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**Optimizing Capacity of Existing Process
Wastewater (Liquid Manure) Holding Ponds:
Understanding Non Pond-Input Reduction Options**

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If pond capacity is limited, reducing pond inputs is often viewed as the “silver-bullet” for maximizing existing pond capacity. In many cases, excessive water usage in the parlor does send too much water needlessly to the pond and reducing these inputs will go a long ways towards solving capacity issues. However, reducing the fresh water inputs to the pond too much can result in process wastewater that is too thick to flush with, is impossible to land apply at agronomic rates, and is at risk of packing pipelines full of solids.

Additional options for optimizing the storage capacity of existing ponds include:

- Solids separation
- Recovering “dead” storage
- Planned mid-winter applications
- Triplecropping
- Scrape systems
- Diverting tailwater away from the pond

Each of these has advantages and complications, and a combination of approaches may be necessary to achieve the needed storage. Calculations should be made to determine the total storage capacity improvement of any option prior to implementation. Some of these may take longer than 12 months to implement, so be certain that anything you propose as an interim storage modification can be implemented by the July 1, 2008 deadline.

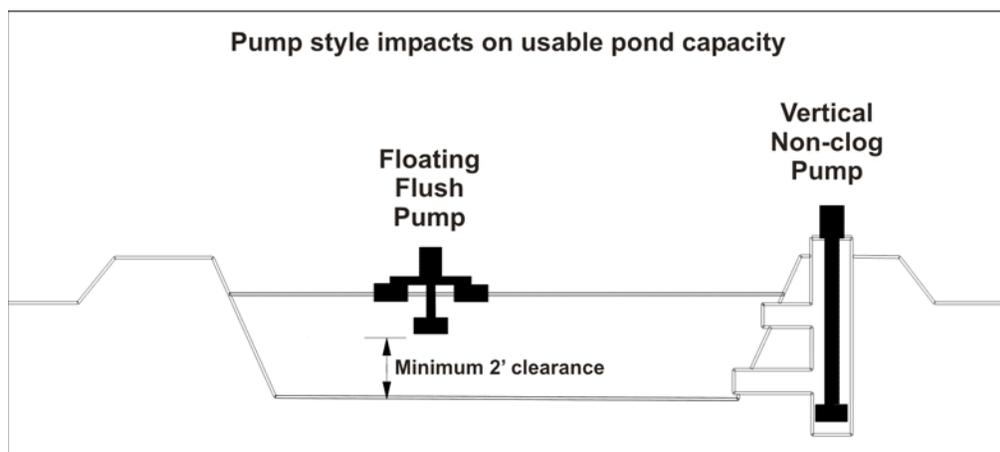
Solids Separation

Solid separation prior to the retention pond can reduce the percent solids content of the pond, effectively reducing the amount of sludge within the pond. Although the total volume recovered by separating solids may not be large, the impact on usable liquid manure within the pond can be significant. Sludge cannot be used to flush cow lanes and is difficult to land apply without risking over-application of nutrients and damage to crops. Sludge in ponds decreases usable storage space even though the actual volume of solids separated may not be large.

Recovering “Dead” Storage Space

Dead storage space is the space within the pond that cannot be accessed by the pump. Adding or replacing an existing pump with a pump that truly drains the pond can

increase the pond's storage capacity. Many floating pumps need a certain level of water in the pond to be useable, any storage below that level is "dead" storage. Likewise, some pump boxes do not drain the entire pond depth and capacity could be recovered if the sump box was deepened. A pump sump box with intakes at different levels gives the flexibility to draw from thinner or thicker areas of the pond depending on the crop need.



Winter Applications To Cereal Forages

Winter forage crops often need nitrogen to be applied just prior to the jointing stage, when the crop begins to grow taller and put on tonnage in early spring. Applications of lagoon nutrients during this time are not only necessary to fertilize the crop, but they provide a way to utilize nutrients during the winter months. The main challenges with winter applications include having fresh water available for dilution and applying an irrigation to soils that are already wet without damaging the crop through waterlogging.

The liquid manure usually needs to be mixed into fresh irrigation water in order to be applied at agronomic rates. Fresh water for dilution can be scarce during winter if relying solely on irrigation district water. If pumps are not available, some dairy operators have captured pump, rain or drain water into blocked off empty canals, then irrigated small areas at a time with the stored water. Some operators deliberately add pump water or divert roof water into ponds during winter to dilute them enough such that direct applications during the winter can be made at reasonable rates.

If done correctly, irrigating damp soils may help the irrigation run faster, effectively lowering the amount of actual nutrients applied. However, caution must be taken to avoid waterlogging. On heavier soils, planting forages on beds may help keep roots from becoming too saturated if excess water can drain off the furrows into the tail water return system. On soils with good internal drainage, mid winter lagoon applications are routinely applied with no crop injury even where soils are wet.

Add A Fall Crop To The Rotation

In a typical double crop forage system, the last time that nutrients can be applied to the corn with reasonable certainty that they will be utilized by the crop is typically in mid-August. Winter forage planted in mid- to late- fall removes only modest amounts of nitrogen until growth picks up in early February to March. Where losses of nitrogen over the winter months are likely, most of the nitrogen for the winter crop should be applied no sooner than late January. Adding a fall crop to the rotation allows for liquid manure applications into early October and provides the ability to go into the winter with a pond that is at or nearly empty.

If triple cropping with a warm-season crop such as sudangrass or growing back to back corn, be certain to plant early enough in the summer to ensure that there is enough warm weather remaining in the season to successfully mature and harvest the crop.

Scrape Systems

Scrape systems should only be used in situations where the collected manure is either exported or can be appropriately land applied. In general, for optimum crop production, only a portion of the crop's nitrogen requirements can be met with solid manure without exceeding total nitrogen application limits. The predominate form of nitrogen in solid manure is organic-form nitrogen. The nitrogen will at times be released during periods when a crop is not there to take it up, and at other times the release rate will be inadequate to supply the crop with sufficient nitrogen during periods of peak need. Often, a very large land base is needed if dry manure is used because supplementation with a more available form of nitrogen will usually be necessary.

An added challenge is that it is more difficult to moderate phosphorus applications when relying solely on scrape manure, since a high percentage of the phosphorus is bound in the manure solids.

Consult an agronomist with expertise in growing crops with manure nutrients prior to changing over to a scrape system to ensure that it will still be possible to get adequate tonnage using scraped, dry or slurry manure as a primary source of nitrogen.

Diversion Of Tailwater Away From The Pond

Some tailwater return systems send water from the field back to the pond. During the summer irrigation season this may not be an issue, but if winter tailwater needs to be contained, diverting this runoff to another field or to a tailwater pond may be a better option.

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