

Pa's Manure Management Programs addressing water quality



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Soil & Manure Management, its a good idea

- ❖ Get the maximum use of your on-farm resources
- ❖ Manure has:
 - Organic matter (water holding, nutrient holding, soil microbes)
 - Micro nutrients (Calcium, Magnesium, Sulfur)
 - Macro nutrients (N – P – K)
- ❖ Proper use of manure improves overall soil health
- ❖ Manure nutrient value:
 - N, P, K in a ton of cattle manure is worth \$11.50 (\$287/cow/yr)
 - N, P, K in a ton of broiler manure is worth \$105 (\$785/1000 broilers)
 - N, P, K in 1,000 gallons of hog manure is worth \$62 (\$34/hog/yr)

Proper Farm Mgmt is also the law

- ❖ We will cover
 - Manure nutrient management requirements relating to water quality
- ❖ All farms that use manure have requirements, requirements vary based on farm scope,
- ❖ For manure management planning, the scope of farm:
 - Dictates the level of detail in the plan
 - Dictates who can write the plan
 - Dictates if the plan needs to be submitted for approval
- ❖ In the past, the emphasis was on larger operations, **new emphasis will be on smaller operations**

Animal Operations in PA

➤ All Animal Operations (AOs)

All operations generating/utilizing manure

* Regulated by PA DEP

➤ Concentrated Animal Operations (CAOs)

High animal density farms

farms > 2,000 lbs/acre animal density

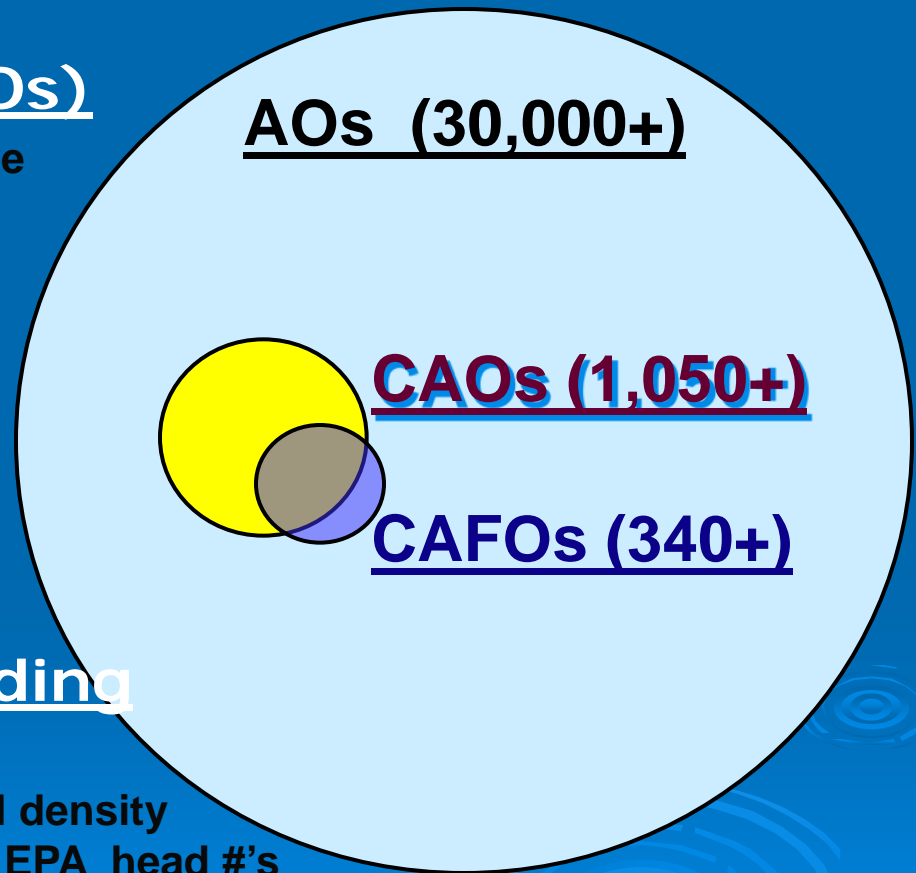
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➤ Concentrated Animal Feeding Operations (CAFOs)

Based on animal numbers and/or animal density

Farms > 1,000 AEUs, CAOs > 300 AEUs, EPA head #'s

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Animal Operations in PA

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AOs (30,000+)

❖ Concentrated Animal Operations (CAOs)

Based on animal density

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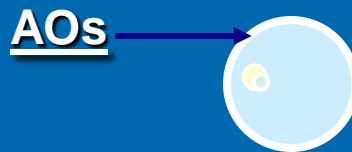
CAOs (1,050+)

❖ Concentrated Animal Feeding Operations (CAFOs)

Based on animal numbers and/or animal density

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CAFOs (340+)



Pa's Clean Streams Law

- ❖ Requires all farms to have a *manure mgmt plan*
 - Must be a written plan (including farm map), kept on site
 - Can be written by farmer or other non-certified individual
 - New planning standards being prepared for publication include:
 - N and P application rates,
 - Application setbacks,
 - Winter application,
 - Pastures
 - Barnyard runoff,
 - Storage and stacking criteria,

Manure Application Rates

❖ 3 options for developing manure rates:

1) Use manure application **charts** (*easy, but most restrictive*)

- No certified specialist required
- Based on crop and manure type
- N based if < 200 ppm P; P based if > 200 ppm P or no soil test

2) Use Nutrient Balance Sheet **worksheet** (*harder but site specific*)

- No certified specialist required
- N based if < 200 ppm P; P based is > 200 ppm P or no soil test

3) Use the PA **Phosphorus-Index** (*most complex but most flexible*)

- Will need to use an **authorized planner**
- N or P based dependent on the results of the P-index
- May allow for N based application on soils with > 200 ppm P

Application Rate, Charts

Nitrogen Based Liquid Dairy

Corn Silage	Yield Groups (ton/A)								For each 1000 gal/A less than the rate in the table, apply lbs. N fertilizer listed below.
	17-21		22-25		26-29		30-33		
	Manure gal/A	Fert N lb/A	Manure gal/A	Fert N lb/A	Manure gal/A	Fert N lb/A	Manure gal/A	Fert N lb/A	
Spring Incorporation within 1 day	9000	0	11000	0	14000	0	16000	0	14
Spring Incorporation within 1 week	13000	0	16000	0	16000	35	16000	65	10
Spring No Incorporation	16000	30	16000	70	16000	100	16000	130	6
Fall	16000	40	16000	70	16000	100	16000	130	6
Winter with cover crop	5000	75	5000	105	5000	135	5000	165	11
Winter No cover crop	5000	100	5000	130	5000	160	5000	190	6

16,000 gal max rate – 6,000 gal selected rate = 10,000 gal reduced from max rate

10,000 gal X 6 lbs per 1,000 gal reduced = 60 lbs of additional N needed

60 lbs additional N needed + 70 lbs base need = 130 lbs of N need at 6k rate

If incorp same day, 6,000 gal rate would only need 70 lbs of commercial fertilizer

Manure Application Setbacks

- Year-round manure application setbacks
 - Only relevant to mechanical manure application
 - No setbacks for pastures
 - Ranging from 100 to 35 foot depending on:
 - 100' if no buffer and not using no-till and cover crops
 - 50' if no buffer but using continuous no-till and cover crop
 - 35' setback if using a permanent buffer next to stream
 - Setbacks proposed to be established for
 - Streams; (at times when water flows in these channels)
 - Lakes, ponds, existing open sinkholes
 - Private or public drinking water source

Winter Spreading Restrictions

- “Winter” is anytime any one of the following are true:
 - The date is on or between Dec. 15 to Feb. 28, **or**
 - The ground is frozen 4 inches or more, **or**
 - The ground is snow covered
- A maximum application rate for the winter months :
 - 5,000 gallons per acre of liquid manure
 - 20 tons per acre dry non-poultry manure
 - 3 tons per acre dry poultry manure
- 25% plant or residue cover at application time
- No winter application on slopes steeper than 15%
 - A, B and C slopes acceptable

Pasture Management

- Pastures on the farm must be included in plan
 - Pastures are a crop field that must be nutrient balanced.
- ◎ Pastures need to be properly managed
 - Dense vegetation: 80% cover and 3" growth at all times
 - Farms with NRCS grazing plan are ok as well
- ◎ Stream bank fencing restricting animal access to a stream is not proposed for a true pasture
- ◎ If overgrazed, then the field would be considered a barnyard (ACA) requiring additional protections including animal exclusion from the stream

Barnyard Management (ACAs)

- ACAs must be addressed in the plan
 - These are barnyards, exercise lots, other denuded animal concentration areas
- ACA criteria to include:
 - Diverting upslope water
 - Ensuring polluted runoff goes into storage or vegetative treatment strip or system
 - Disallowing animal access to streams except properly constructed crossings
 - Keeping watering areas, feed areas, etc away from streams when possible

In-Field Manure Stacking

- In-field stacking of manure on unimproved areas is proposed to be allowed along with restrictions
- Criteria to address unimproved in-field stacking areas:
 - 100' setback from streams, water wells and sinkholes
 - Diverting upslope water where necessary
 - Placing the stack on less than 8% slopes
 - Having a dry enough manure to allow it to be stacked
 - Covering the stack if it will be there more than 120 days
- Stacking on improved areas does not need to follow these same restrictions, just no direct runoff to waters

Existing Manure Storage Requirements

- Manure mgmt plans need to ensure that existing storages do not leak or overflow
- As of 2000, all new liquid and semi-solid manure storages must be:
 - Designed by a Pa registered Professional Engineer
 - Construction must be signed off by engineer and certification kept on site
- Certain size storages need a DEP permit:
 - > 2.5 million gallons
 - > 1.0 million gallons and in a special protection or impaired watershed

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❖ Concentrated Animal Operations (CAOs)

High animal density farms

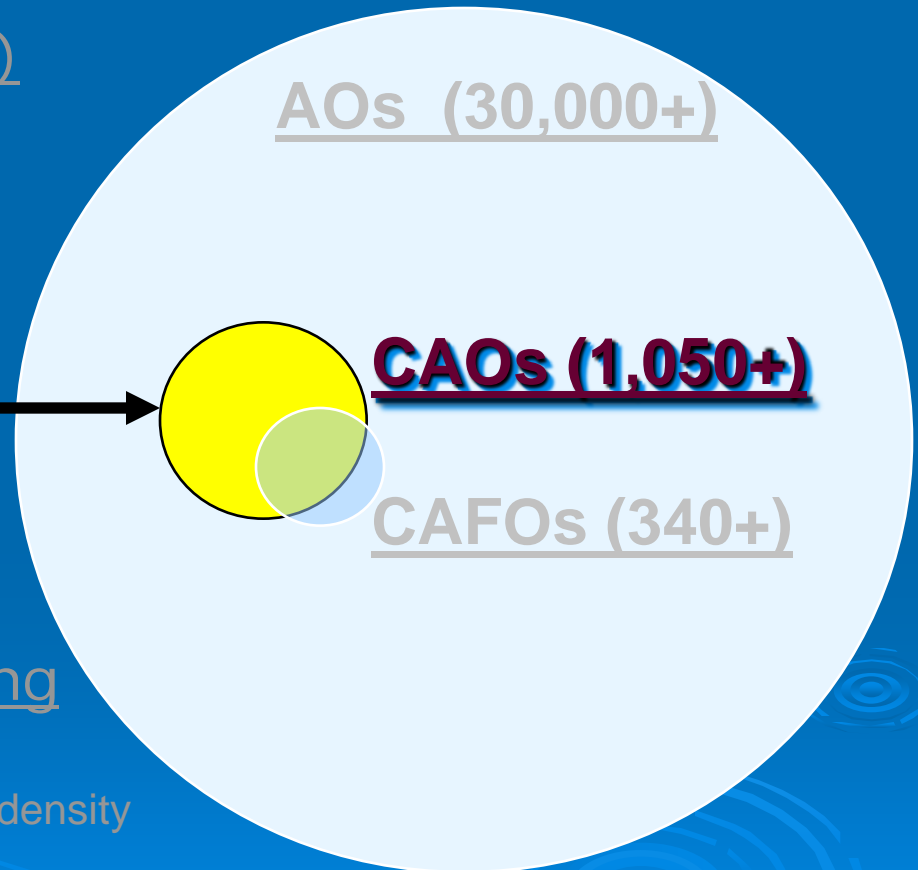
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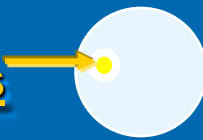
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❖ Concentrated Animal Feeding Operations (CAFOs)

Based on animal numbers and/or animal density

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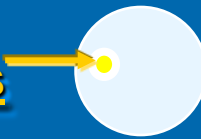
Act 38 Regulatory Program

High density animal operations are considered CAOs
(Greater than 2,000 lbs/acre, or 2 AEU's per acre)

Examples:

- ❖ 100 cows on 200 acres (130,000 lbs/200 acres = 650 lbs per acre)
Not High density therefore not a regulated CAO
- ❖ 100 cows on 60 acres (130,000 lbs/60 acres = 2,167 lbs per acre)
This is a high density operation, therefore it is a CAO

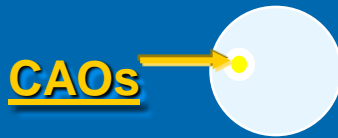
* Available acres = cropland, hay land, pasture (NOT barnyards, wooded pasture)



Act 38 Regulatory Program

❖ What are CAO operations required to have?

- A written Nutrient Management Plan (NMP)
 - Developed by certified planners
 - Submitted, reviewed and approved by conservation district
 - Public comment opportunity available for these plans
 - Annual inspection performed by program staff



Additional nutrient mgmt planning requirements for CAOs

- ❖ Restricts manure applications based on
 - Required Phosphorus-Index assessment of every field
- ❖ Fall application restrictions
 - Required 25% cover or incorporation within 5 days
- ❖ Winter application restrictions
 - Only allowed on program approved fields
- ❖ Exported manure documentation
 - Signed agreements required
 - Manure management plans required on importing sites

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Based on animal density

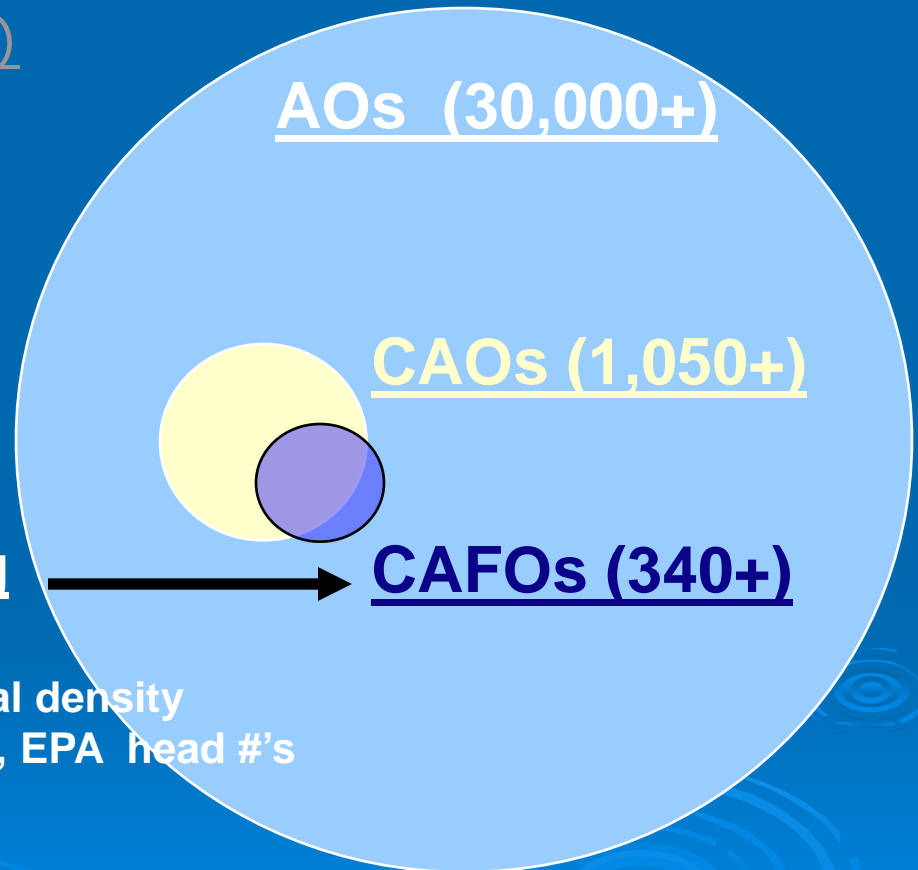
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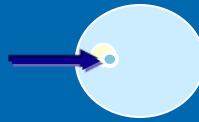
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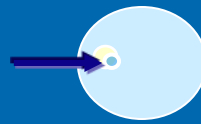
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EPA's CAFO Program in PA

- ❖ Federal program delegated to PA-DEP to administer
- ❖ Regulates larger animal operations (CAFOs) defined as:
 - More than 1,000 Animal Units (750 cows, 2,500 sows, 1,000 horses),
 - More than 300 Animal units *and* a CAO (Concentrated Animal Op.)
(~230 cows), or
 - Meet EPA animal threshold numbers
 - 500 horses
 - 700 mature dairy cows
 - 1,000 beef cattle
 - 2,500 market swine
 - 82,000 layers, dry manure
 - 125,000 broilers, dry manure
 - 10,000 sheep or lambs

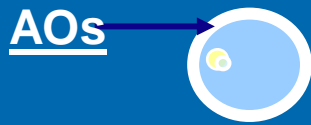


EPA's CAFO Program in PA

- ❖ Requires operation permit (NPDES) from DEP
 - Individual or general

- ❖ Generally, same NMP as CAOs:
 - Plan required to be submitted and approved
 - Application rates, setbacks, fall/winter restrictions, as CAOs
 - Exported manure requirements same as CAOs

- ❖ **But** several additional manure management restrictions on CAFOs:
 - Manure application setbacks required on more than just flowing streams,
 - 14 day in-field stacking limitation (*unless covered, or on an improved area*)
 - Manure storage permit for operations with > 1,000 AEUs
 - Winter application is looked at very closely



In conclusion...

❖ All animal farms

- Manure Management Plan (to be published soon)
- Can be written by farmer
- Addresses manure application as well as ACAs, pastures and barnyards
- No submission , review or approval

❖ Higher density animal farms (CAOs)

- Nutrient Management Plan, more detailed plan format
- Must be written by certified planner
- Plan must be submitted, reviewed and approved by cons district

❖ Larger animal farms (CAFOs)

- Nutrient Management Plan, like for CAOs (submission and approval)
- DEP CAFO Permit
- Additional restrictions on manure stacking, setbacks, & winter spreading