

Riprap, Retaining Walls, and Other Erosion Measures

~~(C)~~ Riprap, Retaining Walls, and Other Erosion Measures (Note: this section addresses shoreline-related measures associated with waves and water erosion. Retaining walls in this section are lake-based retaining walls, also called seawalls. Land-based retaining walls or other landscaping measures are addressed in Section ____.)

(1) Policy

(a) Riprap, retaining walls, and other erosion measures along the shoreline should only be utilized for the purpose of stopping or reducing lakeshore erosion.

~~(a)~~ (b) Retaining walls significantly alter shoreline/lakeshore characteristics. They create a totally unnatural environment shoreline which causes alteration of wave actions, beach dynamics and shoreline erosion patterns. Retaining walls reflect and accelerate wave energy, causing increased erosion on adjacent shorelines. Retaining walls should be constructed only to stop lakeshore erosion.

(c) Alternatives to retaining walls, such as restoration of natural shorelines or riprap, should be explored first. Retaining walls should be constructed only as a last resort.

~~(b)~~ (d) Riprap and Retaining walls which do not follow the natural contour of a lake have a high probability of contributing to erosion of neighboring properties on adjacent shorelines and may have adversely impactsing to the lake and lakebed.

~~(c)~~ Log retaining walls, including logs adequately pinned to a concrete foundation, are preferred to concrete retaining walls.

~~(d)~~ Concrete is the least desirable construction material in relation to wood and native stone. Concrete should only be used in locations where no other reasonable alternatives exist.

(e) On Swan Lake and Lake Mary Ronan, waves and water erosion typically only affect shorelines for a limited time, during limited high water occurrences in spring and early summer. Alternatives to retaining walls and riprap should be explored first. Retaining walls or riprap should be constructed only as a last resort.

Comment [1]:
Moved to these to standards section below

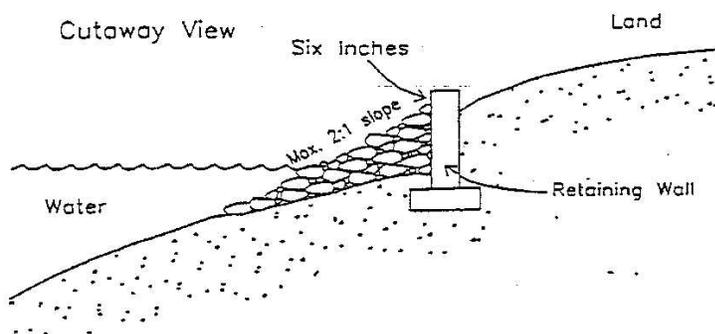
(2) Standards

(a) Soft shoreline stabilization methods such as vegetation, gravels, cobbles, and/or logs should be explored first.

- ~~(a)~~(b) Riprap and Retaining walls shall only not be permitted in areas where active erosion processes are not is evident.
- (c) Riprap and/or retaining walls shall only be permitted when no other reasonable alternative exists.
- (d) Projects designed to extend the land area into the lake shall not be permitted.
- ~~(b)~~(e) Additional permits may be required by the US Army Corps of Engineers, the Confederated Salish and Kootenai Tribes, Montana Department of Environmental Quality, Montana Department of Natural Resources and Conservation. A Lake County Floodplain Development Permit may also be required.
- (f) Soft shoreline stabilization method standards:
 - (i) Soft shoreline stabilization projects should be designed to absorb/dissipate wave energy and re-create or maintain a gradual sloped shoreline.
 - (ii) No fine materials (sands, silts, clays) shall be placed below the mean annual high water elevation.
 - (iii) If fine materials are placed above the mean annual high water elevation, they should only be utilized for the purpose of establishing native vegetation. Appropriate methods should be incorporated to prevent introduction of fine materials into the lake.
- (g) Riprap standards:
 - (i) If soft shoreline stabilization methods are not feasible to control shoreline erosion, riprapping shall constitute the next acceptable method of erosion control.
 - (ii) Riprap shall only be permitted in areas where active erosion is evident.
 - (iii) Riprap rock shall be angular and sized properly for the specific task.
 - (iv) All riprap rock shall be free of silts, sand or fines and acquired from a site outside the Lakeshore Protection Zone. A limited amount of large cobble and boulders lying on the lake bottom and not part of the lakebed armament may be picked from the lakebed and used for riprap, provided it can be picked from the lakebed without excavating any fine lakebed materials and an armament of rock or gravel remains on the lakebed in the work area to mitigate impacts to water quality. The removal of any rock which exposes silts, sands, or fines is prohibited.
 - (v) Riprap rock shall be placed at a maximum slope of 2:1 (2 feet horizontal to 1 foot vertical).

- (vi) Riprap rock shall be placed at or landward of the mean annual high water elevation. Portions of the riprap may be placed below the mean annual high water elevation to achieve a 2:1 slope, however, the project may not extend land area into the lake.
- (vii) Riprap should conform to the contour of the existing shoreline.
- (viii) Riprap should only be installed when the lake level is below the mean annual high water elevation.
- (ix) Filter fabric may be required to be placed along the shoreline and incorporated into the riprap design to inhibit erosion and the washing of fines through the riprap.
- (h) Retaining wall standards:
- (i) In situations where riprap will not suitably address the erosion, the following materials, in order of preference are allowed: stone wall, wood wall, rock-faced concrete wall, stamped concrete wall, or bare concrete wall.
- (ii) Retaining walls shall only be permitted in areas where active erosion is evident.
- (iii) Retaining walls shall be constructed at or above the mean annual high water elevation.
- (iv) Retaining walls shall conform as close as possible to the contour of the existing shoreline.
- (v) Retaining walls designed to extend land area into the lake shall not be permitted.
- (vi) If more than twelve vertical inches (12") of retaining wall is exposed on the lakeward side of the wall, riprap (complying with the above riprap standards) shall be placed on the lakeward side of the wall such that the rock shall extend to within at least six inches (6") of the top of the wall when placed at a maximum slope of 2:1.
- (vii) Material excavated for placement of the footings may be used as backfill on the landward side of the wall or otherwise be deposited outside the Lakeshore Protection Zone. Excavated material may not be deposited on the lakebed.
- (viii) The landward side of the retaining wall shall not be elevated above the pre-existing slope. Backfill shall be limited to that amount necessary to re-establish the pre-existing slope and contours of the landward side of the retaining wall.

- (ix) Within five feet (5') landward of any retaining wall, backfill shall consist of easily drained gravel, rock, stone, sand or a combination of the above. No attempt should be made to establish grass or a yard immediately behind a wall. Native vegetation should be used to re-vegetate exposed soils immediately after construction.
- (x) The landward side of the retaining wall shall extend at least two inches (2"), but not more than eight inches (8"), above the level of backfill to inhibit surface water runoff which may carry fertilizer, herbicides, pesticides, etc.
- (xi) Weep holes shall be incorporated to drain water and to prevent damage from freezing or hydraulic pressure.
- (xii) Retaining walls shall incorporate a filter cloth to prevent the leaching of fine materials (sands, silts, and clays) into the lake.
- (xiii) If placement of a retaining wall will cause erosion on a neighboring property, the governing body may consider approval of a groin, if determined necessary or advisable.
- (xiv) If an old retaining wall is to be replaced, the original shall be removed from the lakeshore protection zone and the replacement wall shall be constructed in essentially the same location as the old wall, whenever possible. If removal of the wall proves unfeasible or will cause environmental hazards (sedimentation, bank failure, etc.) the new retaining wall may be constructed directly in front of the old retaining wall, provided the project does not extend land area into the lake. In no case shall the retaining wall extend more than three feet (3') waterward of the existing wall. Only one such extension is allowed.
- (xv) The use of retaining walls solely for landscaping is not allowed.



(2) Standards *replaced these standards with above text*

- (a) Retaining walls shall not be permitted in areas where active erosion processes are not evident.
- (b) The preferred location of retaining walls is at or above the mean annual high water elevation whenever possible. Retaining walls shall conform as close as possible to the contour of the lake.
- (c) If an old retaining wall is to be replaced, the original shall be removed from the lakeshore protection zone and the replacement wall shall be constructed in essentially the same location as the old wall, whenever possible.
- (d) Where active erosion has been allowed to occur, new retaining walls shall be constructed no more than three feet (3') water ward of the existing mean annual high water elevation.
- (e) Retaining walls designed to reclaim property or to extend the land area into the lake shall not be permitted.
- (f) Groins shall be constructed to prevent erosion of neighboring properties where necessary or advisable.
- (g) Fill behind retaining walls shall not extend further than four inches (4") from the top of the retaining wall.
- (h) Retaining walls shall incorporate a filter cloth to prevent the leaching of fine materials (sands, silts, and clays) into the lake.
- (i) Rip rap shall be placed at the toe of the retaining wall to prevent erosion of the footings and degradation of the structural integrity of the wall.
- (j) Fill behind the retaining wall shall be re-vegetated immediately after the wall is in place.
- (k) Concrete retaining walls shall be faced with wood or some other acceptable medium to break up the outline of the wall from the lake and surrounding properties.
- (l) Weep holes shall be incorporated to drain water and to prevent damage from freezing or hydraulic pressure.

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