

Monitoring and Reporting

- How Tulsa's Stormwater Permit and OKR05 work together -



Jacob Hagen – City of Tulsa: Stormwater Quality

What is Tulsa's Stormwater Permit?

- Oklahoma Dept. of Environmental Quality issued
- Permits Tulsa to discharge stormwater runoff to Waters of the State
- Establishes requirements to ensure compliance

AUTHORIZATION TO DISCHARGE OKLAHOMA POLLUTANT DISCHARGE ELIMINATION SYSTEM

Permit Number OKS000201

In compliance with the Oklahoma Pollutant Discharge Elimination System (OPDES) Act, Title 27A O.S. Supp.1999, § 2-6-201 *et seq.*, and the rules of the State of Oklahoma Department of Environmental Quality (DEQ) adopted hereunder (See OAC 252:606); the Federal Clean Water Act, Public Law 95-217 (33 U.S.C. 1251 *et seq.*), Section 402; and NPDES Regulations (40 CFR Parts 122, 124, 136 and 403),

City of Tulsa
4818 S. Elwood
Tulsa, OK 74107

Oklahoma Turnpike Authority
3500 N. Martin Luther King Ave.
Oklahoma City, OK 73111-4295

Oklahoma Department of
Transportation
200 N.E. 21st Street
Oklahoma City, OK 73105

co-permittees are hereby authorized to discharge storm water from the Tulsa Municipal Separate Storm Sewer System (MS4) to receiving waters:

Arkansas River Basin

Bigheart Creek, Cherry-Red Fork Creek, Vensel Creek, Crow Creek, Downtown Creek, Upper Joe Creek, Elm Creek, Fred Creek, Swan Creek, Fry Ditch No. 2, Garden City, S. Fork, Little Joe Creek, Hager Creek, Haikey Creek, S. Tulsa Drainage Area, Harlow Creek, Lower Basin, Perry Man Ditch, Mooser Creek, Parkview Creek, Nickel Creek, N. Fork Little Joe, and Oak Creek.

Verdigris River Basin

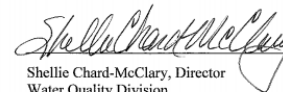
Adams Creek, Center-Rolling Hills Creek, Bird Creek, Coal Creek, Cooley Creek, Dirty Butter Creek, Flat Rock Creek, Lower Middle Mingo Creek, Mingo Creek, Lower Mingo Creek, Reservoir Creek, Spunky - Pond Creeks, Upper Mingo Creek, and Upper Middle Mingo Creek and Knudson Creek.

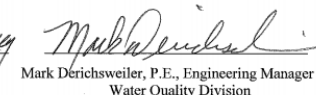
Also included are tributaries thereto, in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, III, IV, V, VI, and VII hereof.

This permit shall become effective on October 16, 2011. It will replace and/or supersede the permit issued on January 13, 2003.

This permit and the authorization to discharge shall expire at midnight on October 15, 2016.

For The Oklahoma Department of Environmental Quality:


Shellie Chard-McClary, Director
Water Quality Division


Mark Derichsweiler, P.E., Engineering Manager
Water Quality Division

Monitoring Required of Tulsa's Stormwater Permit

- Four types of monitoring
 - Watershed Characterization
 - Dry Weather Field Screening
 - Floatables Monitoring
 - Industrial and High Risk Runoff





For the period of July 1, 2012 - June 30, 2013
Prepared by the City of Tulsa Streets and Stormwater Department

Reporting Requirements of Tulsa's Stormwater Permit

- **Annual Report**
 - Report contains data collected from monitoring programs over past year
 - Report covers fiscal year activities (July 1 – June 30)
 - Report covers not only monitoring programs but also all other permit requirements

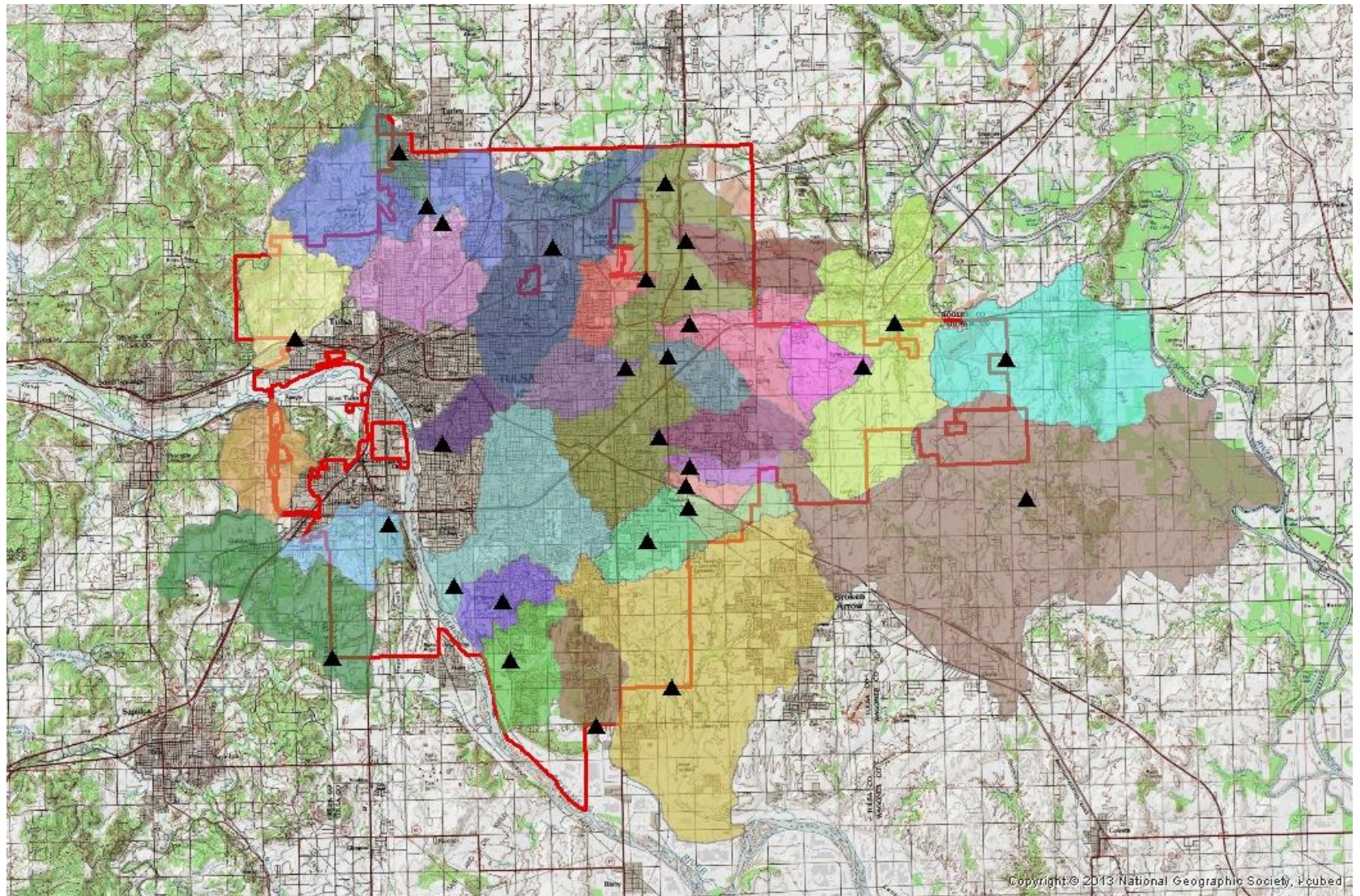
What is Watershed Characterization?

- Water samples + fish + bugs + habitat = Watershed Characterization a.k.a how healthy a stream is.....
-plus the infinite amount of “other” things which impact stream health, i.e. impervious area, sanitary sewer overflows, industrial violations, population size, hazardous material incidents, erosion from construction sites, etc...

Watershed Characterization Program Setup

- Monitor 30 streams over five year period
- Take monthly analytical samples
- Sample fish once per year per stream
- Sample habitat once per year per stream
- Sample benthic macroinvertebrates twice per year per stream





How we sample

- Fish: Backpack electroshocker and seine
- Benthic macroinvertebrates: Kicknet or D-net
- Analytical sample: Glass and plastic bottles
- Habitat samples: Measuring stick and tape



Dry Weather Field Screening

- Check stormwater outfalls during periods of dry weather
- Tulsa is split into four quadrants (approx. 150 outfalls per quadrant)
- Monitor outfalls for:
 - Temperature
 - pH
 - Copper
 - Detergents
 - Ammonia
 - Chlorine
 - Fluoride
 - Conductivity
- All outfalls City-wide to be monitored once per Permit cycle



Floatable Monitoring

- Five floatable (trash) monitoring locations (many more in actuality)
- Capture and categorize floatables
- Heavy equipment needed!!!



Industrial and High Risk Runoff Program

- Required to implement “A program to identify and control pollutants in (industrial) stormwater discharges to the MS4”
- “Priorities and procedures for inspections, **monitoring**, and establishing and implementing control measures for such discharges”

Industrial and High Risk Runoff Monitoring Program

- Five categories of Industries
 - Municipal landfills (0)
 - Other treatment, storage, and disposal facilities of municipal waste (1)
 - Hazardous waste treatment, storage, disposal and recovery facilities (0)
 - Facilities subject to EPCRA Title III, Section 313 (50)
 - Industrial or commercial discharges the permittee determines contribute a substantial pollutant load to the storm sewer system (6)
- Permit requires these industries to conduct self monitoring of their stormwater runoff once per permit
- “No exposure” certification available

Industrial and High Risk Runoff Parameters to Monitor

- Oil and Grease
- Chemical Oxygen Demand
- pH
- Biochemical Oxygen Demand
- Total Suspended Solids
- Total Phosphorus
- Total Kjeldahl Nitrogen
- Nitrate plus Nitrite Nitrogen

Industrial and High Risk Runoff Self Monitoring

- Permit is vague about what to do with info
- We've chosen to compare industrial runoff data to State Water Quality Standards (if possible) and Tulsa's baseline stream data
- Relay findings to industry and require BMP's, education, enforcement as necessary



Watershed Characterization Comprehensive Report

- Attempts to tie all pieces together
- Utilizes all internal and external monitoring data along with other pertinent info to assess health of each watershed
- Very important because this gives a more holistic assessment of stream condition and helps to plan/guide future education/regulation
- Scheduled to be completed at end of Permit

What is OKR05?

- Oklahoma Dept. of Environmental Quality Issued Permit for Industries
- Allows discharge of stormwater from industrial facilities
- Issued Sept. 2011 and expires Sept. of 2016

**OKLAHOMA DEPARTMENT OF
ENVIRONMENTAL QUALITY
WATER QUALITY DIVISION**

**GENERAL PERMIT
OKR05**

**FOR STORM WATER DISCHARGES
FROM INDUSTRIAL FACILITIES
UNDER THE MULTI-SECTOR INDUSTRIAL
GENERAL PERMIT WITHIN THE
STATE OF OKLAHOMA**

September 5, 2011



Monitoring Requirements of OKR05*

- Quarterly Visual Monitoring
 - Nine parameters to be assessed including:
 - Color
 - Odor
 - Clarity/Turbidity
 - Floating Solids
 - Settled Solids
 - Suspended Solids
 - Foam
 - Oil Sheen
 - Other indicators of stormwater pollution

*Of all facilities

Example of Visual Monitoring Table

Table 5-1 Visual Monitoring

Parameter	Method	Results
Color and Extent	Visual	Clear, yellow, red, blue, green, brown, black, milky, etc.
Odor	Smell	None, earthy, sewage, musky, rotten eggs, petroleum, etc.
Clarity or Turbidity	Come up with your own test such as: clean off the label from a 2 liter clear plastic bottle, fill the bottle with the sample, and try to see things through it.	1) can't see through the bottle 2) can see through but could not read newsprint 3) can see through and can read newsprint 4) pretty clear, but not as clear as bottled water 5) as clear as bottled water
Floating solids	Visual	Yes/no - describe what they are.
Settled solids	Use same 2 liter bottle	Tablespoons or cups of material or millimeters of solids on bottom after 24 hours
Suspended solids	Look through the container.	What do you see?
Foam	Visual	Yes/no - how thick is the foam? How much of the surface does it cover? What color is the foam?
Oil sheen	Visual	Color and extent
Other obvious indicators of storm water pollution	Indicate what you observed that would lead a reasonable person to believe that the storm water was polluted.	Tell it like you see it.

Reporting Requirements

- Visual monitoring results must be retained in SWP3
- Annual Comprehensive Site Compliance Evaluation Report
- Miscellaneous Reports as directed

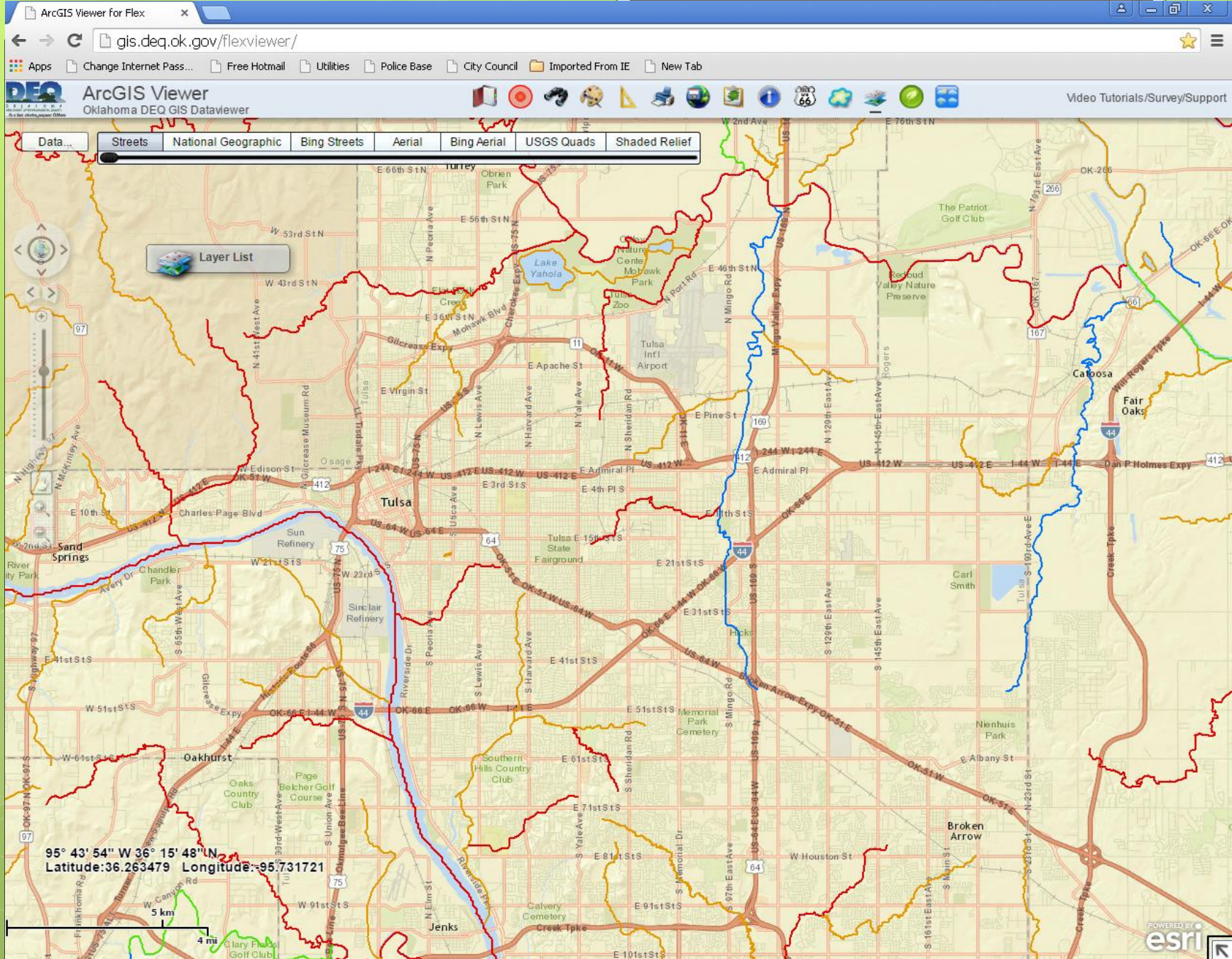
How are these permits mutually beneficial?

- Many of the OKR05 monitoring requirements are for the same parameters/categories as Tulsa's Permit and vice versa
- Lends to more informed inspectors and inspections
- Gives fuller perspective to each entity

How does OKR05 benefit my work specifically?

- Helps Tulsa maintain compliant
- Clean Water Act and Tulsa's Stormwater Permit Goals are to make Tulsa's streams fishable and swimmable





Site-specific Targeted Monitoring Results

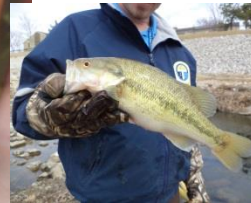
Causes of Impairment Oklahoma Rivers and Streams 2012

[Description of this table](#)

Cause of Impairment	Cause of Impairment Group	Miles Threatened or Impaired
Enterococcus Bacteria	Pathogens	6,984.9
Escherichia Coli (E. Coli)	Pathogens	4,156.4
Turbidity	Turbidity	2,776.9
Dissolved Oxygen	Organic Enrichment/Oxygen Depletion	2,105.8
Sulfates	Salinity/Total Dissolved Solids/Chlorides/Sulfates	1,934.5
Lead	Metals (other than Mercury)	1,708.4
Chloride	Salinity/Total Dissolved Solids/Chlorides/Sulfates	1,691.6
Total Dissolved Solids (TDS)	Salinity/Total Dissolved Solids/Chlorides/Sulfates	1,558.1
Fish Bioassessments	Cause Unknown - Impaired Biota	1,099.3
pH	pH/Acidity/Caustic Conditions	767.7
Benthic Macroinvertebrates Bioassessments	Cause Unknown - Impaired Biota	563.3
Selenium	Metals (other than Mercury)	552.2
Sedimentation/Siltation	Sediment	351.8
Oil and Grease	Oil and Grease	214.0
Copper	Metals (other than Mercury)	174.7
Thallium	Metals (other than Mercury)	107.3
Zinc	Metals (other than Mercury)	98.9
Phosphorus, Total	Nutrients	94.7
Silver	Metals (other than Mercury)	81.9
Nitrates	Nutrients	62.8
Ammonia, Un-ionized	Ammonia	57.8
Cadmium	Metals (other than Mercury)	44.1
Chlorpyrifos	Pesticides	42.0
Toxaphene	Pesticides	30.0
DDT	Pesticides	30.0
Diazinon	Pesticides	10.9
Dieldrin	Pesticides	10.4
Arsenic	Metals (other than Mercury)	6.0
Chromium, Total	Metals (other than Mercury)	6.0
Barium	Radiation	4.4

Fish Tolerances

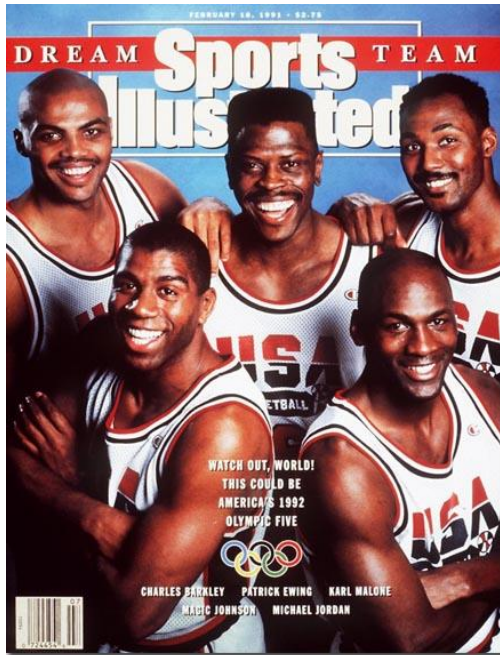
- Most tolerant → least tolerant



Benthic Macroinvertebrate Tolerances

- Most tolerant → least tolerant





Questions?



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