

POND GUIDELINE

Follow this guideline to produce a functional pond, seasonal pond, or wetland. See the attached Example Plan View and Example Watering Ramp.

ALL PONDS

Consult the landowner about the mine and pond site, Opencut operation, and desired postmining use of the pond, then:

1. In Section E2 of the Plan of Operation designate the pond as a pond, seasonal pond, or wetland.
2. In Section E3 of the Plan of Operation commit to following this guideline or submit a detailed pond design.
3. Include a plan view showing the:
 - a. Prevailing wind direction during the “ice-free” season (April–October); landowners and airports are good sources of information.
 - b. Pond location, orientation, and configuration.
 - c. Approximate island locations, orientations, and sizes.
 - d. Fence, watering ramp, and berm locations.
 - e. Operator name, site name, legal description, scale, date of drafting, and north arrow.
4. Provide the following:
 - a. Two cross-section drawings of each proposed pond and/or a contour drawing of the bottom of the pond(s) with maximum two foot contour intervals.
 - b. Proof of consultation with the Department of Natural Resources and Conservation (DNRC)

For a pond that will be fed by surface water, document that there is an appropriate volume, quality, and availability of water, and show that the pond bed will have sufficient water-holding capability. The pond bed should contain at least 35 percent clay and be compacted. Other sealing methods include bentonite and flexible membrane. Provide inflow and outflow designs. If a pond site is dry during mining, notify the Department before it is filled so proper construction can be verified.

WATER LEVELS

Accurately determine a site's existing or expected water levels. During Opencut operations use this water level information and appropriate survey methods to establish correct pond feature elevations. In this guideline, the term “normal water level” means the prevalent water table or surface water level during the year.

ORIENTATION AND SHORELINES

If able, orient the long-axis of the mine pit (future pond) perpendicular to the prevailing wind. Make shorelines irregular with points and coves for smaller ponds, and peninsulas and bays for larger ponds and lakes. Promote shoreline irregularity by mining the pit in an irregular shape. Orientation perpendicular to the prevailing wind minimizes fetch (the distance wind blows over water), thus reducing wave action. Irregularly-shaped shorelines increase edge habitat, provide various plant and animal habitats, and reduce wind and wave impacts on aquatic vegetation and shorelines.

ISLANDS

Islands increase edge habitat by increasing shoreline length, provide safe nesting and loafing sites for wildlife, and add aesthetic appeal. Create islands by leaving natural material in place or by mounding and compacting materials.

Number and Location. Island construction is optional for ponds of less than 2 acres. Construct one island in ponds with 2- to 4-acres of surface water. Construct one island per 4 acres of surface water in larger ponds. The number of islands needed in larger water bodies is negotiable. If able, locate islands in the upwind side of the pond and in other areas protected from the prevailing wind. Maintain at least a 50-foot wide, 2-foot deep separation between islands and the mainland, and keep islands at least 150 feet apart, both at normal water level. Upwind and protected areas have less wind and wave action. Adequate separation between islands and the mainland prevents terrestrial predators from reaching islands. Adequate distance between islands minimizes territorial strife among nesting birds.

Size and Shape. Make islands ranging from 25-foot diameter circles to 50- by 200-foot rectangles at the seasonal high water level. If able, orient the long axes of islands parallel with the prevailing wind. Make the shorelines of large islands irregular. Islands oriented parallel with the prevailing wind are exposed to less wind and wave action. Linear islands with irregular shorelines provide better nesting opportunities.

Height and Shore Slope. Make islands with flat or rounded tops at least 3 feet above the seasonal high water level. Grade the island flanks to 4:1 slopes that go at least 3.5 feet below normal water level. A 4:1 shore slope provides access for wildlife and reduces erosion. A water depth of at least 3.5 feet around an island controls emergent vegetation, which caters to the preference of nesting waterfowl for open shorelines and helps provide a separation between island and shoreline.

SHORE PROTECTION

Protect shorelines with riprap, cobbles, or pit-run gravel placed from 2 feet above the seasonal high water level to 2 feet below the seasonal low water level. Place hydric soil along shorelines to establish a vegetative wave-action barrier. Build windbreak berms on the upwind side of the pond using excess overburden and soil. (Contact DNRC for design information if shorelines may need riprapping with larger rock.) Hydric soil introduces aquatic plants and plant propagules to the pond, which facilitates plant and animal establishment and helps stabilize shorelines via vegetative growth. Retrieve hydric soil from existing wetlands, wet depressions, and ditches, and place it along shorelines and in shallows (contact the U.S. Army Corps of Engineers to see if a permit is needed to obtain hydric soils). Avoid obtaining soil from cattail areas since these aggressive plants are undesirable. Windbreak berm slopes up to 1:1 are acceptable if well vegetated. If an island or mainland shore shows excessive erosion before the permit is released, the Department will require stabilization of those areas.

RESOILING AND REVEGETATION

Seed upland areas at the first seasonal opportunity to minimize the amount of time replaced soil is exposed to erosive forces. Install berms, ditches, catchments, or erosion control products where substantial runoff could carry sediment into the pond or erode shore slopes. Islands must be seeded or planted. For a pond that is dry during mining, reseed and seed islands before the pond is filled.

FENCED BUFFER AND WATER RAMP

If livestock use the area, establish a buffer around the pond by constructing a wildlife-friendly, durable fence at least 50-feet back from the seasonal high water level. If livestock need access to water, construct one or more watering ramps as follows:

1. Grade a minimum 10-foot wide, 5:1 ramp extending from 15 feet upslope of the seasonal high water level to 5 feet downslope of the seasonal low water level. Skip to item 4 if the ramp foundation consists of natural gravel deposit.
2. Install an appropriate geotextile or geogrid over the entire ramp area.
3. Cover the geotextile or geogrid with 1.5 feet of pit run or graded gravel.
4. Install a fence that runs around the end and up the sides of the ramp to a gap in the perimeter fence. Keep the fence just inside the graveled ramp area so livestock remain on firm footing.

Unrestricted livestock can overgraze a pond site, trample the shore and pond bed, muddy and enrich the water, and shorten the life of a pond. Fencing will help vegetation establish and prevent livestock-related problems. Healthy vegetation filters out sediment and contaminants and provides cover for wildlife. A watering ramp provides livestock access to water. A 10-foot-wide ramp will service about 60 cows. Remove shade and other livestock attractants from around the ramp to keep livestock from loafing in or near the area.

WATER SOURCE POND

In addition to the items discussed under All Ponds, follow these criteria for a water source pond.

Typically, a pond 1 acre or smaller may be designated as a water source pond for livestock, irrigation, fire fighting, or general use. (Provide proof of consultation with DNRC.) Grade at least one shore slope to 5:1 and the rest to 3:1. Build the pond so it is at least 3.5-feet deep at normal water level. A 5:1 slope provides good access for livestock, wildlife, and other uses. Water depths of at least 3.5 feet limit the growth of emergent vegetation, thus maintaining open water.

WETLAND POND

The following criteria apply to the creation of a permanent wetland. The Department will also consider proposals for seasonal wetlands, which are wetlands that hold water through much of the summer but usually go dry by season's end. In addition to the items discussed under All Ponds, follow these criteria for a permanent wetland pond.

Size. One to 5 acres is optimal, although a pond as small as 0.25 acre can be a functional wetland. Ponds larger than 5 acres are acceptable. A group of small ponds is better for wildlife than one large pond.

Shore Slopes. Grade to 5:1 slopes along about 75 percent of the shoreline. Intersperse steep drop-off segments that are about 50-feet long and drop to a depth of at least 3.5 feet below normal water level along the other 25 percent of shoreline. A 5:1 shore slope provides good access for wildlife. Steep drop-offs keep portions of the shoreline free of emergent vegetation, which benefits certain wildlife and provides better recreational access.

Depths. Create the following approximate pond depths and coverage areas based on the normal water level:

1. Shallows up to 3.5-feet deep over 25 percent of the area.
2. Deepwater areas 8-feet over 75 percent of the area.

If able, locate the majority of shallows on the upwind side of the pond. Vary water depths across the wetland by intermixing shallow and deepwater areas. Leave steep slopes between pond bed levels. Aquatic vegetation is better protected from wind and wave action in upwind shallows. Areas shallower than 3.5-feet deep support emergent vegetation that benefits certain wildlife and attracts dabbling ducks. Deep water prevents the growth of emergent vegetation and attracts diving ducks. Intermixing shallow and deepwater areas allows the formation of a mosaic of emergent vegetation and open water, which makes good wildlife habitat.

Bed. In various places on at least 50 percent of the shallows bed, apply 6 inches of fine-textured substrate such as hydric or upland soil. Leave areas of sandy, gravelly, and cobbly surfaces. Place boulders, rock piles, and tree trunks in shallows, leaving a portion of each above the normal water level. Fine-textured substrates support wetland plants and animals. Boulders, rock piles, and tree trunks in shallows provide resting sites for wildlife.

WILDLIFE/FISH POND

In addition to the items discussed under All Ponds, follow these criteria for a wildlife/fish pond.

Size. One to 5 acres is optimal. Ponds larger than 5 acres are acceptable. For ponds smaller than 1 acre, supplemental feeding of fish may be necessary, if fish are planted. Small ponds are easier to manage and produce more pounds of fish per acre than large ponds.

Shore Slopes. Grade to 3:1 slopes along about 75 percent of the shoreline. Intersperse steep drop-off segments that are about 50-feet long and drop to a depth of at least 3.5 feet below normal water level along the other 25 percent of shoreline. Steep drop-offs keep portions of the shoreline free of emergent vegetation, which benefits certain wildlife and provides better recreational access.

Depths. Create the following approximate pond depths and coverage areas based on the normal water level:

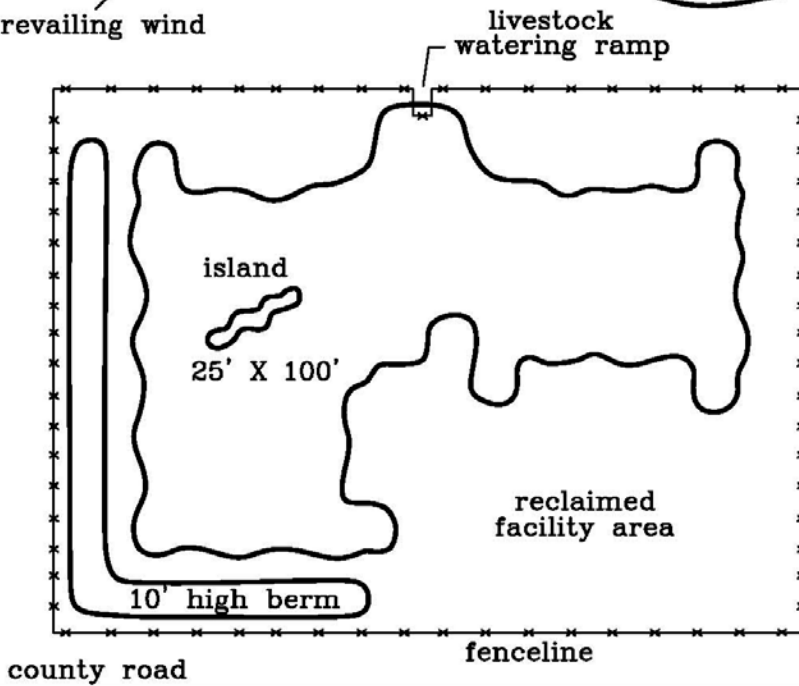
1. Shallows up to 3.5-feet deep over 25 percent of the area.
2. Intermediate depth areas 8-feet deep over 50 percent of the area.
3. Deepwater areas 15-feet deep over 25 percent of the area.

If able, locate the majority of shallows on the upwind side of the pond. Leave steep slopes between pond bed levels. Shallows are needed for wetland habitat, fish forage production, fish reproduction, and aesthetics. Aquatic vegetation is better protected from wind and wave action in upwind shallows. Intermediate depth and deepwater areas maintain open water by discouraging the growth of aquatic vegetation. Deep water reduces the potential for winterkill and helps ensure year-round water availability. Locate some intermediate depth and deepwater areas close to shore to provide better shoreline fishing.

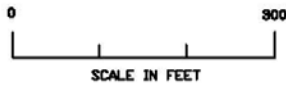
Bed. In various areas on at least 50 percent of the shallows bed, apply 6 inches of fine-textured substrate such as hydric or upland soil. Leave areas of sandy, gravelly, and cobbly surfaces. Leave intermediate depth and deepwater beds rough with sharp 3-foot irregularities. Place boulders, rock piles, and tree trunks in shallows, leaving a portion of each above the normal water level. Place these same items across intermediate depth and deepwater areas, anchoring tree trunks via partial burial in the pond bottom. Fine-textured substrates support wetland plants and animals. Rough intermediate depth and deepwater beds, and steep slopes between the various pond bed levels, provide better fish habitat. Boulders, rock piles, and tree trunks in shallows provide resting sites for wildlife, and in intermediate depth and deepwater areas they provide better fish habitat.

EXAMPLE PLAN VIEW

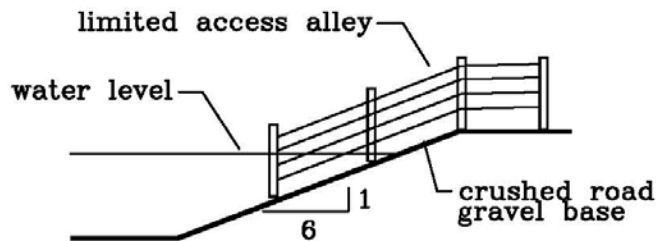
prevailing wind



SAMPLE MINING COMPANY
SMITH POND SITE
NE1/4 SW1/4 SEC. 13
T24N, R21W



EXAMPLE WATERING RAMP



Opencut Mining 10/05