1.01 PROJECT PROPOSAL SUMMARY SHEET

PROJECT TITLE: Red River Basin River Watch and River of Dreams

NAME, ADDRESS, PHONE AND E-MAIL OF LEAD PROJECT SPONSOR/SUBGRANTEE:
International Water Institute
1120 28th Ave. N. Suite B
Fargo, ND 58102

STATE CONTACT PERSON: Charles Fritz **TITLE:** Director
PHONE: 701-388-0861 **E-MAIL:** charles@iwinst.org
STATE: North Dakota **WATERSHED:** Red River Basin
HYDROLOGIC UNIT CODE: 0902 **HIGH PRIORITY WATERSHED (yes/no):** No

PROJECT TYPES	WATERBODY TYPES	NPS CATEGORY
[] STAFFING & SUPPORT	[] GROUNDWATER	[] AGRICULTURE
[] WATERSHED	[] LAKES/RESERVOIRS	[] URBAN RUNOFF
[] GROUNDWATER	[] RIVERS	[] SILVICULTURE
[X] I&E	[] STREAMS	[] CONSTRUCTION
	[] WETLANDS	[] RESOURCE EXTRACTION
	[]OTHER	[] STOWAGE/LAND DISPOSAL
		[] HYDRO MODIFICATION
		[] OTHER

SUMMARIZATION OF MAJOR GOALS:
Provide watershed education opportunities to the ten high schools and eighteen elementary schools currently involved with the Red River Basin River Watch (RW) and River of Dreams (ROD) programs. Expand RW to include three more high schools with the goal to have at least one high school and one elementary school participating in each water resource district within the Red River Basin.

PROJECT DESCRIPTION: The RW program provides watershed education opportunities for local high school students through hands-on science, water quality monitoring, and river recreation activities designed to challenge students and facilitate understanding and appreciation of water resources. ROD is a complementary program that engages elementary students to explore the connectivity of our planet's water supply and how watersheds function.

FY 2022 319 funds requested $251,732 Match $167,821

Other Federal Funds $0 Project FTE: 1.15

Length of proposal: 3 years from July 1, 2022 to June 30, 2025.

Total project cost $419,553

2.0 STATEMENT OF NEED

2.1 This project will build on and continue the Red River Basin River Watch River of Dreams project started in 2020. A summary of activities and accomplishments under the 2020 agreement are included in *Appendix A*.

2.2 The North Dakota Department of Environmental Quality (NDDEQ) has identified the need to deliver a balance of information and education throughout North Dakota as a critical component of the Non-Point Source (NPS) Pollution Management Program. NPS pollution can affect the state's water resources and it is important for citizens to understand NPS causes and effects; including how the NPS pollution is affected by a variety of water issues ranging from flooding, farming practices, drought, and wetland drainage.

Students today are increasingly disconnected from the natural environment. The IWI's RW and ROD projects will engage students in hands-on education programs to better understand how humans interact and affect valuable river resources of the Red River Basin through integrated classroom and outdoor experiences that:

- build awareness of river ecosystems and watershed connections
- increase student capacity to make informed decisions about their environment
- instill a sense of place highlighting the historic, economic, and ecological uniqueness of their local watershed

2.3 RW and ROD increase knowledge, understanding and appreciation of water resources through education of non-point source pollution, water quality issues, connectivity of our planet's water supply, and how watersheds function. RW and ROD target elementary through high school aged students and teachers (specifically 4^{th} – 12^{th} grade). The majority of teachers have little or no training in NPS pollution causes and effects. Teachers are more likely to teach subjects they are familiar with and understand themselves. RW and ROD will increase teacher awareness and understanding leading to more classroom activities on water issues.

3.0 PROJECT DESCRIPTION

3.1 The IWI will engage high school and elementary students within North Dakota Red River Basin school districts in hands-on education programs focused on river resources within their local watershed. IWI will provide integrated classroom and outdoor experiences that; build awareness of river ecosystems and watershed connections, increase student capacity to make informed decisions about their environment, and instill a sense of place about the uniqueness of their local watershed.

3.2 Objectives**/**Measurable outcomes**:**

Obj. 1. **River Watch:** Increase awareness and knowledge of local land use and watershed connections through water quality monitoring, biological monitoring, watershed exploration and STEM activities. Engage thirteen RW teams to explore streams and other aquatic environments in the Red River Basin, documenting local watershed conditions.

Water Quality and Biological Monitoring: Stream Sampling and Macroinvertebrates.

- Water Quality – RW Students and Team Leaders will be trained to use field sampling equipment (e.g. sonde, Van Dorn sampler and Secchi tube). RW teams monitor local rivers and streams. Parameters measured typically include stage, appearance,

recreational suitability, stream condition/habitat assessment, transparency, water temperature, dissolved oxygen, pH, and conductivity. Frequency: Two times annually. Ongoing completed May 2025. Estimated cost $76,316.

- Macroinvertebrate Collection – River Watch students will sample macroinvertebrate communities and learn about the relationship between water quality and biological communities. Teams will monitor biological communities in their own watershed when conditions allow, however; if local conditions are not adequate River Watch teams will be encouraged to visit Prairie Waters Education and Research Center. Two times during the project completed November 2024. Estimated cost $34,468.
- Review water quality data collected with RW teams and teachers. Provide insight into conditions at the monitoring sites. Once annually completed May 2025. Estimated cost $5,560.

River Explorers Paddling Program: Lead guided river ecology excursions (18 trips) from July 2022 through June 2025 on various reaches of rivers in the Red River Basin.

- IWI paddling staff scout rivers at different water levels to assess safety and water levels needed for safe passage by RW student exploratory teams. Ongoing through June 2025. Estimated cost $3,789.
- Eighteen guided river ecology excursions in the Red River Basin, all utilizing GPS and mapping/photo documentation of baseline geomorphology and recreation conditions. Completed June 2025. Estimated cost $37,234.
- Create and share information from river trips on IWI website via on-line map and multimedia reports. Reports may include the following; number of trip participants, river route and reaches covered, photo-documentation of river conditions, and a summary of observations by trip participants on river conditions, land use, and recreation suitability. Completed June 2025. Estimated cost $7,228.
- Final Report to include areas explored, number of participants and links to trip reports Completed June 2025. Estimated cost $1,805.

Obj. 2. **STEM assistance:** Assist in provision of Science, Technology, Engineering and Math (STEM) education and engagement opportunities through watershed science.

Host regional fall kick-off events for RW teachers and youth leaders. Events will incorporate team building skills, local watershed project presentations and data interpretation.

- 2-3 regional fall kick-off events/training sessions in each year. Completed December 2024. Estimated cost $36,063.
- Summary report will be provided each year to document participants at regional kick-off events and topics covered. Information will be included in the Final Report due June 2025. Estimated cost $545.

Utilize the annual River Watch Forum to provide exposure to relevant research topics and an opportunity to present findings from current research involvements. Provide opportunities for youth to engage in scientific research and outreach.

- River Watch Forum presented in February or March each year with keynote speaker and concurrent sessions focused on emerging watershed education and research. Poster displays, written reports and/or video presentations of assigned research topics, service learning projects and special investigations by RW teams in collaboration with watershed partners. Completed April 2025. Estimated cost $60,468.

- Summary report written to document participating RW teams/schools and highlighting awards and watersheds represented in research, with links to materials. To be completed by June 30th of each year and included in the October annual report. Estimated cost $874.

Obj. 3. **River of Dreams:** Engage elementary students in a hands-on education program that incorporates a number of core education topics including math, science and geography (45 classrooms ~ 1,200 students).

Engage an entire grade level of students by partnering with teachers to bring experiential watershed education into their classrooms and then into their watershed.

- School contacts. Solicit classrooms to be involved. Identify lead teacher and determine the number of students to be involved. Ongoing completed September 2024. Estimated cost $3,557.

- Resources acquired to deliver ROD to local elementary students and teachers. Ongoing completed April 2025. Estimated cost $38,704.

- Prepare materials (e.g. virtual geography tour with worksheet) and canoes for ROD activities. Ongoing completed April 2025. Estimated cost $15,653.

- School classroom sessions. Hold classroom sessions to present materials and explore program expectations. Completed April 2025. Estimated cost $27,960.

- Field sessions with ROD participants. Release of individual ROD canoes and review of watershed lessons learned by students. Completed June 2025. Estimated cost $27,960.

- Evaluation of ROD activities using pre/post surveys of students. Completed May 2025. Results will be reported as part of Final Report due June 2025. Estimated cost $4,269.

Obj. 4. **Evaluation/Reporting:** Project Evaluation, Management and Reporting. Cost $37,100.

Track project grant-related expenditures. Compile and organize invoices, pay bills and submit expense reimbursements in a timely manner.

- Grant-related expenditures tracked, bills paid and expense reimbursements submitted at least quarterly.
- Provide quarterly progress reports along with reimbursement requests.

Track objectives and tasks to ensure outcomes are being met. Prepare and complete reports and results from the Red River Basin River Watch and River of Dreams program.

- Annual report to the NDDEQ and RRJWRD will be submitted by October 1 of each year.
- Complete final report and submit by June 30, 2025.

3.3 The milestone table below shows the timeline for the different tasks previously described. All objectives and tasks are the responsibility of the IWI.

TASK/RESPONSIBLE ORGANIZATIONS	OUTPUT	Q T Y	SFY23	SFY24	SFY25
OBJECTIVE 1 - River Watch					
Task 1 - Water Quality and Biological Monitoring	Sampler training, sample collection.	0.20 FTE 13 RW teams involved.			
Task 2 - Red River Explorers	River ecology excursions and trip reports.	0.20 FTE 18 river trips.			
OBJECTIVE 2 - STEM Assistance					
Task 1 - Fall Kick Off Events	Watershed education and training.	0.10 FTE 260 students			
Task 2 - River Watch Forum	Watershed education and training.	0.12 FTE 260 students			
OBJECTIVE 3 - River of Dreams					
Task 1 - School classroom and field sessions.	Deliver and present program materials.	0.27 FTE 1,200 students			
OBJECTIVE 4 - Eval and Report					
Task 1 - Track and pay bills, submit expenses.	Quarterly progress reports and reimbursements.	0.06 FTE			
Task 2 - Prepare and complete reports.	Interim and final reports.	0.06 FTE			

4.0 COORDINATION PLAN

4.1 The IWI will be the sponsoring organization with local cost share ($167,821) provided by North Dakota Red River Joint Water Resources District (RRJWRD). The IWI Education and Monitoring Director will be responsible for project management with the IWI Project Specialist leading coordination and delivery of RW and ROD education activities. IWI will supply all education materials, presentation equipment, and the website for this project. The IWI has a strong long-standing record of working with other entities in delivering watershed education within Minnesota and North Dakota and has worked closely with the Prairie Waters Education and Research Center (PWERC) to help them develop River Watch activities and has received training from their staff to continue the development of our River Watch program (e.g. biological monitoring).

For this project, schools will be encouraged to use the PWERC for their macroinvertebrate collection activities when local conditions are not adequate. IWI and PWERC will coordinate on future education and training opportunities and staff will assist each other when and where appropriate. Since 2013, the IWI has worked with the RRJWRD, NRCS and the State Water Commission (SWC) to deliver watershed education programs within the Red River Basin.

As part of our ongoing coordination and internal assessment process, the IWI Board of Directors oversees the Institute, ensures it is run properly, and involves representative groups in the activities of the Institute. Below is a list of board members and their agency or institution affiliation.

Officers		
George B. Sinner (Chair) Cornerstone Bank 2280 45th St S # A Fargo, ND 58104 Tel: 701.364.9630	**Mike Ell (Vice Chair)** ND Department of Health 918 East Divide Avenue Bismarck, ND 58501-1947 Tel: 701.328.5214	**Dr. Jay Leitch (Secretary/Treasurer)** Natural Resources Management Dept. Chair (Ret) ND State University Fargo, ND Tel: 701.522.2166
Board Members		
Phil Murphy at Large 650 NP Avenue, Suite #110 Fargo, ND 58105 Tel: 701.388.0861	**Dr. Gerry VanAmburg** Concordia College (Ret.) Buffalo- Red River Watershed/MN BWSR Moorhead, MN Tel: 218.790.2502	**Duane Pool** ND State Water Commission 900 East Blvd. Bismarck, ND 58505-0850 Tel: 701.328.4964
Josh Irhy ND Red River Water Resource District P.O. Box 10 Hillsboro, ND 58045 Tel: 701.261.6712		**Michelle Caroll** SC Recon 19494 580th #853 Park Rapids, MN 56470 Tel: 877.727.3266
Dr. Ryan Yonk NDSU PCPE Barry Hall 400 Fargo, ND 58505 Tel: 701.231.5374	**John Finney** Red River Watershed Management Board 11 5th Avenue E. Ada, MN 56510 Tel: 218.784.9502	**Robert Laidler** Director Emeritus Oak Hammock Marsh Winnipeg, MB Tel: 204.952.4856

4.2 RW and ROD have support of governmental, educational and citizen groups. The ND State Water Commission and RRJWRD provided the IWI with a grant to deliver RW in 2018 and in 2019. The NDDEQ with a match from the RRJWRD also provided NPS funds for RW and ROD activities in 2019 - 2022. Through this grant we will continue to engage students to teach them about NPS pollution, watershed functions and our water supply.

4.3 The IWI has a history of delivering watershed education using outdoor learning activities that have been supported by 319 funds. As stated earlier, we have worked with the Prairie Waters Education and Research Center to help in the development of their River Watch program and to receive training from their staff on macroinvertebrate collection and identification.

4.4 The RW and ROD programs provide participants with watershed education that incorporates STEM activities for high school students and geography, culture, art and music for elementary students. RW and ROD activities enable participating students to have a better understanding of how watersheds function and their importance to societal well-being.

RW is a holistic approach covering many aspects of watershed education. Students and teachers learn about watershed function and process through hands-on activities including water quality monitoring, biological monitoring and river exploration. RW participants also receive training during scheduled events throughout the year and complete a yearly assignment as a team for presentation at the annual forum.

ROD students gain an understanding of watersheds and how they function through activities tailored to their local watershed. In coordination with the classroom instruction, IWI staff assist in the implementation and launching of 14” canoes provided to the classrooms. As a canoe is located and documented on the ROD mobile application, a student may better understand the actual physical movement of water resources within tributaries and throughout the Red River Basin through real-time

interaction. Prairie Waters Education and Research Center has a different 319 NPS pollution funded program in North Dakota that brings students to their center for instruction. This project delivers RW and ROD to local schools with activities performed within and tailored to each school's watershed. Therefore, there is no duplication or replication of 319 NPS pollution funding.

5.0 EVALUATION AND MONITORING PLAN

5.1 The IWI will analyze the student participation through quantitative data including numbers of students participated, monitoring completed, explorer miles logged and canoes launched. Qualitative data will be gathered from assessment worksheets, forum assignments completed by the students and through instructor observation. Teacher evaluations of implementation problems as well as pre/post surveys of students will be utilized to gauge understanding and comprehension of key concepts and principles. These data will be collected, reviewed, and discussed by IWI Staff. A compilation of these data will be presented to major funding sources and the Board of Directors. The Director will receive feedback from these entities and implement any needed changes.

6.0 BUDGET

6.1 The funds for this project will be used for a 36-month period. Funding will start July 1, 2022 and continue through to June 30, 2025.

Budget Table for Red River Basin River Watch and River of Dreams

Part 1 – Funding sources

	SFY 23	SFY 24	SFY 25	Total
FY2022 Section 319 Funds	$83,911	$83,911	$83,910	$251,732
State and Local match:				
1) ND Joint Water Resources District	$55,940	$55,940	$55,941	$167,821
				$419,553

Budget Table for Red River Basin River Watch and River of Dreams

Part 2 – Funding Budget - The funds for this project will be used for funding 36 months.

Project Objectives and Tasks	SFY23-25	Total Costs	Cash Match	319 funds
OBJECTIVE 1 - River Watch; Monitoring and Explorers				
Salary/Fringe	$127,300	$127,300	$50,920	$76,380
Sub-Teacher	$11,700	$11,700	$4,680	$7,020
Mileage	$20,400	$20,400	$8,160	$12,240
Meeting Expense	$500	$500	$200	$300
Supplies	$6,500	$6,500	$2,600	$3,900
Subtotals	**$166,400**	**$166,400**	**$66,560**	**$99,840**
Objective 2 - STEM Assistance; Fall Kick Offs and Annual Forum				
Salary/Fringe	$71,500	$71,500	$28,600	$42,900
Sub-Teacher	$4,500	$4,500	$1,800	$2,700
Mileage	$5,000	$5,000	$2,000	$3,000
Meeting Expense	$11,500	$11,500	$4,600	$6,900
Supplies	$5,450	$5,450	$2,180	$3,270
Subtotals	**$97,950**	**$97,950**	**$39,180**	**$58,770**
Objective 3: River of Dreams; Classroom and Field Activities				
Salary/Fringe	$90,100	$90,100	$36,040	$54,060
Sub-Teacher	$0	$0	$0	$0
Mileage	$7,003	$7,003	$2,801	$4,202
Meeting Expense	$0	$0	$0	$0
Supplies	$21,000	$21,000	$8,400	$12,600
Subtotals	**$118,103**	**$118,103**	**$47,241**	**$70,862**
Objective 4 - Evaluation and Reporting; Reimbursements and Reports				
Salary/Fringe	$37,100	$37,100	$14,840	$22,260
Subtotals	**$37,100**	**$37,100**	**$14,840**	**$22,260**
TOTALS	**$419,553**	**$419,553**	**$167,821**	**$251,732**

Appendix A

Red River Basin River Watch and River of Dreams
2020 Project Progress

Project Progress
This report is for the North Dakota River Watch and River of Dreams Project covering July 2020 through February 2022. The Red River Joint Water Resource District is the project sponsor with lead coordination and project management provided by the International Water Institute. The remainder of this report is organized by activities undertaken in 2020 - 2022.

Outdoor Education and Covid-19
Some of the busiest weeks of the year for our River Watch Teams are the weeks between the start of the school year and the formation of ice on the rivers. Though last fall was not full of large in-person events like it has in the past, it remained one of the busiest seasons of the year, an exciting change of pace after an abrupt ending to the spring programming in 2020.

Our schools operated in a variety of models in 2020, allowing us to socially distance outside, meet over video calls, and prepare new virtual interactive activities. River Explorers kayaking trips lend themselves especially well to social distancing and after two autumns with high water, this year's paddling season was especially appreciated. IWI staff was able to take groups paddling on eight tributaries as well as the Red River itself. Trips spanned across the Red River Basin: from the Swan Creek in Casselton to the Tamarac River in Marshall County. Alongside River Explorers trips, River Watch Teams were able to conduct macroinvertebrate sampling and Water Quality Monitoring throughout the Red River Basin.

For our schools that were not able to meet in person in 2020, the Monitoring and Education staff brought the rivers of the basin to the computer screens of our students. Thus far, 2021 fall activities resemble a more normal River Watch year with student river trips and monitoring.

26th Annual Forum – Just Around the River Bend
The 26th Annual River Watch Forum was a huge success! With 20 schools participating from across the Red River Basin, we hosted a three-week virtual forum from March 8th to March 26th. From first-year River Watch Teams to those who have been involved for 26 straight years, each team geared up for a new challenge each week.

Challenge #1: Water Quality of the Red River

River Watch staff collected a 'snapshot' of water quality along 300 miles of the Red River by collecting field data and collecting water samples for further analysis at a lab. This dataset was then given to schools with the task of matching the data to one of the 14 locations on the map.

Challenge #2: Macroinvertebrates of the Red River Basin

River Watch teams were able to collect and identify macroinvertebrates last Fall. This provides and in-depth understanding of the biological component of rivers and streams. For this activity, each team had to

identify several macroinvertebrates from five separate locations and to calculate a Pollution Tolerance Index for each location!

Challenge #3: Sharing and Preparing

After a few weeks of tough challenges, Week 3 was all about sharing a fun River Watch memory for a social media contest and preparing for 2021 summer and fall activities. Check out the winners and their Social Media posts below.

Red Lake Falls River Watch, for the first time in their 23 years as a team, took home 2021 River Watch Forum **Gold Award**.

Climax-Shelly River Watch received the 2021 River Watch Forum **Silver Award**, for the second year in a row!

The **Minto** River Watch Team, which has been active since 2007, took home the 2021 River Watch Forum **Bronze Award**.

The competition was pretty tight with the 2021 River Watch Forum. With little room for score interpretation, there were several who scored incredibly well but didn't quite make the top three. **Honorable Mention** River Watch Teams; Norman County East, Campbell-Tintah and Lakota.

27th Annual Forum – Your River, Your Watershed, Your Community-Your Forum

At the time of the writing of this report the preparation for the 2022 forum is in progress staff are meeting with River Watch teams at individual Kick-Off events. The forum is scheduled for March 30th, 2022 at the Alerus Center Grand Forks, ND. This year, teams are tasked to plan, market, and execute a River Watch event in their community. The idea is to have them engage the public and inform them about what is going on in their watershed. Participating teams will be providing the following:

- **Initial Idea Worksheet: (Due December 17th, 2021)**
  - Part One: Test your knowledge of your watershed
  - Part Two: Brainstorming for your River Watch event
- **Marketing/Promotional materials used: (Due March 11th, 2022)**
  - A copy of promotional materials and/or links to online marketing used that summarize the objectives and the format of the event.
- **1-3-minute video that includes: (Due March 11th, 2022)**
  - Introduction to Red River Basin and specified sub-watershed
  - Video clips from all stages: planning, promoting, delivery
- **Written Summary of Event that includes: (Due March 11th, 2022)**
  - Objectives and desired outcomes of event
  - Overview of planning, promoting, and delivering your event
  - Actual outcomes and evaluation of event

River of Dreams

Due to school closures and social distancing guidelines in 2020, group canoe launches were pushed back into 2021. In response, our teachers had to adapt accordingly and we have been working to support whatever alternative works best for them and their classrooms.

Even though programming has looked a little different, canoes launched in recent years continue to make their way to Hudson Bay.

2021 River of Dreams activities began in a virtual setting with pre-recorded local watershed information activities designed to engage the students in learning watershed vocabulary followed by an interactive Zoom session that takes students around their local watershed illustrating how they connect to the rest of the world around them.

2021 canoe release activities were in person and included the 2020 releases. 19 schools participated in 2020 and 18 schools in 2021.

2022 classroom sessions are underway with 19 schools scheduled to participate.

To view the latest River of Dreams sightings, click **here**

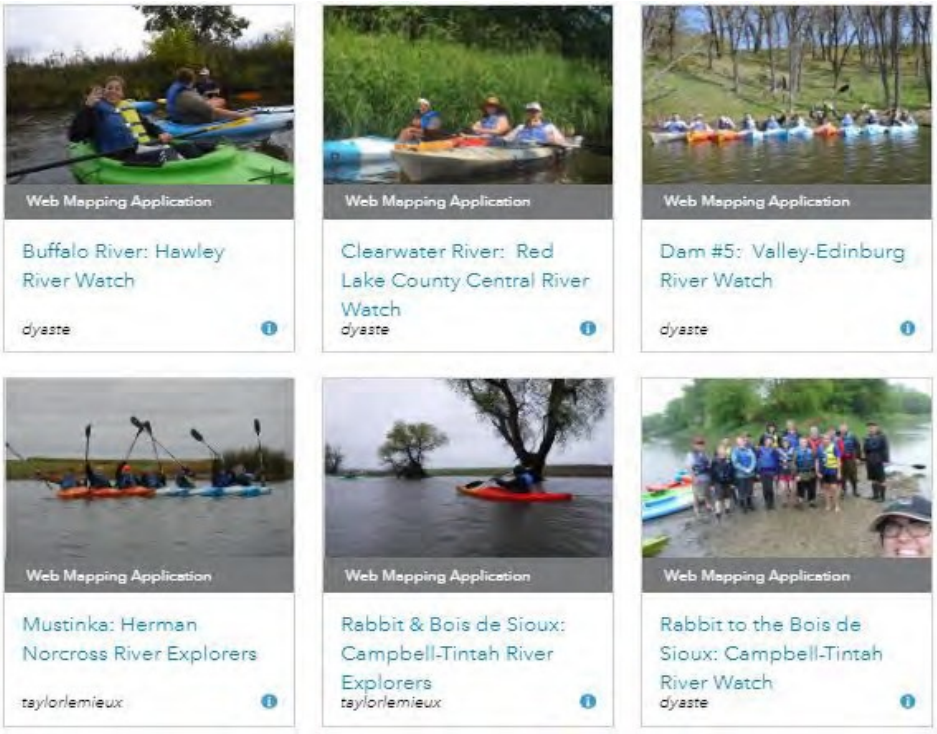
A local science teacher, found a 2018 canoe while out on a recent paddling trip (left). Another 2018 canoe was found upstream from the previous find by a family out exploring, they cleaned it off and returned it to its journey (right).

River Explorers

River Explorers is an educational program that was created to get students in our River Watch program out on the rivers that they sample on. While out in our fleet of kayaks, students take photos and make observations on wildlife, land use, water quality, and anything else that catches their eyes. All of this is put together to create a "story map" on ArcGIS online to share the paddling adventure with the public. We hope that helping students get out on the rivers in their watershed will lead to more members in the community recreating in their free time – a hobby that is especially relevant during a season of life where people find themselves increasingly outdoors.

Using ArcGIS Online, River Watch Teams compile maps with photos and commentary from their River Explorers Paddling Trips. In 2020 and 2021, 262 students have participated in 11 paddling trips covering 44 miles. If you're interested in scoping out some of the tributaries to the Red River, take a look at the River Explorers Map Gallery at the button below.

View Paddling Trips Here!



Water Quality and Macroinvertebrate Virtual Activities

With in-person activities limited due to COVID-19, we created virtual activities for River Watch students to work on in the classroom. A water quality activity where students look at data from water quality samples collected from the Red River and identify a location where individual samples were collected. This activity was designed to familiarize students with water quality parameters, water quality standards, ecoregions, pollutants and stressors. This activity was created in two parts. Part 1 - Water Quality Parameters can be viewed **here** and part 2 - Red River WQ Data **here**.

Similar to the water quality activity, the macroinvertebrate activity was created to enable students to learn about macroinvertebrates, how to sample for them, and how to identify individual specimens. They begin by going through an Introduction to Macroinvertebrates which covers these questions:

- What is a macroinvertebrate?
- How do you identify a macroinvertebrate?
- Where do macroinvertebrates live?
- What is the purpose of macroinvertebrate sampling?
- How do you fill out a pollution tolerance index rating sheet?

Once the Introduction to Macroinvertebrates is completed, students begin working on identifying specimens collected from 5 sampling sites within the Red River Basin. For each sampling site they are asked to completing the following:

- Identify 4 specimens using a dichotomous key
- Complete a Pollution Tolerance Index (PTI) rating sheet
- Submit your PTI rating with the form included
- Submit a final review at the end of each site.

This activity was also created in two parts but can be viewed in its entirety **here**.