FAQ for Design Guideline for Rigid Frame Driftwood Reaper Joined to Existing Sabo Facilities
(in reference to March 2020 Version*)

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* Prior to the introduction of entrapment arrangement in a convex layout.

Q1 What kinds of stream are unsuitable for proposed driftwood reapers?

A1 Upstream sediment reservoirs may not be appropriate for the planning and another section of steam, in a lower section, would have predominance in the following cases:

- ✓ Access road for the related works is unavailable, abandoned e.g., resulting in presumed prohibitive costs for temporary works.
- ✓ Streams with extremely U-shaped or steep V-shaped cross-sectional dimensions may be off-mark since the width of sediment reservoir is not widened with sedimentation, a disadvantage in terms of efficiency.
- ✓ Landslide-plagued areas, where varied sediment surface can induce additional sliding and bank erosion.
- ✓ Gravel-armored sediment reservoir surface with large boulders, entailing fine particle underneath, resulting in work difficulties.
- ✓ Excessive meandering or curved section (a formation of unit components in a convex layout is forthcoming in response to such difficulties.).

  Note 1: Disproportionately large spillway cross-section in relation to the basin area is sometimes seen due, in part, to insufficient wording in the previous version of "Debris Flow and Driftwood Countermeasures Design Technical Guidelines (NILIM)." They are open to this guideline.

  Note 2: Deregulation of clear-cut in nationally owned forest has led to decreasing major driftwood with tangible logs and to increasing sediment washouts as was seen after the WWII in Japanese homeland. Basin-wide revision may be needed in such cases.

Q2 Would installation of driftwood countermeasures in and of itself increase planned sediment reduction/cut volume?

A2 Backwatering elevation on sediment surface may reduce temporal sediment discharge to downstream at the most to intruded height of entrapment structures. With impoundment and standing water caused by driftwood clogging may sustain and elongate such an entrapment period where suspended sediment surface fluctuates between 1/2 and 2/3 of original stream gradient. Note that such an encouraging insight is yet to be admitted officially by related

authorities since the current version in effect since 2016 area is sometimes seen due, in part, to insufficient wording in the previous version of "Debris Flow and Driftwood Countermeasures Design Technical Guidelines (NILIM)" did not reflect it.

Q3 Many existing sabo facilities were designed and executed prior to major Japanese technical code revision in 1977, whose interior parts under capped dam crest are not robust enough. Are they suitable for joining driftwood reapers?

A3 In case facilities are unfit in regard to stability analysis (NG), overhaul reinforcement is inevitable with no exception. In line with the basin-wide erosion control plan, it is advisable to make the facility wholly hydraulically consecutive and permeable, into a steel-frame sabo dam. Such renovation is surely adequate over partial augmentation of functions such as driftwood reapers.

This reasoning is valid to cases where recasting of the entire spillway section after the whole structural removal, due to marked stiff cap of the crest or to presence of hard boulders within the dam, leading to disadvantageously expensive work expenditures. Planners opt out the augmentation for sabo facilities where existing ones are neither demolishional nor suitable for major refurbishing.

(Similar question)

Q3-1 Are sabo facilities of long span suitable for the planning of the installation, as with "double-wall (steel structure) " and/or "sabo soil-cement"?

A3-1 Improved upgraded type of driftwood entrapment structures is under discussion and shall be introduced in the next revision of the design guidelines.

Q4 In some streams, flash floods with less sediment entailment are more frequent (dominant), resulting in a dynamic fluctuation of stream bed. What are some of engineering considerations to be taken?

A4 Entrapment reservoir (so-called "pocket") upstream of sabo facilities in concern is occasionally washed away and scoured, resulting in more entrapping space (volume). This is an evident advantage. Bank protection may be in need, if on the side of sediment reservoir, there are concerns of accelerated landslide and/or sediment wash-out with such potential.

Q5 There could be a confluential point right upstream of the planned site. What are some of engineering considerations to be taken for driftwood entrapment planning?

A5 Fundamentally, placing facilities at anomalous points is to be avoided following existing technical codes, such as in unwanted turbulent or drifted waters. In case one stream is principal

and the other is subjugated in discharge and sediment/driftwood potential, planners can target the former chiefly, for example. Namely, planners can follow engineering reasoning.

Q6 Vegetation may advance into the sediment surface, covering the surface regardless of driftwood supply from the upstream. What are some of engineering considerations to be taken for driftwood entrapment planning?
A6 Regular waterway on the sediment reservoir drifts one way or to the other, causing biased plant vegetation. Their root systems are normally shallow and do not develop well. Expecting much on stream-side trees for entrapping or for anchoring of inflowing floating logs is deemed unwise. Vegetation removal is necessary for structural placing.

Q7 Land acquisition for Japanese sabo facilities has been carried in line with the related directive in 1971, only up to sedimentation line estimated in the planning, with temporal back-sanding included. Planned driftwood entrapment structures may induce backwatering and water impoundment. Is additional acquisition of the right-of-way for stream works always necessary?
A7 The objective of sabo facility planning and its works is sediment. Therefore, would-be-impounded zones beyond sedimentation is not included in erosion control planning; and no additional land acquisition or allowance is necessary. Please request confirmation to due national authorities in this matter.

Q8 Are there concerns such that other public facilities or utility lines may subject to damage in cases driftwood entrapment reapers induce bank erosion by standing or running flood waters or by acute meandering/scouring?
A8 In near streams there are flooding risk of various kinds - sediment, driftwood or other floating objects-, be they in a short duration or unpredictably abrupt events. Overall risks are to be understood comprehensively. In case clear and present danger is evident, pre-consultations between/among related regulators and facility managers are to be held. Please request confirmation to due national authorities in this matter.

Q9 Floating logs are to be removed before the next floods. For those boosted entrapment by the driftwood reapers under planning, what kind of public expenditures is suitable for the purpose, of emergency works or of maintenance?
A9 This guideline is drafted for planners and designers in mind. At present, facility management after the installation including, but not limited to, due budget lines or removal works is to be up to each specific facility/basin management authorities.

Q10 There are many cases where earth retaining weir is present in the upstream of planned sites, placed by other planning such as forest conservation. Driftwood structure control can have interactions mutually. When planners can choose the priority, is there an expert rule to follow?

A10 Some sediment control planning allows planners to start from the downstream and go to the upstream, allowing stream filled-in sediment to be the bases of the upper weirs. Namely, structural erosion control facility planning is allowed to be adjusted in each stream environment (and social context).

[In flood control planning, embankment is from the downstream whereas levee installation is from the upstream, for reference.]

Starting from the downstream may be of reason, or from the upstream, is dependent on the nature of the streams, for driftwood control planning. In the case where driftwood reapers are planned to boost the entrapment function onto the existing facilities, effectiveness and agility of structural installation may be examined with comparison of planned entrapment volume and economic costs, and so on.