



Partnering in Action: Coeur d'Alene River Bridges

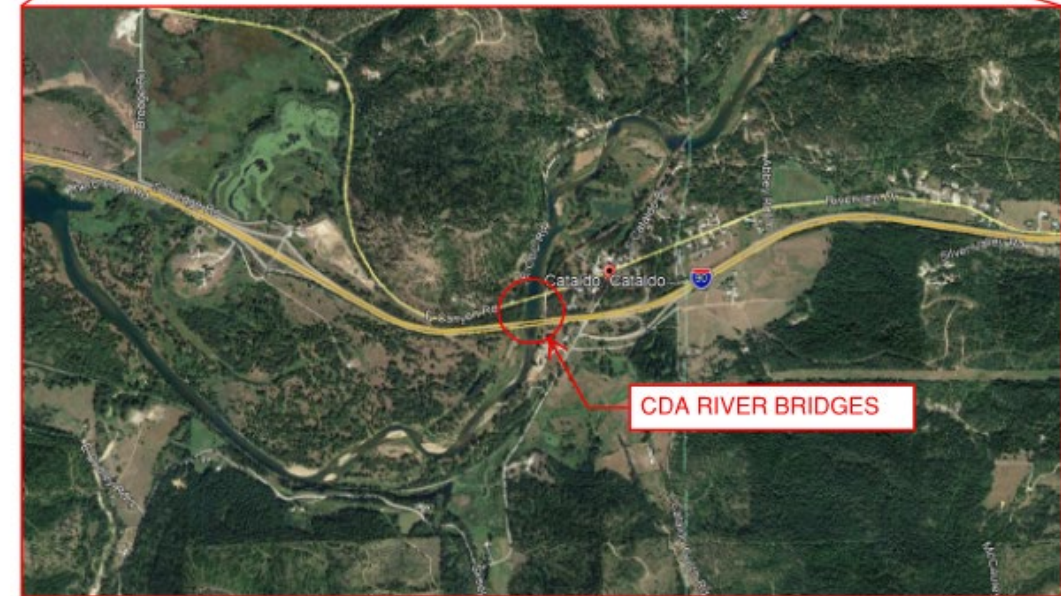
I-90 and Canyon Road, Cataldo, ID



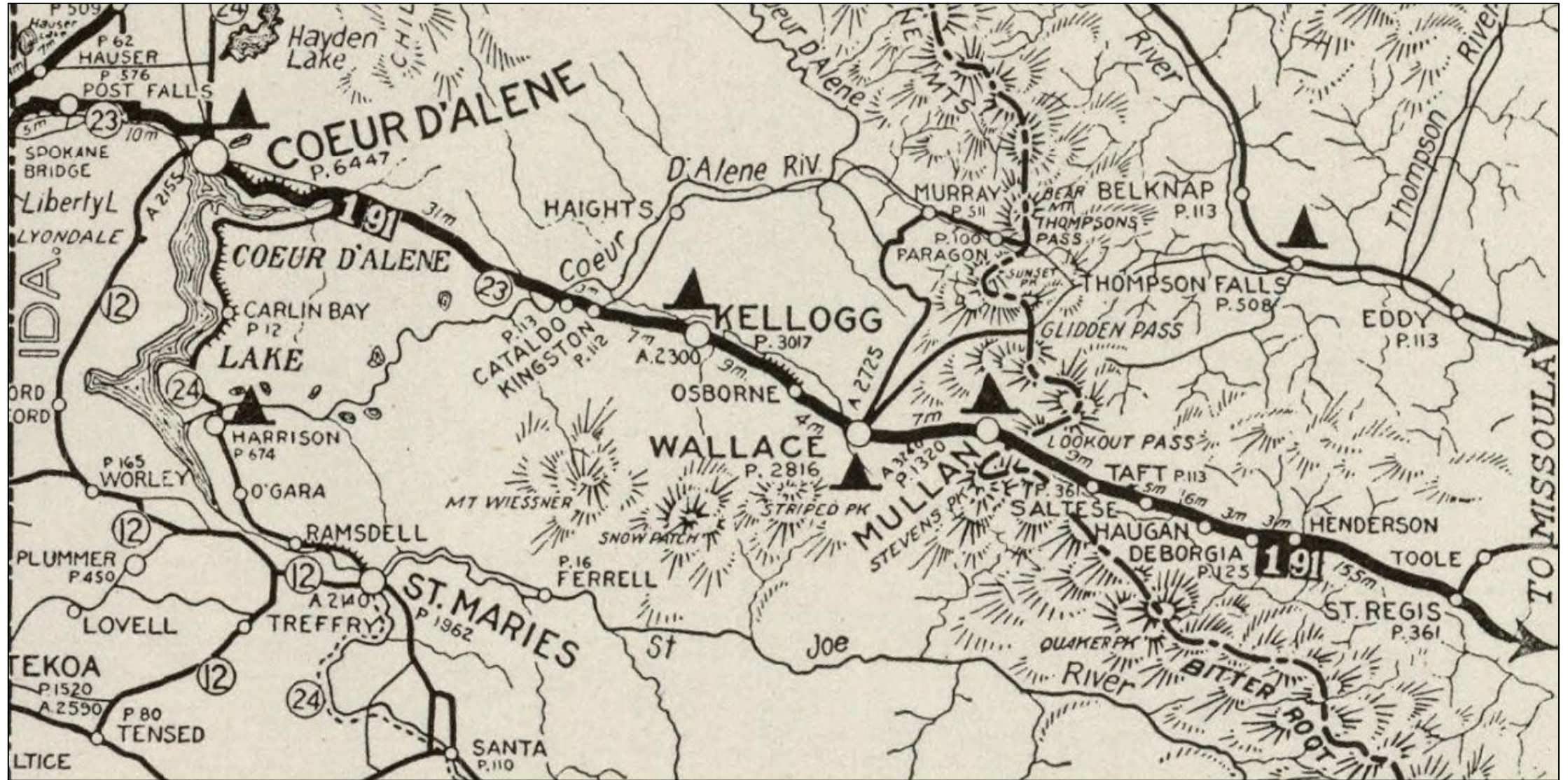
September 9th, 2022
ISPE Annual Meeting

Overview Map

- Cataldo, ID
- Kootenai County - Shoshone County line
- Nearby:
 - Silver Valley, ICP Bunker Hill Superfund Site
 - Old Mission State Park
 - Trail of the Coeur d'Alenes
- Within the ICP Administrative Area Lower Basin
- Non-navigable (USCG Section 10) stretch of CDA River
- Non-certified county levee on left bank



Area Transportation History



Area Transportation History; Inundated with Flooding



FLOODS DESTROY HALF MILLION DOLLARS' WORTH OF PROPERTY

SPOKANE RIVER EQUALS FLOOD RECORD OF MAY

The Spokane river at noon today equaled its flood record of last May, which was the highest known in 21 years, and the indications are unmistakable that its continued rise will result in breaking all high water records since they have been kept officially.

At the upriver station the reading at noon was 1925.9, which was the high water mark reached last May when records of 24 years' standing were broken. The water was still rising and it was predicted unreservedly that the floods will go several inches more before the crest passes.

The Lumbermen and Farmers Are Battling Water in North Idaho.

The Coeur d'Alene river of northern Idaho, sent suddenly into flood stage by the heavy rains of last week, today is completing the destruction of \$400,000 to \$500,000 worth of property.

Rivermen and loggers are battling the most treacherous series of log jams known in the river's logging history.

Every county bridge over the river from Cataldo to Harrison has been swept out by the rush of the waters, and the bombardment of logs, resulting in a loss of more than \$50,000.

The diked yards of the Rose Lake Lumber company are flooded, and 200,000,000 feet of lumber is being partially ruined by the mud laden waters. The

Charles M. Fassett Now Wields Gavel

He Is Again Made Mayor—New City Council Organizes for Year.

Charles Marvin Fassett is new mayor of Spokane.

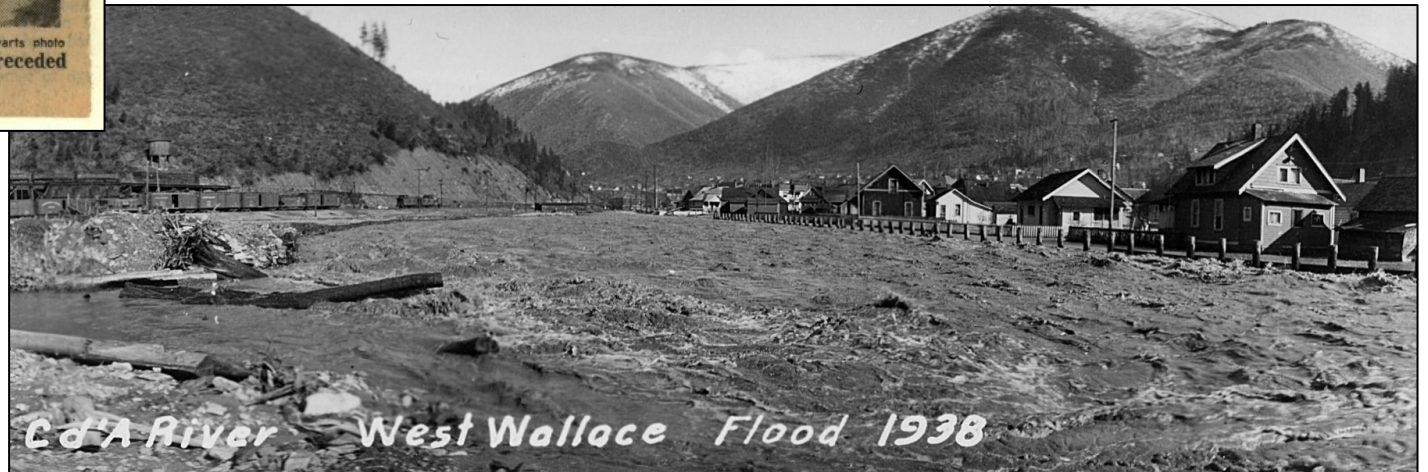
Carrying out exactly the schedule of organization and appointments decided on informally several weeks ago, the new city council met at noon today and was in session but 10 minutes.

In that time Commissioner Fassett was elected mayor, the commissioners were reappointed to their departments and the various appointments were made to offices which the charter provides shall be selected by the council.

SIX PLANES SHOT DOWN

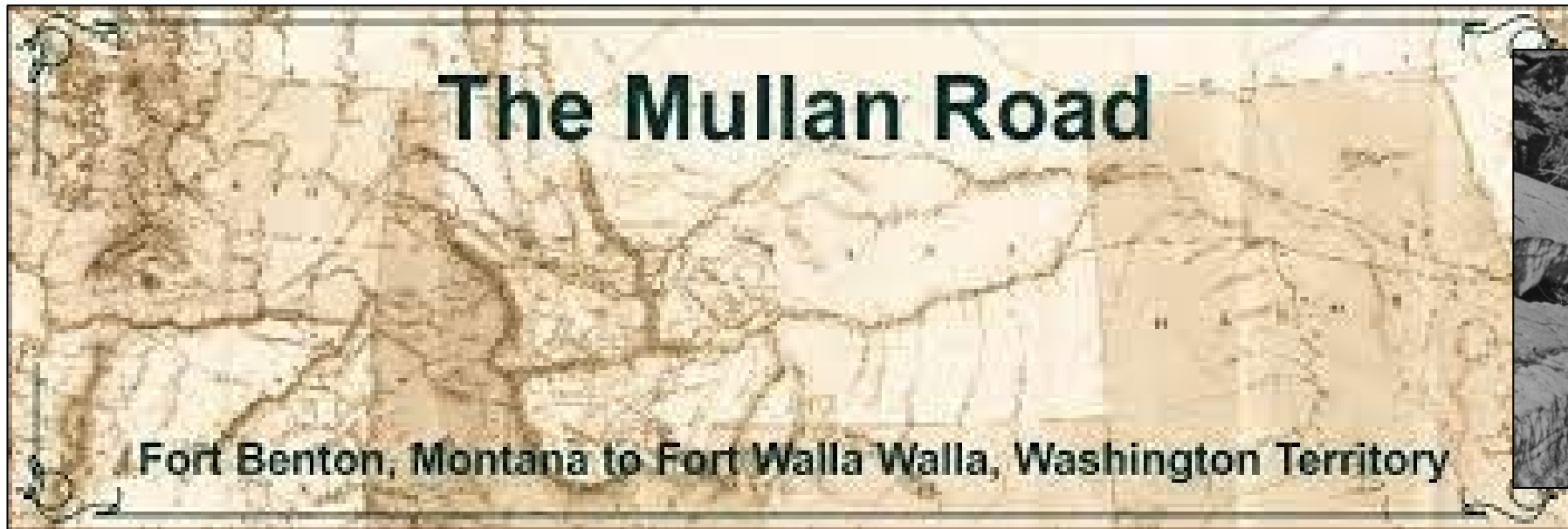
PARIS, Jan. 2.—Six German airplanes were put out of action yesterday by the French, it is announced officially. Artillery fighting continues at various points on the front, but no large infantry actions are reported. The statement says:

"In the course of numerous aerial combats, French pilots yesterday brought down four German airplanes. Two other German machines, badly damaged, fell within the enemy lines."



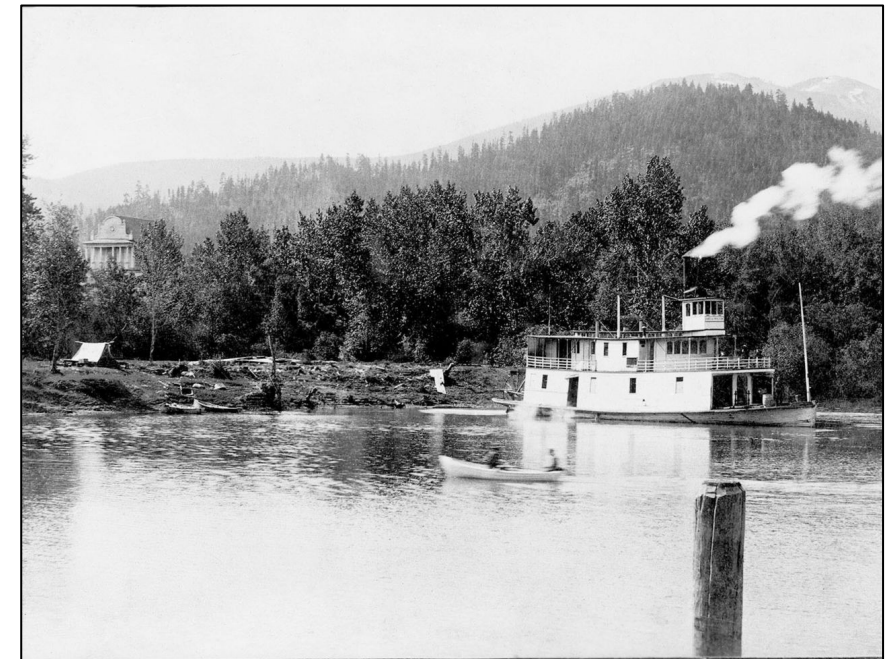
Area Transportation History; the Mullan Road

- The Coeur d'Alene River valley is a natural travel corridor with a trail prehistorically established by Plateau groups traveling to the Great Plains.
- The Mullan Road was built between 1859 and 1862 connecting the Great Plains with the Northwest.
- The first automobile trip from Wallace to Coeur d'Alene on the Mullan Road, over Fourth of July Pass, was made in July of 1911 and took five hours. But before the first automobile ever crossed Fourth of July Pass...



Area Transportation History

- Located just to the west of the bridges, the Cataldo Mission was founded in the 1850's and served as the furthest upriver hub for travel by steamboat from Lake Coeur d'Alene to the Silver Valley.
- Patrick Whalen, a native of New York, settled in Kootenai Co. and established a ferry on the CDA River from a small community known as Mission.
 - Whalen's ferry connected the main road in Mission to the booming Coeur d'Alene Mining District
 - Whalen eventually platted the town of Cataldo
- Ferry crossings = low efficiency for miners
- Enter the Railroad.



The *Amelia Wheaton* with the Old Mission in background ca. 1885

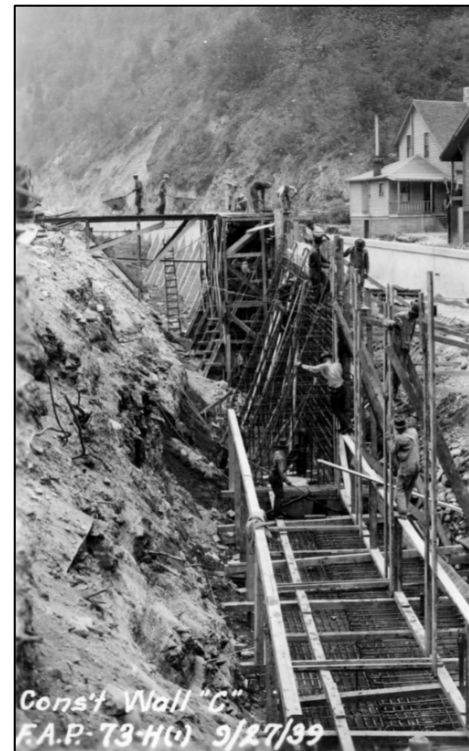


Area Transportation History, continued

- Next up: vehicular transportation
- Bridges go up. And come down.
- The Yellowstone Trail
 - First highway through North Idaho
 - Constructed between 1914 and 1916
 - Followed the same route as the Mullan Road
 - Renamed U.S. Highway 10 in 1926
 - Various sections eventually become I-90
- By 1919, the need for road improvements in North Idaho was critical. See for yourself...



Cataldo Bridge, circa 1910



Road Improvements; A Critical Need

- Shoshone County (Idaho) Mullan Road, 1924. O.W.R. and N. (Oregon Washington Railroad and Navigation Company) tracks off Mullan Road
- A meat truck on Mullan Road in Wallace
- The point above existing Cataldo Bridge, with a roadway running along west bank (1926)
- Flooding continues to be a major problem



Kellogg, ID, December 1933.



Area Transportation History, continued

- U.S. Highway 10; a big improvement
- Old railroad bridge near Cataldo
 - Converted into a vehicular bridge
 - Worn out and flood damaged
 - Replaced in 1920
 - Approach poorly designed – sharp turn at abutment



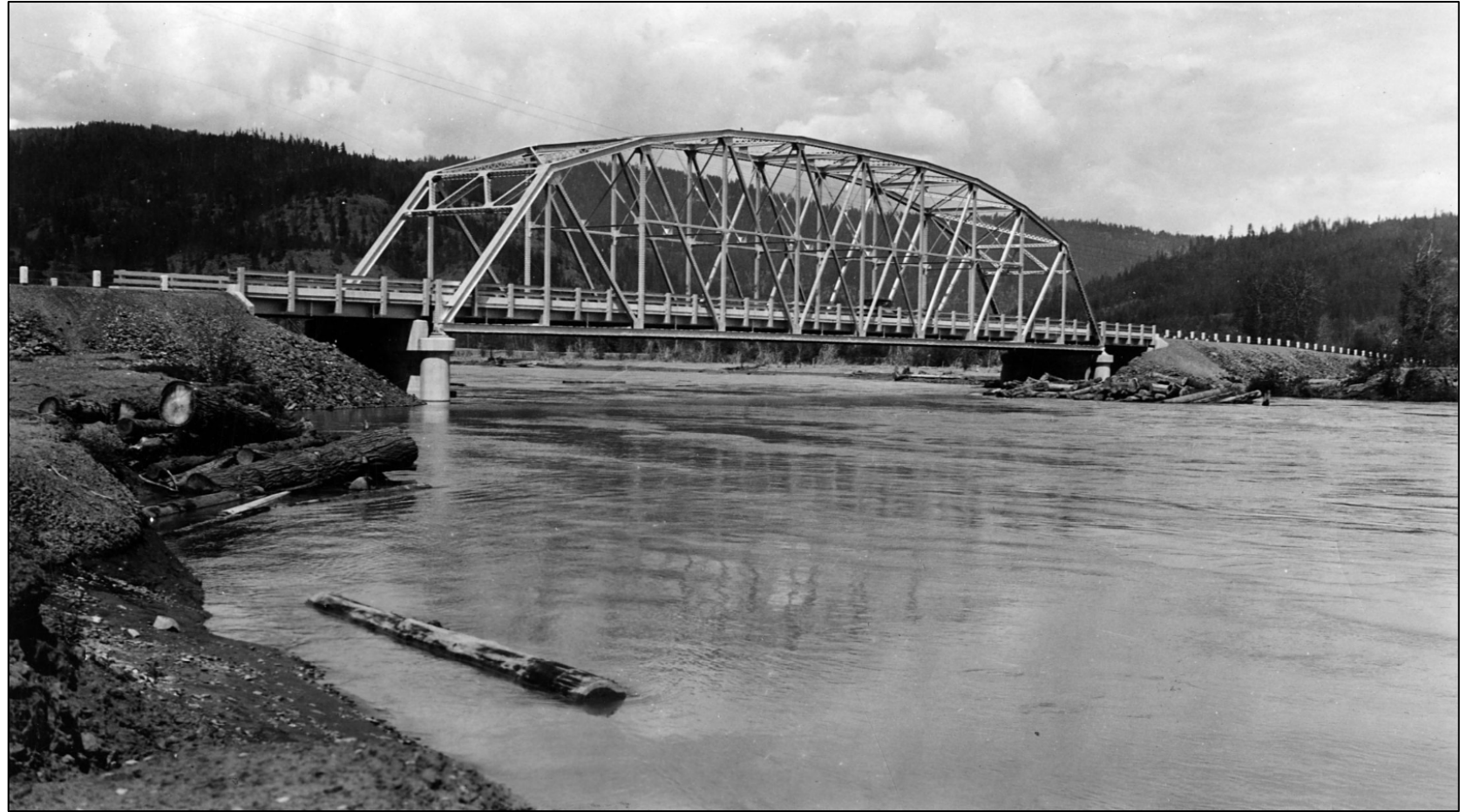
Highway 10; Canyon Road Bridge

- 2,000 ft downriver from the 1920 bridge.
- Approach straightened!
- Constructed in 1934, opened to traffic in January 1935.
- Cost = \$67,000

PLAN TO BUILD CATALDO BRIDGE

KELLOGG, Idaho, May 17.—(Special.)—A new bridge is to be built across the river at Cataldo, according to announcement made here today. The structure will be located farther down the river than the present bridge and made to conform to the course of the road in a straight shoot across from the railroad to the point.

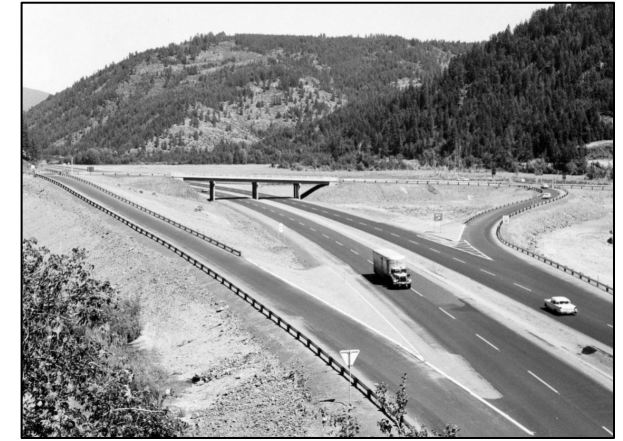
The old bridge has always been a menace with its abrupt, right angle turn and has claimed several lives in the past few years through failure to make the turn with the resultant plunge into the river below.



North Pacific Highway/US Highway 10; Cataldo Bridge over Coeur d'Alene River 1935-05-18

Highway 10; Transfer in Ownership

- New kid on the block: I-90
 - Interstate alignment located 400-ft south of the Canyon Road Bridge
 - CDA River I-90 bridges completed in 1964
- Once I-90 was open in the 1970's, the old highway was transferred to local jurisdiction and became Canyon Road, including the Canyon Road Bridge.
- East Side Highway District is now responsible for the operation and maintenance of a bridge originally built as part of the state system. Accordingly, the population base for funding is rather undersized.



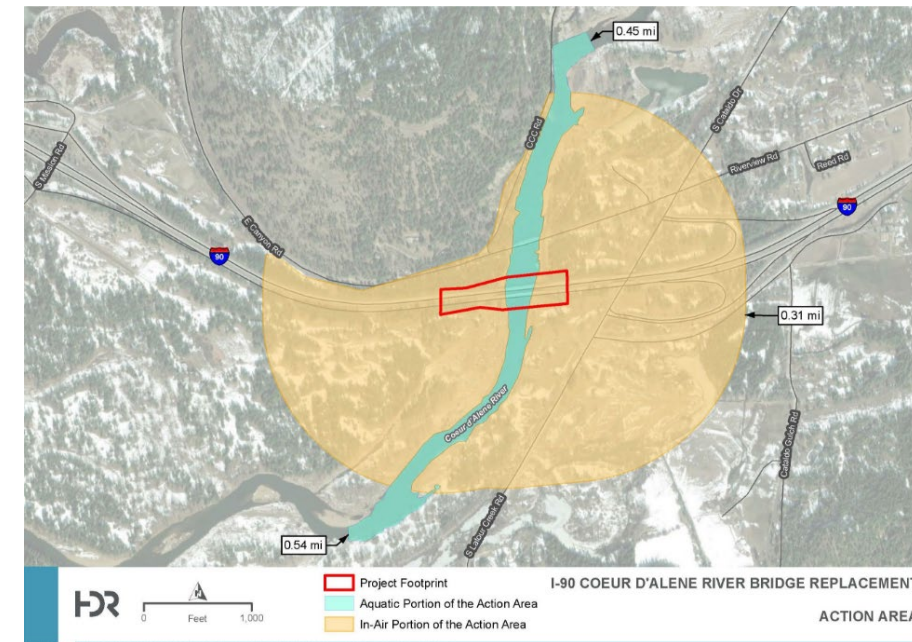
Fast-Forward 56 Years; I-90 Replacement

- I-90 bridges planned for replacement
 - Multiple bridge rehab projects, including deck overlays. Bridges need to be replaced.
 - Locals seize the opportunity!
- State of Canyon Road Bridge in 2020
 - Poor condition, load restricted
 - JUB - feasibility study (2017)
 - Define design & construction options
 - CRB has consistently ranked second or third for LHTAC funding, with the cost exceeding total funds available under the program
- June of 2020 – ITD RFP imminent
 - ESHD immediately met with ITD and proposed a joint project.
 - By early August, the LHTAC Council had allocated funds for concept design and draft TS&L as a joint project with ITD.



Early Process & Programming Challenges

- Adding a project to the LHTAC program mid-year
 - Quick decision from LHTAC – advantages of partnering with ITD were clear
- Previous grant applications placed TS&L design efforts at \$1.2 million
 - Canyon Road Bridge well within the design envelope for the ITD bridges – share information collected!
 - Major cost savings; final cost for the Canyon Road project was \$230k
- Early scoping questions discussed by ITD Bridge, D1, ESHD, and LHTAC:
 - One key number or two? How will funds be paid from LHTAC/ESHG to ITD?
 - Will design funding obligate construction funding that is currently unknown?
 - State or Federal funds?
 - Who designs the ITD bridges?



Early Process & Programming Keys to Success

- **Relationships.** We heard about ITD's project early through multiple channels and engaged with D1 while there was still flexibility in the process.
- **High-Level Buy In.** Engaged key decision makers at each agency early, got their support, made decisions, and moved forward.
- **Trust.** ESHD, ITD, and LHTAC staff had all worked together before, and knew we could rely on each other to deliver.



Coeur d'Alene River Bridges; Design Team

Agencies

ITD District 1



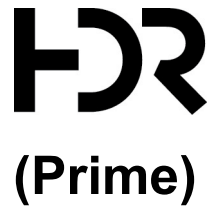
LHTAC



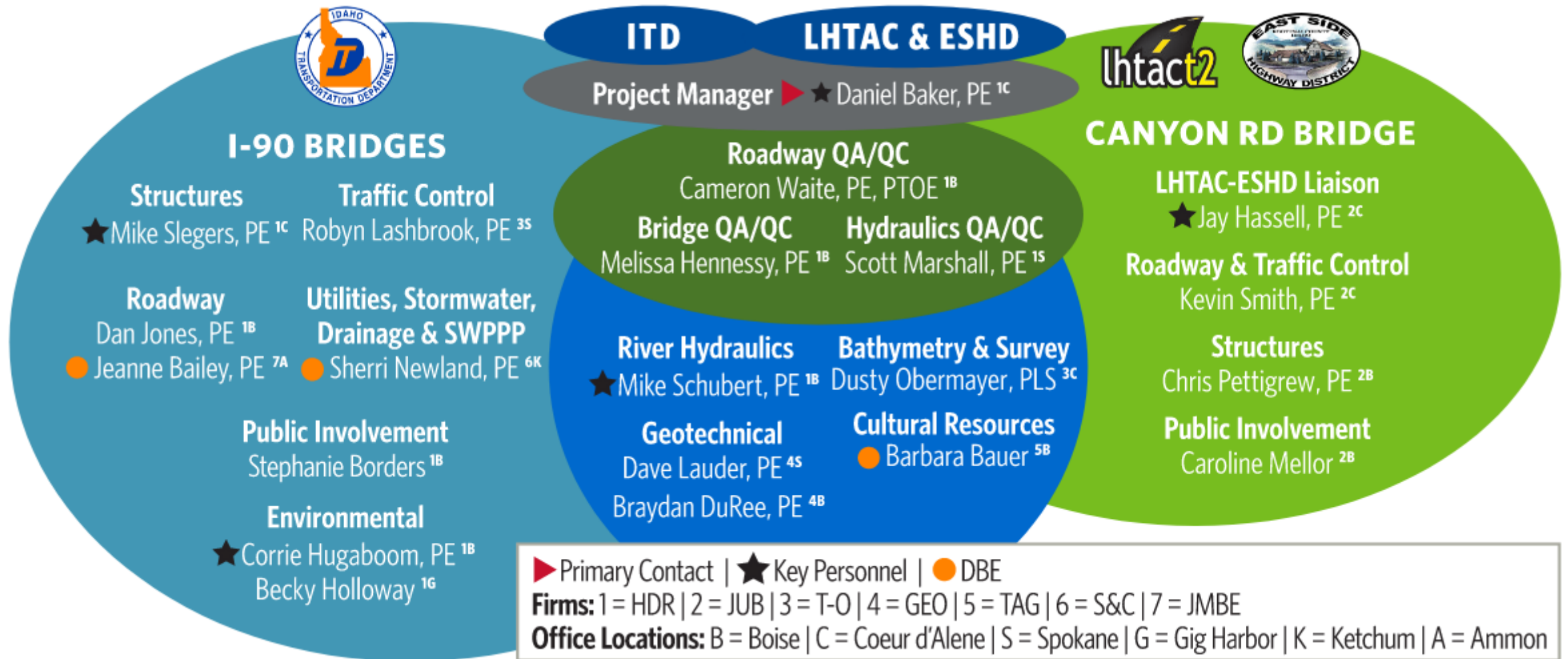
East Side HD



Consultant Team



Consulting Design Team



- Additional considerations; DBE goals, split contracts

Project Scope, Goals, and Constraints

- I-90 Bridges

- Twin bridge replacement
- FY24 construction start date
- One bridge per construction season (EB/WB)
- Maintain traffic flow on I-90
- Minimize footprint in the river
- Stay within ITD ROW



- Canyon Road

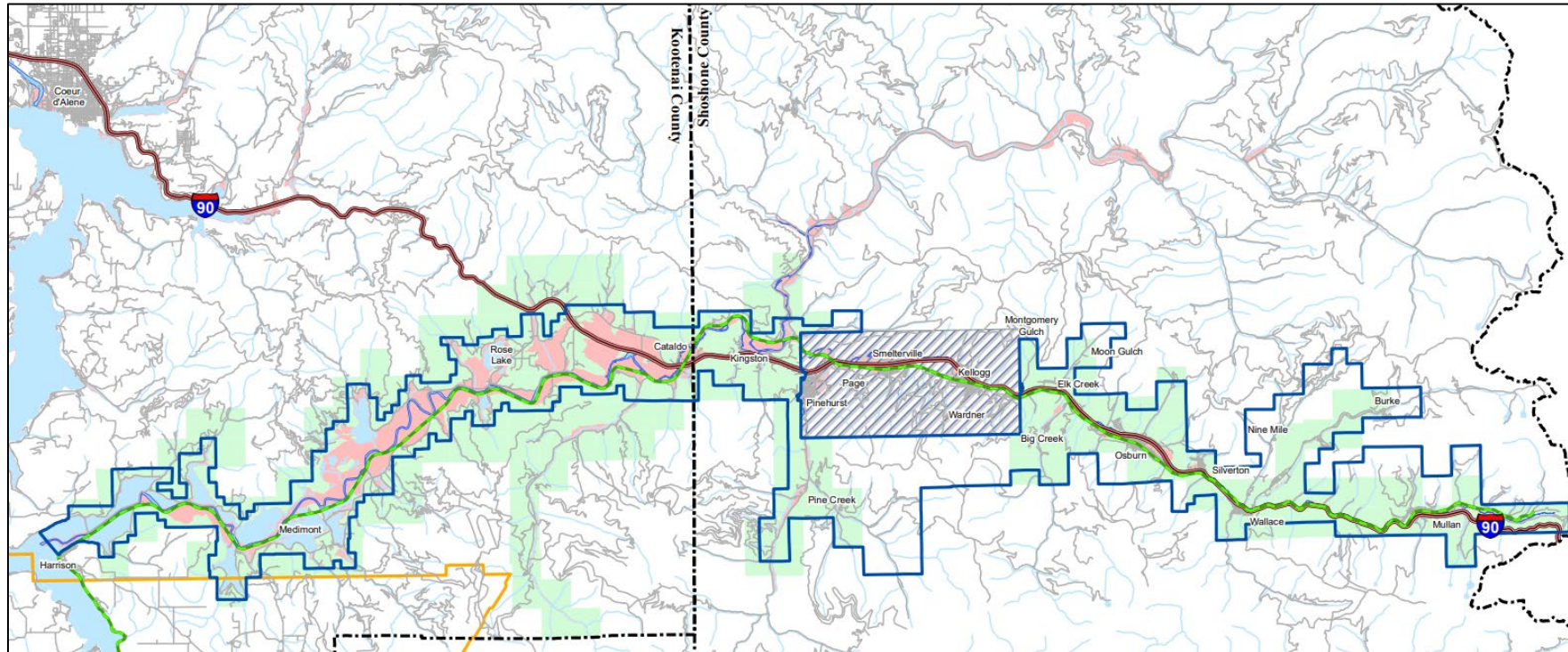
- Feasibility study – no construction funds
- Determine the most appropriate alternative for the Canyon Rd Bridge
 - Replacement
 - Removal
 - Rehabilitation – not feasible
- Be ready for Final Design when funds become available





Environmental Challenges

- Contaminated river bottom and highway embankments – Superfund site
 - Within the Bunker Hill Basin ICP Administrative Area (Lower Basin)
 - Testing showed heavy metal levels >> EPA RSL (lead, cadmium, arsenic)



Metals ^{2,3}					
Arsenic	Barium	Cadmium	Chromium	Lead	
75	92	16	J 2.8	J 2.8	3700
150	86	J 12	J 5.2	J 5.2	2900
86	350	J 18	J 8.7	J 8.7	14000
5.1	34	1.2	2.1	2.1	250
7.9	25	2.0	3.4	3.4	8.6
28	55	J 4.4	15	15	1300
9.4	23	2.4	6.3	6.3	320
55	30	J 5.1	J 4.3	J 4.3	2000
200	190	1.8	J 5.2	J 5.2	4200
6.4	48	J 0.27	6.9	6.9	64
35	40	J 8.1	J 4.1	J 4.1	2200
24	17	J 3.5	J 2.4	J 2.4	2400
10	67	J 4.8	J 7.4	J 7.4	630
8.9	19	1.6	2.9	2.9	340
11	28	2.8	3.3	3.3	12
5.3	17	1.6	2.5	2.5	13
4.3	26	1.7	5.0	5.0	8.1
37	64	J 5.8	J 4.1	J 4.1	2000
59	60	8.4	J 3.6	J 3.6	2300
65	290	J 12	J 10	J 10	7700
59	40	11	J 4.3	J 4.3	1800
75	80	7.8	J 5.1	J 5.1	2200
19	19	J 3.5	J 1.8	J 1.8	660
22	16	J 3.5	J 3.6	J 3.6	1100
0.68	15000	7.1	120000	400	
3	220000	100	1800000	800	



Environmental Challenges, continued

- Spokane Valley Rathdrum-Prairie Sole Source Aquifer **source area**
 - Same consideration given to projects directly over the aquifer
- Canyon Road Bridge – historic truss



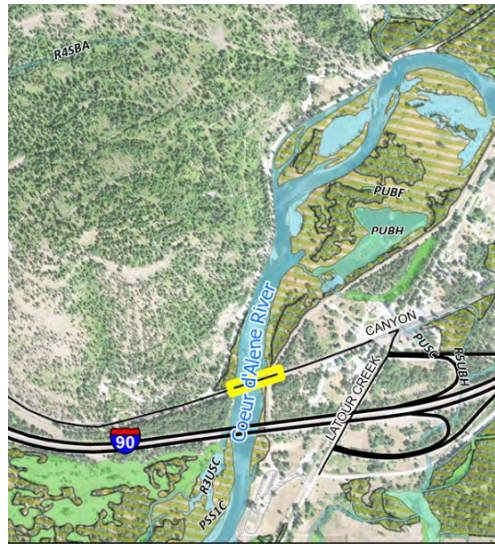
North Pacific Highway – Cataldo Bridge over Coeur d'Alene River. View from downstream. 01-1935. J.W. Gillmore, Photographer. MS281 U.S. Bureau of Public Roads. Idaho State Archives



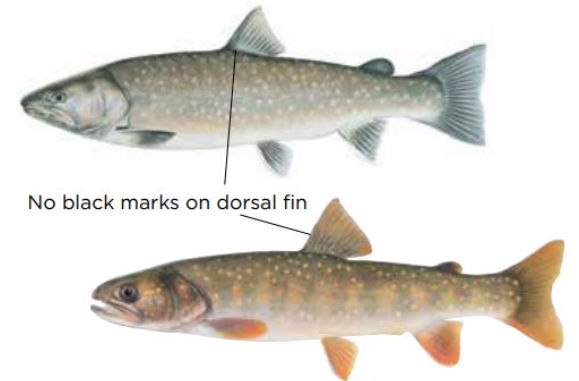


Environmental Challenges, continued

- Protected biological resources
 - Bull trout, resident population of Chinook Salmon
- Stream alteration – renewed Nationwide Permit
- Wetlands



NATIONAL WETLANDS INVENTORY Figure 4
KN23092
CANYON ROAD BRIDGE FEASIBILITY STUDY



Bull Trout No Harvest Allowed

Photo per Idaho Fish and Game

Hydraulic Complexities

- It floods.

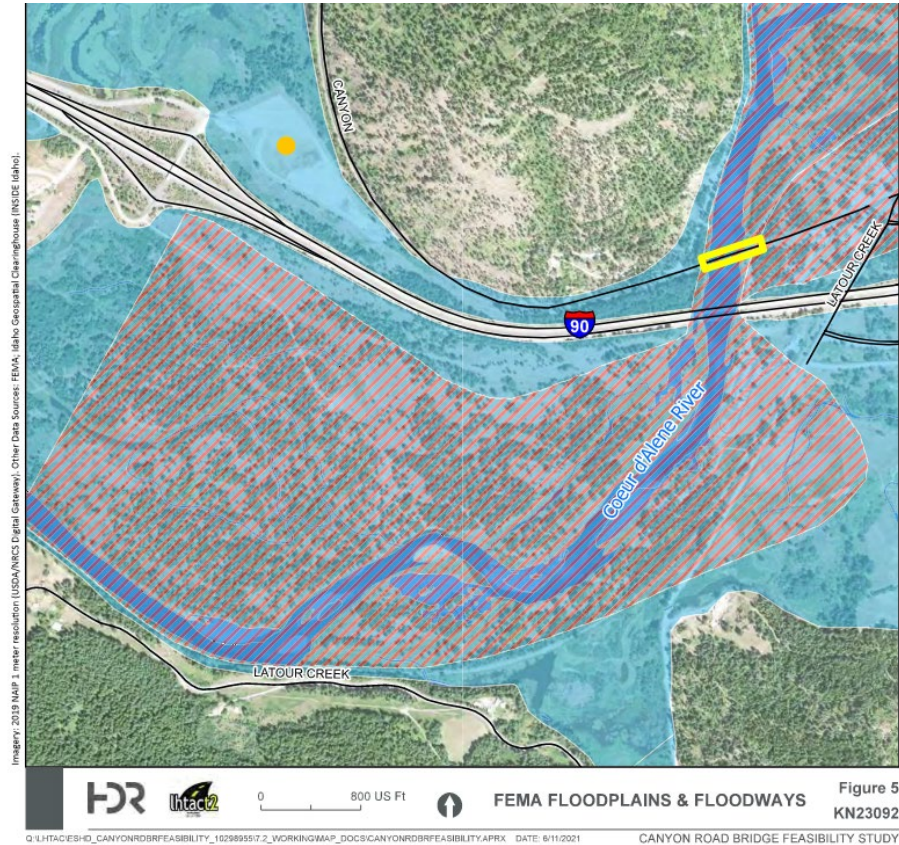


Figure 5
KN23092

- FEMA regulatory floodplain and floodway – Zone AE
- USGS gage directly upstream – 100 years of streamflow data

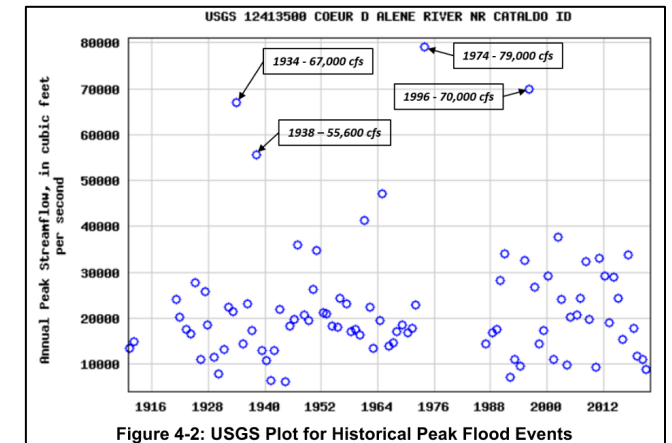
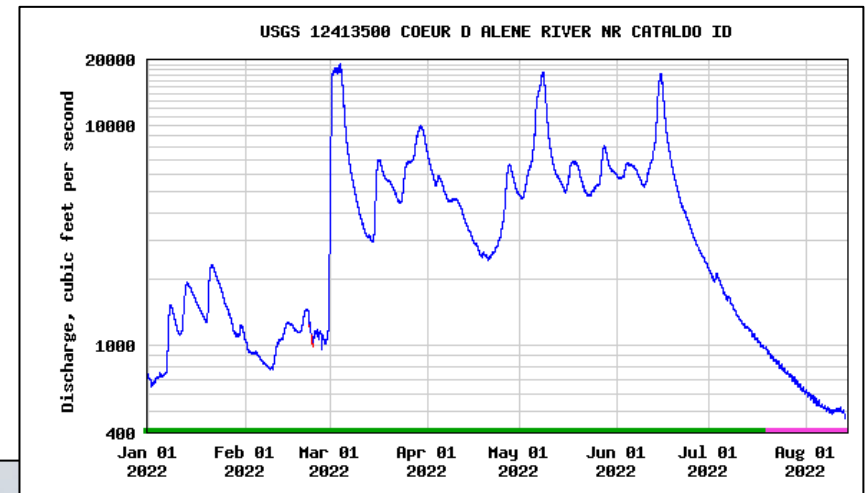


Figure 4-2: USGS Plot for Historical Peak Flood Events

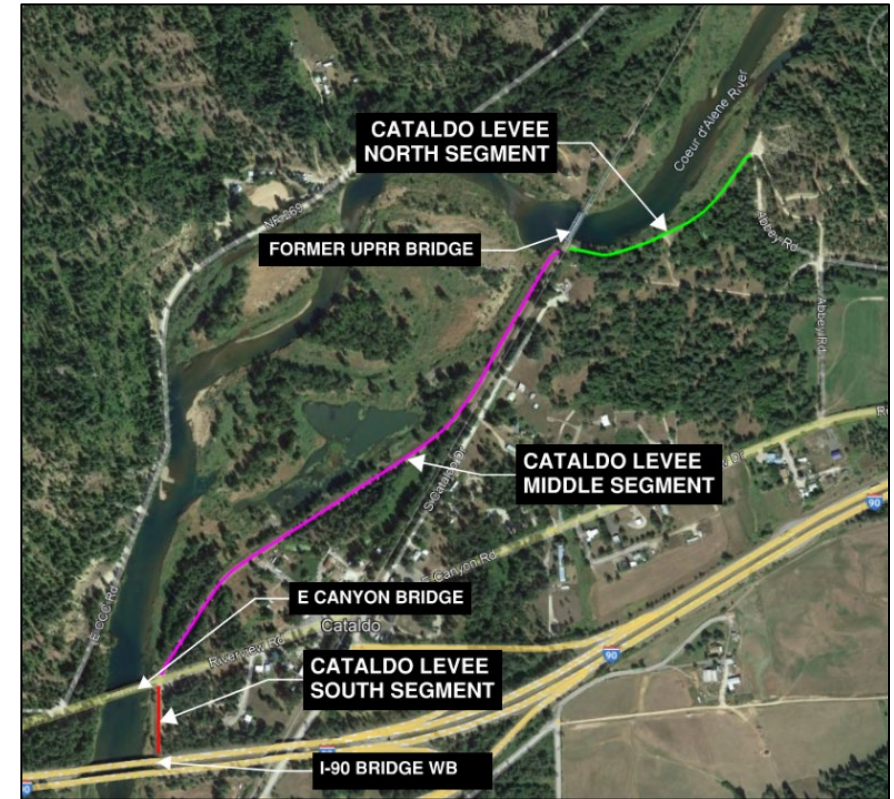
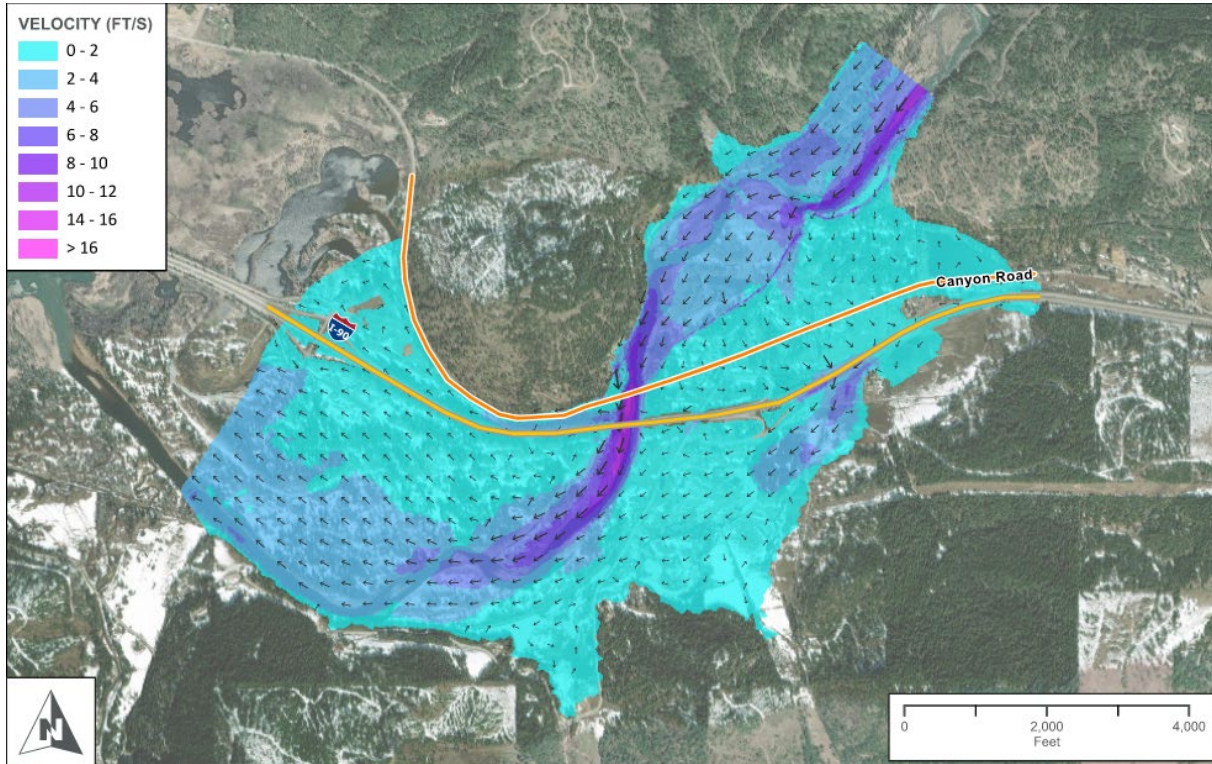
Hydraulics, continued

- March 2022 flooding event – unique during design
 - ~5 year flows
 - Capture WSE's, calibrate hydraulic model



Hydraulic Complexities, continued

- Uncertified county levee on east bank
 - Constructed in 1964 to protect the town of Cataldo
- SRH-2D hydraulic modeling



Hydraulic Opening Width	Design Flood Requirements		Check Flood Requirements	
	Design Event	Criteria ¹	Check Event	Criteria
>50 feet with multiple spans	50-year	2 feet of Freeboard at all points	100-year	Flow passes through structure without contacting low chord

¹ Freeboard measurement is based on WSEL at a distance of 50 feet upstream of bridge face.

- No-rise certificate

Hydraulic Complexities, continued

- Scour
 - Large scour event during 96' flood – Canyon Road closed for repairs (west abutment)
 - 2022 scour results:

Table 9-4: Summary of Total Combined Scour

Scour Flood Event	Discharge (cfs)	Contraction Scour (ft)	Abutment Scour (ft)	Pier Scour (ft)	Total Combined Scour (ft)
Design (100-year)	68,900	3.5	-	14.6	18.1
Check (500-year)	97,800	2.2	-	14.0	16.2

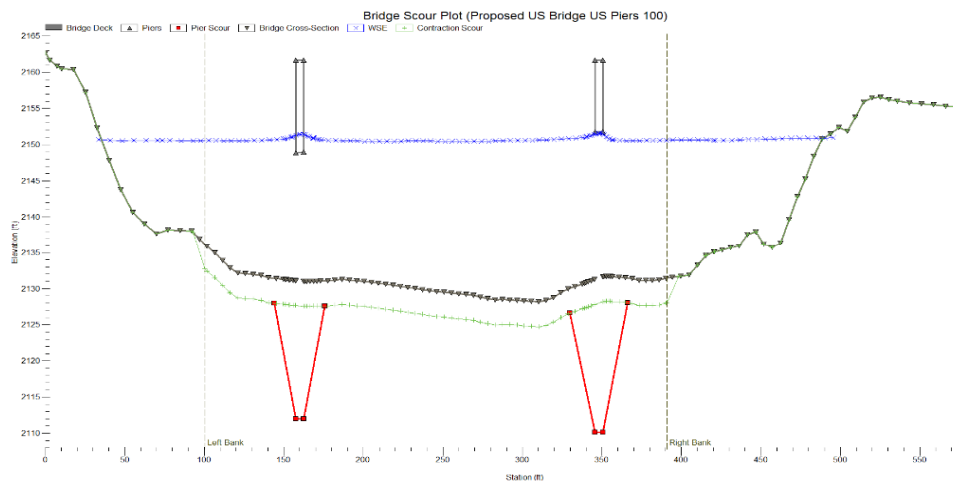
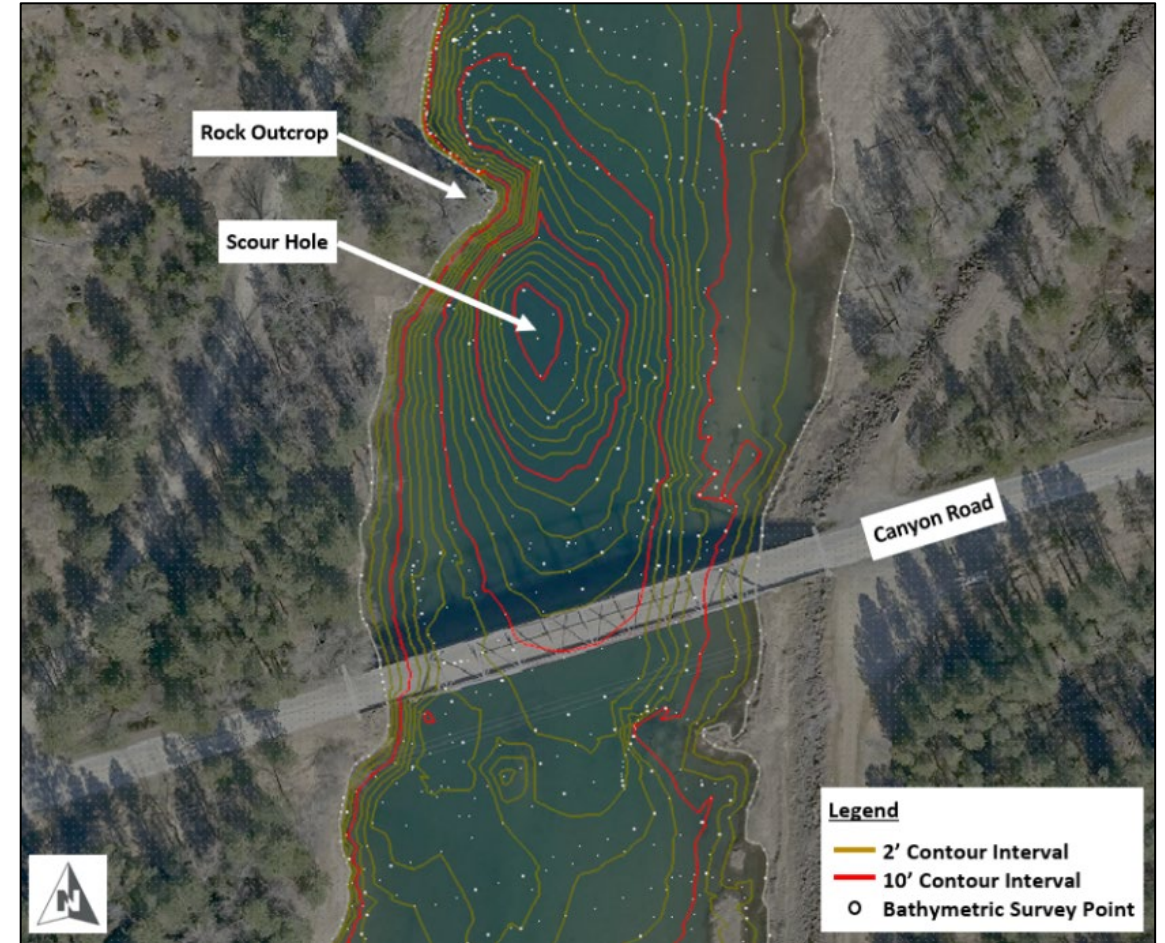
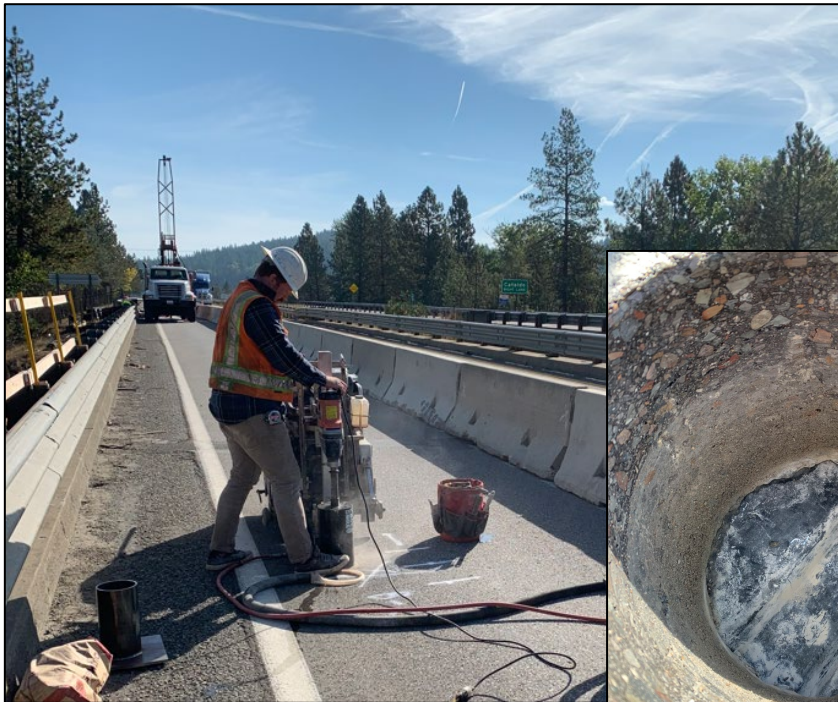


Figure 9-10: Scour Plot Profile – Proposed I-90 Bridges



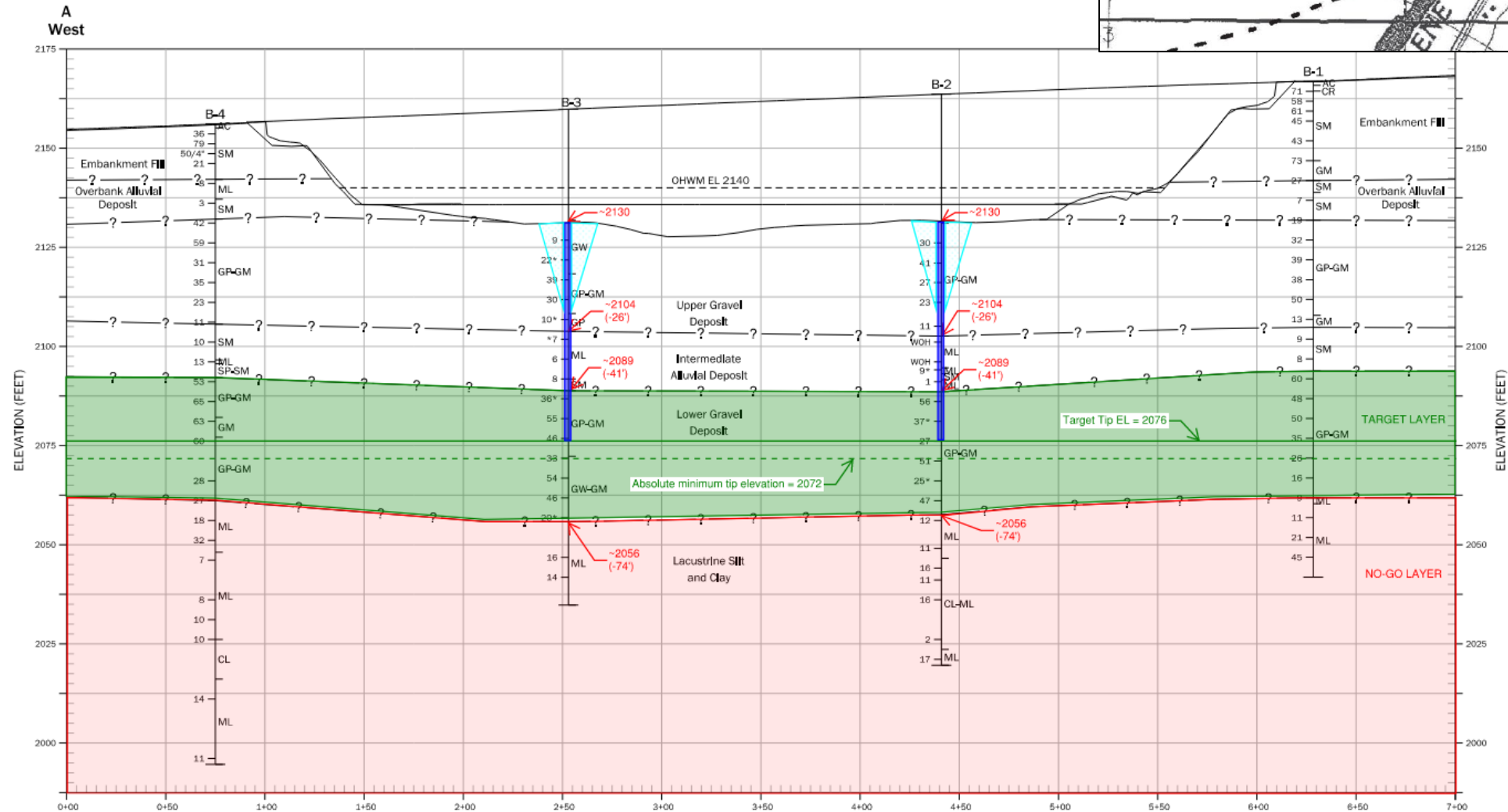
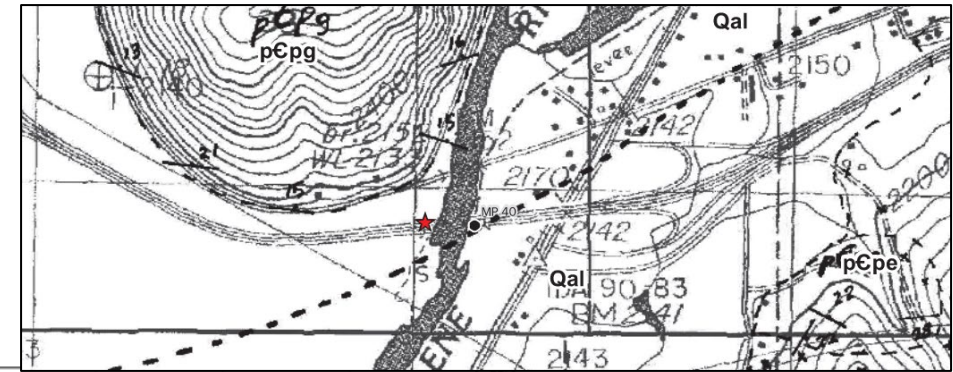
Geotechnical Considerations

- Borings – Fall 2021
 - Shallow river section at I-90
 - Drill through bridge decks
- Drilled shafts in the river; minimize foundation footprint



Geotechnical Considerations, cont.

- Hoping for rock – didn't find it



Canyon Road Bridge; A Unique Design Alternative

- Team investigated a bridge removal (with no replacement!)
 - Boat Launch
 - Dredge Road rehab
 - Dredge Road re-alignment
- Public input key



Alternative 4. Bridge Removal

ALTERNATIVE 4

- \$900,000 Project Cost (Bridge Removal Only)
- Removes local crossing over the Coeur d'Alene River west of Cataldo
- Removes the bridge from the floodplain, eliminating potential hazard to I-90 bridges

If the bridge is removed, the following options can be considered to improve access routes around the crossing area:

ALTERNATIVE 4A

Bridge Removal + Boat Launch \$1.6M

This alternative would add a boat launch to the westerly bank to increase recreational access.

ALTERNATIVE 4B

Bridge Removal + Dredge Road Rehabilitation \$3.3M

This alternative would widen and reconstruct Dredge Road and provide a detour route around the removed river crossing via I-90.

ALTERNATIVE 4C

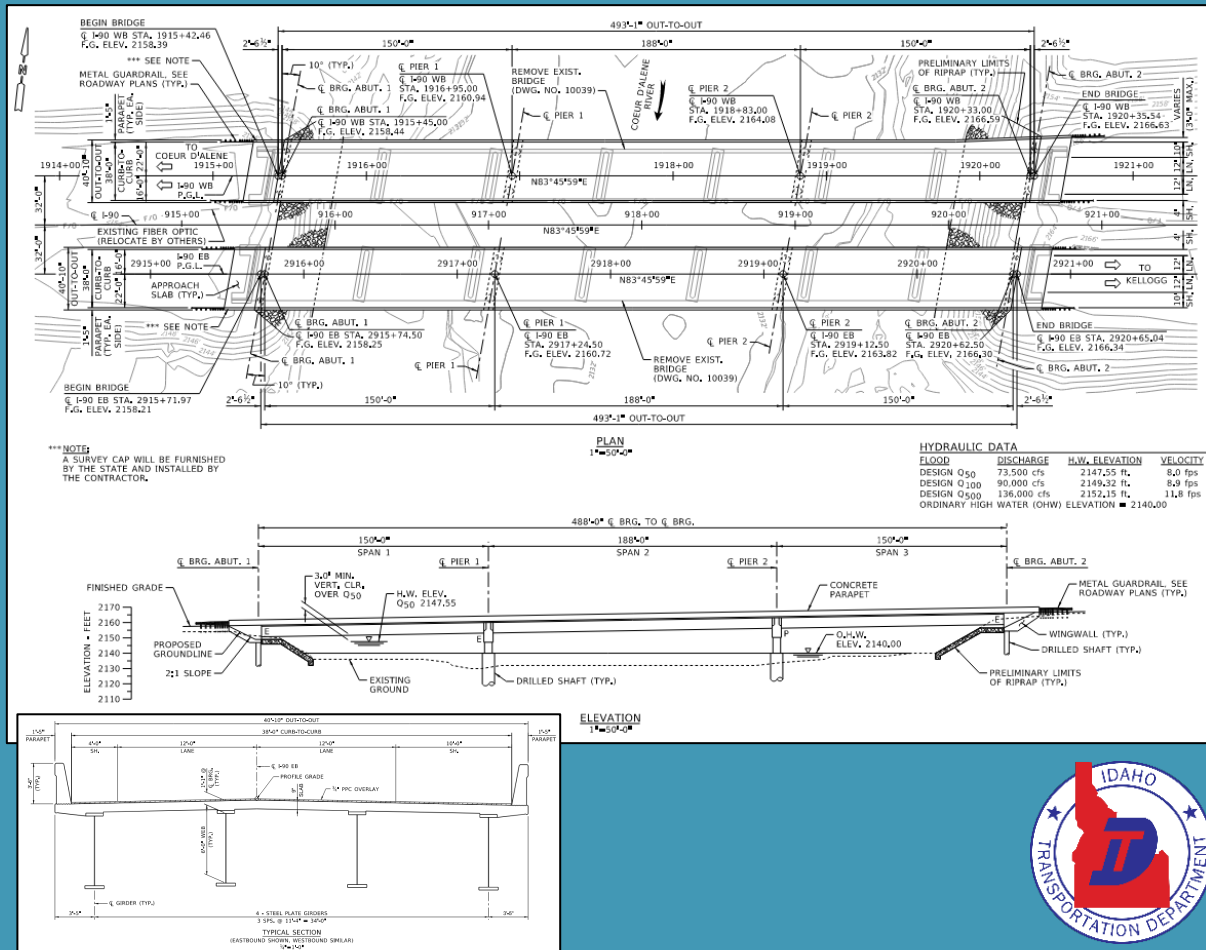
Bridge Removal + Dredge Road Realignment/Rehabilitation \$7.9M

This alternative would add a new connector road from the Mission Interchange to Canyon Road, decreasing travel times from I-90 to the west bank of the river and would rehabilitate Dredge Road similar to Alternative 4B.

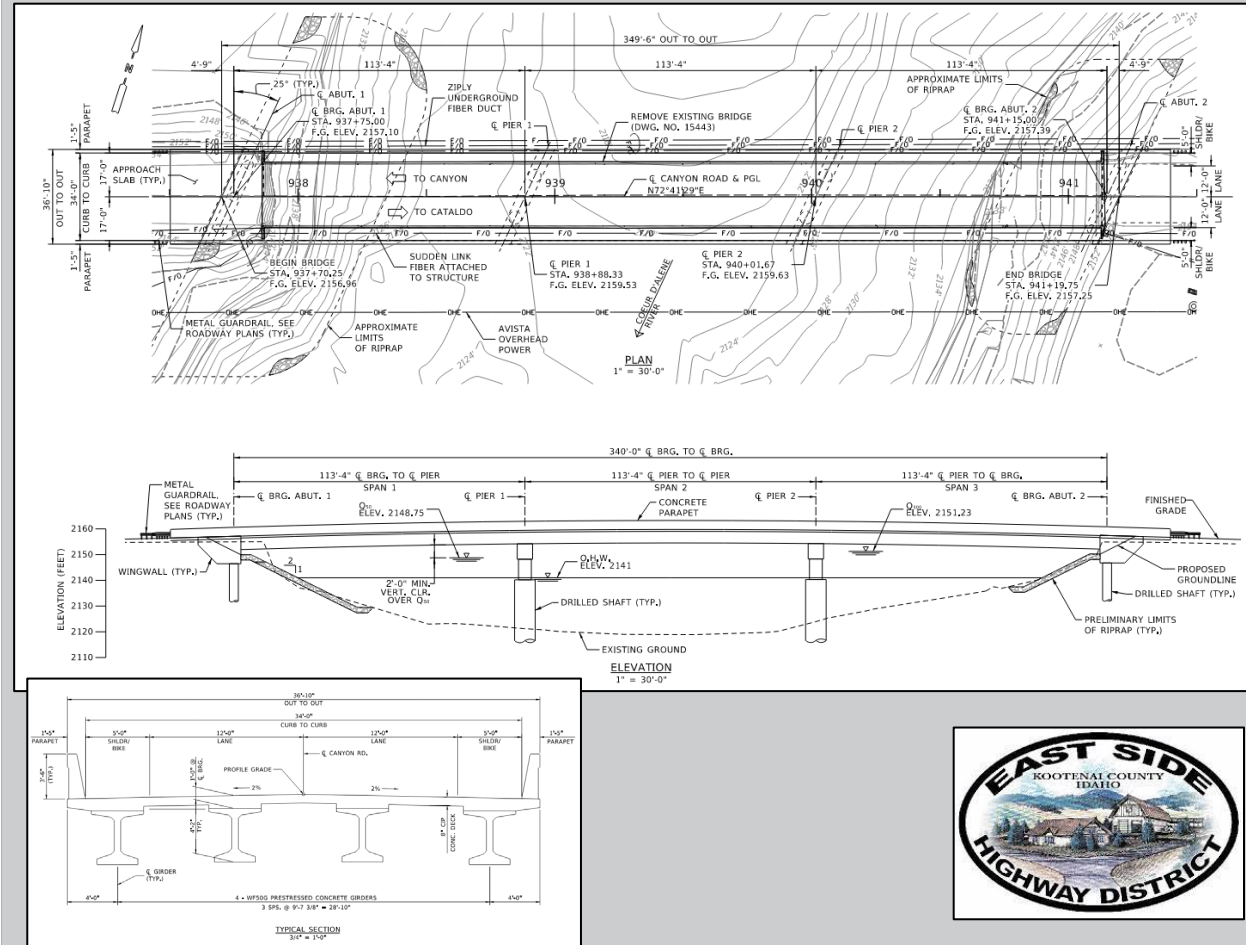
Coeur d'Alene River Bridges Project

Bridge Concepts

- I-90 Bridges
 - Twin three-span steel plate girder bridges
 - 150'-188'-150' balanced span configuration

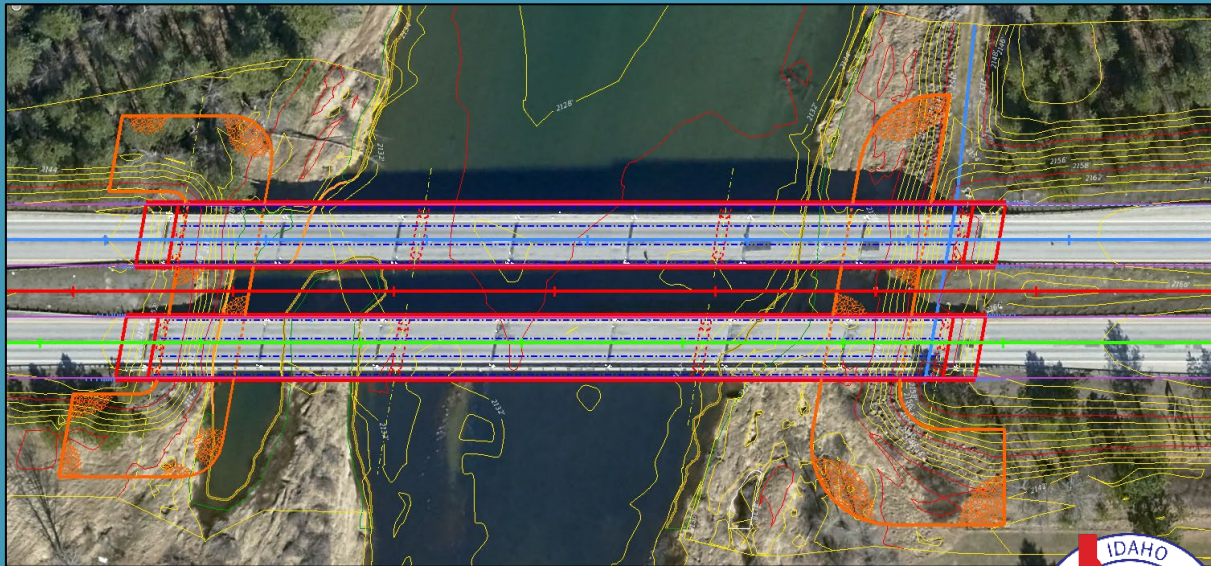


- Canyon Road
 - Three-span prestressed girder bridge
 - 113'-113'-113' equal span configuration



Current Status

- I-90 Bridges
 - Final Design efforts under way
 - PS&E delivery Spring 2023
 - EB Bridge construction: 2024
 - WB Bridge construction: 2025



- Canyon Road Bridge
 - Enhanced Feasibility Study complete
 - Looking for funding opportunities for Final Design and construction



Questions?

