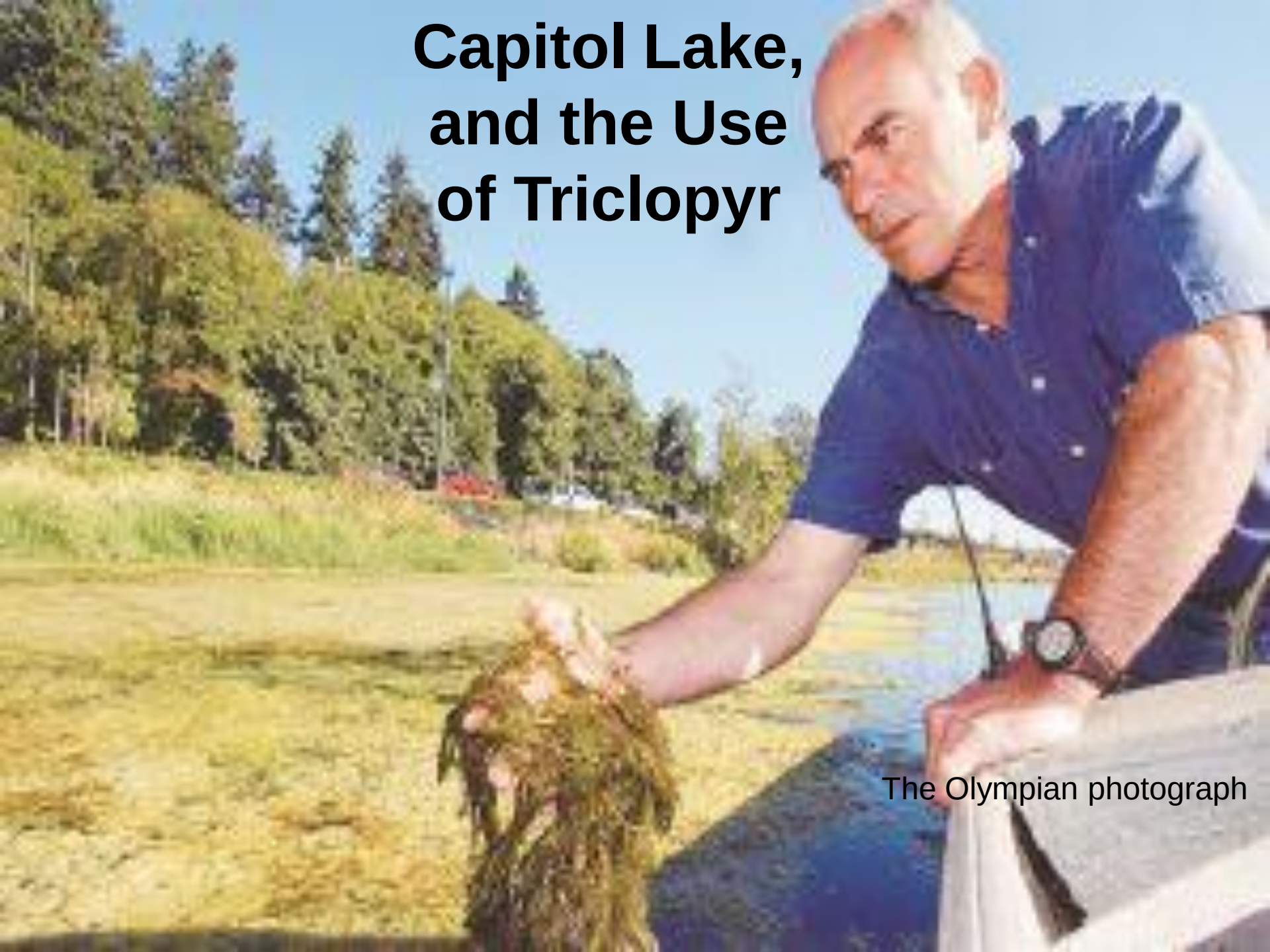
Capitol Lake, and the Use of Triclopyr

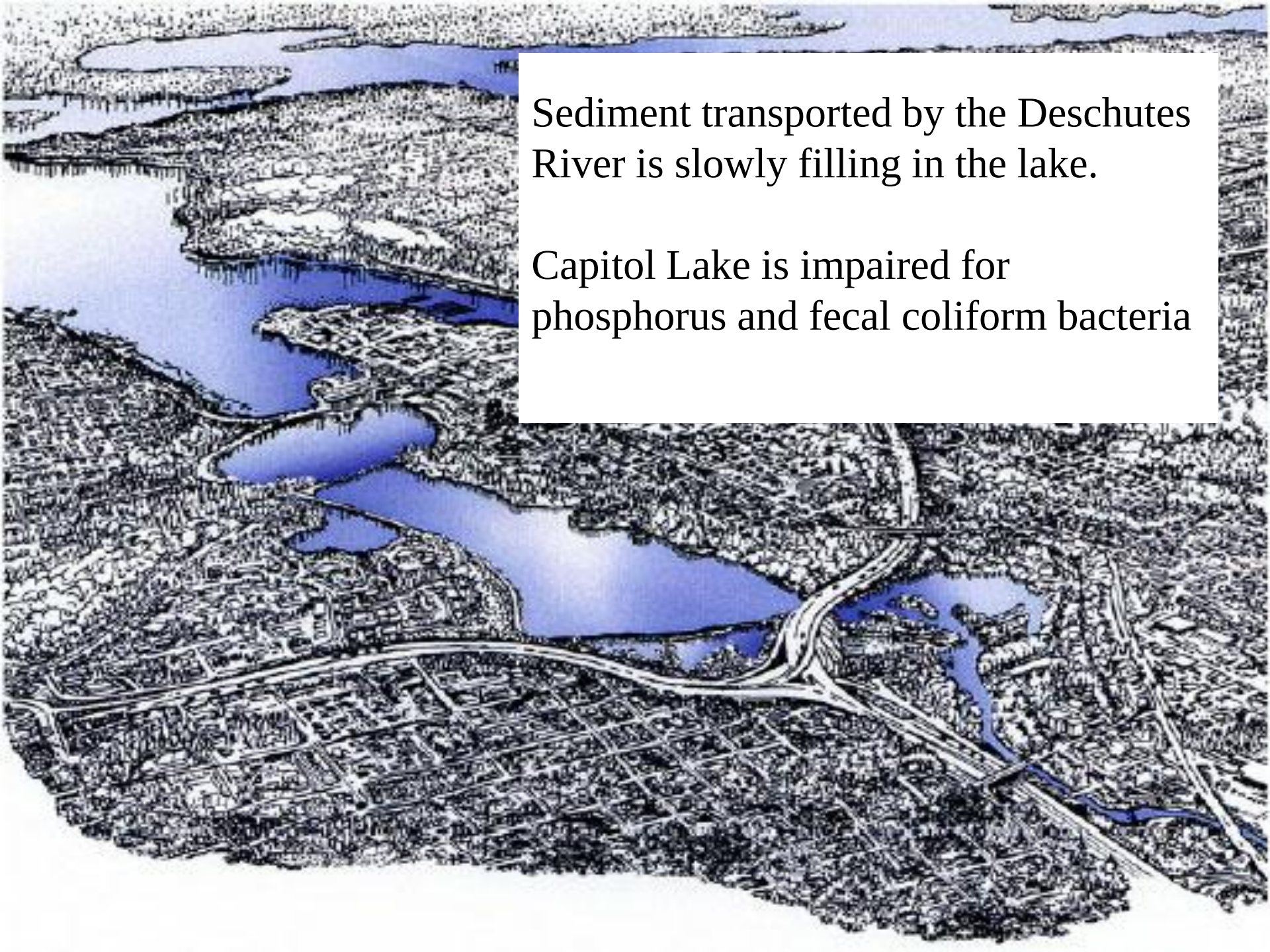


The Olympian photograph

Capitol Lake is Unique

- Capitol Lake is actually a 260-acre reservoir.
- It was created in 1951 when the state constructed an earthen dam to block the flow tidal flow of Budd Inlet
- This changed the mudflats of the Deschutes River estuary into a lake.

- The idea of creating a lake comes from the 1911 Capitol Campus design plan.
- The lake was meant to serve as a reflecting pool for the Capitol and to enhance the scenic views of the Olympic Mountains and Puget Sound from the Capitol Campus.
- The state Department of General Administration manages the lake with help from the Capitol Lake Adaptive Management Plan Committee.



Sediment transported by the Deschutes River is slowly filling in the lake.

Capitol Lake is impaired for phosphorus and fecal coliform bacteria

Lake Management

- For many years, Capitol Lake was back flushed with salt water to remove freshwater plants.
- Then under a permit from Ecology, GA agreed to allow a freshwater community to establish.
- A plant community established and then……..

Capitol Lake

Prior to milfoil invasion

Milfoil in 2003

Milfoil was first discovered in Capitol Lake in September 2001

2002 Activities

- A milfoil TAC was formed;
- Diver hand pulling and bottom barrier installation were advised by the TAC;
- GA hoped to take advantage of the lake drawdown for earthquake repairs to get contractors out on the lake bottom;
- This effort failed;
- Milfoil was more widespread than thought.

Plan B

- GA hired a contractor to develop an Integrated Aquatic Vegetation Management plan for Capitol Lake;
- During plan development, all management options were examined;
- There were 2 potential herbicide options
  - 2,4-D (rejected)
  - Fluridone (brand name Sonar)

Fluridone

- Fluridone requires a 10-12 week contact time with plants;
- Capitol Lake has rapid water turnover;
- Fluridone is non-selective;
- Capitol Lake discharges to Budd Inlet
- Many questions raised at the public meeting about this use.

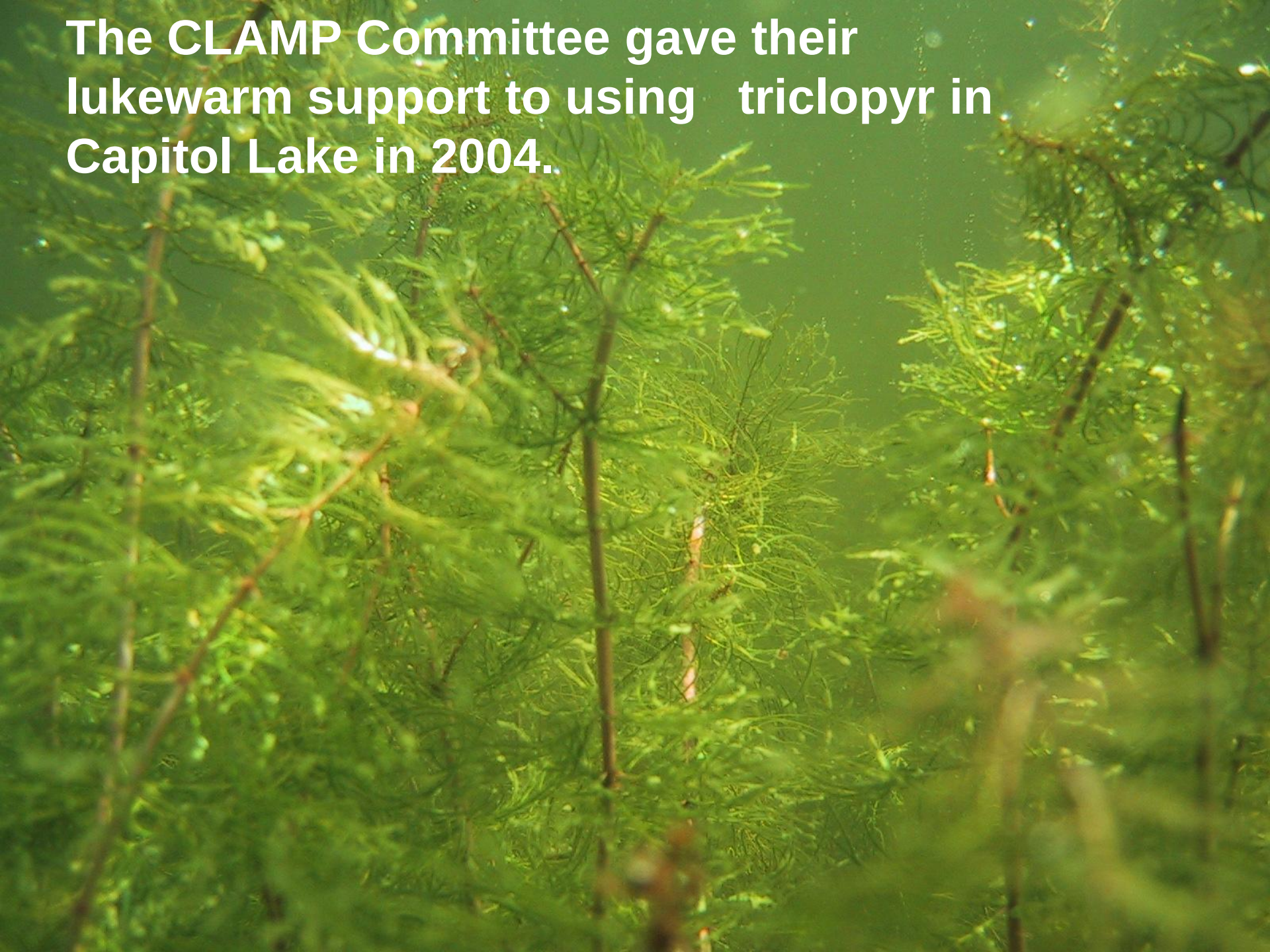
CLAMP Committee does not approve Fluridone for 2003;

More studies are done on the Lake in 2003;

- Water Quality monitoring
- Plant Mapping

2003-4

- Triclopyr is registered by EPA.
- Triclopyr is:
  - Fast acting (only needs 24-48 hour contact time);
  - Selective to dicots (milfoil is a dicot); and
  - Breaks down quickly
- GA compares herbicides and decides triclopyr is a better option than fluridone.


The CLAMP Committee gave their lukewarm support to using triclopyr in Capitol Lake in 2004.

Controversy

- A small, but vocal, group of folks was opposed to all chemical use in Capitol Lake (they ultimately filed a 60 notice of intent to sue).
- Others questioned why should GA use a chemical to treat milfoil when the lake isn't used for much besides aesthetics.

Controversy & Issues

- People were concerned that some triclopyr would enter Budd Inlet.
- People confused the two formulations of triclopyr (one is toxic).
- Triclopyr and Agent Orange are confused.
- People worried about bats and frogs.

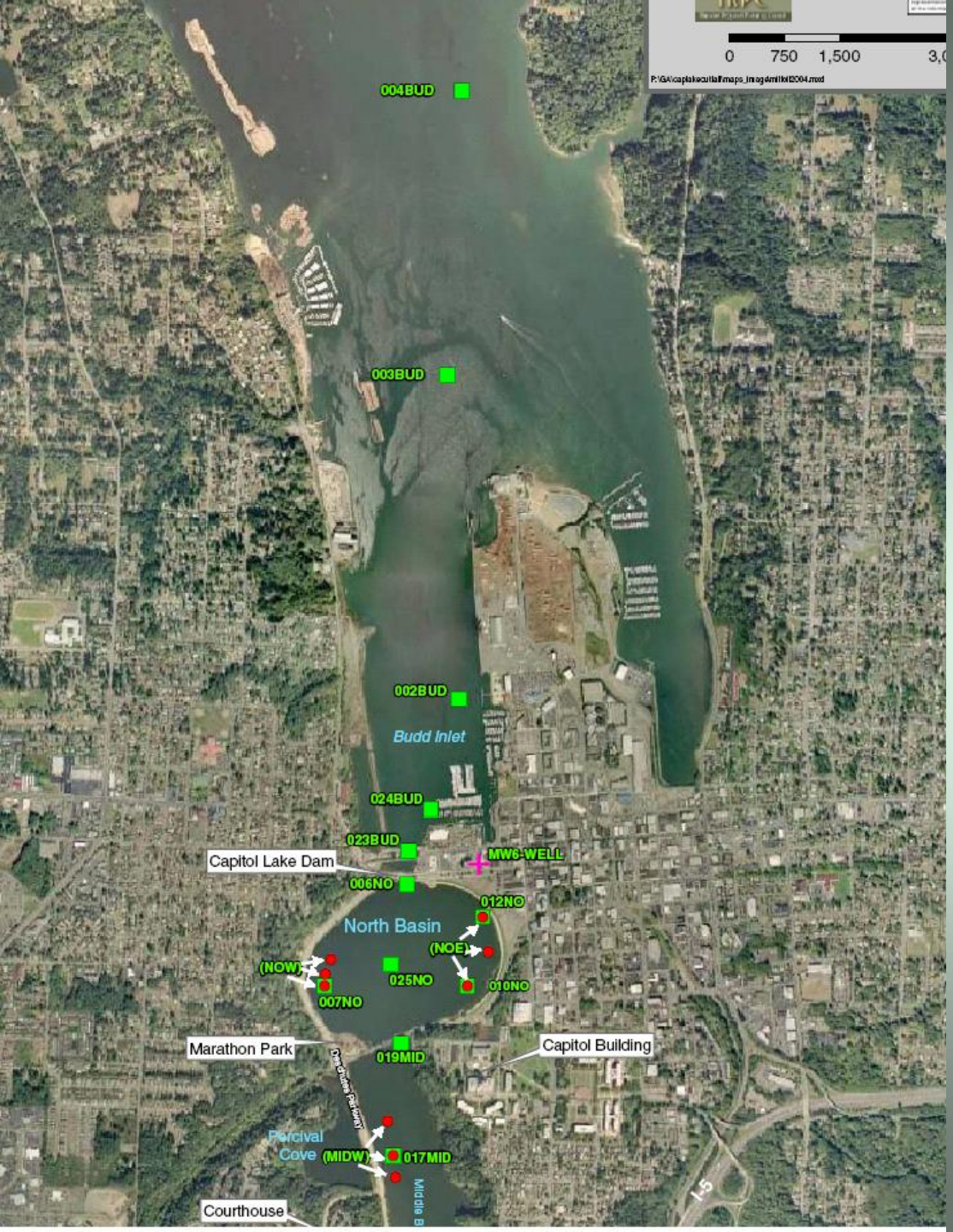
Treatment

- **The basin furthest away from Budd Inlet was treated first – July 19**
- **The basin closest to Budd Inlet was treated on July 29.**
- **Monitoring was conducted**

- GA closed the tide gates to minimize herbicide discharge to the Sound.
- On the July 29, one tide gate was 3 percent open for about two-hours.
- Both treatments were monitored by Agriculture and Ecology staff

Monitoring

- “Frequency of Occurrence” sampling of the aquatic plant community –
- Biomass sampling of aquatic plant community
- Dissolved oxygen sampling
- pH sampling
- Triclopyr sampling of lake and marine water
- Triclopyr sampling of lake sediments
- Triclopyr sampling of groundwater

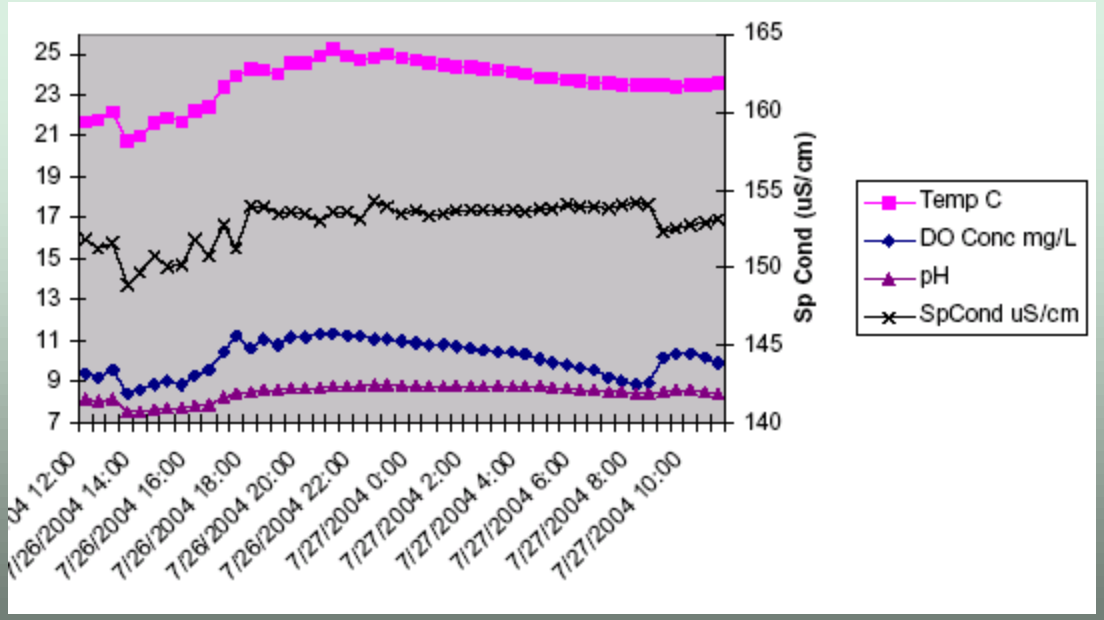


Sampling Locations

- In-lake Stations
- Puget Sound Stations

Results - WQ

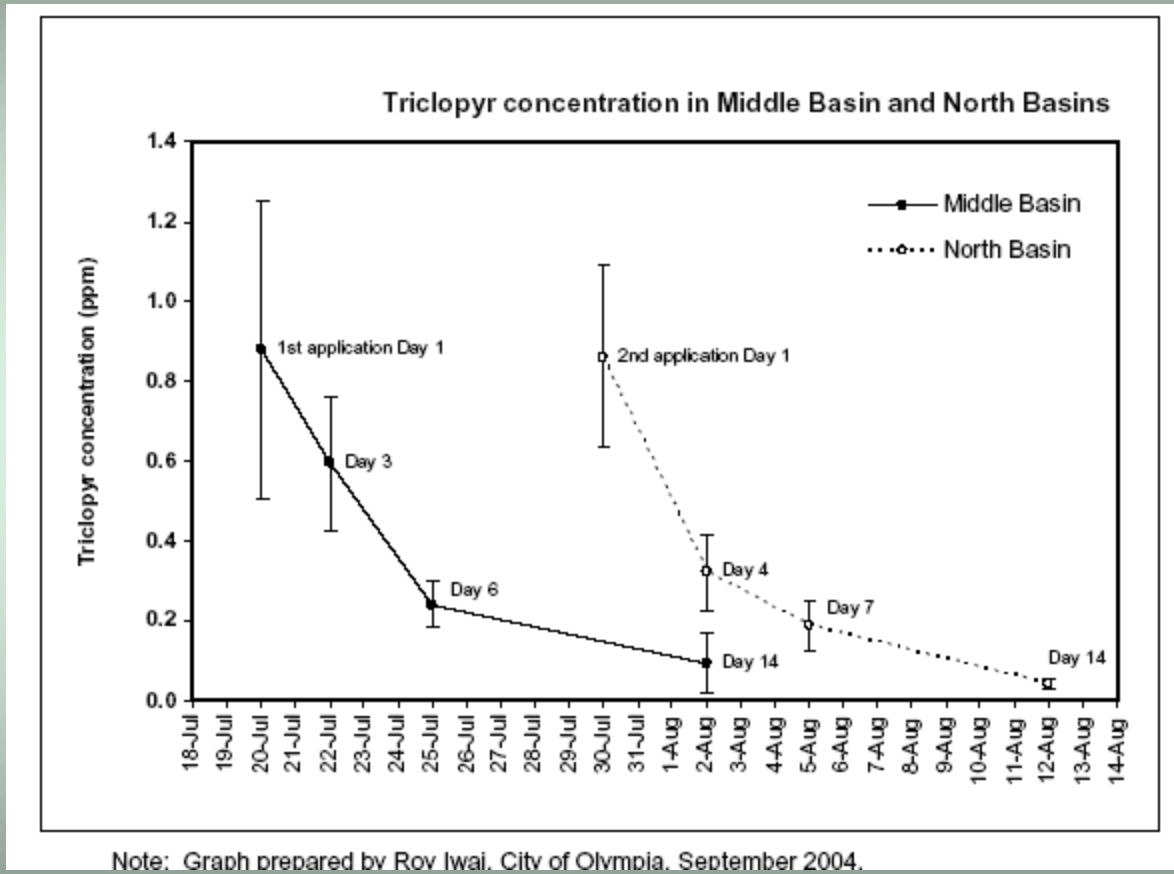
- Little change in pH
- Minor to no drop in DO
- 24 hour monitoring from middle basin shown



Data collected and prepared by Thurston County and Olympia

Results – Triclopyr - Water

- The maximum detected concentration was within the label limit of 2.5 ppm.
- Concentrations decreased rapidly during the sampling interval.



Note: Graph prepared by Roy Iwai, City of Olympia, September 2004.

Results – Triclopyr - Water

- Triclopyr was detected in the freshwater layer over marine water in Budd Inlet. Highest concentration was 48 ppb during regular sampling.
- Samples collected seaward of the tide gate shortly after the 2nd application, when a tide gate had been ajar, had triclopyr concentrations of 65 and 54 ppb. (EPA standard 400 ppb)
- No triclopyr was detected in the shallow monitoring well next to the Heritage Park fountain 27 days

Results – Triclopyr - Sediment

- Triclopyr concentrations in the lake sediments ranged from 55 to 690 ppb in four composite samples.

Draft Results – Plant Frequency

- Milfoil was the only plant to decrease significantly from July to September.
- Stonewort and curly-leaf pondweed both increased significantly.
- The other common plants maintained about their same level of frequency throughout the summer.

Draft Results – Plant Biomass

- Milfoil biomass decreased significantly from July to September.
- Biomass of waterweed (*Elodea* sp) increased significantly.
- The biomass of other species, including total biomass for the whole lake, did not change significantly during the study period.

Overall conclusions

- Triclopyr performed as expected.
- Some milfoil remained in the basin closest to the waterfalls. They will be hand removed.
- We consider this to be a success!

- Questions?