

Environmental DNA as a Tool to Detect an Impending Northern Pike Invasion in the Anadromous Segment of the Columbia River

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Columbia River Inter-Tribal Fish
Commission

23RD INTERNATIONAL CONFERENCE ON AQUATIC
INVASIVE SPECIES, HALIFAX, NOVA SCOTIA

“Meeting Challenges with Innovation”

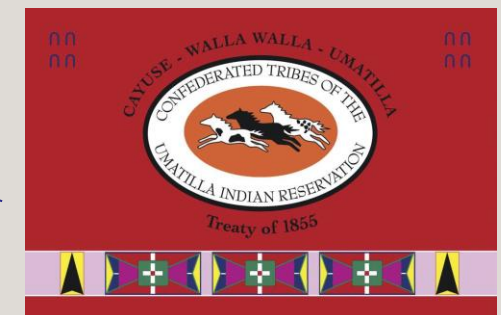
May 12 - 16, 2024

May 13th, 2024, 13:00 - 14:40 ADT Room 109



Columbia River Inter-Tribal Fish Commission

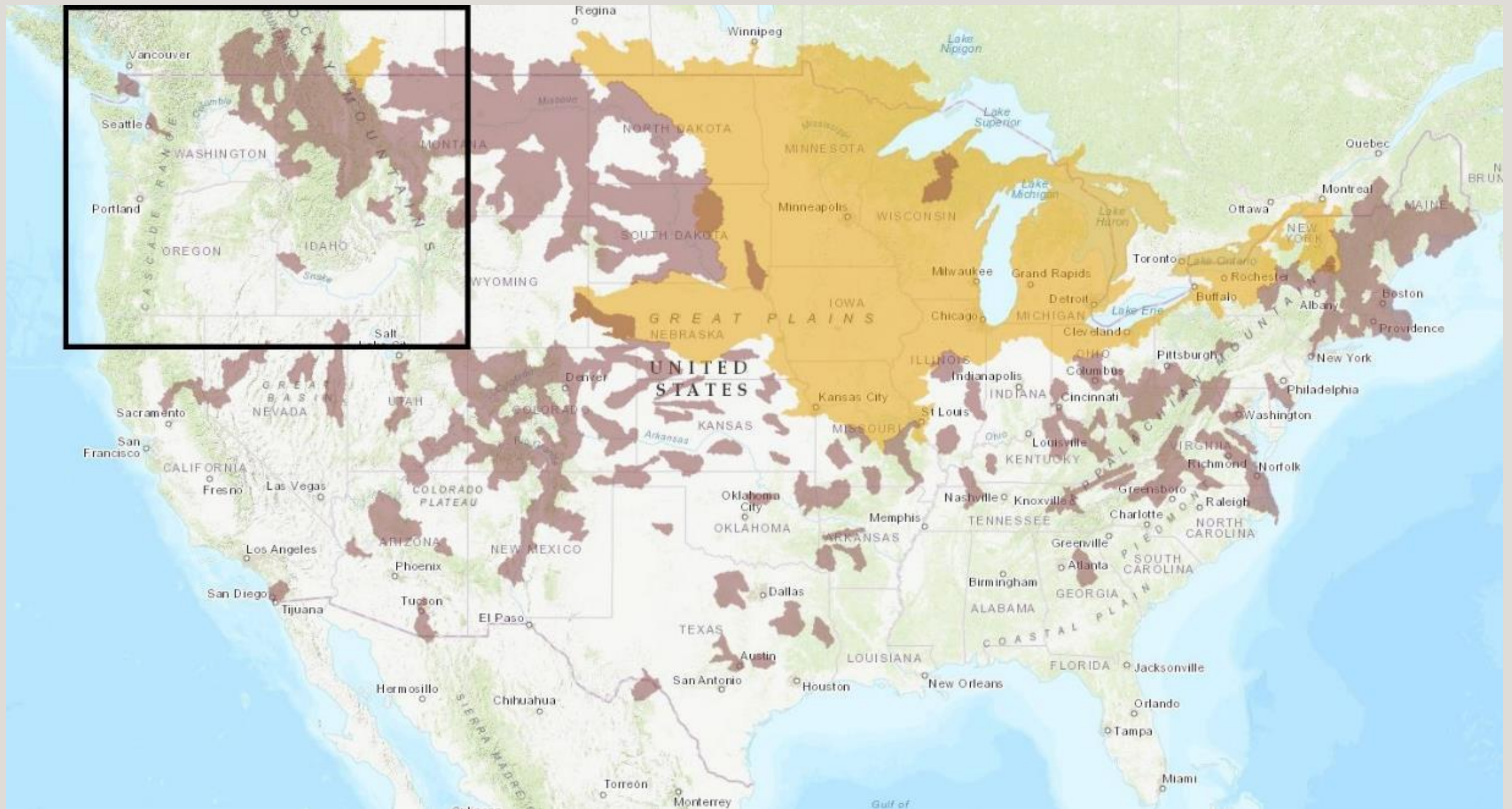
Four tribes with treaty-reserved fishing rights along the Columbia River came together in 1977 to protect member tribes' treaty fishing rights at their traditional fishing areas throughout the region and work together to restore fish runs.



Why is CRITFC Monitoring for Northern Pike?



Present Distribution of Northern Pike in the United States



Present Range of Northern Pike in the Columbia River Basin



Monitoring Goal = Early Detection

- Emphasizes locating potential founder populations while small and controllable
- Review and Analyses of Northern Pike potential spawning and rearing habitats = 180 + sites
- Prioritization of high-risk sites as determined by spatial, temporal and biological parameters for Northern Pike spawning and rearing habitat
- Coordinated and collaborated with tribal, state and federal partners
- Sampling schedule upstream from Bonneville Dam to the free-flowing Hanford Reach near Priest Rapids Dam



2023 CRITFC Northern Pike Survey Monitoring Sites



Sample Site Protocol- eDNA/Accompanying Data

- Data were recorded on tablet with custom designed *Survey 123* collection form including:
 - Environmental DNA collection
 - Habitat parameters
 - Water Chemistry and physical measurements
- Limited gillnet sampling completed in 2023

The screenshot shows a digital data collection form titled "Northern Pike eDNA Sample Data". The form is organized into sections. The "General Info" section includes a "Date" field with a calendar icon, currently set to "Friday, April 19, 2024". Below it is a "Site Code" field with a dropdown menu and a note: "If new site not from GIS list, pick 'Other' from this list and describe in General Site Description." The "General Site Description" field is a large text area with the instruction: "Describe if different than information already gathered about the site and any other comments." Below this are "Crew Names" and "Weather" fields, both with text input areas and instructions. The "Air Temperature (C)" field has a numeric keypad icon. The "Sample Data" section is partially visible, showing a link to "Protocol - Form Instructions (click on image to enlarge)". A green checkmark is visible in the bottom right corner of the form.



Environmental DNA (eDNA)

- Samples collected with Smith ROOT@ “Citizen Scientist Sampler”
- 2 kinds of filters
 - Sealed version (WDFW Lab)
 - Open, removeable Filter (USDA Lab)
- Goal to filter 5 L of water
- Collected > 3 L for most samples
- Locations with suspended fines, algae, and plankton limited samples to < 2 L of filtered water



Control Sample and Decontamination Protocol

- Cross-contamination prevented via established protocols and use of Control Sample (tap water) between sites.
- Cleaning protocols verified using “spiked” positive NP sample with control samples before and after the positive sample in coordination with WDFW Lab.
- Controls samples taken before and after “spiked” sample were free of NP DNA and confirmed the effectiveness of the decon protocols.



2023 Field Season & Results

Field Schedule

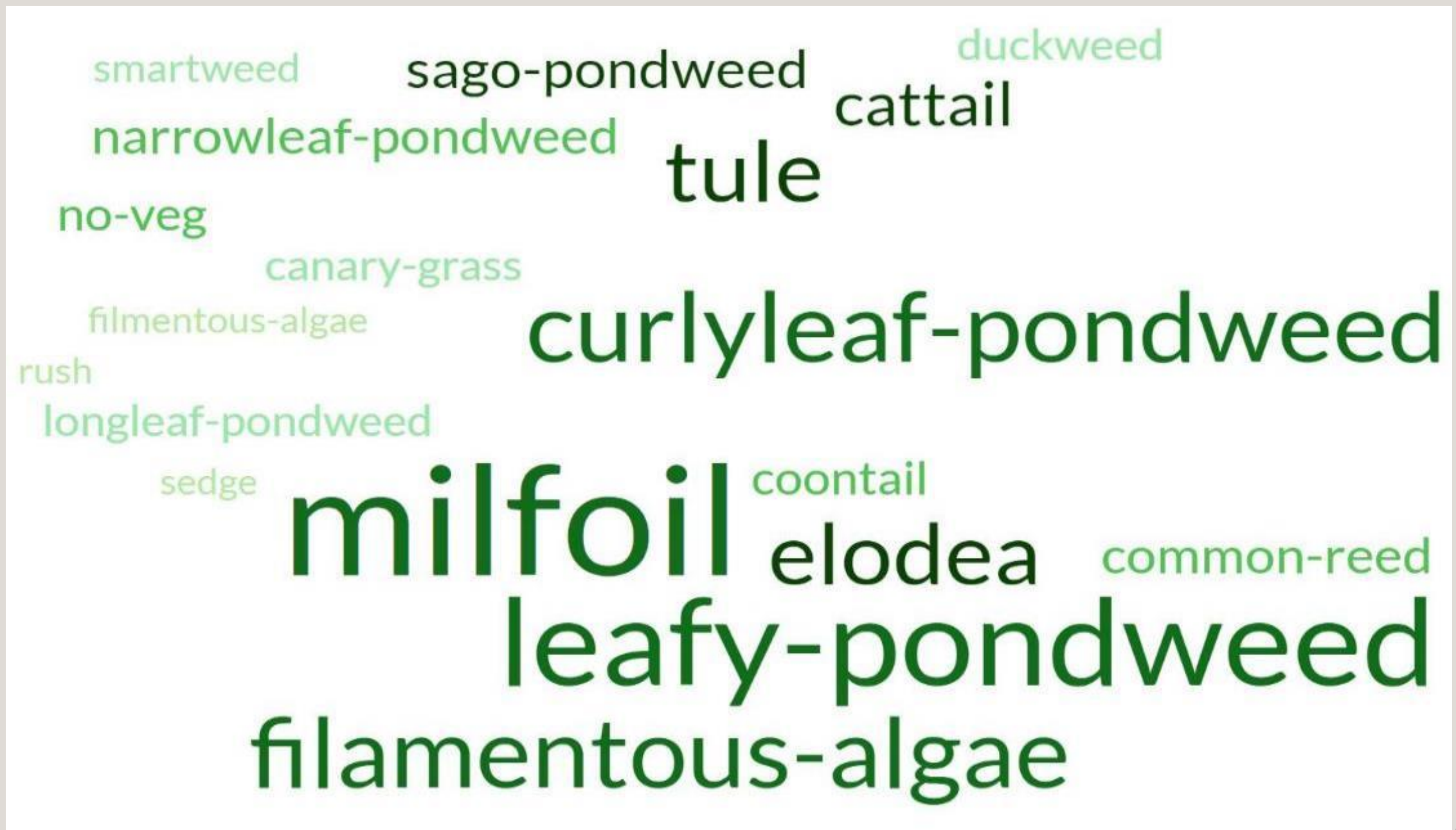
- Began in August and completed in November of 2023
- Began in Bonneville Reservoir upstream through successive reservoirs and ended near the free-flowing Hanford Reach section.
- Some sites were not sampled due to:
 - Low water
 - No access
 - Excess Suspended Materials
- Sampling done from shorelines, docks, boat ramps and airboats.

Results

- 50 sites sampled in 4 Reservoirs
- Water chemistry, physical measures, and habitat data were within normal and seasonal parameters.
- Northern Pike DNA NOT detected at any location,
- Gillnet sampling yielded only non-native fish and no Northern Pike were NOT collected,



Aquatic Plant Species Documented in 2023



Findings

Concerns

- Tremendous quantity of Northern Pike habitat
- If Northern Pike are present, will we detect them in time?
- If established maybe too large to eradicate or control
- Serious threat to restoration of Federally listed salmon and steelhead runs

Positives

- Collaboration with regional partners
- Established a Tribal/CRITFC monitoring presence for Northern Pike
- First systematic monitoring for Northern Pike in this reach of Columbia River



2024 Sampling Plan

- Monitoring resumed March 2024 with USFWS staff in Hanford Reach not sampled in 2023.
- Will increase gillnet sampling in high-risk locations Increase our number of samples / locations with earlier start.
- Coordinate with State and Federal partners on a Rapid Response Plan in the event Northern Pike are found.



Thank You

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