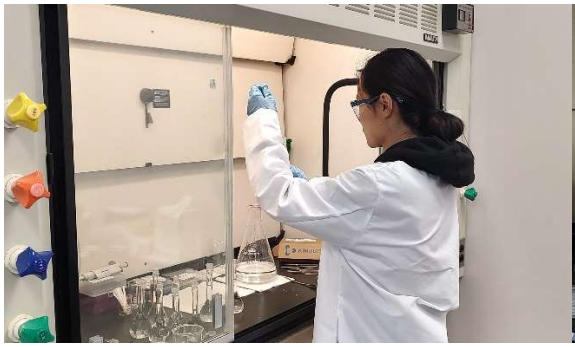
KENTUCKY DIVISION OF ENVIRONMENTAL PROGRAM SUPPORT'S STATE FISCAL YEAR 2022-23 ANNUAL REPORT



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Note from the Assistant Director

Dear Reader,

Welcome to the Department for Environmental Protection (DEP) Division of Environmental Program Support's Fiscal Year 2022-23 annual report. This report highlights the activities and accomplishments for the division, also called DEPS or the DEP lab, from July 1, 2022 to June 30, 2023.

It's been quite a year for DEPS. The lab has undergone changes in personnel, added new test methods and purchased new instruments and equipment in order to meet the demands of increased sample analysis needed by DEP. The number of samples submitted to DEPS increased by over 800 samples and is expected to continue to increase into the next fiscal year. An increase in 800 samples may not sound like a lot but those samples increased the number of actual analyses by over 5000 and the total reportable analytes by over 10,000. That's a huge increase for a small lab!

At the end of December 2022, the long-time Assistant Director of DEPS retired. A new assistant director was hired in March 2023. Operations at DEPS continued to run smoothly throughout the changes in leadership which is a testament to the dedication of the staff of DEPS and upper management of DEP. I consider it an honor to be chosen to help lead such a great group of people.

DEPS received an on-site assessment by the National Environmental Laboratory Accreditation Program in New Hampshire (NELAP-NH) in March 2023. I am very pleased to announce we

received accreditation for PFAS (per- and poly-fluoroalkyl substances) analysis by EPA Method 533 for drinking water and PFAS analysis in fish tissue by EPA Method 8327. DEPS also received re-certification for all previously accredited methods.

DEPS had several new projects this fiscal year. DEPS Inorganic Branch took on two new major projects this year which will continue into the next fiscal year. The first project is for the Division of Water called 2023 CSA MAJOR POTW NUTRIENTS which contains multiple tests for each sample with the bulk of the testing being conducted in the Inorganic Branch's Standard Testing Section. The second project is the analysis for lead in drinking water under the US Environmental Protection Agency's WIIN Grant Act (Water Infrastructure Improvements for the Nation) which was conducted by the Inorganic Branch's Metals Section. DEPS Organic Branch continued to be dominated by projects concerning the analysis of PFAS.

While new projects are always exciting, the majority of DEPS samples continue to be routine monitoring samples. Whatever the future brings to DEPS, I am confident our staff is ready for the challenge and will continue to produce the high-quality work our clients expect.
Thank for your interest in DEPS and taking the time to ready the annual report.

Sincerely,

Andrea S. Pergram

Andrea Pergram
Assistant Director DEPS

Our Mission

The mission of DEPS is to provide accurate and defensible sample analysis results to other divisions within the Department of Environmental Protection (DEP) to help them achieve the goals of the department's Strategic Plan. Whether it is through the analysis of routine monitoring samples, special projects such as analysis for PFAS or the need for immediate sample analysis for emergency situations like the devastating flooding in Eastern Kentucky, DEPS strives to produce high quality results as quickly as possible.

Significant Events at DEPS during FY 2022-23

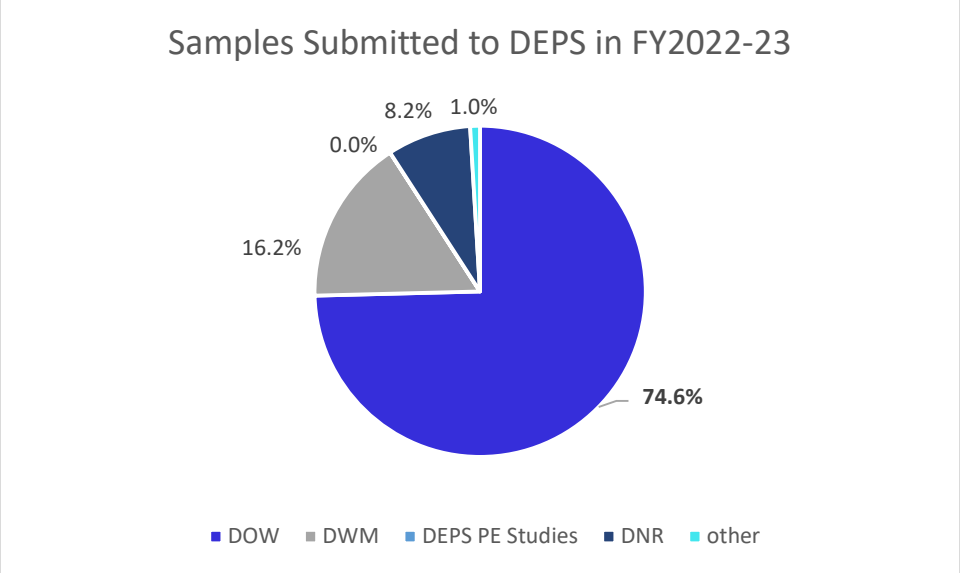
NELAP NH Assessment:

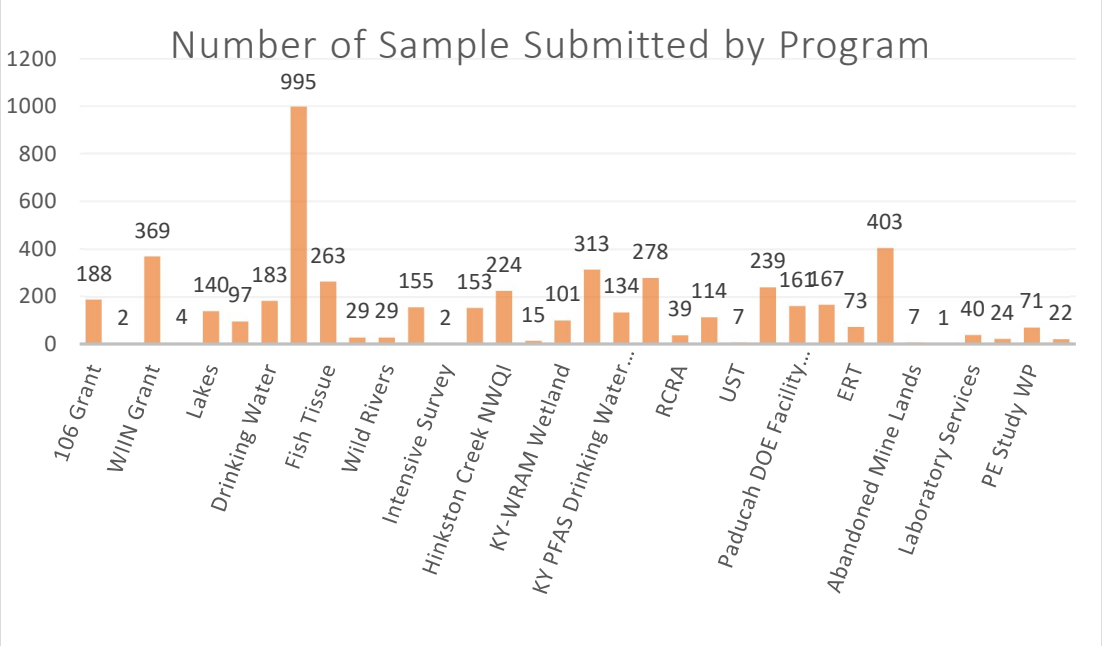
During the 2nd week of March 2023 NELAP NH spent 3 days at DEPS assessing our standard operating procedures (SOPs), chemist's knowledge and adherence to the methods and our quality system as a whole. The assessors were very complimentary of the lab and its staff. There were very few items that needed correction and all corrections were made to NELAP NH assessor's satisfaction. The assessors awarded DEPS with another year of certification for the methods assessed. DEPS was also awarded new accreditation for the analysis of PFAS in drinking water by US EPA method 533 and for the analysis of PFAS in fish tissue by US EPA method 8327.

Samples:

The number of samples submitted to DEPS for testing increased by 21% from last year. That's an increase of 870 samples. While the majority of samples were for routine environmental monitoring, samples were also submitted for special projects and for emergency analysis for the flooding in Eastern Kentucky. In addition to analyzing samples for DEP. DEPS also analyzed

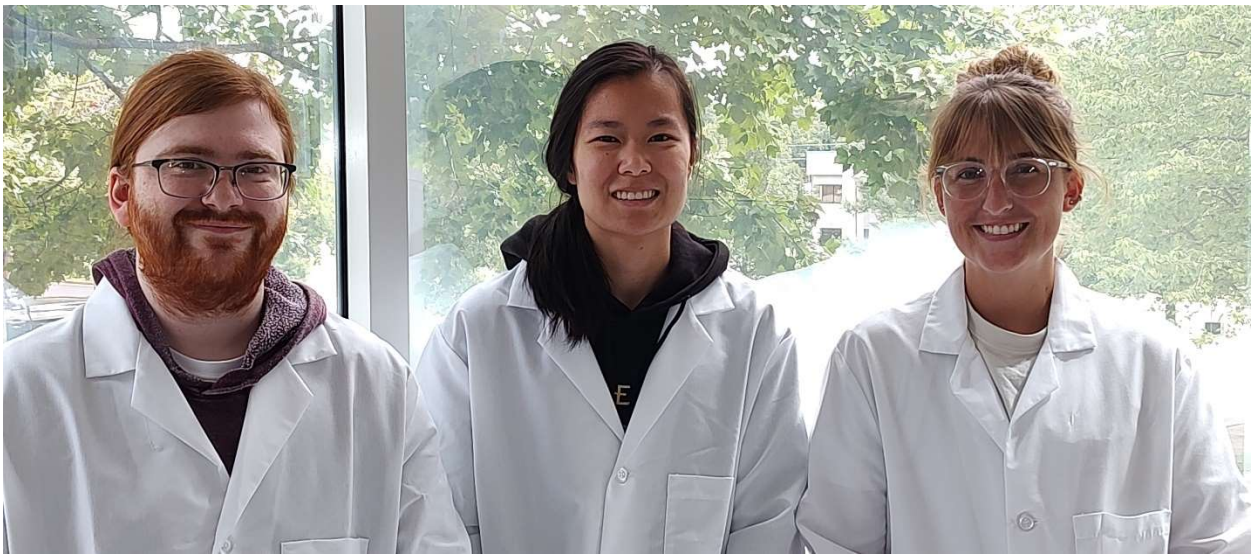
samples for other departments and agencies including the Department for Natural Resources (DNR), The Office of Kentucky Nature Preserves (OKNP) and the Cabinet for Health and Family Services (CHFS). The graphs below show give a breakdown of how many samples were submitted to DEPS and who submitted them.





Personnel:

In addition to the loss of the Assistant Director, there were several other personnel changes. DEPS Organic Branch Manager was promoted to Assistant Director and a chemist in the Organic Branch was promoted to Organic Branch Manager. The Inorganic Branch added a Metals Section Supervisor who was hired from outside of DEPS. DEPS lost 3 employees in the Inorganic Branch but was able to hire 5 new employees, most of which were in the Organic Branch due to the high volume of samples being submitted for PFAS analysis. DEPS also hosted 5 interns, 2 of which were hired as chemists upon their college graduation. The internship program has been a great success for DEPS. There are currently 5 former interns who have been hired as chemists for the division.



Former DEPS interns Vince, Faith and Lauren now working as chemists for DEPS.

New Instruments and Equipment:

DEPS was able to purchase new instruments and equipment this year in part due to its partnerships with the Division of Water and the Division of Waste Management. DEPS

purchased 2 new instruments, a new ICP-MS and a new LC/MS/MS. DEPS also purchased 2 new automated solid phase extractors and an oven for solids analysis.

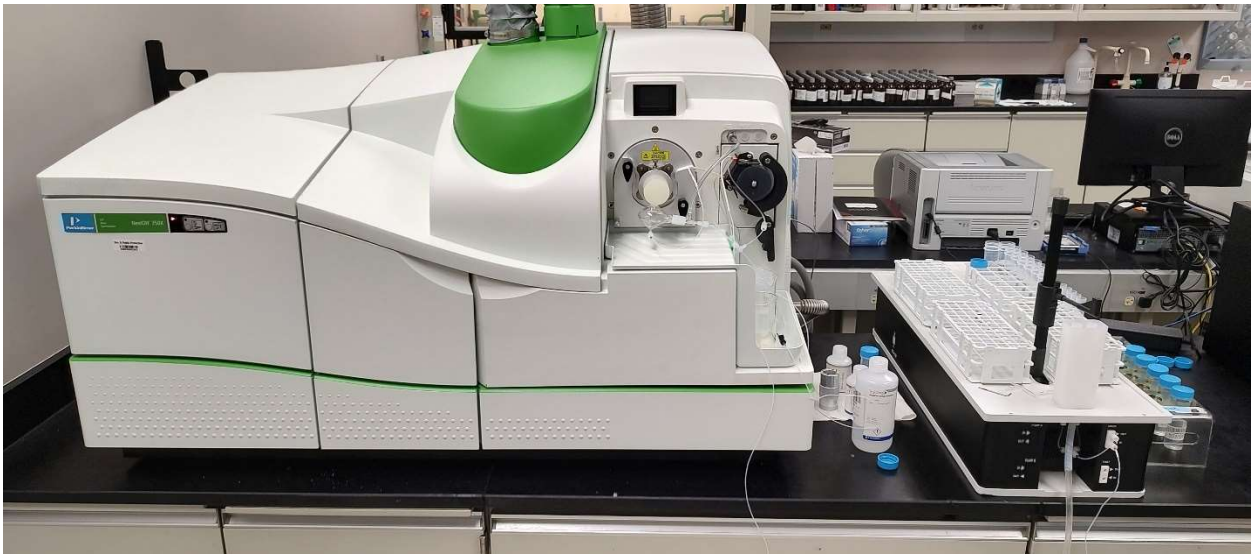
Method Development:

The Inorganic Branch Metals Section brought a new method on-line for the analysis of lead in drinking water for WIIN Grant samples. The Standard Testing Section developed a method on the Mantech Ion Chromatograph for testing turbidity. The Organic Branch developed and implemented the analysis of PFAS in drinking water by EPA method 533 and developed a new method to analyze for surfactants. Method development is on-going for the detection of explosives, perchlorate and haloacetic acids by LC/MS/MS.

DEPS Inorganic Branch

Metals Section

ICP-MS (Inductively Coupled Plasma – Mass Spectrometer) used for metals analysis



NexION 350 ICP-MS used for the analysis of WIIN Grant Samples

DEPS Metals Section started this Fiscal Year with a new Section Supervisor. This position had been vacant for several years and was badly needed by the branch. The Metals Section also filled a vacant chemist position and rounded out the section with two interns, one working with the section for nine months and the other over the summer.

During this fiscal year the Metals Section completed 11,017 total analyses. Several of these were part of the new WIIN Grant testing for lead in drinking water.

Analyses conducted by the Metals Section:

Metals by ICP-MS (21 total):
1. Aluminum
2. Antimony
3. Arsenic
4. Barium
5. Beryllium
6. Cadmium
7. Chromium
8. Cobalt
9. Copper
10. Lead

11. Manganese
12. Molybdenum
13. Nickel
14. Selenium
15. Silver
16. Strontium
17. Tin
18. Titanium
19. Thallium
20. Vanadium
21. Zinc

Metals by ICP:

1. Calcium
2. 2. Boron
3. Iron
4. Lithium
5. Magnesium
6. Potassium
7. Sodium

Hexavalent Chromium Analysis
High Level Mercury Analysis by CVAA
Low Level Mercury by CVAF
Toxicity Characteristic Leaching Procedure (TCLP)

Standard Testing Section

Picture 1. Standard Testing Section Chemist Sean with a Discreet Analyzer
Picture 2. A rack of biochemical oxygen demand samples
Picture 3. Samples awaiting analysis on the Mantech Ion Chromatogram

DEPS Standard Testing Section had an extremely busy year. The section performed 32,324 analyses! This section too had personnel changes. In January 2023 a 10-year employee's duties changed leaving a gap in coverage for the section. The section supervisor and chemists rallied and covered the gap. The search for a qualified candidate to fill this position is underway. The section also host a summer intern.

Analysis conducted by the Standard Testing Section:

Acidity
Alkalinity
Ammonia
CBOD
Chloride
Color
Conductivity
Corrosivity
Hardness
Ion Chromatography
- Fluoride
- Chloride
- Nitrite
- Bromide
- Nitrate
- Phosphate
- Sulfate

Nitrate
Nitrite
Ortho Phosphate
pH
Phenolics
Residual Chlorine
Settleable Solids
Sulfate
Total Dissolved Solids (TDS)
Total Organic Carbon (TOC)
Total Kjedahl Nitrogen (TKN)
Total Phosphorus
Total Suspended Solids
Turbidity

DEPS Organic Branch

Horizon Solid Phase Extractors used for the extraction of organic compounds from liquid samples.

The Organic Branch reported 2,942 analyses during FY 2022-23. This number seems low in comparison to the numbers analyzed for the Inorganic Branch, but the data received through each analysis gives results for more analytes at a time making the amount of work conducted by each branch pretty comparable. Unlike the Inorganic Branch, the Organic Branch does not have sections. This was due to the low number of people employed in the sections that were combined into the Organic Branch several years ago. This year has seen a much higher sample load for the branch due to the addition of PFAS analysis. To support this analysis, 4 new chemists were hired. The split of the branch into sections may come as PFAS continues to dominate the branch. The Organic Branch also hosted 2 interns last summer, both of which were hired as chemists when they graduated.

Analyses conducted by DEPS Organic Branch:

Alcohols – Ethanol and 2-Propanol
Caffeine and 1,7-Dimethylxanthine
Diesel Range Organics
Glycols – ethylene glycol and propylene glycol
Glyphosate (4 compounds)
Haloacetic Acids (HAAs) (10 compounds)
Harmful Algal Bloom analysis, 9 compounds including Microscystins, Cylindrospermopsin and Anatoxin-a
Herbicides (18 compounds)
Oil and Grease
Pesticides
Polychorinated Biphenyls (PCBs)
PFAS (31 compounds}
Semi-Volatile Organic Compounds (70 – 101 compounds) including polycyclic aromatic hydrocarbons (PAHs)
Surfactants
Total Petroleum Hydrocarbons
Volatile Organic Compounds (86 compounds) including the subsets of benzene, toluene, ethylbenzene and xylenes (BTEX) and total trihalomethanes (TTHMs)

New LC/MS/MS for PFAS analysis

Technical Services Branch

The work of the Technical Services Branch (TSB) can't be compared to the Inorganic and Organic branches by the number of samples analyzed. The work is behind the scenes but vital DEPS. The Technical Services Branch is responsible for assessing and maintaining the quality control system of DEPS. It is also responsible for logging in all samples submitted to the lab for analysis. The list below is just a sample of the important work conducted by this branch.

1. All samples submitted to DEPS pass through TSBs login personnel. They are responsible for ensuring all sample containers are properly labelled and assigned the correct analyses requested on the Chain-of-Custodies. This includes field samples, proficiency testing samples and all in-house quality control samples.
2. TSB personnel conduct internal audits of all analyses each year to make and report any findings or recommendations to DEPS management and personnel responsible for each analysis audited. TSB personnel monitor all equipment for proper operation and conduct ongoing checks of performance. When necessary, control limits are recalculated and applied for all analyses that use statistically derived control limits.
3. TSB also maintains our Laboratory Information Management System (LIMS), which is vital to the function of the lab as it contains all sample information including chain-of-custody information, samples results and final sample reports. The LIMS holds all quality control data for the lab, and must be updated in support of any changes in the analytical capabilities of the Lab.
4. TSB helps review and maintain the Lab's Quality System documentation which includes the LOQAM and all SOPs, the Lab's Corrective Action Reports, Performance Testing (PT) program participation and reporting of results.
5. TSB is responsible for creating and maintaining all data exports for clients in the format and frequency needed by the client. This includes specialized US EPA formats, US DOE formats, and KY DEP KWADE format.

Contact Information

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