

Scour Monitoring and Mitigation

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Idaho Transportation Dept.
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Types of Scour

General Scour

Contraction Scour

Local Scour





Shoshone County Airport

Smelterville

Bradley

W McKinley Rd

Mc Kinley Ave W

Mc Kinley Ave W

30680

30695

17095

37825

17180

17105



Bliss Grade Rd

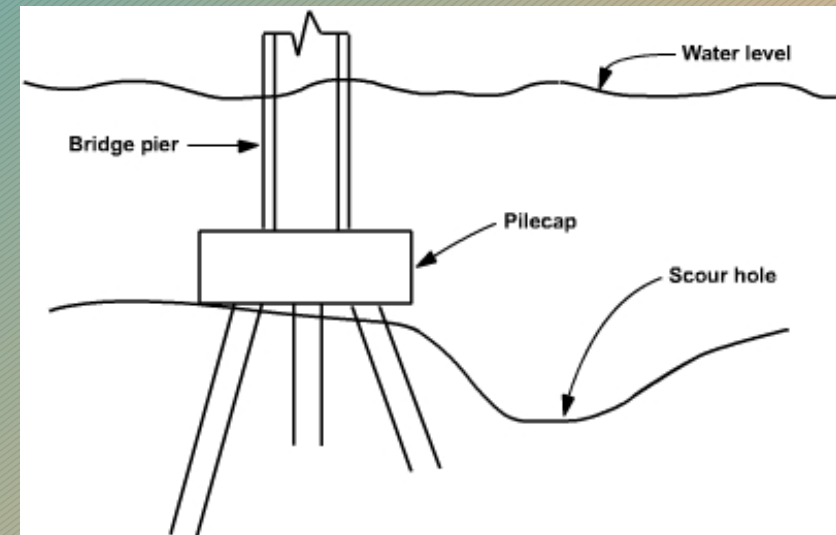
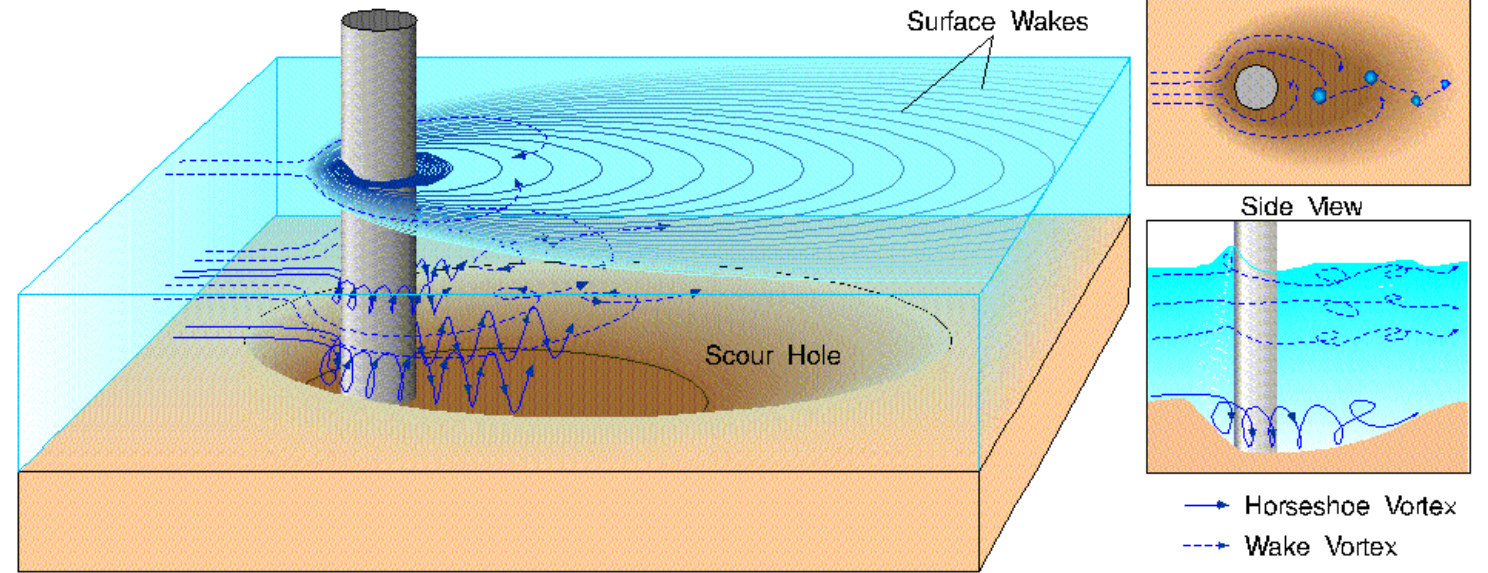
25930

Shoestring Rd

Bliss

How scour works

Horseshoe and Wake Vortices around a Cylindrical Element





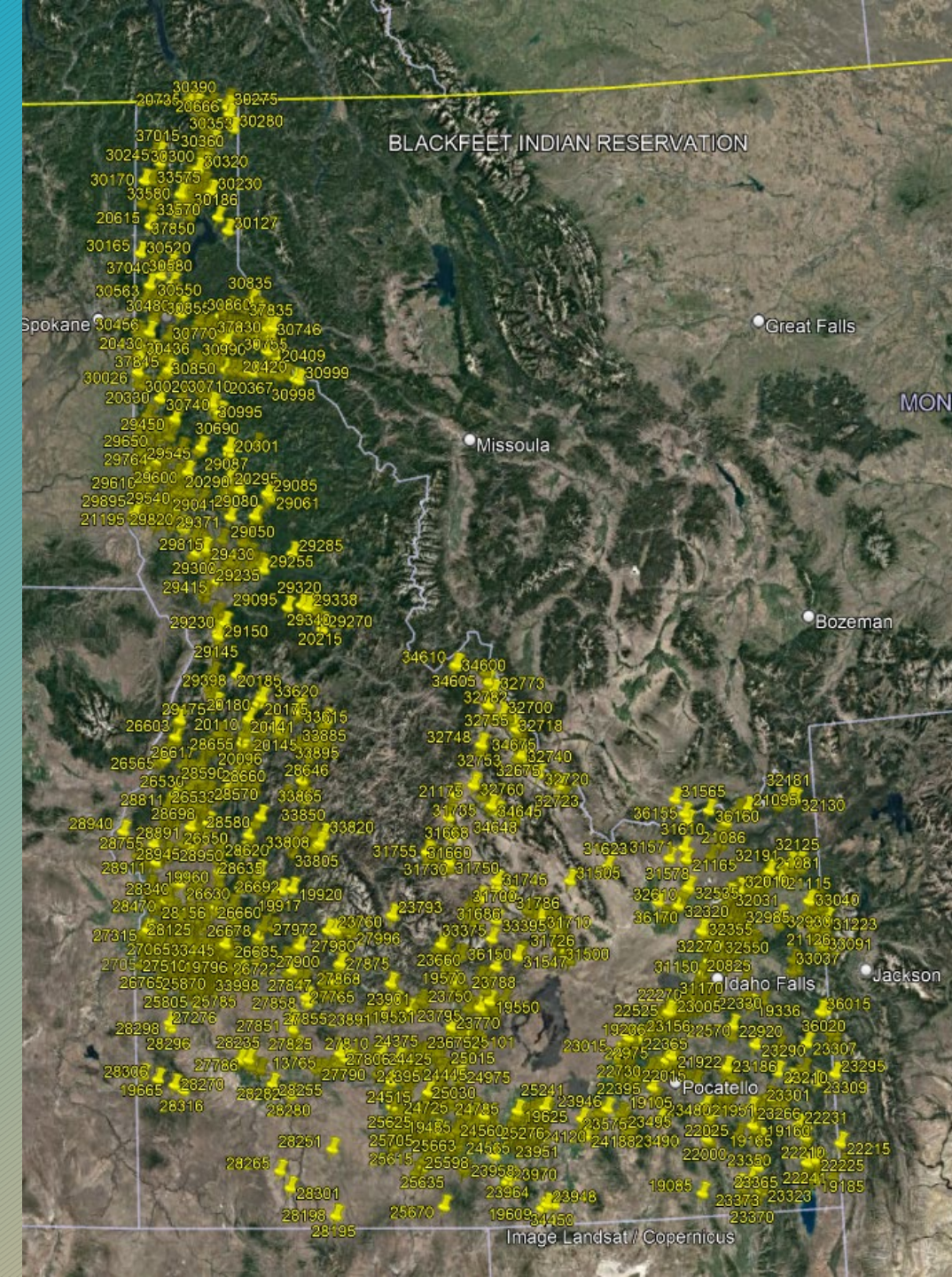
13-6-98



Idaho Local Bridges

2,506 Local
bridges in Idaho

98% or 2,464
bridges are over
water

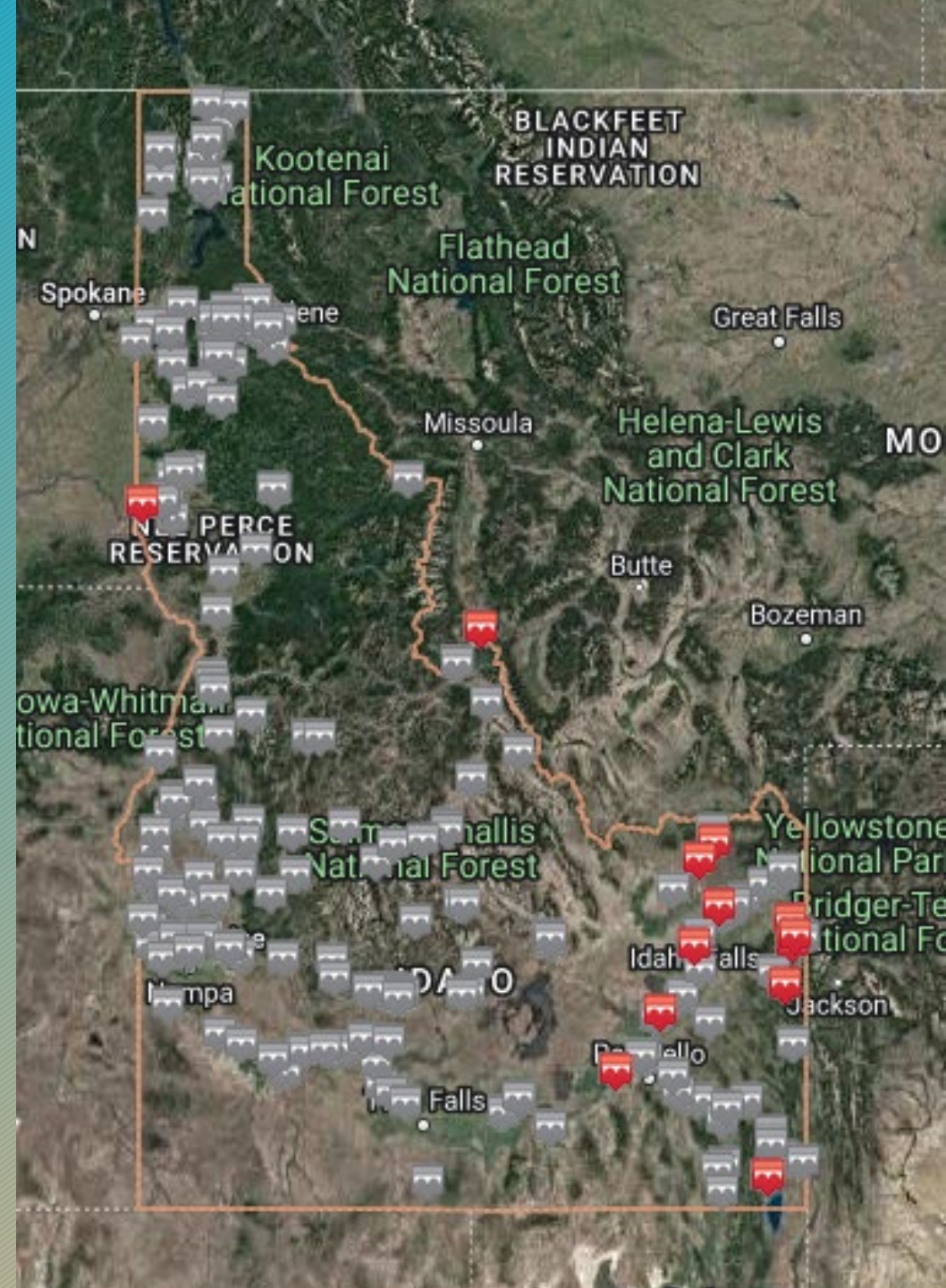


Idaho's Scour Critical Bridges

→ 102 of Idaho Local bridges are Scour Critical

Either:

- 1) Inspections show scour has undermined foundation
- 2) Calculations indicate scour will undermine foundation



ITD Responsibility

- Inspection
- Coding
- Monitoring
- Repair

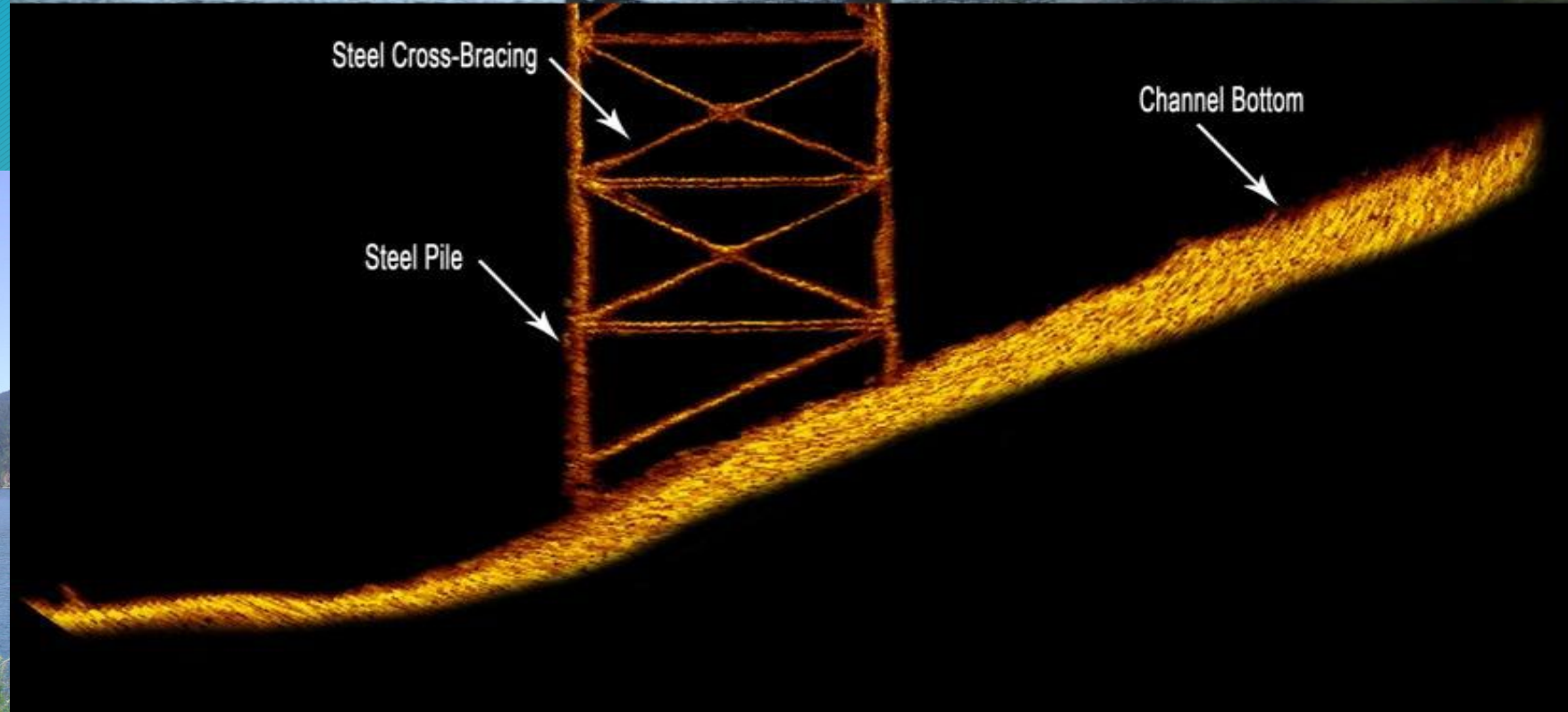
Underwater Inspection



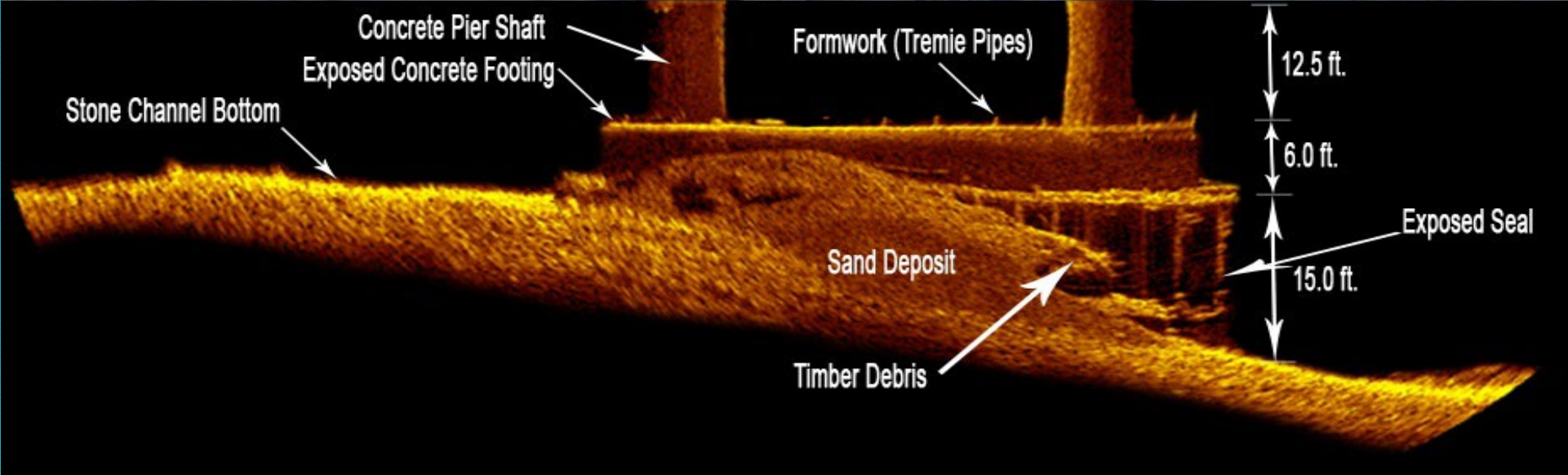
At a minimum a bridge requiring an Underwater Inspection must have one every 60 months.

Blue Creek Bay Bridge, Coeur D'Alene, ID

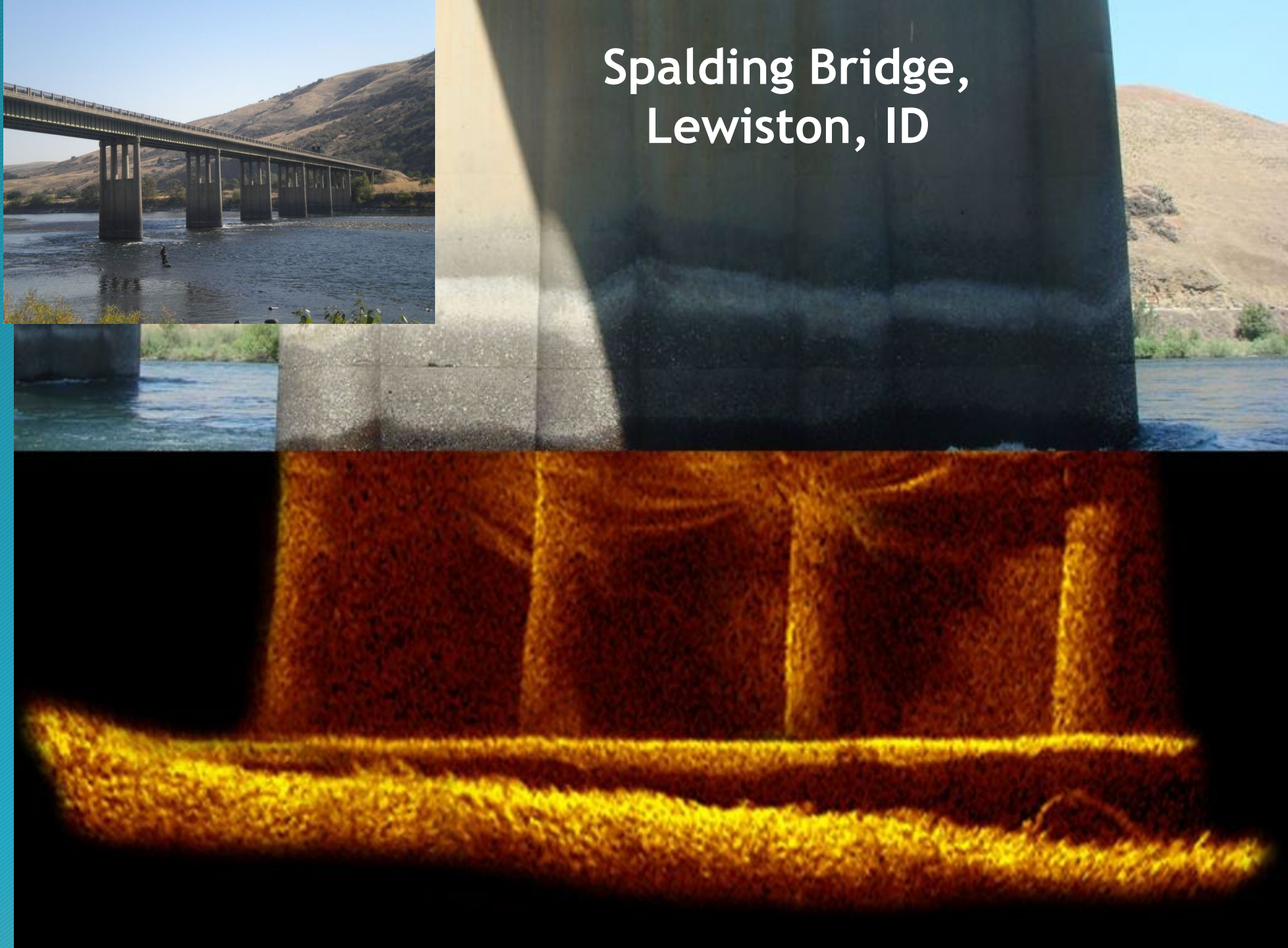
Sonar Imaging



Southway Bridge, Lewiston, ID



Spalding Bridge, Lewiston, ID



Scour Committee

- Code NBI Item 113 - Scour
- Multi-Discipline

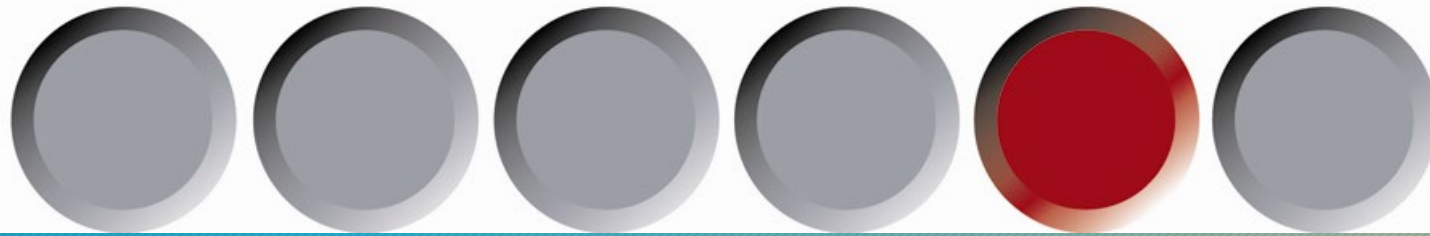
Typical Scour Coding's

- 8 - No scour issue
- 5 - Scour exists, bridge is stable.
- 4 - Scour exists, bridge needs repair.
- 3 - Scour critical by calculation.
- 2 - Scour critical by observation.
- U - Unknown Foundation

APPRAISAL

(67)Structure Condition:	6 Equal Min Criteria
(68)Deck Geometry:	4 Tolerable
(69)Undrclear,Vert and Horiz:	N Not applicable (NBI)
(71)Waterway Adequacy:	8 Equal Desirable
(72)Approach Alignment:	8 Equal Desirable Crit
(36)Traffic Safety Features:	
(a)Bridge Rail:	0 Substandard
(b)Transition:	0 Substandard
(c)Approach Rail:	0 Substandard
(d)Approach Rail Ends:	0 Substandard
(113)Scour Critical:	8 Stable Above Footing

BridgeWatch



Corp. 2008

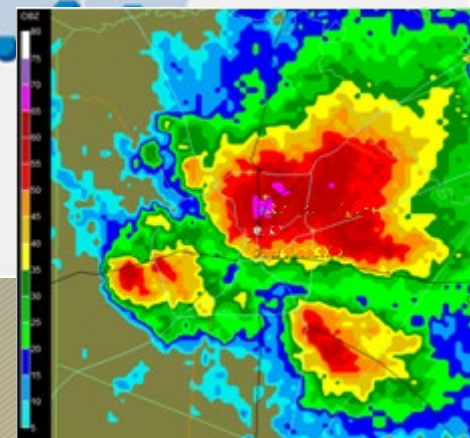
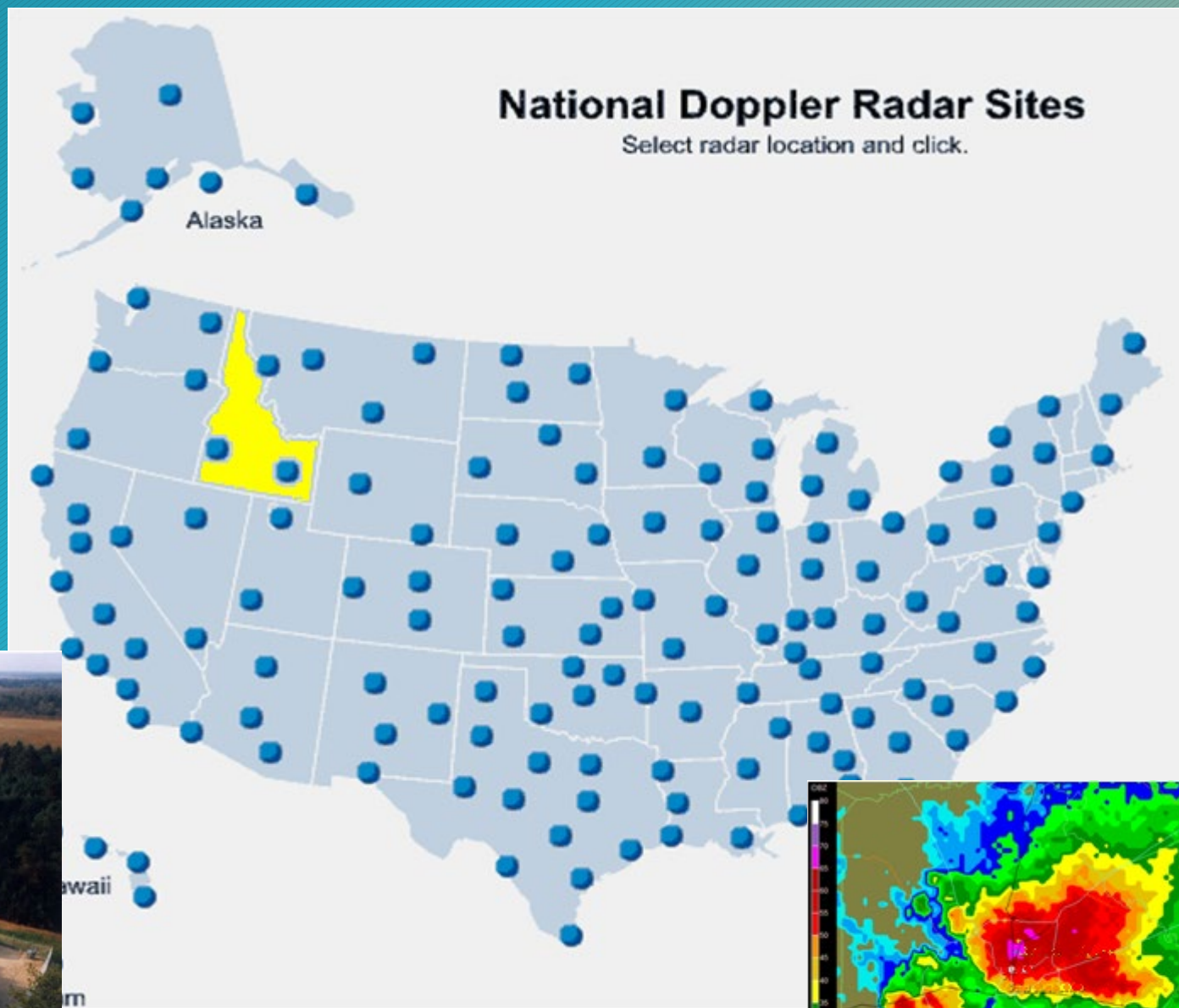


What are we watching for?

- In Idaho it is primarily...

→ High flows on rivers

- Strong precipitation (downpours, thunderstorms) events
- Seasonal events such as rapid spring snowmelt
- Other extreme events might be tsunamis, seismic events, dam breaks, tidal floods, other natural events



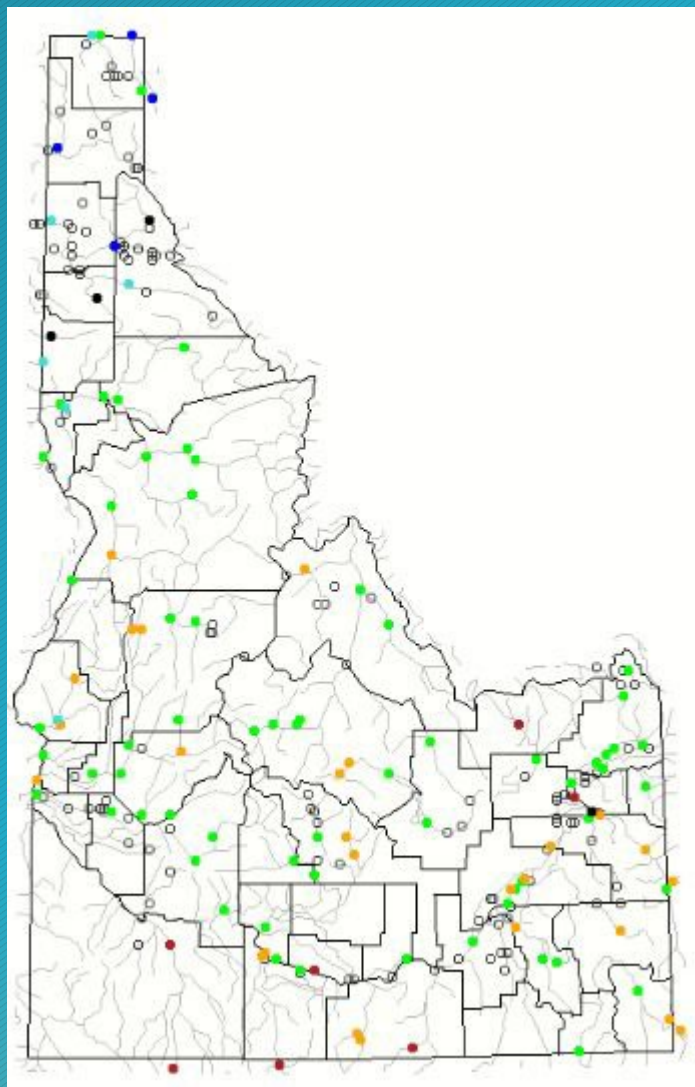
SNODAS

4-8-22

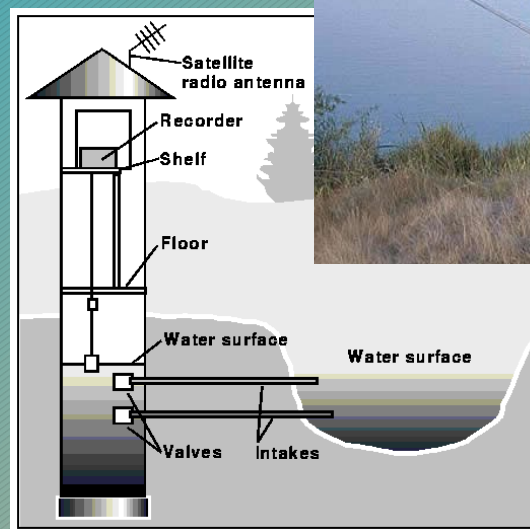
5-11-22

Inches 0.5 1 2 3 4 5 6 7 8 9 10 12 14 16 18 20 25 30 35 40

Idaho Stream Gauging Locations



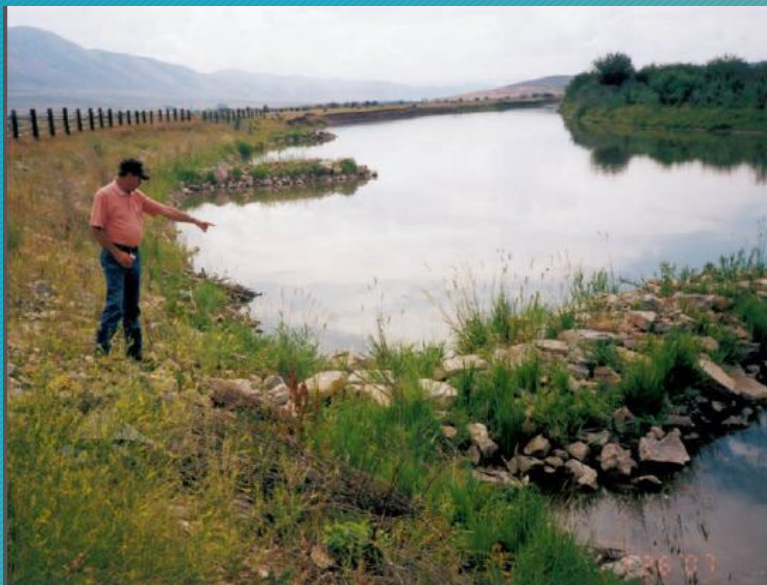
Explanation - Percentile classes							
Low	<10 Much below normal	10-24 Below normal	25-75 Normal	76-90 Above normal	>90 Much above normal	High	Not-ranked

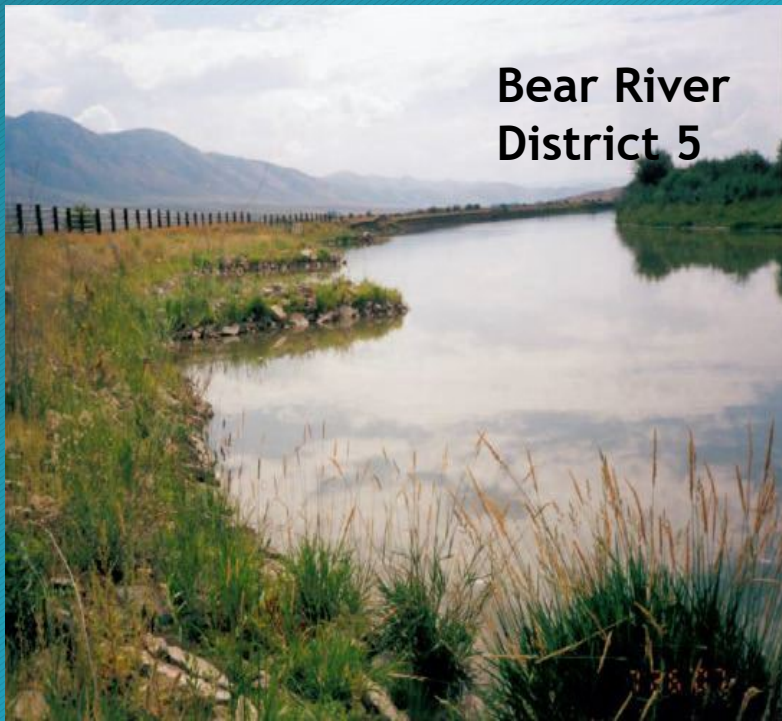


Continuous Monitoring provides Early Warning

- BridgeWatch continuously monitors incoming data sources.
- ITD sets thresholds for high flows.
- Sends alerts to email, cell phone.
- Owner can inspect bridge and close it to the public if necessary.

COUNTERMEASURES / REPAIR

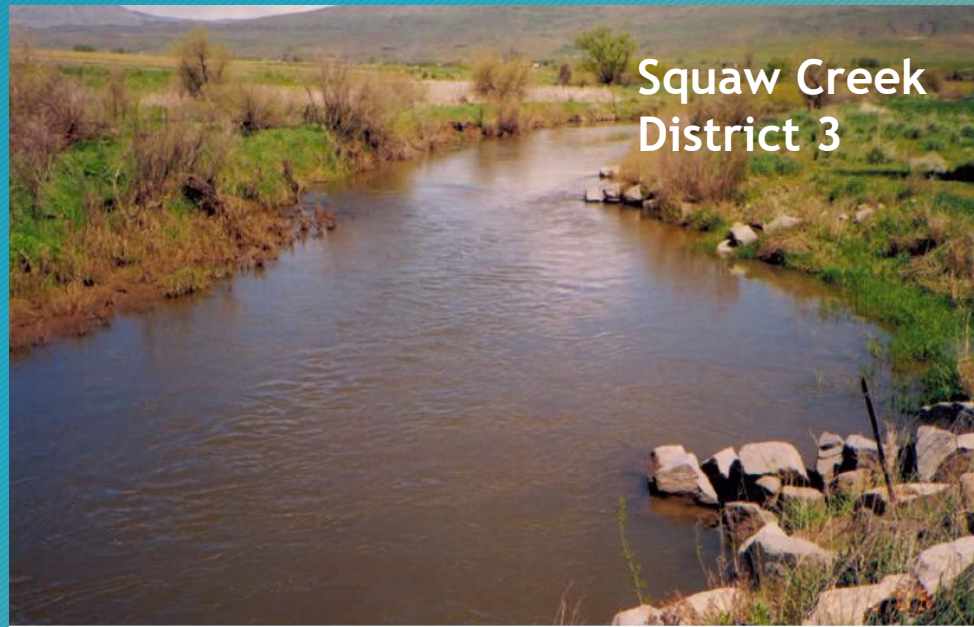




**Bear River
District 5**



**Bruneau River
District 3**

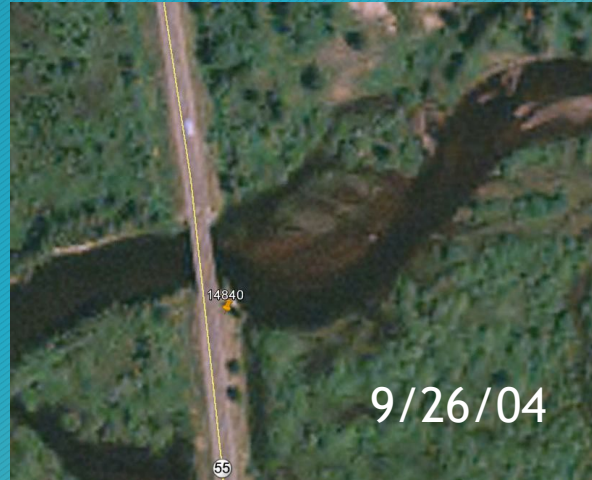


**Squaw Creek
District 3**

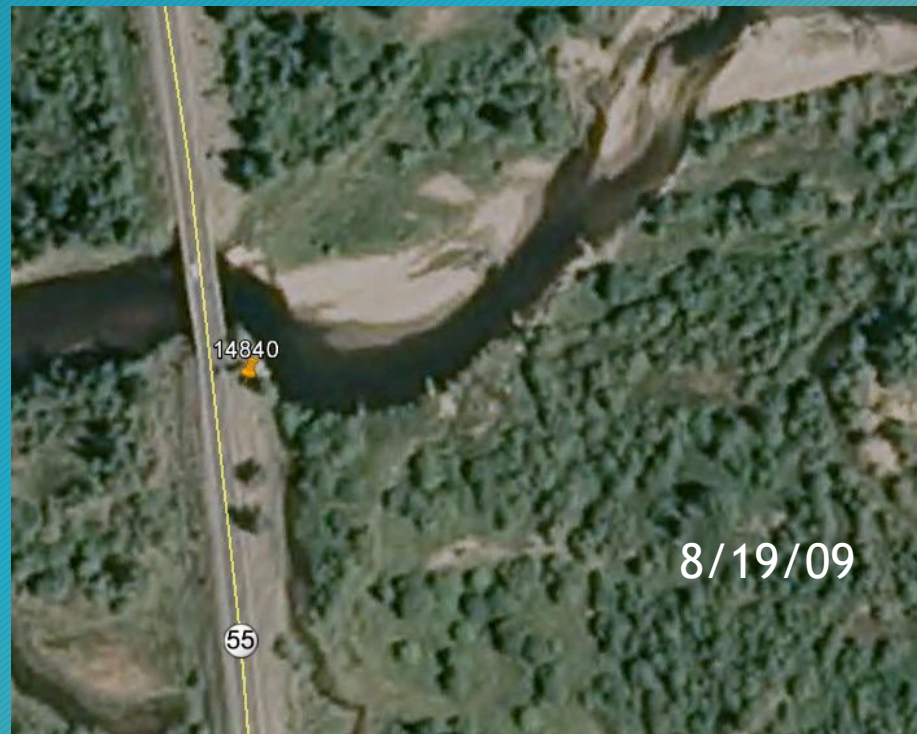


**Gold Fork River
District 3**

Gold Fork Creek



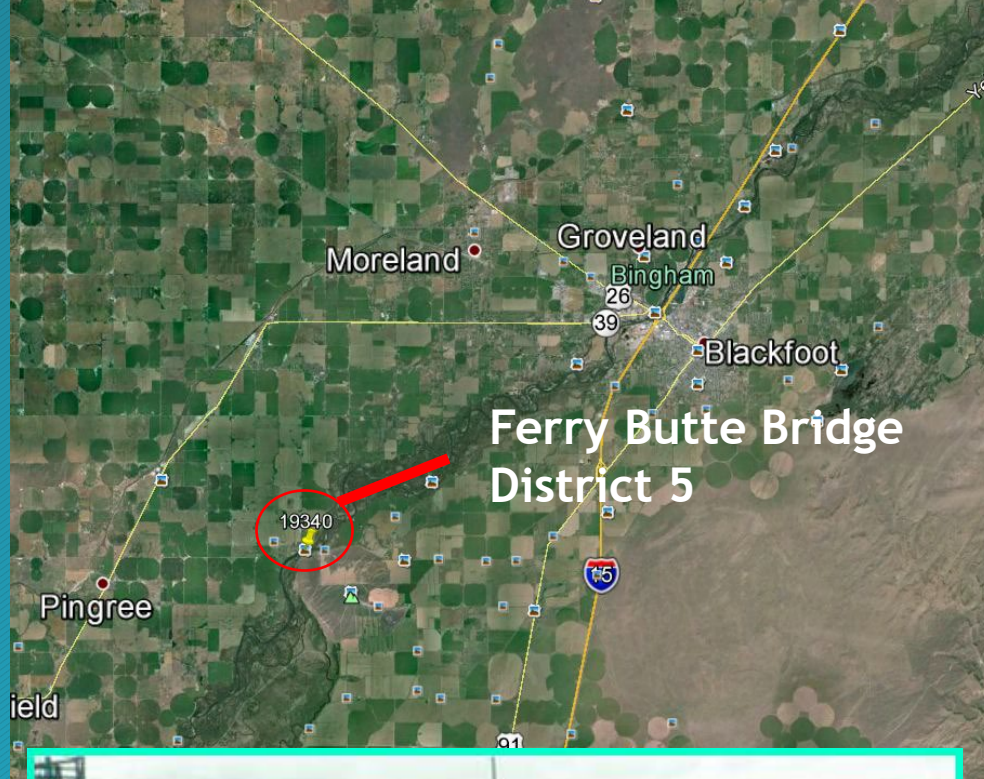
9/11/06





14841

7-12-17





Rip Rap



Rip Rap



Rip Rap



New Bridges

- Scour depth should be calculated at a 500 year flow.
- Footings or pile should be below that depth.
- Abutments and Piers protected with Rip Rap.

Questions



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