Documenting Landslides and Fluvial Erosion Features In the Caspar Watershed

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OVERVIEW

Annually, walk all North Fork and South Fork channels.

Ideally, walk all North and South Fork channels where surface flow after any storm event where weir stage exceeds 3 ft. Be systematic. Survey a complete subwatershed or reach beginning with those that are actively gauged and prioritize those with gage evidence of elevated turbidity. Not all channels are mapped. Begin by surveying the mapped reach of each subwatershed. When a qualifying erosion feature is encountered, estimate distance to the nearest downstream benchmark (DS BM). A metric tape, hipchain, and/or GPS to estimate distance to nearest DS BM to a precision of 10 m.

Displaced volume	Locate on Channel Maps	Notebook	Flag on ground	Sketch Map
> 10 y^3 on mapped reach	Yes GPS point	Record dist. nearest DS BM & new volume	Yes: date & cum. volume	Yes
10 y^3 on unmapped reach	NA GPS point	Record dist. nearest DS BM & new volume	Yes: date & cum. volume	Yes
3-10 y^3 on mapped reach	Yes	Record dist. nearest DS BM & new volume	Yes: date & cum. volume	Not unless cum. volume now 10 y^3 +
5- 10 y^3 on unmapped reach	NA GPS point	Reference dist. nearest DS BM and record size	Yes: date & cum. volume	No

CHECKLIST OF FIELD GEAR

Trimble Geo7x (GPS)
Channel maps
Watershed map with ungaged tributary identifiers (see Channel Disturbance binder)
Blank "Large Failure sketch" forms
Tatum and pencils
Field notebook
compass
Hip chain*
30 or 50 m tape
Stadia Rod
Flagging (pink and black striped)
Black Sharpie
camera

MAPPING
On mapped channels, locate the slide on the map according to the nearest identifiable feature (step, headcut, log) and distance from the nearest downstream benchmark. Note the date, volume in cubic yardage, and type of failure on the map with an arrow pointing to the location of the failure event. For larger failures, sketch the feature to scale on the map. If GPS coverage is adequate, use the Geo7x to log a location for the feature.

MEASUREMENT
Measure the length, width and depth at one or more transects along the slide. It is often easier to measure slope distance, but be sure to measure depth at a right angle to length and width. Volume = *average* L* *average* W* *average* D. Historic protocols record volumes in cubic yards.

FLAGGING
Flag the feature with pink and black striped flagging. On the flagging, write the date, displaced (cumulative) volume. If the feature was previously flagged, note both "new" and cumulative volume. Smaller features of less than 3 y^3 may be flagged with an initiation date and volume but needn't be tallied in the notebook.

NOTEBOOK
At the top of each page, note: Date, observer initials, and tributary identifier.
Gaged watersheds have 3-letter identifiers (POR, HEN...). Ungaged watersheds (South Fork) have single or double letter identifiers (b, d, ff…). In addition to the letter designator, smaller forks may have a number designator (YOC2). Refer to the subwatershed maps for these.

Make two columns in the notebook. Use left column for feature location and right column for feature description. For mapped channels, record the distance of the slide from the nearest DS BM (meters). Also note the distance and azimuth to a nearby "step", "headcut", or other previously mapped feature. (This may save you time backtracking to the DS BM). For unmapped channels, record location as distance from the nearest downstream confluence. Displacement volume estimate and description are recorded in the right column. Note the type of failure that occurred (bank failure, tree-throw, rotational/debris slide, etc.), the newly displaced and cumulative volume of sediment and the volume stored on-site. If the failure volume is greater than 10 y^3, complete a "Large Failure sketch".

LARGE FAILURES > 10 CUBIC YARDS
Measure and sketch the slide void, deposition, and position relative to the stream. Complete all information on the sketch form. "Plan view" is from above, "Front view" is as you view it from the downslope side, and "X-section" is viewed horizontally from the upstream side. These needn't be fine art, just quick sketches drawn to approximate scale. Where possible, photograph these slides using stadia rod for scale. According to historic protocols, final volumes are recorded in cubic yards.

OFFICE FOLLOW-UP

1. Place completed "Large Failure Sketch" forms in the "Failure Survey" folder, and the notebook in the incoming data drawer.

2. Note the tributaries you visited on annual status sheet in the “Failure Survey” folder, incoming data drawer.
3. Log the GPS data file in the data records binder for later processing.
4. Annually update GIS shapefiles: failpt_yy and fail_yy with map and processed GPS data.