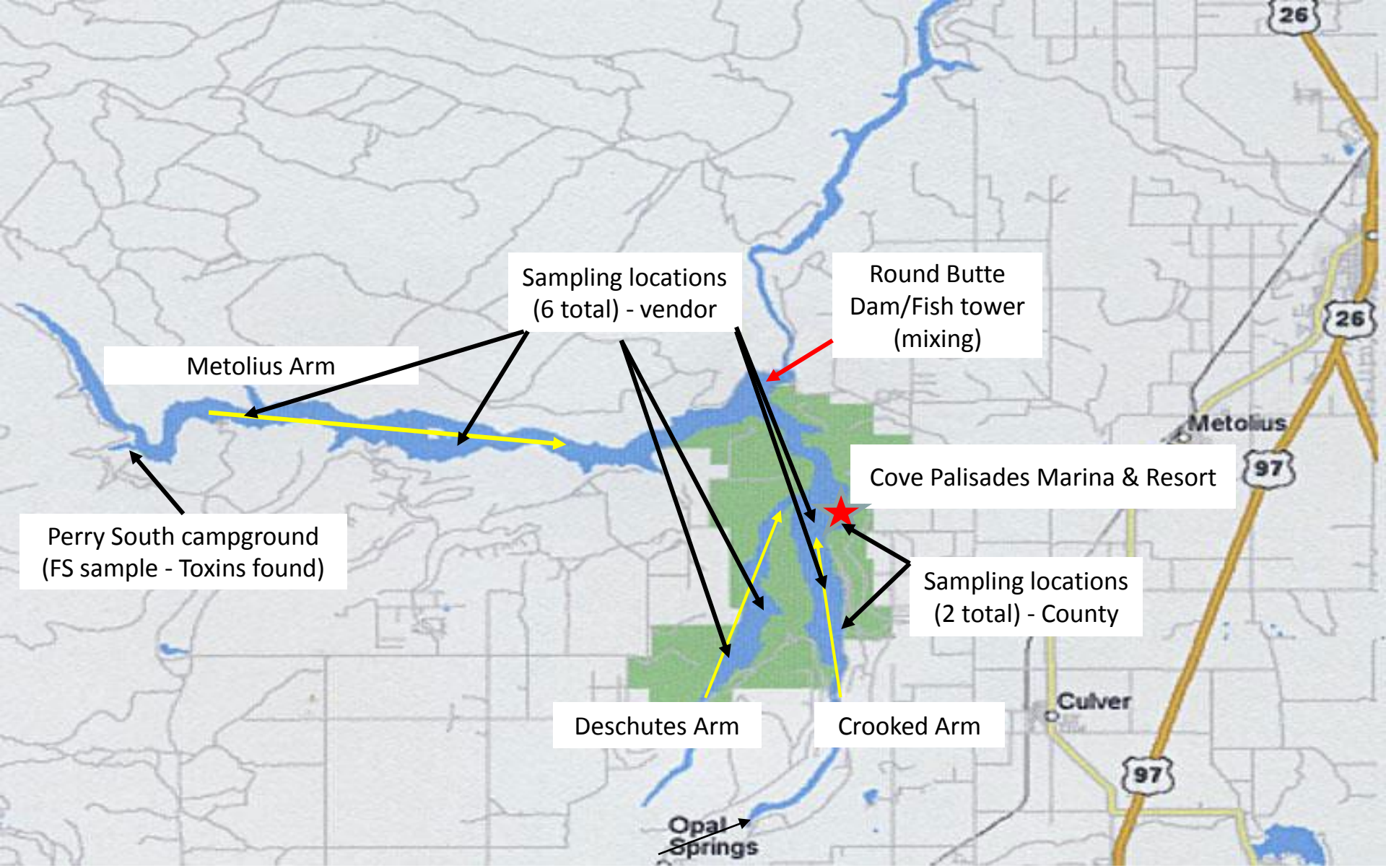
Flexible monitoring can be used only if…

- Dip stick tests are available for predominant toxin, **<u>and</u>**
- WB lends itself to flexible monitoring
  - WB geography - large lake w/arms or a river system
  - WB dynamics (current flow, prevailing winds, etc.)
- Used for toxin surveillance & maintenance monitoring
- Diligent monitoring & ongoing communication occurs

In all cases: Positive dip stick detections at 10 ppb must have further analysis (full ELISA, LCMS, etc)

Case study:– Lake Billy Chinook

- Flexible monitoring option based on geography & dynamics of lake
- Large lake: 3 rivers flowing in at diff. locations/arms
- Bloom identified in cove on Metolius arm (above other 2)
- Current dynamics in place: Deschutes & Crooked rivers flowing against direction of Metolius River
- Fish tower in place at end of Metolius arm causes mixing
- TBM performed on all three arms (8 samples total)
  - Dolichospermum dominant but microcystin only toxin found
- Blooms identified at end of Deschutes/Crooked rivers had disappeared



River flow

Sample locations

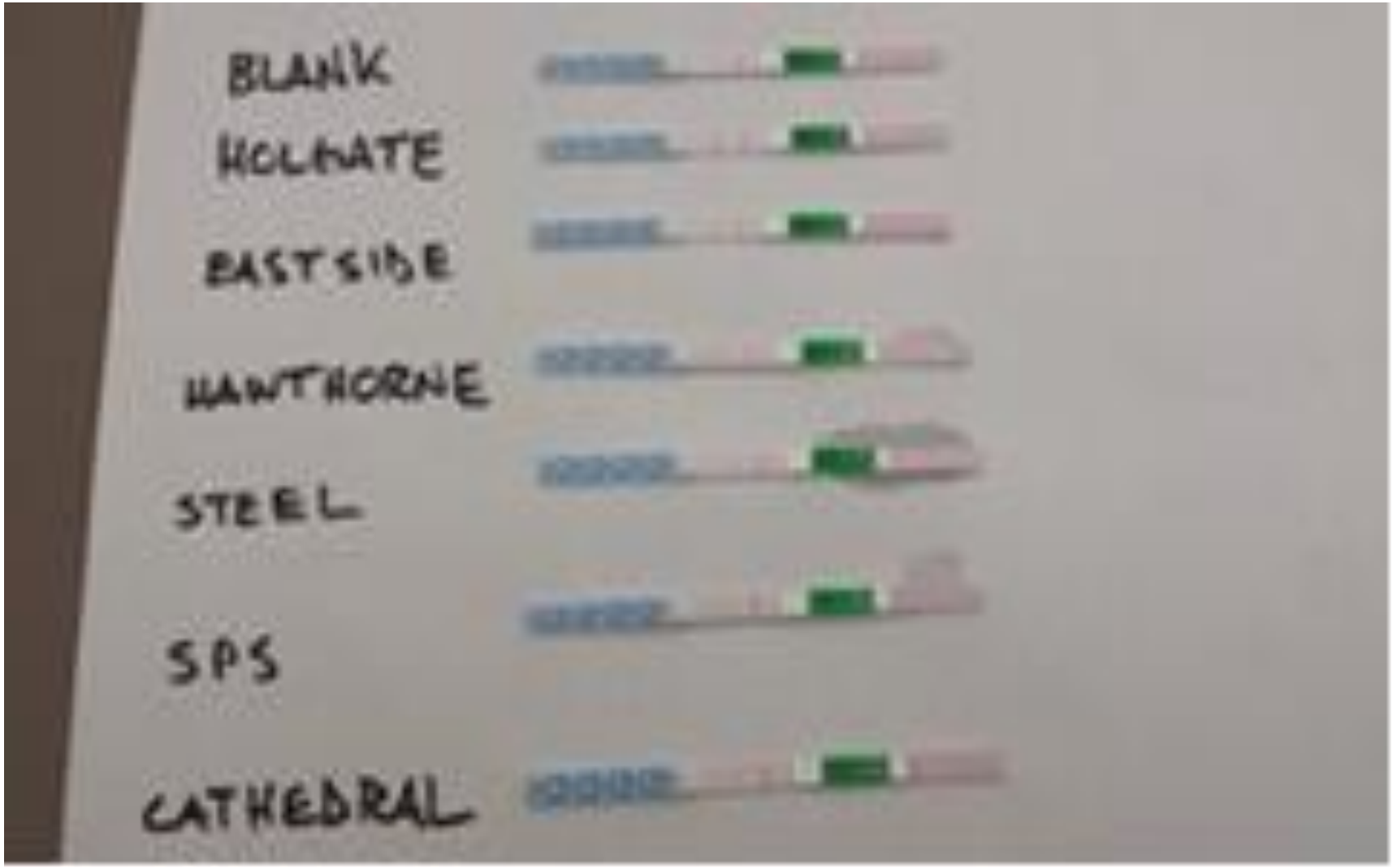
Mixing of all three arms occurs

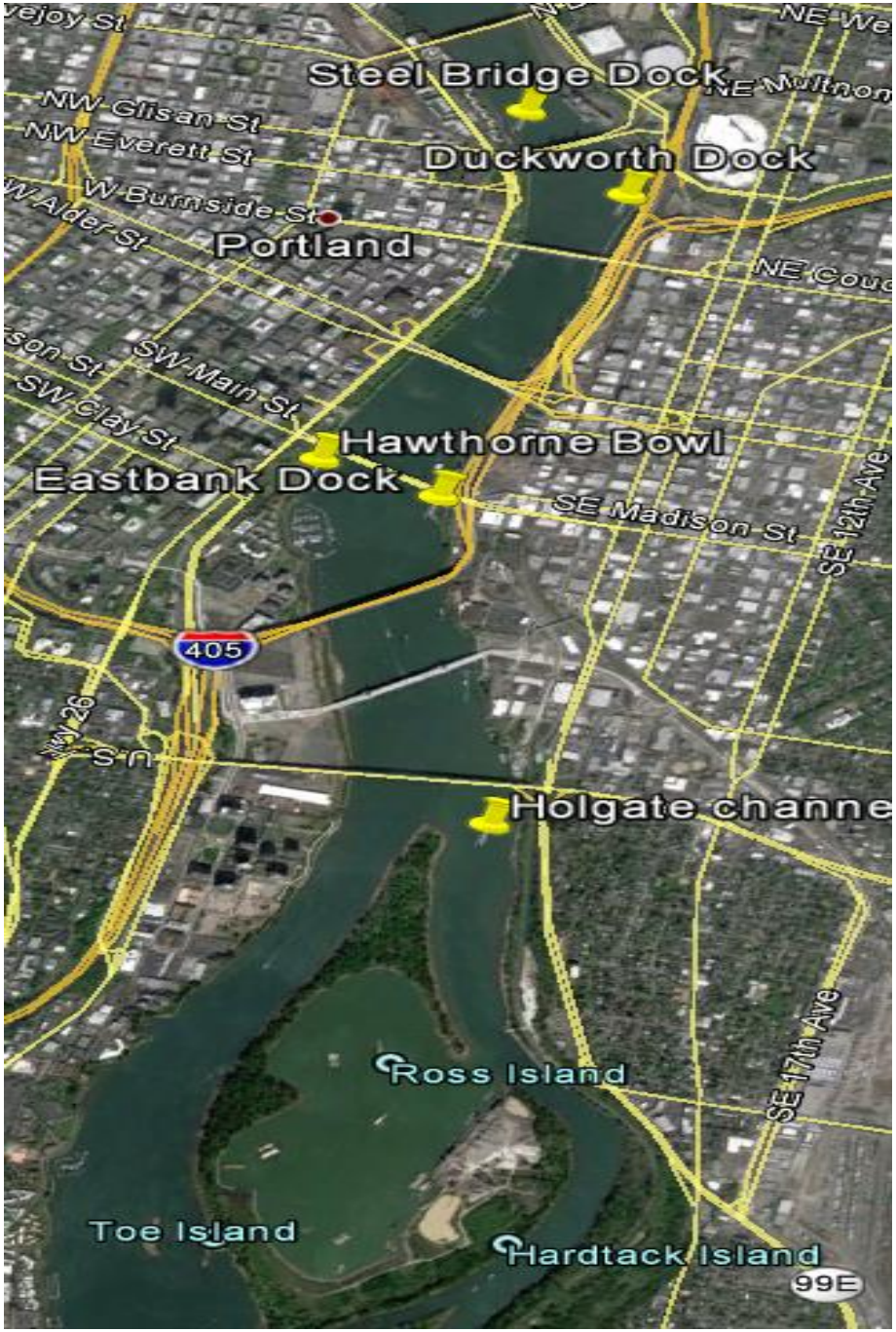
Case study: Willamette R. & RI Lagoon

- MOU established between OHA and DEQ
- Initial analysis for toxins in lagoon – toxins low
  - Dominant genera MYC (some Dolichospermum)
- No TBM in lagoon – Advisory stayed until bloom gone
- 2 samples taken per area along 10 river mile stretch
  - ELISA ST used on 1 sample/2nd to lab if toxins near 10 ppb
  - Full TBM performed for heavy growth or where public events to be held
- Although advisory issued for RI Lagoon based on visible scum, advisory did not extend into the river based on dip stick testing and TBM as necessary

Dip stick testing

Examples of dip stick tests taken on the Willamette River




Steel Bridge Dock
Duckworth Dock
NW Glisan St
NW Everett St
W Burnside St
W Alder St
Portland
SW Main St
SW Clay St
Hawthorne Bowl
Eastbank Dock
SE Madison St
SE 12th Ave
405
Holgate channe
Ross Island
SE 17th Ave
Toe Island
Hardtack Island
99E

N Smith St
SPS Bowl
NW Bridge Ave
N Willamette
NW St Helens Rd

Additional toxin analysis

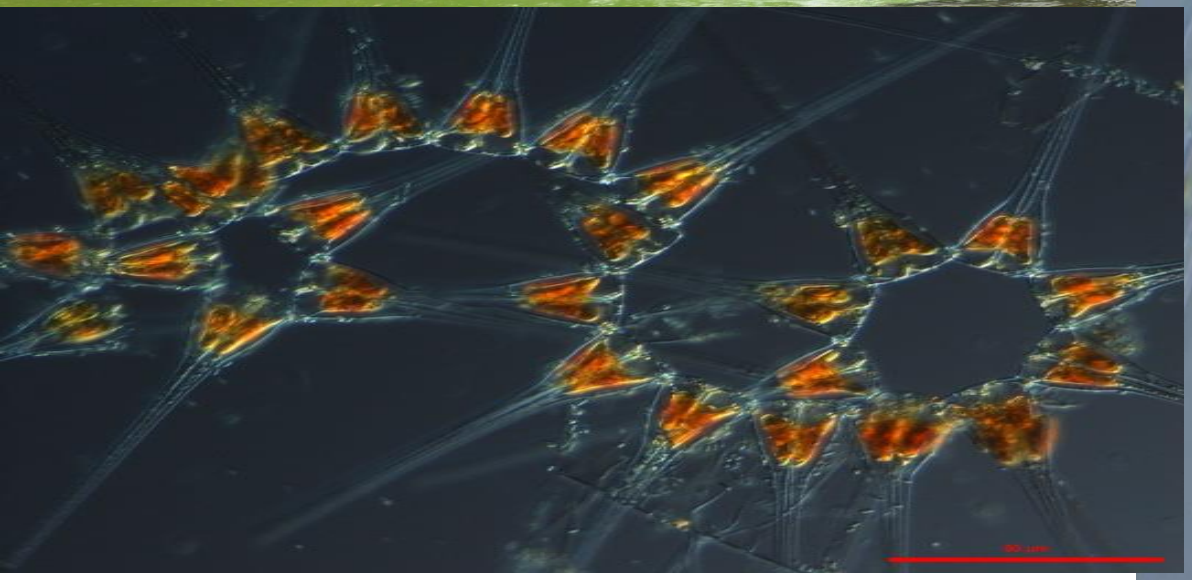
DEQ/Human Access Project samples prior to The Big Float

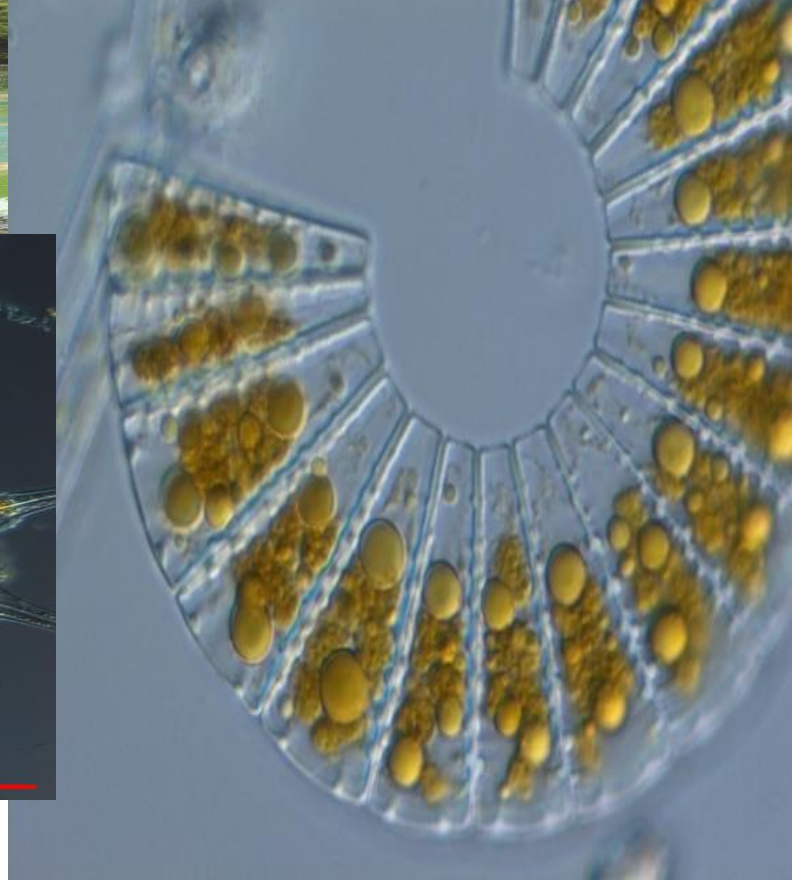
Looking ahead

- Communications plan developed & in place
- Availability of additional innovative field tests = more flexibility
- Recommended sampling will continue to change based on improvements in rapid detection methods
- With help from partners, OHA hopes to provide support and guidance on additional ways to make monitoring more flexible while protecting public health
- In future, flexible monitoring should help reduce burden on DMAs and on vendors/parks due to lost revenue

Questions anyone!

Additional information





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