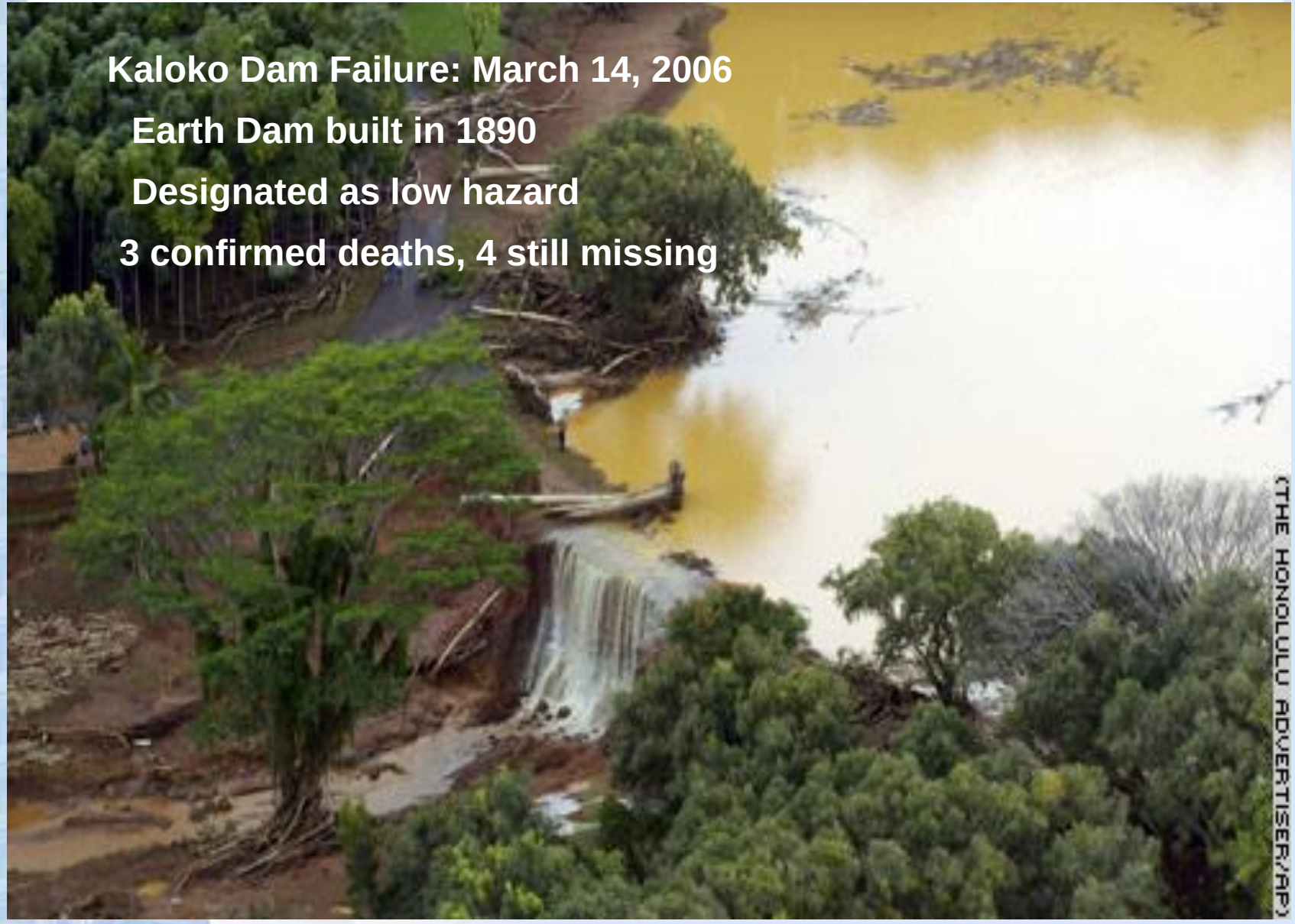
SAFETY OF DAMS

CONDITION ASSESSMENT PROTOCOLS

DAM DEFICIENCIES

By Dana Cork

Why are we interested in documenting the condition of our dams?


Kaloko Dam Failure: March 14, 2006
Earth Dam built in 1890
Designated as low hazard
3 confirmed deaths, 4 still missing
(THE HONOLULU ADVERTISER/AP)

DAM DEFICIENCY TABLE EXERCISE

Get into groups of 3-4 people (based on teams A-D)

Each group will receive 2-3 pictures of dams

Identify the deficiencies in each picture

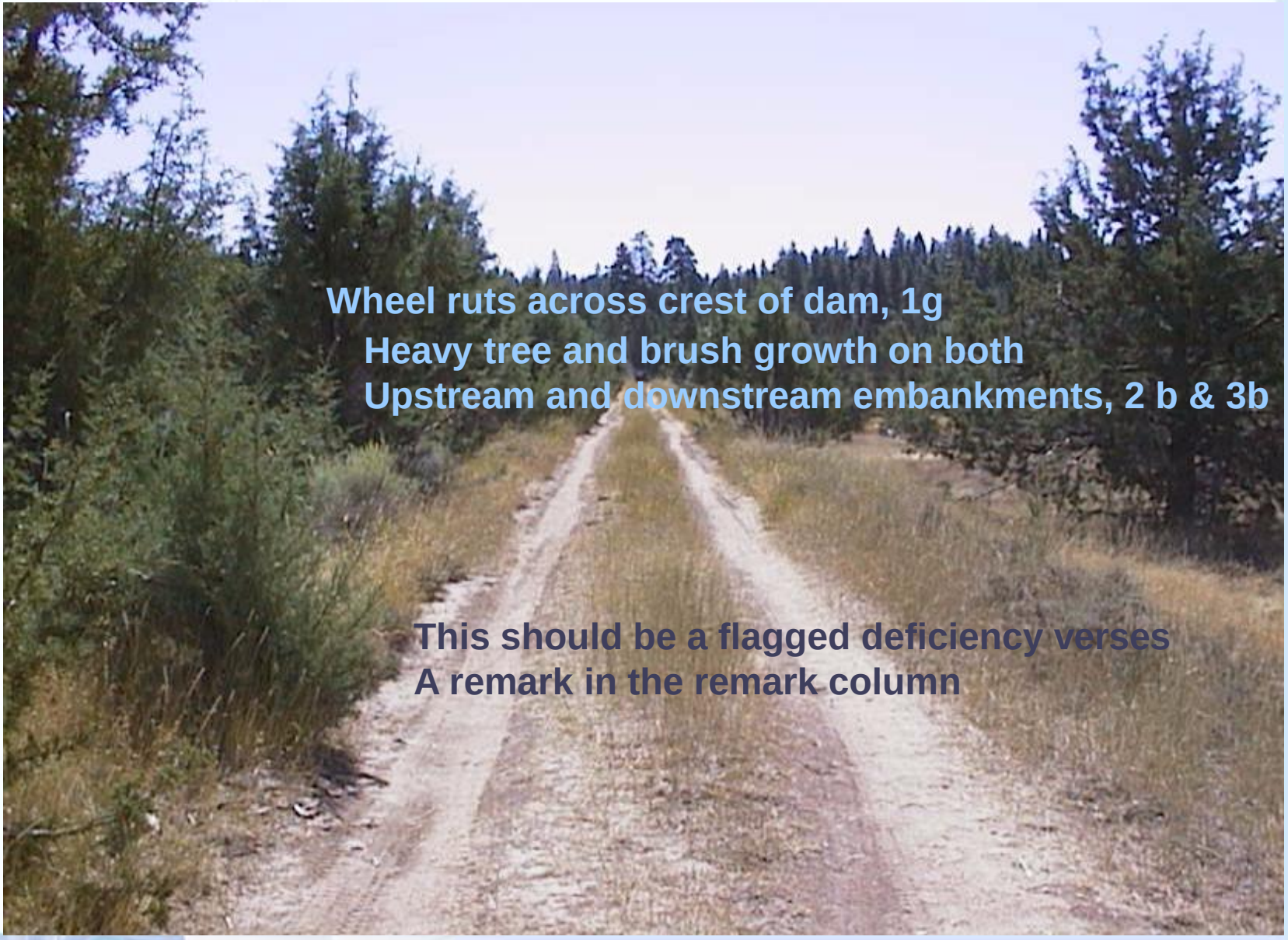
Locate the condition assessment item number for Each deficiency


Vegetation on upstream and downstream slope, 2b & 3b
Spillway scour, 11 d (1)
Suspect vegetation on downstream slope, 3i

Undermining and erosion at the weir, 12 f (4)

Concrete failure, 12g


37
36
35
34
33
32


Wheel ruts across crest of dam, 1g
Heavy tree and brush growth on both
Upstream and downstream embankments, 2 b & 3b
This should be a flagged deficiency verses
A remark in the remark column

EXAMPLE

DEFICIENCIES:

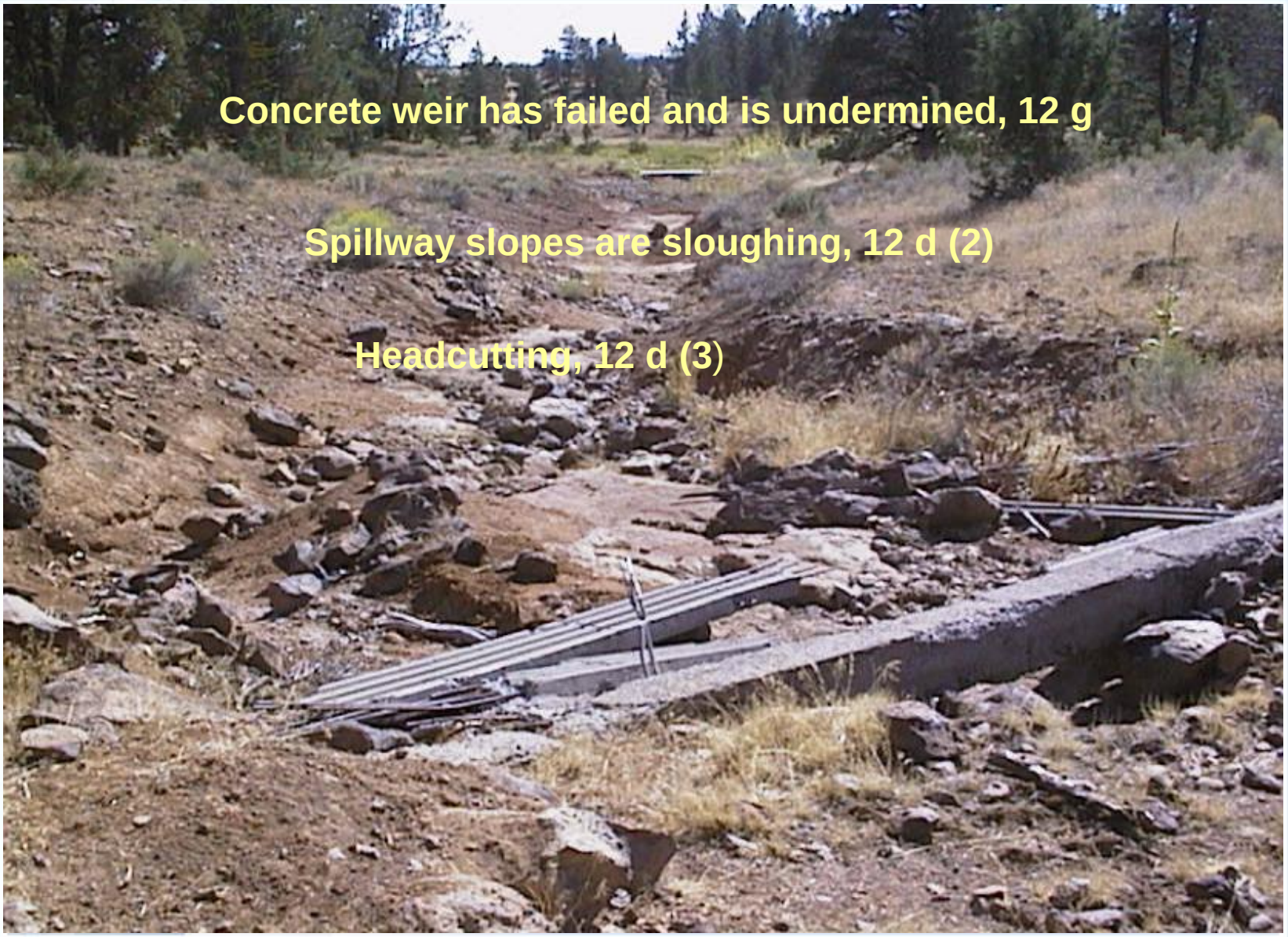
1. N/C Pine trees, juniper trees, willow trees, sage brush and other vegetation growing on both upstream & downstream faces. Pine trees are over 20' tall, juniper trees are 15' ±, and willows are up to 15' tall. Dense cover on full upstream length. Trees are scattered on downstream face with brush full length. Upstream vegetation inhibits inspection. NEW: Approx. 10% less vegetation. Paths to water line exist and the inspection is based from the visible areas.

When should a deficiency be marked by flag number verses making a comment under the remarks column?

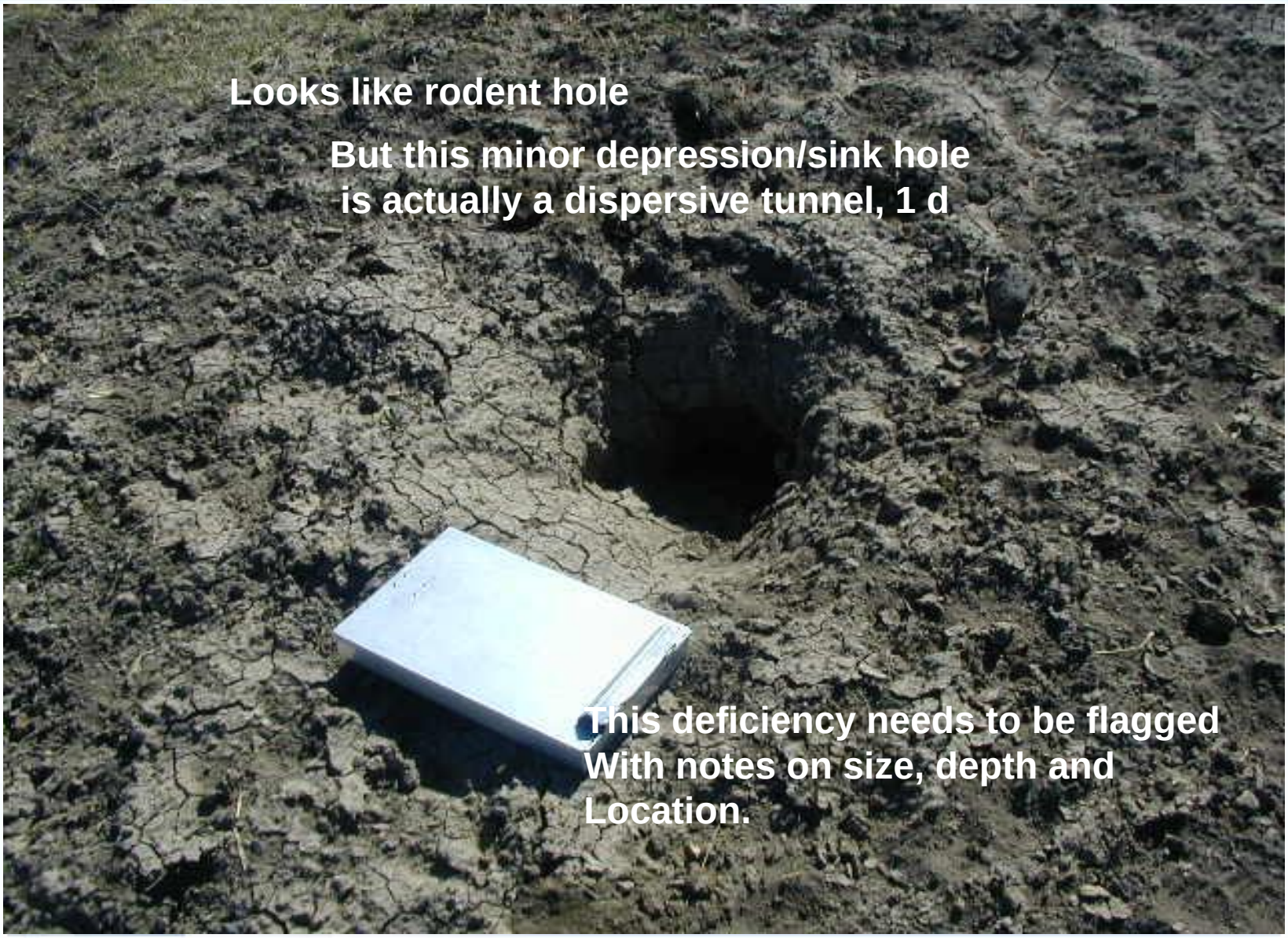
Flag numbers are used to identify and describe deficiencies that may require further investigation, monitoring, maintenance, or replacement. Flag numbers are also used to elaborate on repeated deficiencies and minor deficiencies that may impede the ability to inspect the dam.

Remarks column is used for short comments On minor deficiencies.

Remark Example: Noting that the gate operator handle is not on site


Concrete weir has failed and is undermined, 12 g
Spillway slopes are sloughing, 12 d (2)
Headcutting, 12 d (3)

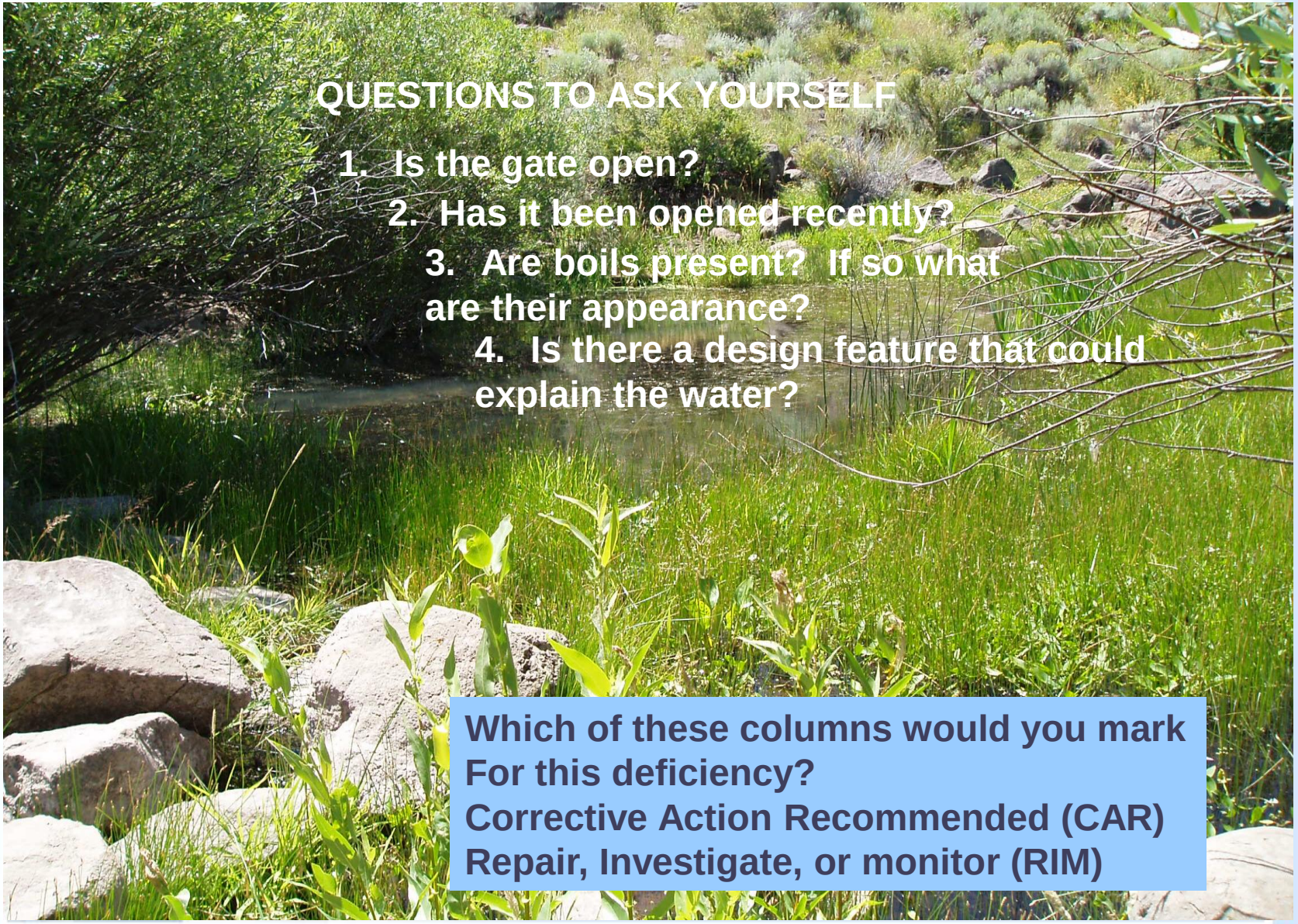

07/02/2006


Looks like rodent hole
But this minor depression/sink hole
is actually a dispersive tunnel, 1 d
This deficiency needs to be flagged
With notes on size, depth and
Location.

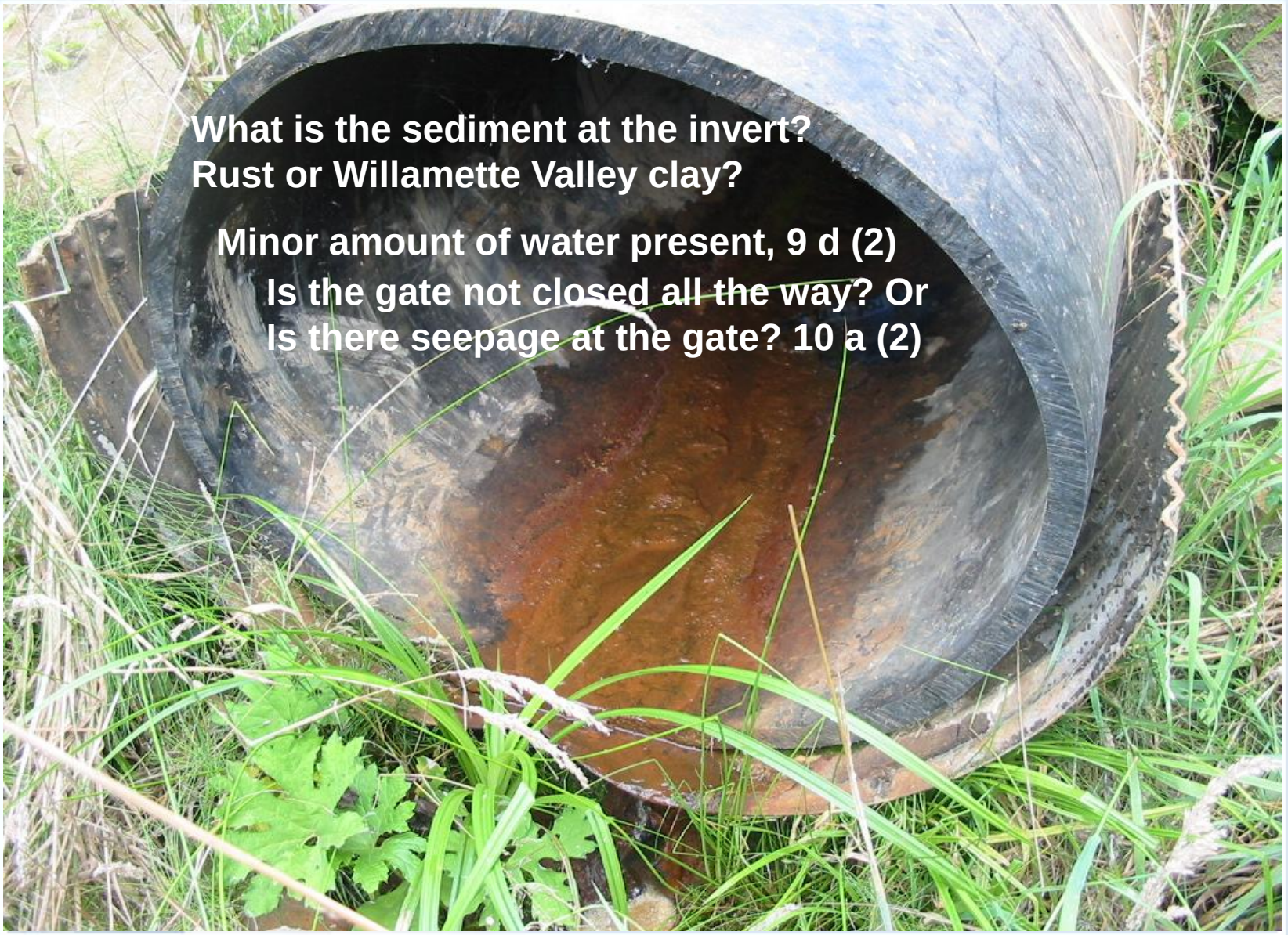
24 5:04PM

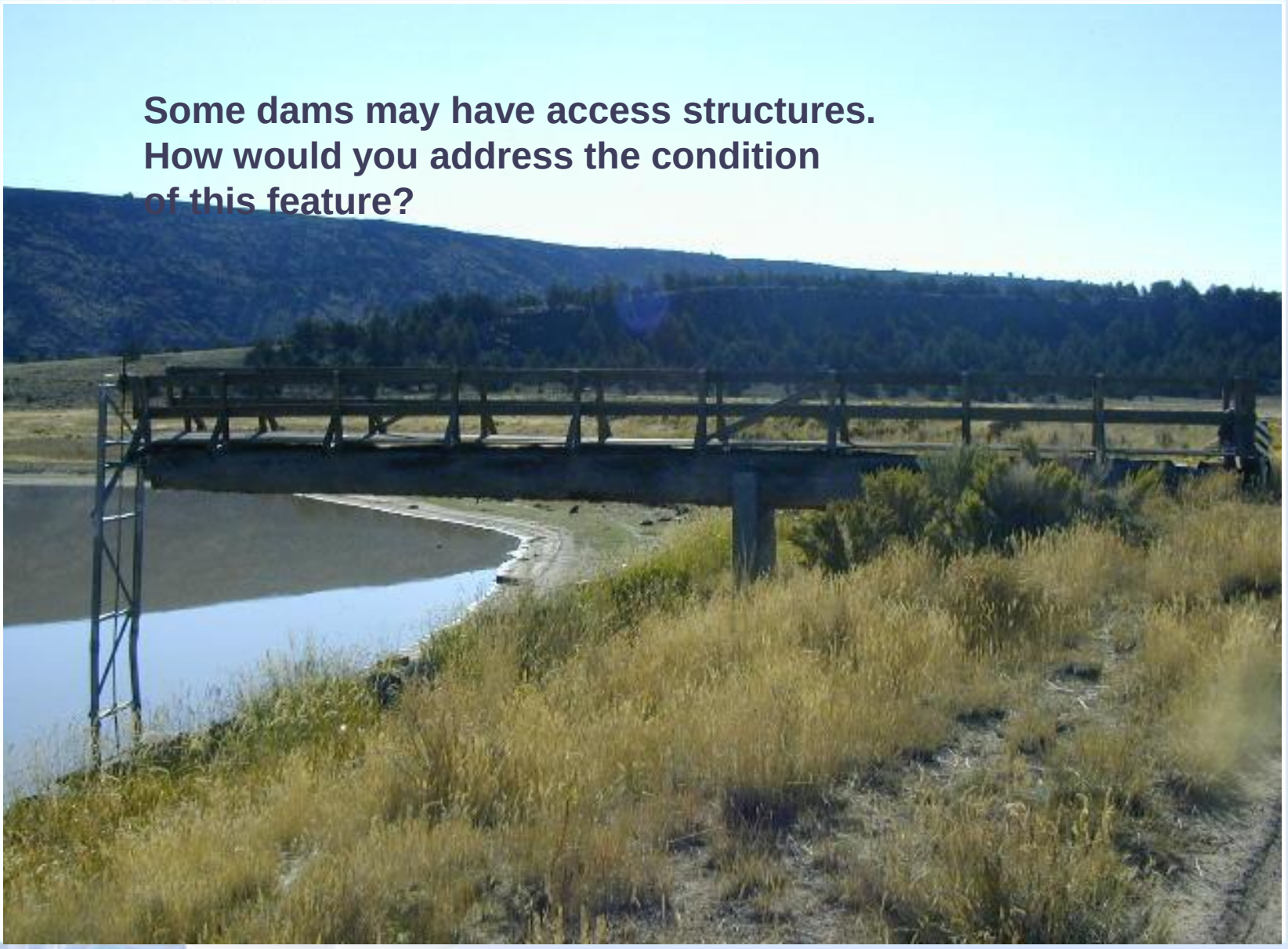

24 4:18PM


24 4:51PM


QUESTIONS TO ASK YOURSELF
1. Is the gate open?
2. Has it been opened recently?
3. Are boils present? If so what are their appearance?
4. Is there a design feature that could explain the water?
Which of these columns would you mark For this deficiency?
Corrective Action Recommended (CAR)
Repair, Investigate, or monitor (RIM)

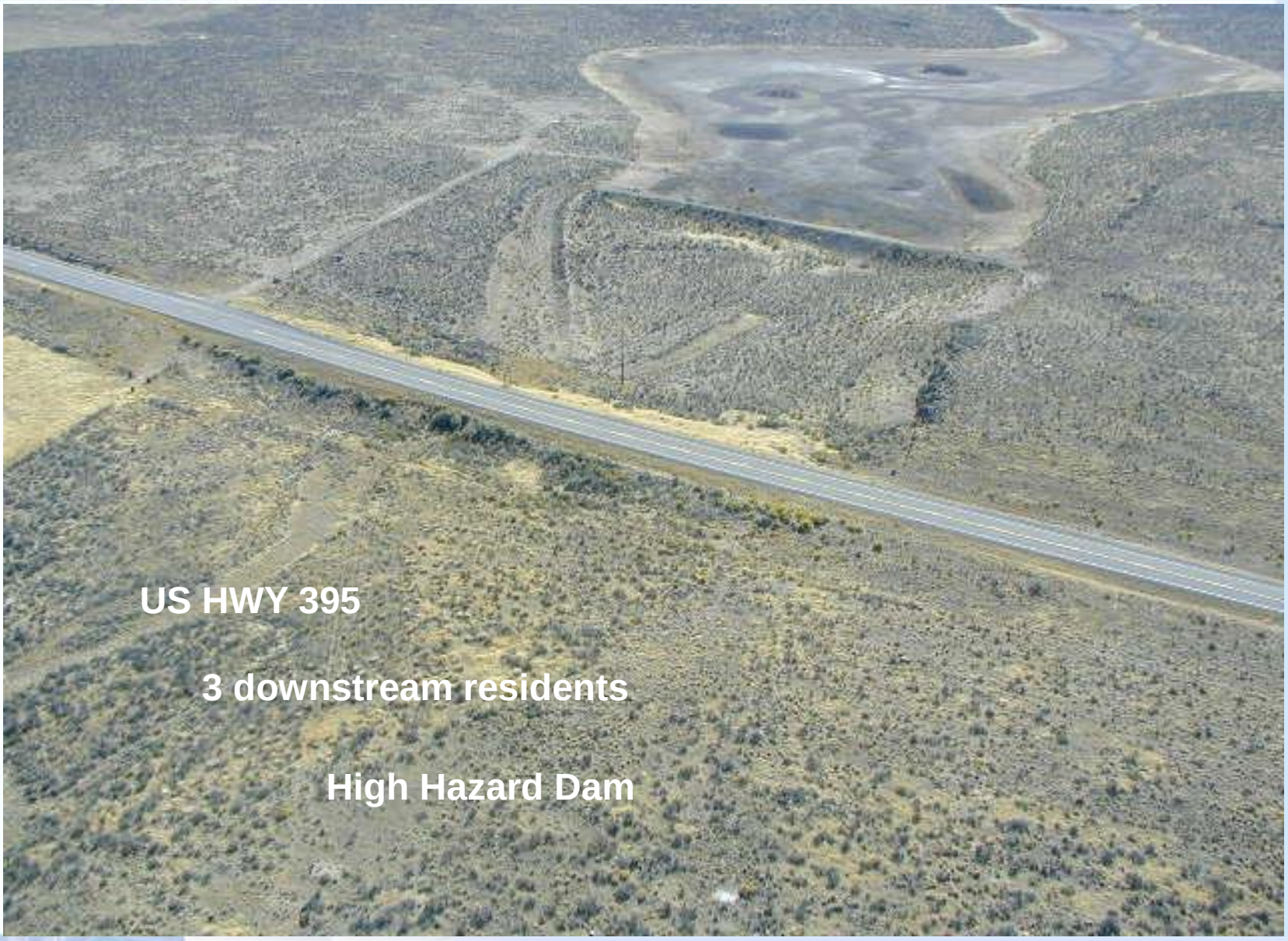

JUN 19 2007


What is the sediment at the invert?
Rust or Willamette Valley clay?
Minor amount of water present, 9 d (2)
Is the gate not closed all the way? Or
Is there seepage at the gate? 10 a (2)


Some dams may have access structures.
How would you address the condition
of this feature?


Corrosion on trash rack, 8 d (1)
Minor debris around gate, 8 a
Scaling, 8 b (4)
Many times the intake structures are submerged
And cannot be inspected. So document its condition
With a photo when you get the opportunity.

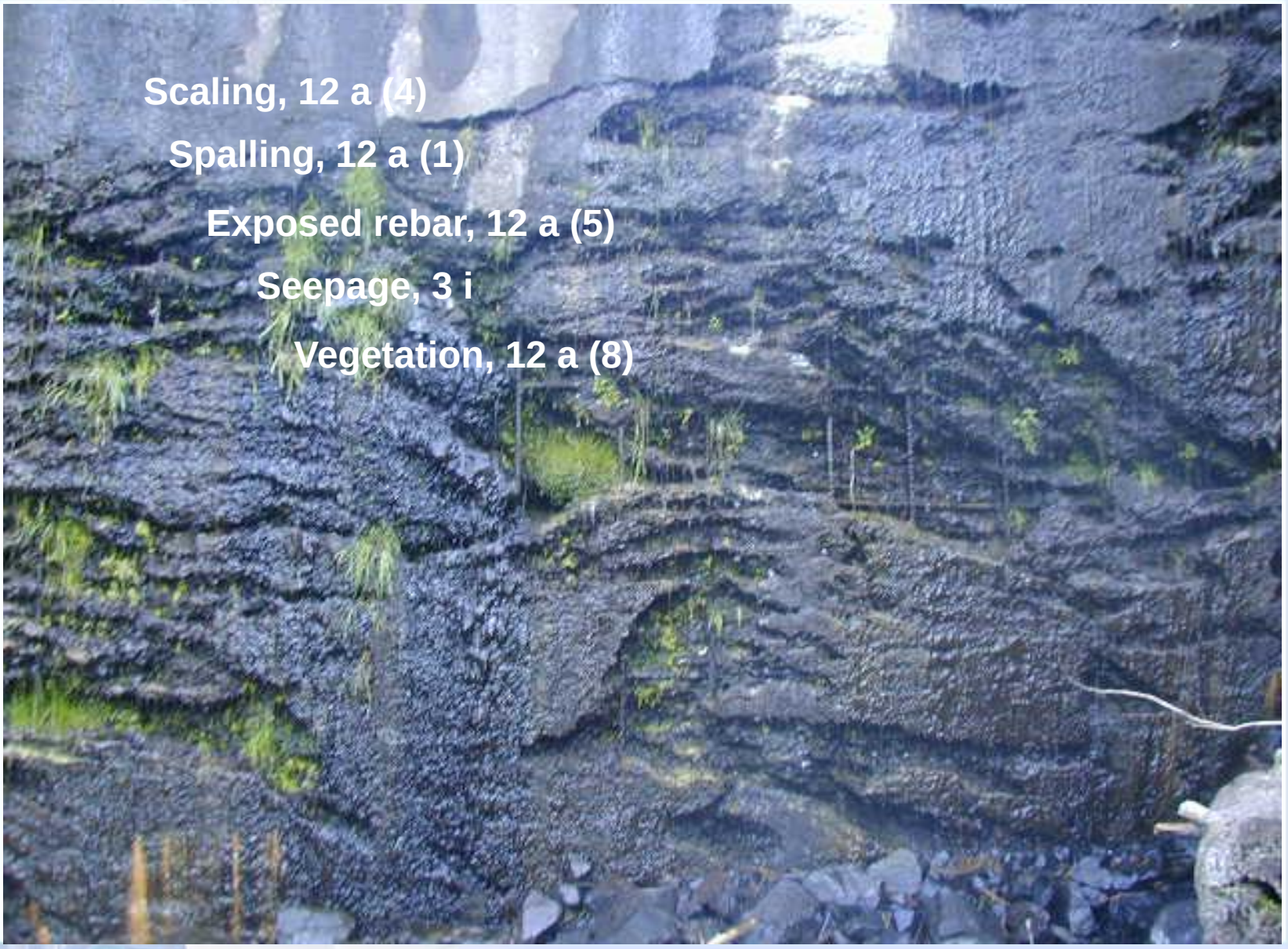
NAME OF DAM: Rock Creek Date: August 9, 2005
PHOTOS: Intake Assembly


US HWY 395
3 downstream residents
High Hazard Dam


04/10/2006


04/10/2006


04/10/2006


Scaling, 12 a (4)
Spalling, 12 a (1)
Exposed rebar, 12 a (5)
Seepage, 3 i
Vegetation, 12 a (8)

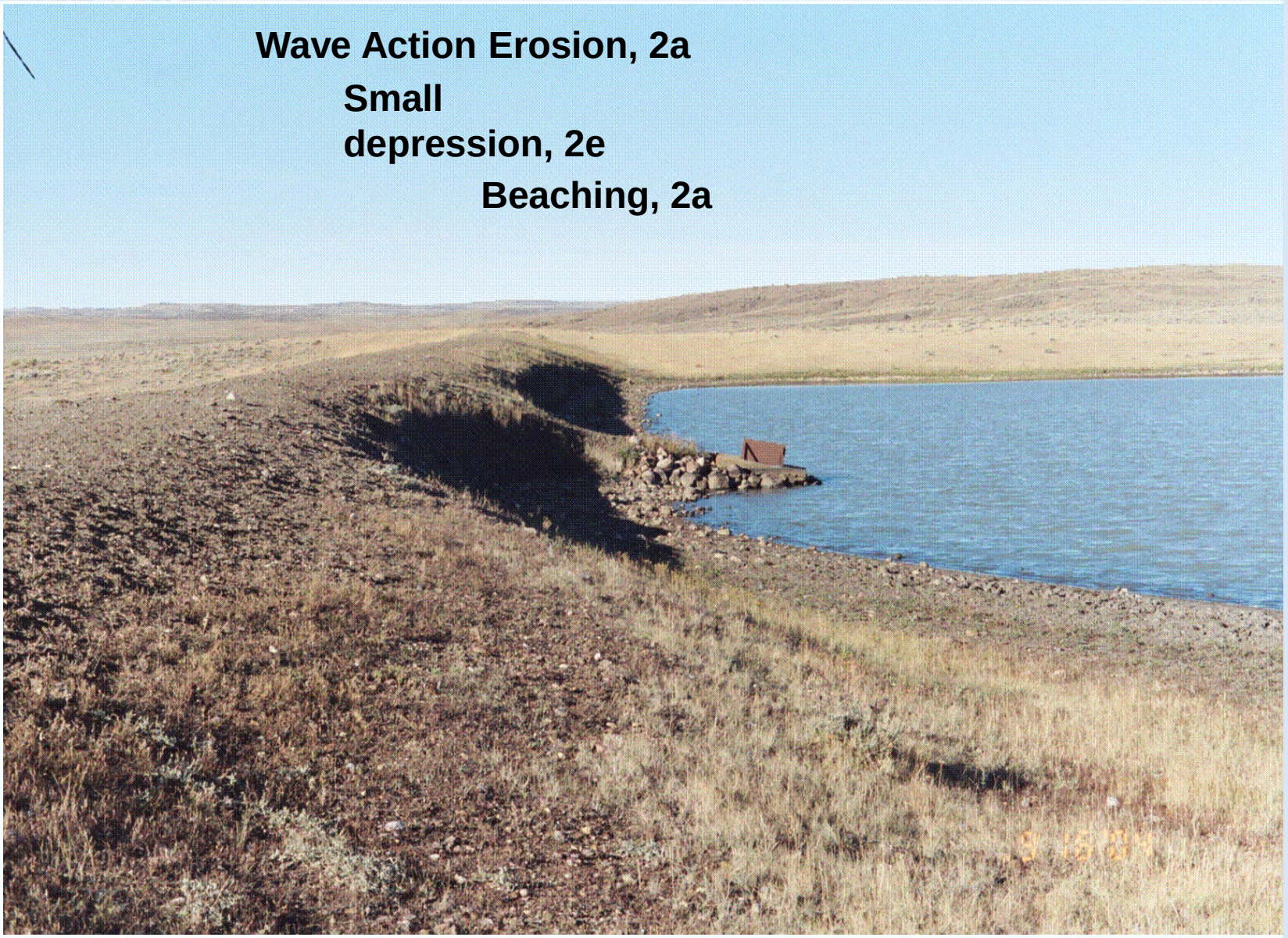
Example

DEFICIENCIES:

1. N/C - Exposed vertical and horizontal rebar in downstream face of dam structure; mostly in left 1/3 of structure. NEW – Rebar is exposed at bottom of dam, 3/8 point from right abutment.
2. Observation of left ½ of dam structure shows seepage through concrete. Seepage appears at top and throughout the spalled area. Seepage rate is approx. 3 to 5 gallons per minute flow. NOTE: Did not measure flow rate this inspection (9/25/03). 95% of downstream face was exposed for inspection (e.g. without water flowing over face of dam)

NAME OF DAM: Little Hyatt Date: Sept. 23, 2003
PHOTOS: Looking at exposed rebar, downstream face 3/8 point from right abutment


9.17'04


Wave Action Erosion, 2a
Small
depression, 2e
Beaching, 2a


Are tires an effective tool
For protecting against
Wave action?
What would you use
Instead?