Presenter(s)	Title	Abstract
Session: Session 1A: Creeks, Cane, and Comebacks (4/15 9:45-11:25) Room 108		
Brian Lewis blewis@cityoftulsa.org	Joe Creek Ecosystem Restoration Project	In 1963 The United States Army Corp of Engineers (USACE) and the City of Tulsa entered an agreement for a channel improvement project authorized by the Flood Control Act of 1948. This improvement would work to alleviate devastating flood problems by diverting the stream to flow in a more direct route to the Arkansas River. The project was completed in 1980 and in the early 2000's downstream/mouth portions of the Joe Creek channel showed signs of concerning degradation. The USACE proposed a bank stabilization project that would incorporate riparian stream corridor habitat restoration. Completed in 2013, the project incorporated management strategies to encourage a natural low flow channel, increased natural riparian area, and provide habitat for terrestrial and aquatic wildlife. The unintended consequence of this project shows promise to be a Best Management Practice to reduce bacterial loadings into a newly implemented TMDL waterbody, the Arkansas River. This 4.9 million dollar project currently lies functioning quietly while thousands of Tulsa citizens pass over it daily. This presentation is a long overdue spotlight on the Joe Creek Ecosystem Restoration Project.
Hailey N. Blackwell hseago@ou.edu	Where Canebrakes Belong: Using Geospatial Data to Guide Rivercane Restoration in the Illinois River Watershed	Arundinaria gigantea (rivercane) is a native bamboo of riparian and bottomland ecosystems in the southeastern United States and holds cultural significance for many Indigenous peoples. Dense stands of rivercane, known as canebrakes, provide critical wildlife habitat, stabilize streambanks through extensive rhizome networks, and provide nutrient and sediment retention supporting water quality. Despite these ecological and cultural benefits, rivercane has declined to less than two percent of its historical abundance. This study used physical parameters from known rivercane locations to develop a habitat suitability model in geographic information system (GIS) software to identify potential rivercane occurrence and restoration areas within the Illinois River watershed. Land use, soils, elevation, and wetland datasets were reclassified according to characteristics associated with known canebrake sites, assigning greater suitability values to classes with greater rivercane occurrence. The combined criteria generated a watershed-wide likelihood scale for rivercane presence. Model results identified potential habitat overlapping 80 percent of known canebrake locations, while rivercane locations identified from aerial imagery intersected 82 percent of known sites. These results demonstrated the effectiveness of GIS-based modeling for prioritizing rivercane restoration and guiding Indigenous communities seeking culturally significant plant resources.
Lori Han lhan@ou.edu	Producer Knowledge and Perceptions of Biochar for Eastern Redcedar Management	Eastern redcedar (Juniperus virginiana), a conifer native to the eastern United States, poses a significant threat to the grasslands of the U.S. Great Plains due to its invasive characteristics and broad environmental tolerance. Current management strategies typically involve mechanical removal of established trees, generating substantial amounts of organic waste that is rarely repurposed. Converting this biomass into biochar presents a sustainable alternative, offering a value-added product that can enhance soil fertility, improve water retention, and sequester carbon—thereby addressing both ecological degradation and climate change while potentially creating new revenue streams for landowners. Despite these benefits, the practice of producing biochar from Eastern redcedar waste remains uncommon in the Great Plains. This study explores the factors contributing to limited adoption by assessing landowner knowledge, perceptions, and attitudes toward biochar, redcedar encroachment, and interested in using and/or producing biochar out of redcedar waste.
Tatumn Kennedy tatumn.kennedy@okstate.edu	Stillwater Creek Streambank Stabilization	This project addresses streambank instability along Stillwater Creek in Stillwater, Oklahoma, focusing on severe erosion near the Country Club Road Bridge crossing. Field and satellite observations identified active bank incision, lateral erosion, and instability associated with improperly tapered riprap installed during the 2015 bridge construction. These conditions pose ongoing risks to water quality, aquatic habitat, and critical infrastructure at the bridge crossing. To quantify site conditions, the project team surveyed the site to collect detailed cross-section data. These survey data were imported into Civil 3D to generate accurate elevations and channel geometry. The processed geometry was then implemented into HEC-RAS for hydraulic modeling. Based on modeled conditions representative of observed hydropeaking events, multiple potential flow values were evaluated for steady, unsteady, and quasi-steady state scenarios. The model was used to analyze flow depth, velocity, and shear stress to determine potential sediment transport and bridge safety under these scenarios. Hydrologic uncertainty remains a key challenge. Stillwater Creek experiences hydropeaking influenced by overtopping events at nearby reservoirs during major rainfall, and available discharge data contain significant uncertainty. Therefore, modeling provided a practical approach for evaluating stabilization alternatives under plausible high-flow conditions. Potential solutions, including riprap reinforcement, riparian vegetation enhancement, and combined stabilization approaches, were assessed for their effectiveness in reducing erosion and improving channel resilience. In addition to the technical analysis, AutoCAD is being used to design an educational outreach bridge model and site molds for each location. These models will be 3D printed to demonstrate channel processes and proposed stabilization strategies to the community.
Session: Session 1B: Floods, Flows, and Feedbacks (4/15 9:45-11:25) Room 109		
Debbendu Saha debbendudip123@gmail.com	Downstream Flood Reduction Analysis Based on Design Hydrographs	

Presenter(s)	Title	Abstract
Diego Felipe Osorio Giraldo diego.osorio@okstate.edu	Influence of Storm Motion on Flood Peaks Across the State of Oklahoma	Peak streamflow controls flood risk assessment, hydraulic design, and water resources management. While the effects of rainfall intensity and total accumulation on peak flows are well-documented, the role of storm motion remains comparatively underexplored. Existing evidence suggests that storm motion properties, specifically storm direction and speed, can influence peak flow magnitude. However, prior research has largely relied on synthetic rainfall and idealized watersheds, or has been limited to isolated storm events, constraining the generalizability of findings. This study presents a methodology that leverages large-sample datasets and storm tracking algorithms to statistically assess the influence of storm motion properties on peak flow magnitude. By quantifying how peak flow distributions vary with the speed and direction of generating storm events, we provide a more systematic framework for evaluating these relationships. The analysis was conducted using watersheds from the CAMELS-H dataset in Oklahoma. Results indicate that, in several watersheds, storm direction and speed significantly influence peak flow magnitude. These findings open new avenues for understanding how storm motion–streamflow relationships vary across watersheds throughout the contiguous United States, with implications for improved flood forecasting and hydrological modeling.
Kasra Khodkar kasra.khodkar@okstate.edu	A Hysteresis Analysis of Water Salinity Under Storm Events in the Upper Red River Basin	Salt-affected basins in arid and semi-arid regions increase the need for improved understanding of salinity processes to support sustainable water resources management. The Upper Red River Basin represents a complex hydrologic system where freshwater and saline surface waters interact with groundwater systems, irrigated agriculture, and irrigation return flows. Understanding the hysteretic response of stream water salinity during storm and precipitation events can provide valuable insight into salinity transport mechanisms, dominant flow regimes, and identifying potential discharge sources within the basin.This study investigates storm-event salinity hysteresis using high-frequency monitoring datasets collected across the basin. The analysis utilizes 15-minute salinity measurements from stream and groundwater monitoring stations together with high-resolution climate (5-minute) and hydrologic (30-minute) observations obtained from the Oklahoma Mesonet, the U.S. Geological Survey (USGS), and the Oklahoma Water Resources Board (OWRB). Event-scale hysteresis characteristics are evaluated using loop direction, loop area, empirical relationships, and hysteresis indices to better characterize salinity transport dynamics under groundwater-dominated, surface-water-dominated, and irrigation return-flow conditions. The results contribute to improved understanding of salinity behavior in salt-prone and water-limited basins and support the development of more effective basin-scale water and salinity management strategies.
Navdeep Saasan navdeep.saasan@okstate.edu	Agro-Hydrological Responses and Sensitivity Analysis of Regenerative Agricultural Practices in a Sub-Watershed of the North Fork Red River Basin Using APEX	The semi-arid Southern Great Plains of the United States faces persistent water management challenges due to climate variability and limited water availability. Regenerative agricultural practices (RAPs), including no-till and cover crops, may improve soil moisture conservation and support sustainable crop production in this region. This study evaluates the agro-hydrological impacts of field-tested RAPs in one of seven sub-watersheds of the North Fork Red River Basin using the Agricultural Policy/Environmental eXtender (APEX) model. The model was developed using soil, topographic, weather, and land use data, along with projected climate data for future analysis. Crop growth and field operation parameters, including planting, tillage, irrigation, and harvesting, were adopted from calibrated field-scale simulations developed with the Environmental Policy Integrated Climate (EPIC) model based on experimental cotton systems at Altus, Oklahoma. These parameters represent both regenerative and conventional practices and were transferred to APEX to maintain consistency across scales. Sensitivity analysis, calibration, and validation will be conducted to assess runoff, evapotranspiration, percolation, and soil water storage. Scenario simulations will further examine RAP effects under irrigated and dryland conditions to support conservation and water management planning.
Tucker McCoy tucker.mccoy@owrb.ok.gov	Cleveland Reservoir: A Firm Yield Analysis	Modeling the sensitivity of Oklahoma reservoirs to historical drought and sedimentation is crucial to understanding their firm yields, which is the volume of water available annually for withdrawal without the designated storage pool going dry. In this report, we utilize a variety of data sources to model the inputs and outputs of Cleveland Lake on a monthly time step. This is done through an excel-based model that incorporates precipitation, sedimentation, evaporation, stream inflows, monthly municipal withdrawals, and seepage variables in combination with bathymetric surveys of the lake to model the firm yield of the lake over the historical drought of record. This data will be used to effectively manage the water resources at Cleveland Lake, and serve as a foundation for future firm yield studies.
Session: Session 1C: Bugs, Blooms, and Bubbles (4/15 9:45-11:25) Auditorium		
Aakriti Adhikari aaadhik@okstate.edu	Assessment of Water Quality in Aquaculture Systems for Sustainable Fish Production in Sierra Leone	Fish accounts for approximately 80% of total dietary animal protein intake for the people Sierra Leone. This makes it a critical component of country's food security and nutritional well-being. Declining marine fish stocks threaten the sustainability of primary protein sources. The decline is due to illegal overfishing by other countries in Sierra Leonian waters. It raises concerns about food security and nutrition. It highlights the urgent need to identify and develop sustainable alternative sources of fish production to meet demand. Aquaculture represents a viable alternative to reduce pressure on wild fisheries; but its sustainability depends on maintaining good water quality for fish production. Poor management of key physico-chemical parameters influences fish health, growth and mortality. This makes water quality monitoring essential for long-term success. The objective of this study is to assess water quality and examine fish growth, survival, and aquaculture production performance for our project with Njala University. Water quality is monitored on this project using a Solinst Eureka sonde including a variety of water quality parameters across OSU-NU aquaculture farms in Sierra Leone including the water supply source, aquaculture ponds, effluent discharge points and concrete tank.
Grace Shea gshea@okstate.edu	The Effects of Aeration on Water Quality: A Study of Theta Pond at Oklahoma State University	Deteriorating water quality in aquatic ponds is a major environmental concern, particularly in water bodies experiencing low dissolved oxygen levels due to stratification and watershed pollution. Aeration is commonly used as a management strategy to improve water quality by disrupting thermal stratification and increasing dissolved oxygen; however, its effectiveness under varying environmental and operational conditions is understudied. This study evaluates the effects of a mechanical aeration system on water quality in Theta Pond, a historically significant urban pond located on the Oklahoma State University campus in Stillwater, Oklahoma. Water quality data collected from December 2021 through 2025 are used to assess changes in dissolved oxygen, phycocyanin, and chlorophyll-a concentrations before and after aeration system installation. Measurements were obtained using a YSI Sonde ProDSS multimeter probe at multiple sampling locations and depths. Periods of aerator shutdown and altered operation due to maintenance and repair events provide additional conditions for evaluating aeration performance. Surface water samples collected during visible bloom events were further analyzed using AI-assisted BloomOptix technology to support cyanobacteria identification. The findings of this study are expected to provide insights into the effectiveness of aeration as a water quality management strategy for small urban ponds.

Presenter(s)	Title	Abstract
Leif Olson (a) lolson@ou.edu	Exploring Microbial Diversity of Legacy Mine Drainage Contaminated Wetlands in the Tar Creek Superfund Site	Wetlands host biogeochemical processes that contribute to mitigating mine drainage contamination. The sulfur and iron cycles are crucial for this, and can be microbially driven depending on environmental conditions. Sulfate reduction and iron oxidation both precipitate and immobilize dissolved metals, decreasing downstream contamination. Wetlands naturally decrease metal contamination through these mechanisms, and treatment wetlands can be ecologically engineered to improve mine drainage remediation efficiency. This research examined iron- and sulfur-cycling bacteria in natural and treatment wetlands in the Tar Creek Superfund Site in northeast Oklahoma, an area heavily impacted by legacy lead-zinc mining. Surface water and sediment geochemistry were measured and microbial communities were characterized with environmental DNA using short read 16S rRNA gene and long read 16S-ITS-23S rRNA operon sequencing methods. Results showed the relative abundances of iron-oxidizing bacteria in aerobic treatment wetland surface water and sulfate-reducing bacteria in sediments were increased. More organisms were identified to species with long read data, improving predictions of microbial identity compared to short read data that usually resolves organisms to the genus or family level. The results of these microbial community surveys with traditional and novel molecular biology tools support that the desired biogeochemical processes were amplified in aerobic treatment wetlands.
Sreemala Das Majumder sreemala.das_majumder@okstate.edu	Bridging the Gaps: Building a National Framework from State-Level Harmful Algal Bloom Monitoring and Management Practices	Harmful algal blooms (HABs) are increasing in frequency, duration, and spatial extent across freshwater systems in the United States, driven by nutrient enrichment and climatic variability. Many HABs are dominated by toxin-producing cyanobacteria that threaten ecosystem health, drinking water supplies, recreation, and local economies. Despite extensive research on HAB ecology and toxin detection, state-level monitoring and management responses remain heterogeneous, and no nationwide synthesis of monitoring frameworks exists. This study addresses that gap by reviewing publicly available federal and state resources to construct the first comparative database of state HAB monitoring programs. Programs were evaluated using a five-pillar framework assessing monitoring coverage, monitoring frequency, analytical metrics and methods, cyanotoxins assessed, and data access and management, which were integrated into a composite National HAB Monitoring Index (NHMI). Results revealed substantial variability in monitoring infrastructure across states. Freshwater lakes and reservoirs were widely monitored (96% of states), whereas monitoring of rivers (2%), drinking water sources (2%), and public beaches (9%) was limited. Seasonal monitoring was most common (65%), while high-frequency weekly or bi-weekly sampling occurred in only 12% of programs. ELISA was the most frequently reported analytical method (69%), with advanced molecular or confirmatory techniques reported by 39%. Monitoring of at least one cyanotoxin class occurred in 86% of states, although broader ecological indicators were integrated in only 14% of programs. Public HAB dashboards and advisory thresholds were reported by 69% of states, while multilingual communication resources were limited (12%). Composite NHMI scores ranged from 0 to 12.75, indicating large disparities in monitoring capacity and program integration nationwide. This synthesis highlights key gaps in monitoring coverage, analytical capacity, and communication infrastructure and provides a foundation for improving national HAB monitoring coordination.
Viktoria Stallings Viktoria.A.Stallings-1@ou.edu	Algae Assessment of Water Samples From Treatment Wetland Mesocosms at the Norman Water Reclamation Facility in Norman, OK	Natural wetland ecosystems are well known to be productive and biodiverse. Treatment wetlands are designed and constructed to improve water quality by mimicking the biogeochemical functions of natural wetlands. Photosynthetic microorganisms such as cyanobacteria, diatoms, and green algae are primary producers that are the foundation of metabolic processes and nutrient dynamics in wetland ecosystems. This research examines algal communities living in treatment wetland mesocosms at the Norman (Oklahoma) Water Reclamation Facility receiving secondarily treated wastewater and urban stormwater. Three different hydraulic designs were examined: subsurface flow (SSF), free-water surface flow (FWS), and open-water controls (OWC). In addition, two vegetation planting schemes (planted with *Juncus effusus* and unplanted) were crossed with source waters and hydraulic designs, creating a robust experimental design (n=50). It is hypothesized that differences in biotic communities exist in mesocosms based on design. Water samples were collected from mesocosms for each potential design factor combination and analyzed using the YOKOGAWA FlowCam at the Water Quality Laboratory at the Grand River Dam Authority Ecosystems and Education Center. Diversity metrics and statistical analyses were used to assess differences in biological communities in each unique mesocosm design. Understanding potential differences in biotic communities will inform future treatment wetland design.
Session: Session 2A: Engineering the Flow (4/15 12:30-1:50) Room 108		
Annie Sales annie@irwp.org	Retrofitting Detention Ponds for Water Quality and Community	Detention ponds are a common feature in urban landscapes, yet most function only as flood control structures with limited ecological or water quality benefits. Retrofitting these ponds to mimic wetland functions presents a significant opportunity to improve water quality, enhance habitat, and provide multiple community benefits. This presentation will explore design strategies that use wetlands as a reference ecosystem, focusing on hydrology, vegetation, and habitat structure to guide practical retrofits. The Apple Orchard Detention Pond Retrofit will serve as a case study, demonstrating how a conventional dry basin was transformed into a multifunctional green infrastructure feature. The project illustrates how ecological principles can be applied to stormwater infrastructure to achieve measurable improvements in water quality and biodiversity, while also creating a more resilient and engaging community space. Lessons from this retrofit highlight scalable opportunities for municipalities, developers, and watershed groups to reimagine detention ponds as functioning wetland systems.

Presenter(s)	Title	Abstract
Coy Clark coy.clark@atlanstormwater.com	Using Floating Wetlands to Create Additional Environmental Benefits in Stormwater Design	Urban development changes the way water enters the environment, increasing the volume of water runoff and the concentration of pollutants entering the downstream environment. Authorities put requirements in place to give developers an understanding of how to deliver a project that returns the water entering the environment back to predevelopment levels at Atlan Stormwater we deliver research backed solutions to help developers meet their obligations and provide additional benefits for the environment and community. Floating Treatment Wetlands are one of these solutions that offer multiple benefits and allow our industry partners to bring the principles of nature into their urban developments. This presentation will unpack the underlying treatment principles observed in nature, as well as the process of developing a solution that allows others to bring nature's treatment principles in to the urban space. It will also discuss a wide variety of research that has given us a better understanding of the potential of Floating Treatment Wetlands. We have papers related to nutrient and heavy metal reduction, biodiversity and habitat creation. Current studies are increasing our understanding of biodiversity, greenhouse gas mitigation and PFAS reduction. These papers highlight the diverse benefits Floating Wetlands offer to improve the overall health of your water body. Exposing the roots of the plants to the water column provides a massive living surface area that supports biofilm formation. Our observations are that this underwater surface area creates the building blocks for an ecosystem that forms around our islands. The layers of biofilm process nutrients which are then made available to the plants. Macro and micro organisms form and then live in and feed off of this biofilm, Frogs, fish and other underwater animals feed off of these organisms, and each other forming an underwater food web. On top of the islands plant growth attracts insects, bugs and birds and forms spaces for them to feed, hide and create nests. Plant growth is enhanced by the stable water level relevant to the plants and the increased level of bioavailable nutrients from the biofilm. With over 10 years of experience delivering these projects and seeing the excited reactions from our industry partners as they experience the return of endangered frogs to their waterways or have swans nesting away from land based predators. I will share some of these stories and go into detail about working with nature and seeing everything it has to offer.
Kevin Blanco kevin.blanco_silva@okstate.edu	Sanitary Sewer System Benchmarking Dataset for I&I and SSO Using a Synthetic Approach Based on Stillwater, OK	Sanitary sewer systems are vital for public health, environmental safety, and urban resilience across communities in the United States. Like many areas, Oklahoma faces increasing challenges in managing these systems because of aging infrastructure, rapid urban growth, changing land use, and more variable rainfall patterns. These stressors increase the risks of infiltration and inflow (I&I), sanitary sewer overflows, and higher treatment costs—placing significant pressure on municipalities and utilities to assess system performance and plan for future investments. Yet despite their importance, sanitary sewer systems remain notoriously difficult to study and model. Field campaigns to evaluate I&I or monitor sewer performance are costly, logistically complicated, and seldom performed on a large scale. In Oklahoma, the limited availability of open, high-resolution datasets hinders the ability to evaluate modeling frameworks, test design strategies, or explore the long-term effects of infrastructure aging and wet-weather events. To overcome this limitation, our project presents a Sanitary Sewer System Benchmarking Dataset based on a synthetic modeling framework built with SewerTris (a Tetris-based sanitary sewer network generator), which generates spatially coherent sewer networks that mimic the layouts of realistic urban environments. Using this approach, we created a fully synthetic yet hydrologically relevant digital siblings of Stillwater's sanitary sewer system that serve as a cost-effective and reproducible testbed for analyzing I&I dynamics, assessing infrastructure stressors, supporting model development, benchmarking design tools, and encouraging data-driven decisions for resilient sewer systems in Oklahoma and beyond.
Megan Ryan megan.m.ryan@okstate.edu	Watching the Waters: Drone-Based Assessment of Culvert Condition in Oklahoma	Culverts are critical infrastructure that provide transportation, hydraulic, and aquatic connectivity; however, they are aging infrastructure, not well inventoried and susceptible to failure under changing hydrologic conditions. Currently, only culverts over 20 feet in flow length are documented in the NBI. In Oklahoma, the current culvert inventory includes 8,279 structures, which represents 19% of all road stream intersections in the state. Furthermore, 61% of culverts in this database are 50 years old or older. These structures are manually inspected; however, limitations include inspection time and inspector safety. To assess a methodology that could improve this process, UAVs are suspected to be more efficient while limiting human intervention. Ground inspection data was collected prior and used as ground truth for comparison with UAV results. The objectives of this study were to (a) understand the feasibility of UAV-collected photogrammetry data for culvert inventory and inspections, and (b) determine the accuracy of measurements from photogrammetry-derived data compared to ground surveyed data. UAV-derived photogrammetry was created by conducting UAV flights, collecting location data, geotagging images, and stitching images together to generate a 3D point cloud. The culverts were assessed using the SARP Stream Crossing Survey, which evaluates structural and aquatic connectivity components of stream crossings. This methodology was used for flight testing, UAV and ground comparison, and case study operations, while statistical analyses differed. Flight testing included 27 flights to evaluate flight height, image side overlap, and flight direction. The UAV and ground comparison analysis found that horizontal measurements (i.e., structure length and bankfull width) displayed better accuracy with ground measurements, producing an R^2 of 0.9977, compared to vertical measurements (i.e., road fill height and outlet drop), which produced an R^2 of 0.8635. The case study included structures smaller than 20 ft in flow length and produced similar results; however, the outlet drop produced the lowest R^2 value of 0.6585. Qualitative measurements were also compared using a confusion matrix, which determined that most qualitative values (e.g., structure type and material) could be identified using UAV. This study provides an assessment of UAVs for culvert inspections that demonstrate the value, limitations, and advantages of this technology.
Session: Session 2B: Counting Water, Counting Life (4/15 12:30-1:50) Room 109		
Dan Dvorett dan.dvorett@conservation.ok.gov	Using the archetype concept to group streams for the development of Indices of Biotic Integrity	Understanding which fishes to expect by locality is a critical component of Index of Biotic Integrity (IBI) development. It is common practice to group streams by ecoregions and set reference conditions by which all streams in the ecoregion are evaluated. In Oklahoma, an inability to set meaningful reference criteria in some of the diminutive ecoregions, and the availability of 20+ years of monitoring data has sparked interest in reevaluating the state's

Presenter(s)	Title	Abstract
Miguel Ingram miguel.ingram.research@gmail.com	Can Volunteer Chloride Data Be Used in Conjunction with Professional Data in a Landscape-Scale Analysis? A Multi-Method Validation of Oklahoma's Blue Thumb Program	Citizen science programs generate environmental monitoring data at scales impossible for government agencies alone, but uncertainty about data quality limits their use in formal assessments. Oklahoma's Blue Thumb program offers a unique validation opportunity: the Oklahoma Conservation Commission maintains professional chloride records in the EPA Water Quality Portal under a distinct organization identifier, while volunteer records are maintained in a separate OCC data portal, enabling programmatic separation of the two datasets without new field sampling. This presentation examines volunteer data quality using three independent lines of evidence. First, within-test precision: 2,566 volunteer titration replicate pairs yielded a mean absolute difference of 1.53 mg/L (±0.11), whereas the mean difference in professional duplicates was 2.51 mg/L (±0.72, n=113), both within the 5 mg/L quantization floor of the Silver Nitrate method. Second, professional within-site spatial replicates (N=114, ~100 m apart) yielded 3.58 mg/L (±1.10), revealing the natural field precision. Third, a generalized linear mixed-effects model was used to compare professional and volunteer data while controlling spatiotemporal variance (N=895 observations, 92 sites). The fixed effect associated with Volunteer data was -0.433 (SE=0.218, p=0.047) compared to the intercept β=-37.663 (SE=7.64, p<0.001), with strong longitudinal (β=-0.435, SE=0.078, p<0.001) and seasonal effects (β=+0.110, SE=0.023, p<0.001). When site geographic distribution was balanced via stratified subsampling, the Volunteer effect was eliminated entirely (p=0.54), indicating that natural landscape variation, not observer error, drives apparent differences between volunteer and professional readings. This presentation demonstrates that Blue Thumb volunteer chloride data is internally consistent and geographically irreplaceable: 93% of 327 monitoring sites are more than 1 km from the nearest professional station. These findings support the integration of volunteer monitoring into landscape-scale water quality analyses, provided geographic and seasonal covariates are explicitly modeled.
Narges Taravatrooy narges.taravatrooy@okstate.edu	Using Satellite Observations to Monitor Lake McMurtry's Water Volume Dynamics	Monitoring lake water storage is increasingly important for managing freshwater resources given climate variability and rising demand. Traditional in-situ measurements can be costly and are often limited in spatial and temporal coverage. Collectively, these create challenges for comprehensive reservoir level monitoring. This study focuses on Lake McMurtry, near Stillwater, Oklahoma, as a case study for demonstrating the use of multi-source remotely sensed datasets to estimate water level and storage variations. The Surface Water and Ocean Topography (SWOT) satellite is a relatively recent endeavor from NASA that provides new opportunities by offering high-resolution radar observations of inland water bodies (altimetry and surface area). Since SWOT is known to have accuracy issues with surface area, this study will couple SWOT data with Sentinel-1 data to provide a more accurate estimation of change over time. Altimetry data from SWOT will be compared to in-situ data (staffing gauge and pressure transducer sensor measurements) for validation, coupled with Sentinel-1 area data, then combined with bathymetric data to estimate lake water volume change over time. These compiled datasets allow the development of a workflow for deriving lake water volume changes from spaceborne observations. The study highlights the potential of satellite remote sensing to provide continuous, scalable, and reproducible monitoring of lakes and reservoirs in data-scarce regions.
Session: Session 2C: Dirty Water, Clever Biology (4/15 12:30-1:50) Room 209		
Jacobey King & Madelynn Henderson cobey@ou.edu	Microbial Source Tracking in Northeast Oklahoma Using qPCR-Based Host-Associated Markers	Fecal contamination remains a persistent challenge in freshwater systems, necessitating tools capable of distinguishing between human and non-human sources to inform effective management strategies. Microbial source tracking (MST) using quantitative PCR (qPCR) provides a targeted approach for identifying host-associated fecal pollution in complex environmental matrices. In this project, water samples were collected from freshwater systems across Oklahoma and analyzed using a suite of MST markers, including but not limited to HF183 (human-associated), DG3 and BacCan (canine-associated), and GFD (bird-associated), alongside the Salmon DNA internal amplification control (Sketa) to assess inhibition. DNA was extracted from environmental samples and evaluated using established qPCR assays to determine the presence and relative contribution of fecal sources. Results demonstrate the widespread occurrence of host-associated markers across diverse land-use settings, with human-associated contamination frequently detected in urban-influenced watersheds and animal-associated markers more prevalent in agricultural and mixed-use areas. The inclusion of an internal control enabled identification of PCR inhibition, improving confidence in negative results. These findings highlight the utility of qPCR-based MST as a practical and scalable tool for source identification in Oklahoma water systems. By providing actionable data on fecal pollution sources, this approach supports watershed managers and stakeholders in implementing targeted mitigation strategies to protect water quality and public health.
Landon Mortimer landont.mortimer@gmail.com	Can Biodegradable Materials Filter Heavy Metals?	Heavy metal contamination in water, such as at Oklahoma's Tar Creek Superfund site, poses ongoing risks due to pollutants including lead, zinc, and cadmium. This study evaluated biodegradable materials as low-cost filtration options for heavy metal removal. Garlic, banana peels, and sludge cake were tested against a control using eco-column filtration of Tar Creek water, with metal concentrations measured before and after filtration. Garlic increased lead concentrations, likely due to interactions with calcium and magnesium ions that mobilized bound lead. Sludge cake reduced lead but elevated nitrate and nitrite levels, limiting its application. Banana peels consistently reduced lead to below detectable limits across all trials. Follow-up testing using eco-columns and aquarium systems confirmed these results. Supported by experts and literature review, the findings suggest banana peels are an effective, biodegradable option for lead removal. Future research will explore additional biodegradable materials, such as eggshells, leaves, and apple cores, alongside microscopic analysis and the development of filtration devices to advance sustainable solutions for the long-standing heavy metal contamination at Tar Creek
Leif Olson (b) lolson@ou.edu	Metal Tolerance Adaptations by Sulfate-Reducing Bacteria in a Mine Drainage Treatment Bioreactor at the Tar Creek Superfund Site	Anaerobic bioreactors that host sulfate-reducing bacteria (SRB) are an effective passive treatment technology for mine drainage. They are designed to amplify sulfide production, which naturally occurs in aquatic sediments and precipitates dissolved metals into insoluble metal sulfides. This nature-based technology helps remediate legacy lead-zinc mine drainage at the Mayer Ranch passive treatment system in the Tar Creek Superfund Site in Ottawa County, Oklahoma. This research examined microbial adaptations related to SRB metal resistance and ecological diversity from an anaerobic bioreactor at Mayer Ranch through cultivation of wild SRB and genomic analyses. Putative strains from the Desulfovibrionaceae family were isolated and subjected to metal tolerance assays, and 16S ribosomal RNA gene sequencing was performed to identify the microbial communities present. The wild isolates had variable performance compared to reference strains of SRB in metal tolerance assays, while the microbial community included a diversity of SRB genera as well as organisms capable of complex carbon degradation, which produces simpler forms of carbon that are preferred for SRB metabolism. This suggests that the broader microbial community that develops in these bioreactors is more impactful than the metal tolerance adaptations of individual organisms for the efficacy of these systems.

Presenter(s)	Title	Abstract
Stacey Herriage stacey.herriage@okstate.edu	Evolutionary Ionomics Reveals Tissue-Specific Metal Accumulation in Sunfish from the Tar Creek Superfund Site	Fish populations can differ substantially in their tolerance to metal contamination, yet the mechanisms underlying these differences remain poorly understood. This study investigated how chronic metal exposure influences elemental composition (the ionome) of fish populations inhabiting the Tar Creek Superfund site in the Tri-State Mining District, a watershed historically contaminated by mining activities. Despite remediation efforts, elevated concentrations of metals, particularly lead (Pb), cadmium (Cd), and zinc (Zn), persist in local waterways. We identified resident populations of Bluegill (Lepomis macrochirus) inhabiting these contaminated waters and tested the hypothesis that fish from highly polluted sites would exhibit distinct elemental profiles compared with fish from reference locations. Bluegill were collected from four sites representing a contamination gradient: two polluted sites (one highly contaminated and one moderately contaminated) and two reference sites. Concentrations of metals were measured in water samples and in multiple fish tissues including gill, liver, intestine, skin, white muscle, and excrement using inductively coupled plasma optical emission spectrometry and mass spectrometry (ICP-OES and ICP-MS). Fifteen elements were quantified, including Pb, Cd, Zn, arsenic, bromine, calcium, copper, iron, magnesium, manganese, potassium, phosphorus, sodium, sulfur, and selenium. Water samples from the most contaminated site contained 12.49 µg/L Cd, 12.17 µg/L Pb, and 7445.39 µg/L Zn, while these metals were below detection limits at the most distant reference site. Preliminary analyses revealed significantly elevated metal concentrations in tissues from fish collected at contaminated sites relative to reference sites. Metal concentrations in fish tissues were strongly correlated with dissolved metal concentrations in the surrounding water. These responses were tissue-specific, with skin and gill ionomes showing the strongest associations with environmental metal levels. These findings suggest that ionomic variation in sunfish may reflect physiological responses and potentially evolutionary adaptation to chronic metal exposure in Tar Creek. Understanding the biochemical mechanisms underlying these patterns may provide important insight into how fish populations persist in contaminated ecosystems and inform management strategies for watersheds affected by legacy mining pollution.
Session: Session 3A: Workshop (4/15 2:00-3:45) Room 209		
Jack Hilgert jack.hilgert@conservation.ok.gov	Workshop - WILD About Wetlands: Engaging Communities in Wetland Conservation Through Hands-On Education	Wetlands are among the most productive and valuable ecosystems in a watershed—filtering water, reducing flooding, supporting biodiversity, and sustaining community resilience. Yet many communities and students have limited opportunities to explore and understand these critical landscapes.This interactive session introduces WILD About Wetlands—Strategies to Appreciate These Ecosystems, a collection of engaging activities drawn from three nationally recognized environmental education programs: Project WET, Project WILD, and Project Learning Tree. Participants will experience short demonstrations and practical applications of activities that help learners explore wetland ecology, wildlife habitat, soil processes, and ecosystem connections. This session demonstrates how wetlands education can strengthen watershed literacy, foster stewardship, and help communities better appreciate the ecological services wetlands provide.
Session: Session 3B: Conservation in Action (4/15 2:00-2:25) Auditorium		
Jeri Fleming jeri@irwp.org	American Ecosystem Restoration Initiative Grant Implementation	The Cherokee Nation received an American Ecosystem Restoration Initiative planning grant to collaboratively develop a watershed-wide implementation plan addressing four key focus areas: riparian restoration and conservation, public access improvements, unpaved road management, and community engagement. The Illinois River Watershed Partnership is leading the Conservation and Restoration focus area by developing conservation plans and landowner agreements. IRWP is working closely with the Cherokee Nation, the Grand River Dam Authority, and additional partners to enhance recreation opportunities and improve river access across both Oklahoma and Arkansas. This presentation will describe how program partners are engaging landowners and collaborating with regional organizations to design conservation plans, expand and enhance river access, and develop a strategic implementation framework that will position the watershed for future restoration funding. The session will also highlight current challenges related to river access in both states and summarize progress achieved to date.
Session: Session 3B: Conservation in Action (4/15 2:25-3:05) Auditorium		
Morgan Keeling, MBA morgan@irwp.org	Special Session - Communications that Drive Conservation	Effective communications is not separate from conservation work — it is how that work becomes visible, fundable, trusted, and scalable. This session will share the Illinois River Watershed Partnership's Communications & Outreach Strategy and how clear, intentional messaging can move people from simple awareness to real action.Grounded in 2024 focus group research, demographic analysis across the watershed, and evaluation tools aligned with the Social Indicators Planning and Evaluation System (SIPES), this strategy shows how evidence-based, culturally responsive, and story-driven outreach strengthens participation, partnerships, and long-term outcomes. We will discuss practical best practices that any organization can use, such as using data to better target outreach, building trust through listening and strong partnerships, creating a clear internal structure for content and storytelling, measuring impact beyond clicks and likes, and making communications a shared responsibility across staff.This session is designed for watershed groups, nonprofits, municipalities, and conservation practitioners who want to improve their communications systems and support meaningful, community-led stewardship.
Session: Session 3B: Conservation in Action (4/15 3:05-3:45) Auditorium		
Justine McCann & \Jake McDoulett justine.mccann@ou.edu	Special Session - The Great Plains Stormwater Center of Excellence	The U.S. Environmental Protection Agency has funded four regional Stormwater Centers of Excellence representing cold climates, southeast coastal, arid southwestern, and the Great Plains regions of the United States. The Great Plains Stormwater Center of Excellence (GPSCOE) is a consortium of researchers at five institutions in Oklahoma and Kansas: the University of Oklahoma, Oklahoma State University, Kansas State University, Langston University, and Pawnee Nation College. GPSCOE will conduct research into the siting, funding, implementation, and maintenance of stormwater best management practices (BMPs). The center will also build resources for a regional network of stormwater professionals, including an online repository of research results, technical assistance for design plan review troubleshooting of BMPs, and opportunities to collaborate with other practitioners in webinars and conferences. GPSCOE's objective is to help communities and stormwater practitioners address the water quality and quantity challenges that arise from the unique climatological setting of the Great Plains. This presentation will introduce GPSCOE, provide an overview of current research efforts, and seek feedback from the audience to help shape ongoing and future activities.
Session: Session A: OCC Blue Thumb Program (4/16 10:00-11:20) Auditorium		

Presenter(s)	Title	Abstract
Cheryl Cheadle, Jocelyn Matousek, John Harrington, Holly Mauslein hunter. hodson@conservation.ok.gov	Special Session - Oklahoma Conservation Commission's Blue Thumb program	The Oklahoma Conservation Commission's Blue Thumb program empowers Oklahomans to protect and improve water quality through volunteer monitoring and environmental education. This one-hour track will introduce Blue Thumb and highlight its impact through diverse perspectives, including program leadership, a student participant, and a long-time volunteer, demonstrating how the program fosters stewardship and community engagement. The session will also feature introductions to environmental education programs Project WET and Project WILD, which equip educators and volunteers to inspire the next generation of conservation leaders.
Session: Session B: Water Resource Planning (4/16 10:00-11:20) Room 108		
Carly Clark & Justin Higa carly.clark@owrb.ok.gov	Update on OWRB Lakes section Monitoring Stations for the Oklahoma Hydronet	The Oklahoma Water Resources Board (OWRB), in partnership with Oklahoma State University and the National Oceanic and Atmospheric Administration, completed the construction of five weather and lake level monitoring stations as a part of the Oklahoma Hydronet program. The Oklahoma Hydronet program consists of a network of monitoring stations maintained by a multitude of partners, developing a statewide monitoring network that will be used to provide information on severe weather and infrastructural needs. Monitoring stations were installed at Okmulgee Lake, Claremore Lake, Brushy Creek Reservoir, Lone Chimney Lake, and Murray Lake, and are currently configured to collect data such as precipitation, wind, and lake level, which the OWRB and OK Hydronet teams can access remotely. The method of distribution of weather data from these gauges is currently under development. In the future, data collected through the monitoring stations will be made available to the public through both OWRB and Hydronet websites, using tabular and visual representations of lake level and weather data. In addition to the five monitoring stations constructed to-date, more lakes are being scouted as potential sites for weather and lake level data for the Hydronet program. These data will eventually be made available in near-real-time, with an emphasis on providing data that can be used for flood monitoring and water supply assessment.
Cresencia Storms cresencia.storms@owrb.ok.gov	The OWRB Water Division Experience: A Look Into Surface and Groundwater Water Quality Reports for the 2025 Oklahoma Comprehensive Water Plan	The OWRB's Water, Assessments, Trends, and Environmental Research Division used ESRI's Experience Builder to create interactive webpages to showcase water quality across the state's lakes, rivers, and groundwater. In this session, we will walk through these water quality experiences as we explore water quality stories in the 13 Oklahoma Comprehensive Water Plan planning regions. Journey across Oklahoma as we touch on the spatial distribution of eutrophic waterbody conditions, biological concerns with vulnerable keystone fish populations, elevated nitrate levels in drinking groundwater, and more. We will also discuss critical data gaps in regions that need more water quality and quantity monitoring to create accurate, comprehensive trends for future water planning.
Jordon Henderson jordon.henderson@owrb.ok.gov	Oklahoma Lake Trends	The Oklahoma Water Resources recently completed an analysis of lake trends. The OWRB has been collecting lakes data for special projects since the 1980's, and in 1998 began collecting data statewide on over 120 lakes. Historically, this data has been used mainly to assess beneficial uses and, secondarily, to analyze long-term trends. The most recent statewide trends analysis occurred in 2012. In 2021, the program underwent a major programmatic shift, with regular long-term trend analysis becoming the primary programmatic focus. This analysis represents the first of regularly occurring bi-annual trend analyses. Prior to any trend workup, a comprehensive exploratory data analysis (EDA) was employed to better understand: 1)data distribution and shape, 2)effects of spatial variation, seasonality, growing season, and lake dynamics, and 3) effects of data gaps and censored data. A best fit trend model was used that incorporated both a non-parametric approach, using Mann-Kendall and Seasonal Kendall tests, and linear regression. The analyses evaluated long-term changes in lake water quality indicators, including total phosphorus, total nitrogen, chlorophyll a (pheophytin-corrected), dissolved oxygen, turbidity, temperature, and specific conductance. The talk describes both EDA and trend analysis approaches, as well as the overall workflow used to process and analyze statewide monitoring data. Finally, the presentation will discuss monitoring priorities, and the development of an R-based package for analysis.
Lara Joy lara.joy@owrb.ok.gov	The Prioritization of Firm Lake Yield Studies in Oklahoma	The Oklahoma Water Resources Board (OWRB) manages surface water permitting in Oklahoma. Oklahoma's reservoirs are a vital source of water for a number of purposes including public water supply. In order to issue appropriate permits, the OWRB seeks to establish a firm yield value for each reservoir. 190 reservoirs of at least 50 acres in surface area were selected for prioritization for firm yield studies representing approximately 14,600,000 acre-feet in normal storage. Most reservoirs in the list are municipally- or state-owned, but some federally- and privately-owned reservoirs that are used at least partly for public water supply were also included. Reservoirs were prioritized based on several weighted criteria including storage volume, amount of unpermitted water available, purpose, number of pending applications, and age of bathymetric surveys. Up-to-date bathymetric surveys are critical to the determination of a firm yield value for a reservoir as they allow for factors such as sedimentation over time to be accounted for. 113 reservoirs were found to not have had a bathymetric survey completed within the last 20 years, so a separate prioritization list for bathymetric surveys was created using similar criteria. These prioritization lists will provide important supplementary information for the upcoming 2025 Oklahoma Comprehensive Water Plan Update.