

MICROORGANISMS: THE FOUNDATION OF AQUATIC ECOSYSTEMS IN A
NORTHWEST U. S. CITY'S PARKS: A SNAPSHOT OF THE INVISIBLE WORLD.
PART 2: STUDIES ON PLANKTON SAMPLES FROM EDMONDS FISHING PIER
ON TWO DATES IN 2021.

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During a canvass of aquatic sites on May 12 and June 26, 2021, plankton tows were taken mid-day at the Edmond Fishing Pier near the Edmonds-Kingston Ferry Terminal. Edmonds is a city on Puget Sound, Washington State USA, part of the Salish Sea. A 55 micron mesh net was used and ample samples of microscopic planktonic creatures were obtained (for complete description of location selection and methods see [Part 1](#)).

Identifications were made by consulting various scientific articles and books (e.g. *Identifying Marine Phytoplankton* edited by Carmelo Tomas, 1997). Since we were limited to observing live specimens, at times we could only identify to the genus level. In Puget Sound diatoms generally bloom in spring -followed by dinoflagellates and zooplankton [later in summer](#) so we were curious to determine if that was the case on our two dates.

On May 12, diatoms were extremely abundant; the diatom seen most frequently was *Chaetoceros debilis*, a chain-forming species that forms a spiral. This is a common diatom in Puget Sound, usually seen abundantly in spring (personal observations in samples from the Seattle Waterfront and Bainbridge Island). Several other *Chaetoceros* species as well as many other diatoms were also observed (Table 1, Plate 1). In addition, some dinoflagellates and a copepod nauplius (immature copepod) were sampled (Table 1, Plate 2)

The June 26 sample yielded diatoms and other phytoplankton not seen in May, for example, *Actinopterychus senarius* and *Ditylum brightwellii* -however *Chaetoceros debilis* was rare (Table 2, Plate 3). Dinoflagellates appeared to increase in abundance and diversity. Some zooplankton that was not observed in May (e.g. barnacle and clam larvae and a tintinnid ciliate) (Table 2, Plate 4) appeared. As mentioned earlier, an increase in zooplankton often follows a phytoplankton bloom and this was noted on our two sample dates.

In conclusion, diversity was high in both plankton samples with considerable overlap in species. Zooplankton appeared in the later June sample that were not observed in the spring May sample.

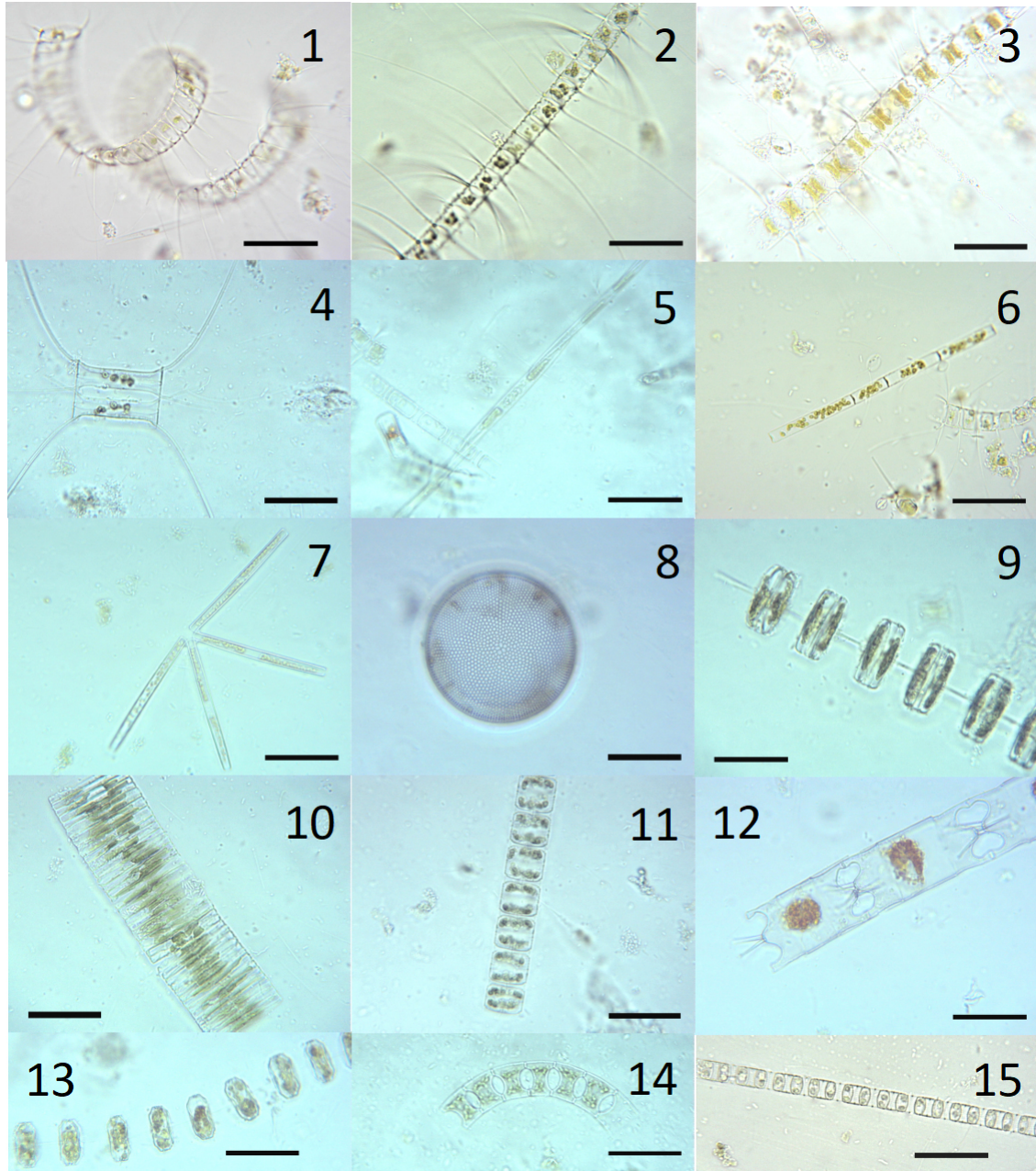


Plate 1. Representative diatoms, May 12, 2021: Fig. 1 *Chaetoceros debilis* Fig. 2 *Chaetoceros diadema* Fig. 3. *Chaetoceros didymus* Fig. 4 *Chaetoceros lorenzianus* Fig. 5 *Pseudo-nitzschia* sp. Fig. 6 *Leptocylindrus danicus* Fig. 7 *Thalassionema nitzschioides* Fig. 8 *Coscinodiscus centralis* Fig. 9 *Thalassiosira rotula* Fig. 10 *Fragilaria crotonensis* Fig. 11 *Detonula pumila* Fig. 12 *Odontella longicuris* Fig. 13 *Thalassiosira nordenskiöldii* Fig. 14 *Eucampia zodiacus*. Fig. 15 *Skeletonema costatum*. All scale bars = 50 μ m.



Plate 2. Representative species other than diatoms, May 12, 2021: Fig. 16 *Peridinium* sp. Fig. 17 *Dinophysis norvegica* Fig. 18 *Protoperidinium* cf. *oceanicum* Fig. 19 *Protoperidinium* sp. Fig. 20 *Protoperidinium conicum* Fig. 21. Copepod nauplius. Scale bars = 50 μ m, except for Fig. 21 where scale bar is 200 μ m.

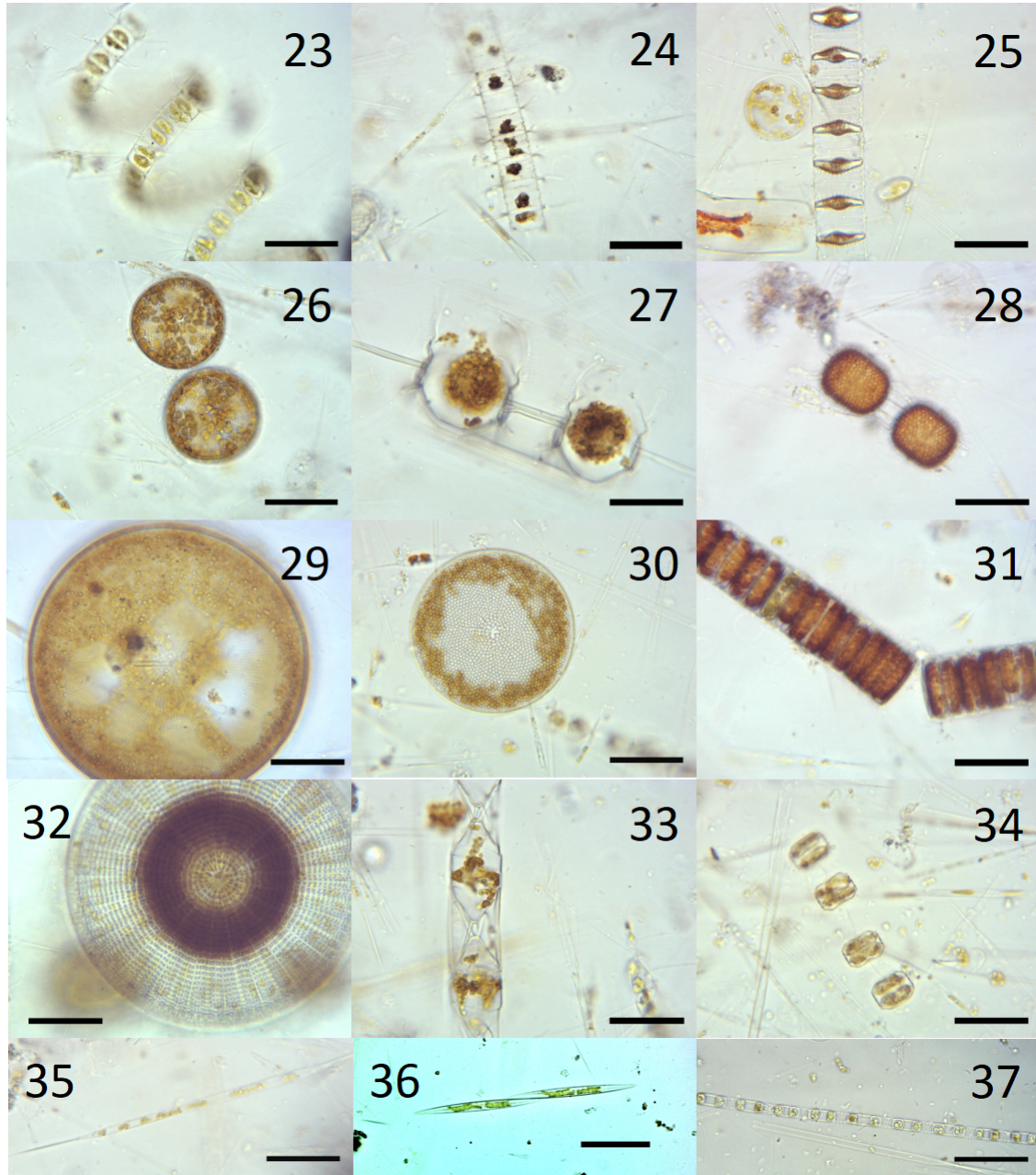


Plate 3. Representative diatoms, June 26, 2021: Fig. 23 *Chaetoceros debilis* Fig. 24 *Chaetoceros diadema* vegetative cells Fig. 25 *Chaetoceros diadema* spores Fig. 26 *Actinoptychus senarius* Fig. 27 *Ditylum brightwellii* Fig. 28 *Stephanopyxis palmeriana* Fig. 29 *Coscinodiscus wailesii* Fig. 30 *Coscinodiscus centralis* Fig. 31 *Paralia sulcata* Fig. 32 *Arachnoidiscus ehrenbergi* Fig. 33 *Odontella longicruris* Fig. 34 *Thalassiosira nordenskiöldii* Fig. 35 *Rhizosolenia* sp. Fig. 36 *Pseudo-nitzschia* sp. Fig. 37 *Skeletonema costatum*. All scale bars = 50 μ m.

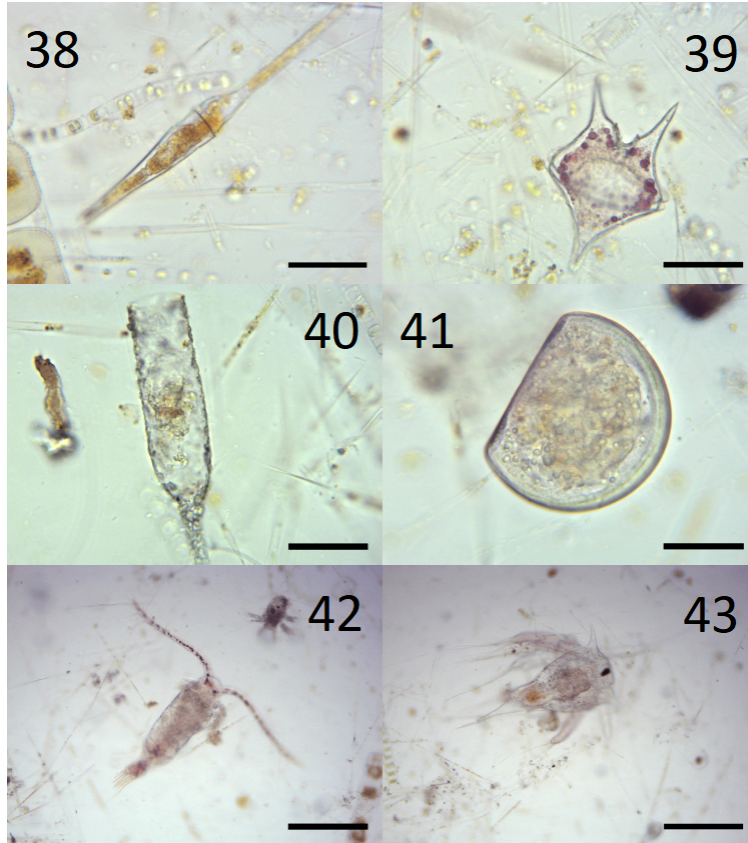


Plate 4. Representative species other than diatoms, June 26, 2021: Fig. 38 *Ceratium fusus* Fig. 39 *Protoperidinium* cf. *oceanicum* Fig. 40 *Favella* sp. Fig. 41 Larval clam Fig. 42 Calanoid copepod and copepod nauplius Fig. 43 Barnacle larva. Scale bars = 50 μm except for Figs 41-43, scale bar = 200 μm .

Diatoms

Bacteriastrum sp.
Chaetoceros debilis
Chaetoceros decipiens
Chaetoceros didymus
Chaetoceros sp.
Coscinodiscus centralis
Detonula pumila
Eucampia zodiacus
Fragilaria crotensis
Leptocylindrus danicus
Odontella longicruris
Pleurosigma sp.
Pseudo-nitzschia sp.
Skeletonema costatum
Stephanopyxis palmeriana
Striatella unipunctata
Thalassionema nitzschioides
Thalassiosira nordenskiöldii
Thalassiosira rotula

Dinoflagellates

Ceratium fusus
Dinophysis norvegica
Proto-peridinium spp.
Proto-peridinium cf. *minutum*

Others

Copepod nauplius

Table 1. Sample taken 5/12/21.

Diatoms

Actinopterychus senarius
Arachnoidiscus ehrenbergi
Chaetoceros debilis
Chaetoceros diadema (plus spores)
Chaetoceros didymus
Coscinodiscus centralis
Coscinodiscus wailesii
Cylindrotheca closterium
Ditylum brightwellii
Eucampia zodiacus
Isthmia nervosa
Leptocylindrus danicus
Odontella longicruris
Paralia sulcata
Pseudo-nitzschia sp.
Rhizosolenia sp.
Skeletonema costatum
Stephanopyxis palmeriana
Thalassionema nitzschioides
Thalassiosira nordenskiöldii
Thalassiosira rotula
Thalassiosira sp.

Dinoflagellates

Dinophysis norvegica
Dinophysis fortii
Peridinium sp.
Ceratium fusus
Proto-peridinium cf. *Minutum*
Proto-peridinium cf. *oceanicum*

Others

Barnacle larvae
Calanoid copepods
Copepod nauplii
Favella sp. (tintinnid ciliate)
Larval clams
Rotifers

Table 2. Sample taken 6/26/21.

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