

Lakeshore Underwater Beach Construction

(Revised 2008)



DNR

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Importance of Shoreline Habitats

Recent studies have shown that failure to protect the water quality and recreational value of a lake can significantly reduce lakeside property value. Shoreline plants help keep a lake clean by protecting the shoreline from erosion, trapping sediment, and removing nutrients that would otherwise pollute the water.

Many fish, wading birds, and other aquatic animals depend on plants, rocks, and logs in shallow water to provide food, nesting sites, and places to hide. Disturbing these areas with shoreline construction can disrupt critical relationships between plants, animals, and water quality, resulting in a degraded lake resource.

Shoreline Erosion and Beach Stability

Human actions can increase existing natural erosion along shorelines. For instance, a 50 mph wind over a distance of 1,000 feet can create a wave height of one foot. A ski boat operating at 20 mph, 100 feet from shore, can generate waves that are three times this high with enough force to move stones up to four inches in diameter.

Aquatic plants act as a breakwater to reduce wave energy before it gets to shore. Where vegetation is removed, alternative materials may need to be used to protect against erosion.

Erosion of sand beaches can result in financial and legal problems for shoreline property owners. Erosion can displace 20 to 50 percent of the original fill soon after a sand beach is installed, even in protected areas. Sand generally settles into the natural bottom sediment or washes away in one to six years, depending on the native soil type and rate of erosion. Stable sand beaches are particularly difficult to establish on muck soils.

Sandy beach materials that have drifted along the shoreline can expand the original size of a beach, resulting in a violation of state regulations by creating a full-frontage beach. Beach drift can also create sandbars that restrict boating and result in costly

dredging to restore water depth in nearby channels.

Pea gravel is a desirable alternative to sand. The inherent relative stability of pea gravel can compensate for the initial higher cost of the installation. Larger, heavier gravel stays in place longer than sand and reduces wave energy as water rolls the pebbles and flows between them. Therefore, beaches consisting of washed pea gravel (small rounded #12 stones at least 3/8" in diameter) will last longer than sand beaches.

Minimizing Impacts on Fish and Wildlife

Fish and wildlife in a lake will be more abundant and diverse if disturbed shoreline areas are kept as small as



possible. Similarly, diversity and habitat also will be enhanced if pea gravel is used for beach construction.

Silt deposits may, in some cases, completely cover sand, but silt falls into spaces between stones, resulting in a better quality beach area and reducing movement and resuspension of sediment in shallow area. Spaces between small stones also provide nesting areas for sunfish, bass, walleye, and other fish by improving water circulation around eggs, providing hiding spaces for newly-hatched fish in shallow water areas, and creating habitat for many aquatic insects upon which fish feed.

A thick layer of fine, compacted materials, such as sand and silt, or the use of impermeable plastic sheeting as a base for a beach, can decrease oxygen levels in the lake bed, and cause the release of phosphorus and other undesirable chemicals (including hydrogen sulfide, which has an odor of rotten eggs). In addition, small flat-shaped sand grains can bind together and make burrowing difficult for beneficial animals such as clams, crayfish, and insects.

Locating Wetlands and Significant Shoreline Vegetation

Wetlands provide a natural buffer between land and water at many Indiana lakes and are protected by state and federal law. Selection of materials for seawalls and other shoreline construction is based on wetland conditions at proposed project sites. For regulatory purposes, there are four shoreline categories. These changes are based on the extent to which the shoreline has been modified from a natural condition. They are: significant wetland, natural shoreline, area of special concern, and developed area as defined in 312 IAC 11-2.

A **significant wetland** (312 IAC 11-2-24) is an area where shoreline zones possess at least one of the following qualities:

- 1) at least 2,500 square feet of contiguous emergent vegetation or rooted vegetation with floating leaves;
- 2) adjacent wetland areas designated by a federal or state agency; or
- 3) existence of animals or plants that are listed as extirpated, endangered, threatened, or rare;

A **natural shoreline** (321 IAC 11-2-14.5) is a continuous section of unaltered shoreline or water line where the distance between lawful permanent structures is at least two hundred fifty (250) feet.

An **area of special concern** (312 IAC 11-2-2) contains at least one of the following characteristics:

- 1) more than 625 square feet of contiguous emergent vegetation or rooted vegetation with floating leaves;
- 2) altered shoreline where bulkhead seawalls are at least 250 feet apart;
- 3) bogs, fens, muck flats, sand flats, or marl beaches.

A **developed area** (312 IAC 11-2-7) does not contain any of the following characteristics:

- 1) an area of special concern;
- 2) a significant wetland;
- 3) a natural shoreline

Underwater Beach Construction Regulations

Placement of underwater beach fill requires a permit from the Division of Water under the Lakes Preservation Act (IC 14-26-2) and must follow the requirements outlined in 312 IAC 11-4-4.

Underwater beaches are not allowed along a shoreline designated as a **significant wetland** or **natural shoreline**.

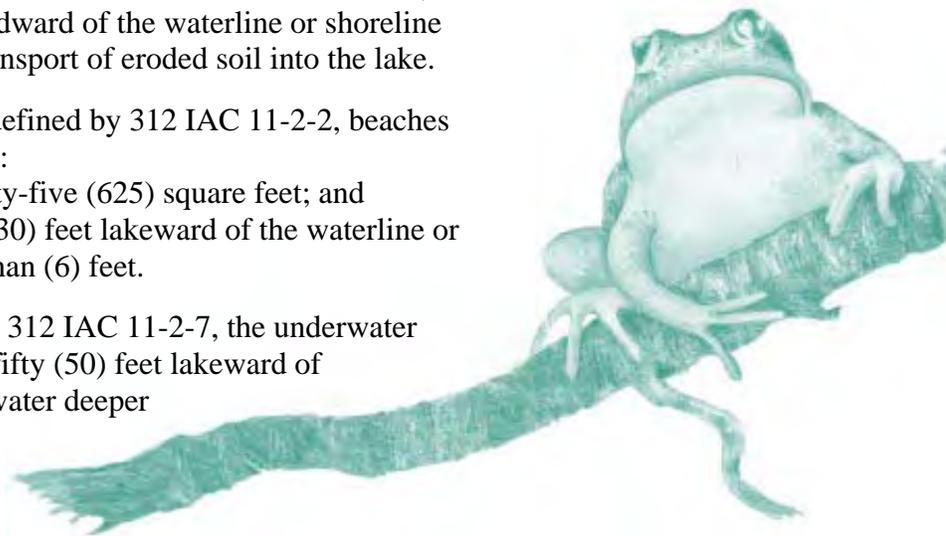
Underwater beaches in other areas must meet the following minimum criteria:

- must consist of clean nontoxic pea gravel;
- must be tapered to the waterline or shoreline;
- must be placed on no more than one-half of the landowners frontage;
- must not exceed six (6) inches in thickness;
- must not use filter cloth or impermeable materials beneath the fill;
- erosion from disturbed areas landward of the waterline or shoreline
- must be controlled to prevent transport of eroded soil into the lake.

In an **area of special concern** as defined by 312 IAC 11-2-2, beaches must meet these additional criteria:

- cannot exceed six hundred twenty-five (625) square feet; and
- cannot extend more than thirty (30) feet lakeward of the waterline or shoreline, or into water deeper than (6) feet.

In a **developed area** as defined by 312 IAC 11-2-7, the underwater beach must not extend more than fifty (50) feet lakeward of the waterline or shoreline or into water deeper than six (6) feet.



Contacts

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Revised September 2008