Riprap Placement, Replacement, Repair - Exemption Requirements

A riprap placement, replacement, or repair structure does not need a waterway permit if the project meets all the requirements below, including best management practices to protect water quality. Statute and code references for this activity include ch. 30.12, Wis. Stats., and s. NR 320.04(3) and (12), Wis. Adm. Code.
If your project meets all the requirements below, you do not need to contact DNR and you may proceed with your project in accordance with all other necessary federal, state, and local permits or approvals.

☐ The structure may not be located in an *area of special natural resource interest* (ASNRI) as defined in s. 30.01(1am), Wis. Stats., or a *public rights feature* (PRF) described under s. NR 1.06, Wis. Adm. Code.

☐ The structure is placed and maintained only by a riparian (or their authorized agent) and the structure shall be placed entirely within the riparian's zone of interest as determined by one of the methods outlined in s. NR 320.09, Wis. Adm. Code.

☐ A one-time deposit of sand, gravel, or stone under s. 30.12(1g)(a), Wis. Stats., may be associated with the structure provided the deposit is limited to the area immediately underneath or adjacent to the structure and is less than 2 cubic yards.

☐ Dredging, grading, excavation, land disturbance, and vegetation removal shall be confined to the minimum area necessary for construction. Such disturbance may also be subject to local shoreland zoning regulations or s. 30.19, Wis. Stats.

☐ Construction shall be accomplished in such a manner as to minimize erosion and siltation into surface waters and wetlands. All erosion control measures shall meet or exceed technical standards under subch. III of ch. NR 151, Wis. Adm. Code. Any area where topsoil is exposed during the project shall be immediately seeded and mulched to prevent erosion into the waterway.

☐ To minimize adverse impacts on fish movement, fish spawning, and egg incubation periods, in-water work may not occur during any of the following time periods unless timing restrictions have been waived by the department:

a. September 15 through May 15 for all trout streams identified on DNR published maps. **Note:** To determine if a waterway is a trout stream, you may use the department trout stream maps at https://dnr.wisconsin.gov, keyword "trout stream maps."

b. September 15 through June 15 on all Great Lakes tributaries upstream to the first dam or barrier.
c. November 1 through June 15 for Lake Michigan waters surrounding Door County, including Green Bay and all harbors and bays.
d. September 15 through July 1 for Lake Superior waters surrounding Douglas County, including St. Louis River and all harbors and bays.
e. March 1 through June 15 for all other waters.

Note: To request a waiver for some or all of the fish timing restrictions submit the information listed below in a voluntary exemption review request to the DNR Waterways General Question inbox. The DNR will make a determination within 15 days.

- A statement that describes the proposed activity.
- The site location.
- The construction timing and methods that will be used.
- The project scope and design.
- A demonstration that the proposed activity will not cause a material injury to the riparian rights of any riparian owners.

☐ All project equipment shall be decontaminated for removal of invasive species prior to and after each use on the project site by following the most recent department approved washing and disinfection protocols to comply with ch. NR 40, Wis. Adm. Code. **Note:** Current protocols can be found on the department website at https://dnr.wisconsin.gov, keyword “invasives disinfection.”

☐ The riprap may extend up to 200 linear feet if placed in a stream or inland lake or may extend up to 300 linear feet if placed in a Great Lakes waterbody.

☐ The site where riprap is proposed along the shoreline of an inland lake or impoundment is a moderate energy or high energy site as determined by a storm-wave height of 1.0 or greater (the Storm-Wave Height Calculator available online at https://dnr.wisconsin.gov/topic/Waterways/shoreline/erosioncalculator.html) or an *Erosion Intensity* (EI) score of 48 or greater (see below: Table 1. EI Worksheet).

☐ The site where riprap is proposed along the shoreline of a stream has a *Bank Erosion Potential Index* (BEPI) score of 20 or greater as calculated using the BEPI Worksheet (see below: Table 2. BEPI Worksheet), or the bank edge recession or lateral migration rate equals or exceeds 0.5 feet per year as calculated using methods

in s. NR 320.12, Wis. Adm. Code (found online at https://docs.legis.wisconsin.gov/code/admin_code/nr/300/320/12).

☐ The riprap is clean fieldstone or quarry stone with a diameter of no less than 6 inches and no greater than 48 inches. **Note:** This includes riprap that is sized according to the USDA, NRCS Wisconsin Supplement to the Engineering Field Handbook Chapter 16 − Streambank and Shoreline Protection using D50 sizing methods. For example, a 6-inch D50 gradation would be acceptable.

☐ To minimize the incursion into the waterway, the toe of the riprap may not extend more than 8 feet waterward of the *ordinary high-water* mark (OHWM).

☐ To minimize the barrier to fauna movement in the near-shore riparian corridor and to maximize the dissipation of wave energy, the final riprap slope may not be steeper than 1 foot horizontal to 1.25 feet vertical (1'H:1.25'V). **Note:** A slope of 2 feet horizontal to 1 foot vertical (2'H:1'V) is effective in achieving this performance outcome.

☐ The riprap does not reach an elevation higher than 36 inches above the OHWM or above the storm-wave height as calculated under s. NR 320.11(1), Wis. Adm. Code, whichever is greater.

☐ The riprap follows the natural contour of the shoreline.

☐ Filter fabric, clean-washed gravel, or coarse-grained filter bedding is used as a filter layer under the riprap.

☐ Except for the riprap and underlayer materials described above, no other material, soil, or fill may be placed in a wetland or below the OHWM of any navigable waterway.

☐ Any bank disturbed during the placement of riprap shall be re-vegetated above storm-wave height with native plantings, which may include native non-woody plants, native shrub plantings, native live stakes or native jointed plantings. The addition of soil and mulch in this location may be necessary to ensure the success of plantings. This subsection does not apply in locations intended to serve as shoreline access points in compliance with ch. NR 115, Wis. Adm. Code, or other applicable regulations, or where no such ordinances apply up to 10 feet in total length along each riparian parcel. **Note:** For the purpose of this standard, the "bank" is identified as the bank depicted in the EI Worksheet under s. NR 320.11(2), Wis. Adm. Code, and the BEPI Worksheet under s. NR 320.12, Wis. Adm. Code.

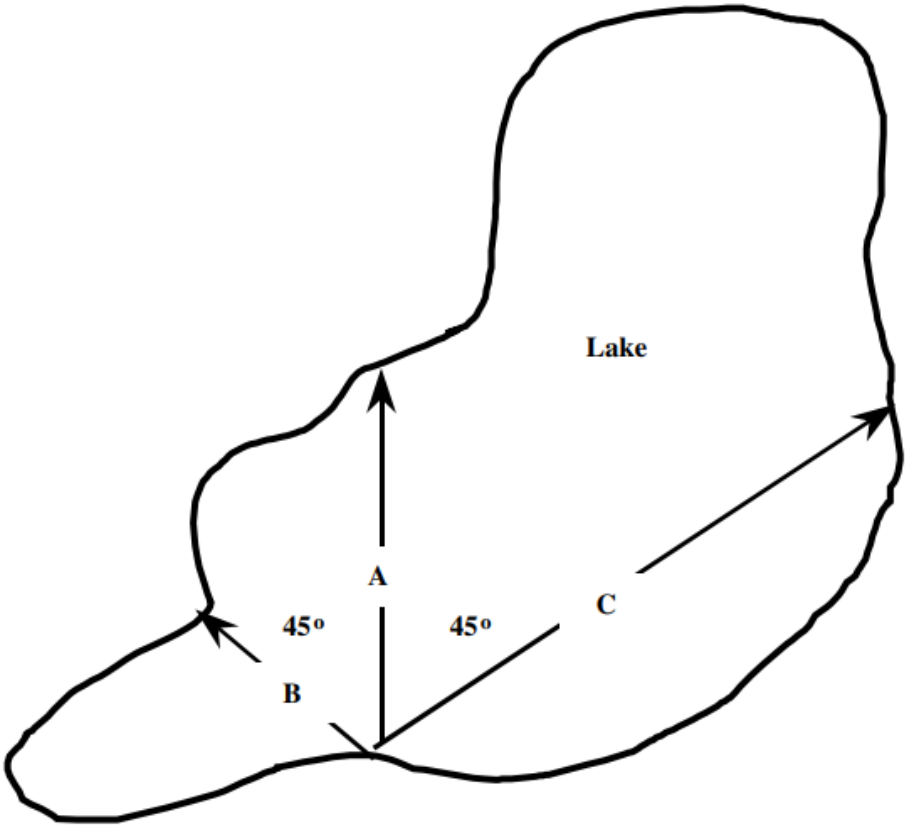
Table 1. Erosion Intensity (EI) Score Worksheet: Applicants and department staff shall use this worksheet to calculate erosion intensity pursuant to s. NR 320.11, Wis. Adm. Code.

(Adapted from Knutson, P.L., H. H. Allen, and J. W. Webb, 1990. "Guidelines for Vegetative Erosion Control on Wave-Impacted Coastal Dredged Material Sites, "Dredging Operations Technical Support Program Technical Report D-90-13, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS 39180, 35pp.)

SHORELINE VARIABLES	DESCRIPTIVE CATEGORIES Note: Erosion Intensity value is located in parentheses on the bottom of each category box							ASSIGNED EI VALUE
AVERAGE FETCH average distance (mi), across the open water to the opposite shore measure 45° other side of perpendicular to the shoreline.	<1/10 (0)	1/10 – 1/3 (2)	1/3 – 1 (4)	1 – 3 (7)	3 – 10 (10)	10 – 30 (13)	>30 (16)	
DEPTH AT 20 FEET depth of water (feet) 20 feet out from shore.	<1 (1)	1 – 3 (2)	3 – 6 (3)		6 – 12 (4)	>12 (5)		
DEPTH AT 100 FEET depth of water (feet) 100 feet out from shore.	<1 (1)	1 – 3 (2)	3 – 6 (3)		6 – 12 (4)	>12 (5)		
BANK HEIGHT height of bank (feet), measure from toe of the bank to top of the bank-lip.	<1 (1)	1 – 5 (2)	5 – 10 (3)		10 – 20 (4)	>20 (5)		
BANK COMPOSITION composition and degree of cementation of the sediments	Rock, marl, tight clay, well cemented sand (dig with a pick) (0)	Soft clay, clayey sand, moderately cemented (easily dug with a knife) (7)			Uncemented sands or peat (easily dug with your hand) (15)			
INFLUENCE OF ADJACENT STRUCTURES likelihood that adjacent structures are causing flank erosion at the site.	No hard armoring on either adjacent property (0)	Hard armoring on one adjacent property (1)	Hard armoring on both adjacent properties (2)		Hard armoring on one adjacent property with measurable recession (3)	Hard armoring on both adjacent properties with measurable recession adjacent to both structures (4)		

AQUATIC VEGETATION type and abundance of vegetation occurring in the water off the shoreline.	rocky substrates unable to support vegetation (0)	dense or abundant emergent, floating, or submerged vegetation (1)	scattered or patchy emergent, floating, or submerged vegetation (4)	lack of emergent, floating, or submerged vegetation (7)	
BANK VEGETATION type and abundance of the vegetation occurring on the bank face and immediately on top of the bank lip.	bank composed of rocky outcropping unable to support vegetation (0)	dense vegetation, upland trees, shrubs, and grasses, including lawns (1)	clumps of vegetation alternating with areas lacking vegetation (4)	lack of vegetation (cleared), crop or agricultural land (7)	
BANK STABILITY the degree to which bank and adjacent area (within 10ft of the bank-lip) is stabilized by natural ground, shrub, and canopy vegetation (outside a 10ft pier access corridor). Human disturbance is typified by tree removal, brushing, mowing, and lawn establishment.	established lawn with few canopy trees (0)	established lawn with moderate to dense canopy trees (1)	moderate to dense natural ground vegetation and canopy trees with shrub layer substantially reduced; or few canopy trees with moderate to dense natural shrub layer. (4)	moderate to dense canopy trees with moderate to dense natural shrub layer; or other natural features preventing establishment of vegetation. (7)	
SHORELINE GEOMETRY general shape of the shoreline at the point of interest plus 200 yds on either side.	Coves or bays (1)		Irregular shoreline or straight shoreline (4)	Headland, point, or island (8)	
SHORE ORIENTATION geographic direction the shoreline faces.	<1/3 mile fetch (0)	North to east to south-southeast (349°–360°, 1°–168°) (1)	South to west-southwest (169°–258°) (4)	West to north-northwest (259°–349°) (8)	
BOAT WAKES proximity to and use of boat channels.	No channels within 100 yds, broad open water body, or constricted shallow water body; or channels within no-wake zones. (1)		Thoroughfare within 100 yds carrying limited traffic, or thoroughfare 100 yds to 0.5 mile offshore carrying intensive traffic. (6)	Thoroughfare within 100 yds carrying intensive traffic (unregulated boating activity) (12)	
EROSION INTENSITY SCORE (EI)					

Average fetch: The following diagram describes the calculation of average fetch.

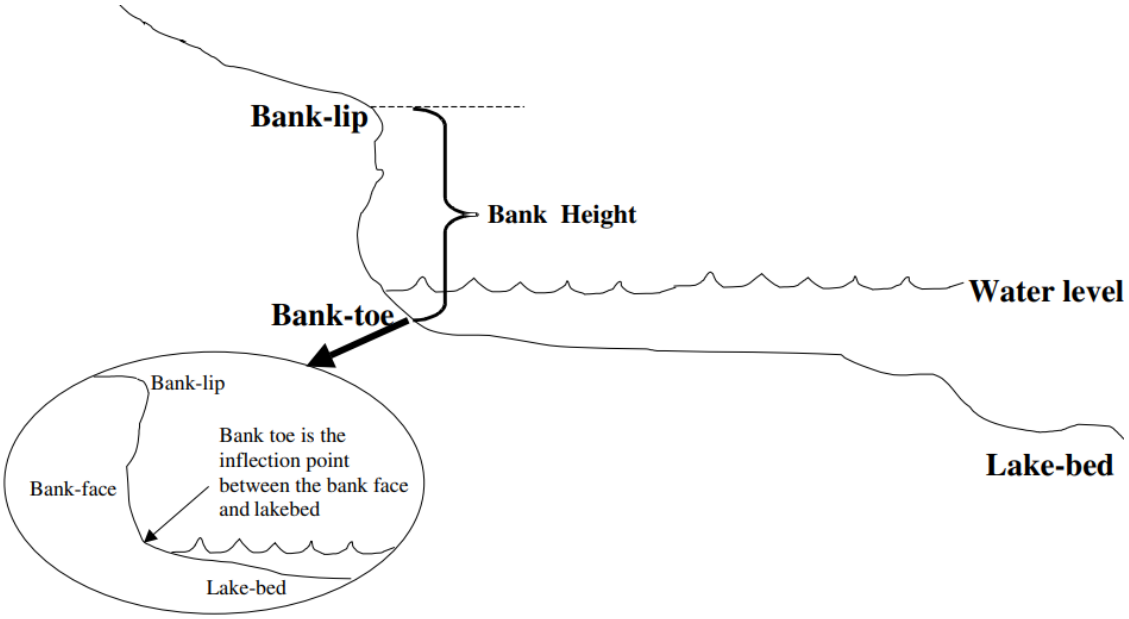


$$ave.\ fetch = (B + C)/2$$

*Aquatic Vegetation: Dense or abundant means that on average 50-100% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15. Scattered or patchy means that on average 1-49% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15. Absent means that on average < 1% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15.

*Boating: A thoroughfare is identified as physical narrowing of the waterbody that by its nature intensifies boating activity near the shore. Thoroughfares which are 250 yards or wider are not scored 12 points, unless the depth contours of the thoroughfare constrict boating activity in close proximity to one shore, and the traffic is intensive. Intensive traffic is defined by a location where at least 50% of the public boating access available must pass through the thoroughfare to reach the open water of the lake, provided the waterway has a total of more than 60 car-trailer units. Limited traffic is defined by a location where at least 30% of the public boating access available must pass through the thoroughfare to reach the open water of the lake, provided the waterway has a total of more than 40 car-trailer units.

Bank Height: The following diagram describes the features of the bank for the purpose of accurately measuring bank height. Bank height is the vertical measurement (feet) from the bank-toe to the top of the bank-lip, irrespective of changes in the water level.



Shoreline Orientation: The following lake map shows an example of accurately determining shoreline orientation.

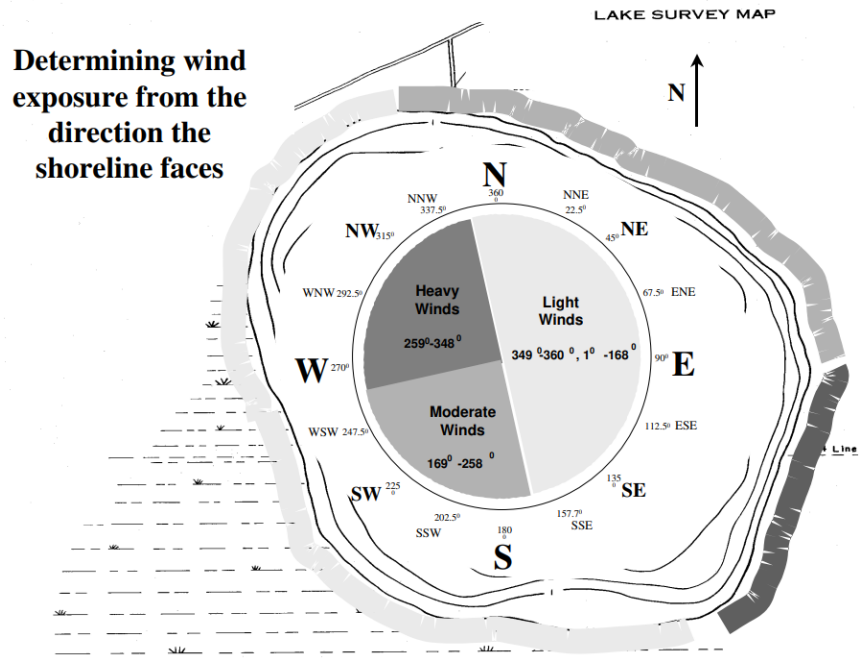


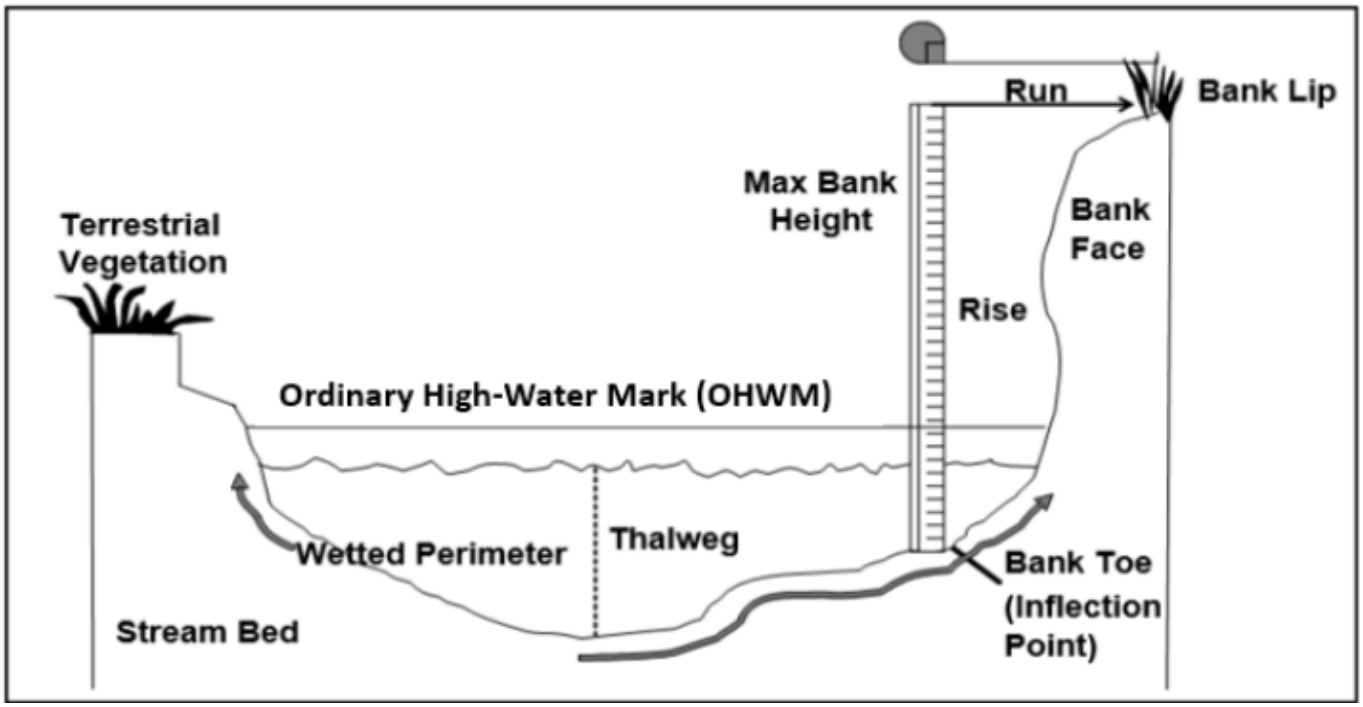
Table 2. Bank Erosion Potential Index (BEPI) Score Worksheet

(Adapted from Rosgen, David L. "A Practical Method of Computing Streambank Erosion Rate", Wildland Hydrology Inc., Pagosa Springs, CO, 10 pp.)

STREAMBANK VARIABLES	**DESCRIPTIVE CATEGORIES** Note: Erosion potential value is located in parentheses on the bottom of each category box						**ASSIGNED BEPI VALUE**
BANK MATERIALS predominance of bank materials at toe (between bed and OHWM on bank face).	Bedrock Outcrop *Stop assessment* BEPI = 0	Cobble > 3 inches (-10)	Silt/Clay (0)	Gravel < 3 inches (5)	Sandy gravel (7)	Non-plastic sands and silts (10)	
HYDRAULIC INFLUENCE OF UPSTREAM STRUCTURES distance (number of channel widths) to bridges, culverts, or dams. Calculation: Number of Channel Widths = Stream Distance to Structure / Average Channel Width	10+ channel widths (1)	5.1 – 10 channel widths (2)		2.1 – 5 channel widths (3)		0 – 2 channel widths (4)	
MAX BANK HEIGHT (feet) Divided by the OHWM Height (feet)	1 – 1.19; very low or low (2)	1.2 – 1.5; medium (5)	1.6 – 2.0; high (7)		2.1 – 2.8; very high (8)	> 2.8; extreme (10)	
BANK SLOPE (degrees) measure rise/run and translate into angel degree. Calculation: Bank Slope = Inverse Tangent (Rise/Run)	0 – 20; very low (1)	21 – 60; low (3)	61 – 80; moderate (5)		81 – 90; vertical (7)	91+; undercut (10)	
STRATIFICATION or BANK LAYERING type of soil layering occurring on the bank face.	no stratification (0)	No stratification, seepage present (3)	Stratified above OHWM (4)		Stratified above OHWM with seepage present, or stratified below OHWM (7)	Stratified below OHWM with visual seepage (10)	

BANK VEGETATION abundance of the vegetation, roots, and tree-falls occurring between the OHWM and the bank lip.	Rock outcrop bank unable to support vegetation (-7)	dense vegetation < 30% bare soil visible (-4)	Clumps of vegetation 30-59% bare soil visible (0)	Sparse vegetation 60-90% bare soil visible (4)	Vegetation absent > 90% bare soil visible (7)	
THALWEG LOCATION deepest part of the channel or the location of stream current.	Located across the stream, against opposite bank (0)		Flowing down the center of the stream channel (2)		Immediately adjacent to bank proposed for erosion control (8)	
BANK EROSION POTENTIAL INDEX (BEPI) SCORE						

*To measure the **bank slope** (degrees), the rise and run must be measured from the bank toe to the top of the bank lip. With your measure tape or stick, place the end firmly on the bank toe, parallel to the bank face and measure up to the bank lip to find the rise or max bank height. Then measure the run from the bank toe to the bank lip. From these measures, you should be able to calculate the bank slope with the formula 'bank slope=inverse tangent (rise/run)'.



*__Thalweg__ means the deepest part of the channel or the location of fastest current. To find the thalweg, the channel must be divided into thirds. The applicant needs to perform one or a mixture of tests for the three segments in determining its location. The following tests are suggested: float an object such as an orange peel down the stream to find the segment of fastest current, find the segment with the bubble line visible at the water's surface, or find the deepest part of the channel, if safe. After locating the thalweg, record its proximity to the tested bank, adjacent (closest), center, or opposite (furthest) and record its associated point value.

