Animal Populations in CAST

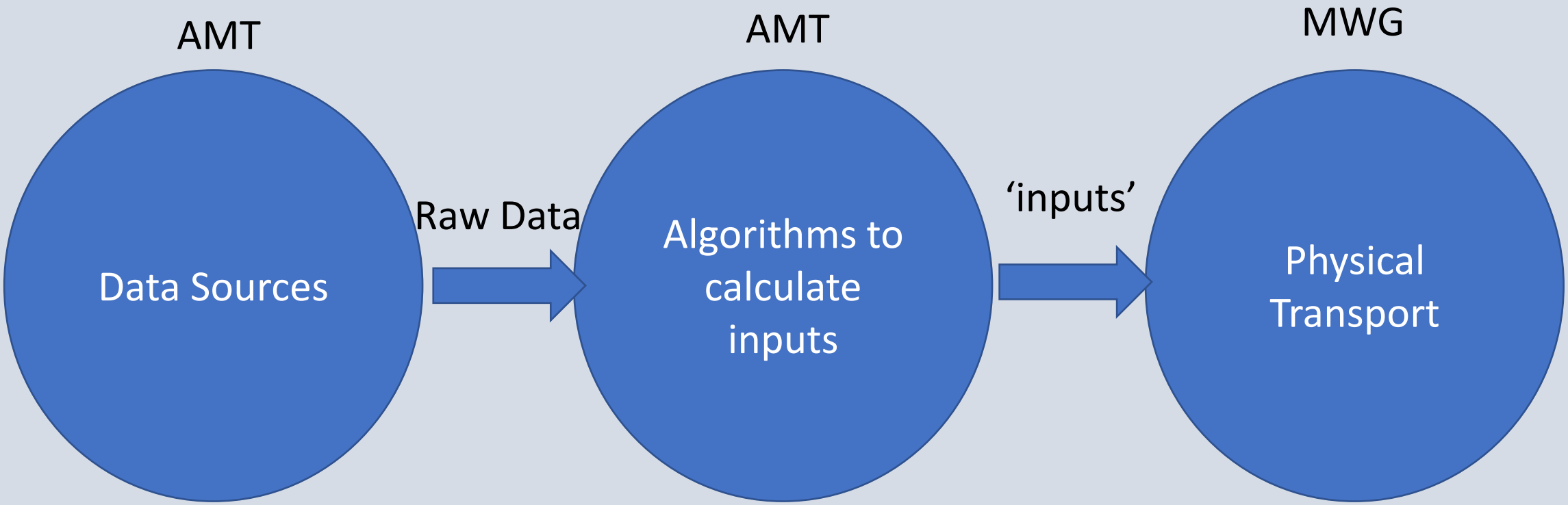
Tom Butler, EPA-CBPO

02/10/2023

Recap

- CAST nutrient application
- Three counties compared
- Nutrient management

CAST Domains



This time in the AMT: Adding Animals

Picked several types of livestock

- Beef
- Dairy
- Turkeys
- Layers

100,000 Animal Unit (AU) increase in each county

- Results vary spatially

A look at Frederick and Kent Counties in MD

- 2025 scenario with no BMPs as we currently account for Nitrogen
- Both have very similar stores of Nitrogen
  - Holds true when adding AUs

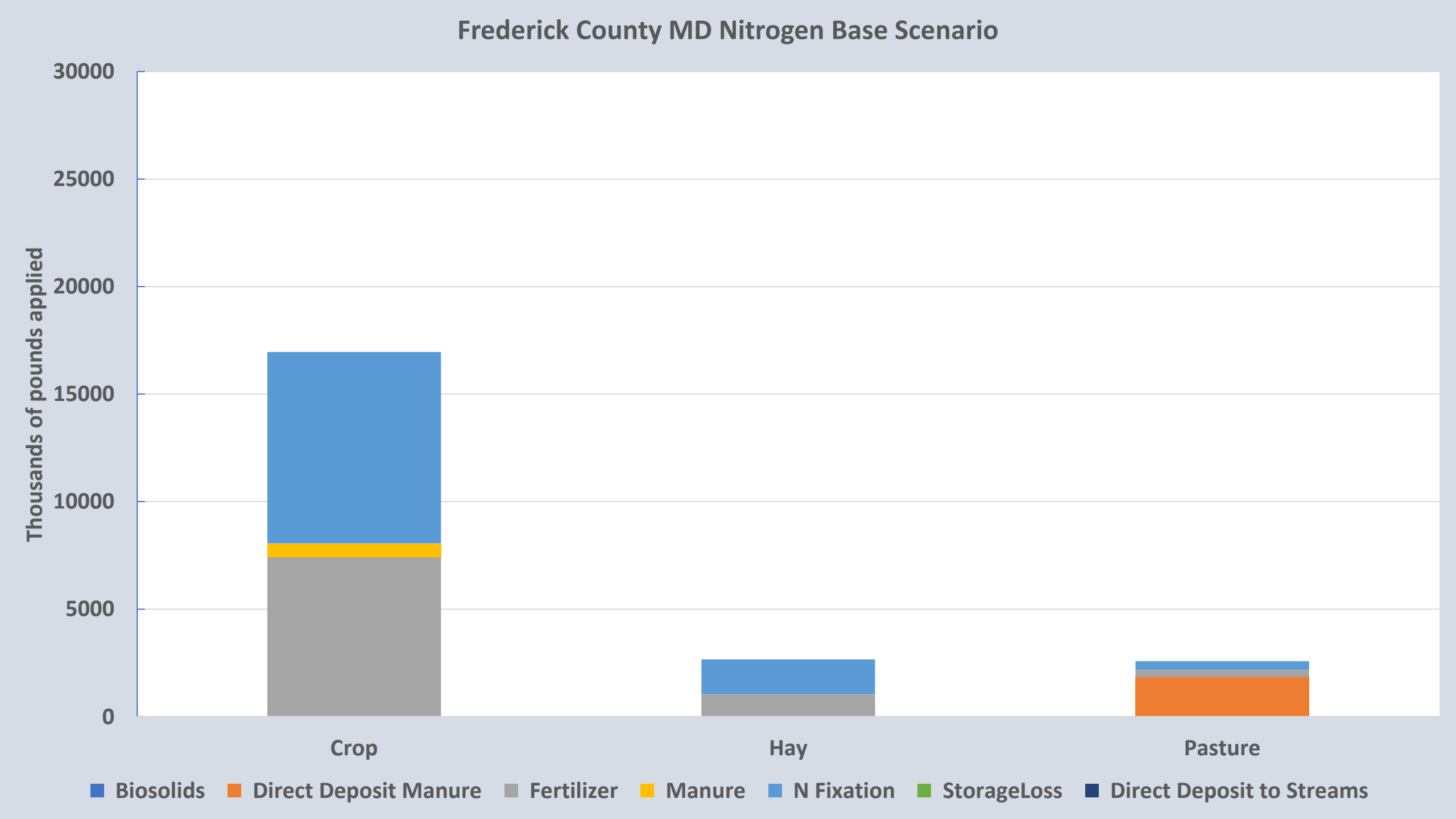
ScenarioName	CountyName	Nitrogen Stored Nutrient Lbs	Plant Available Nitrogen Stored NutrientLbs
2025 No Action	Frederick	629,235	347,348
2025 No Action	Kent	617,951	376,834

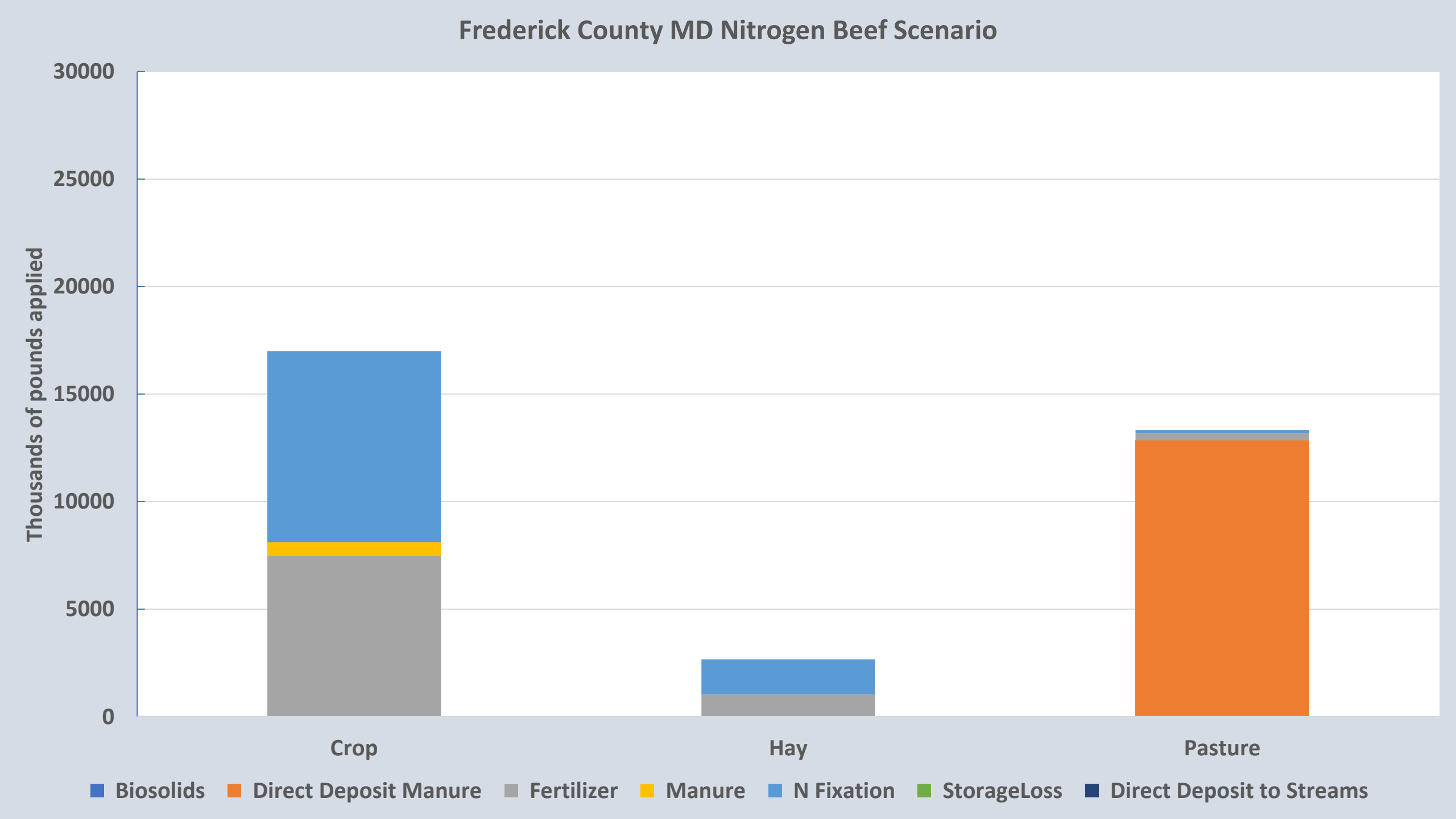
Not all N can be used the same way

ScenarioName	County	StoredManureDryLbs	NitrogenStoredNutrientLbs	Manure and Fert Eligible Nitrogen Crop Need	Fert Only Nitrogen Crop Need
2025 No Action	Frederick	18,490,026	629,235	3,573,711	5,841,256
2025 No Action	Kent	16,927,086	617,951	1,087,907	7,579,443

Frederick County, MD

- Examined the N based on the current number of AUs
- Compared this to increases in:
  - Beef
  - Dairy
  - Turkeys
  - Layers


Frederick County MD Nitrogen Base Scenario
Thousands of pounds applied
30000
25000
20000
15000
10000
5000
0
Crop
Hay
Pasture
Biosolids
Direct Deposit Manure
Fertilizer
Manure
N Fixation
StorageLoss
Direct Deposit to Streams


Frederick County MD Nitrogen Beef Scenario
Thousands of pounds applied
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15000
10000
5000
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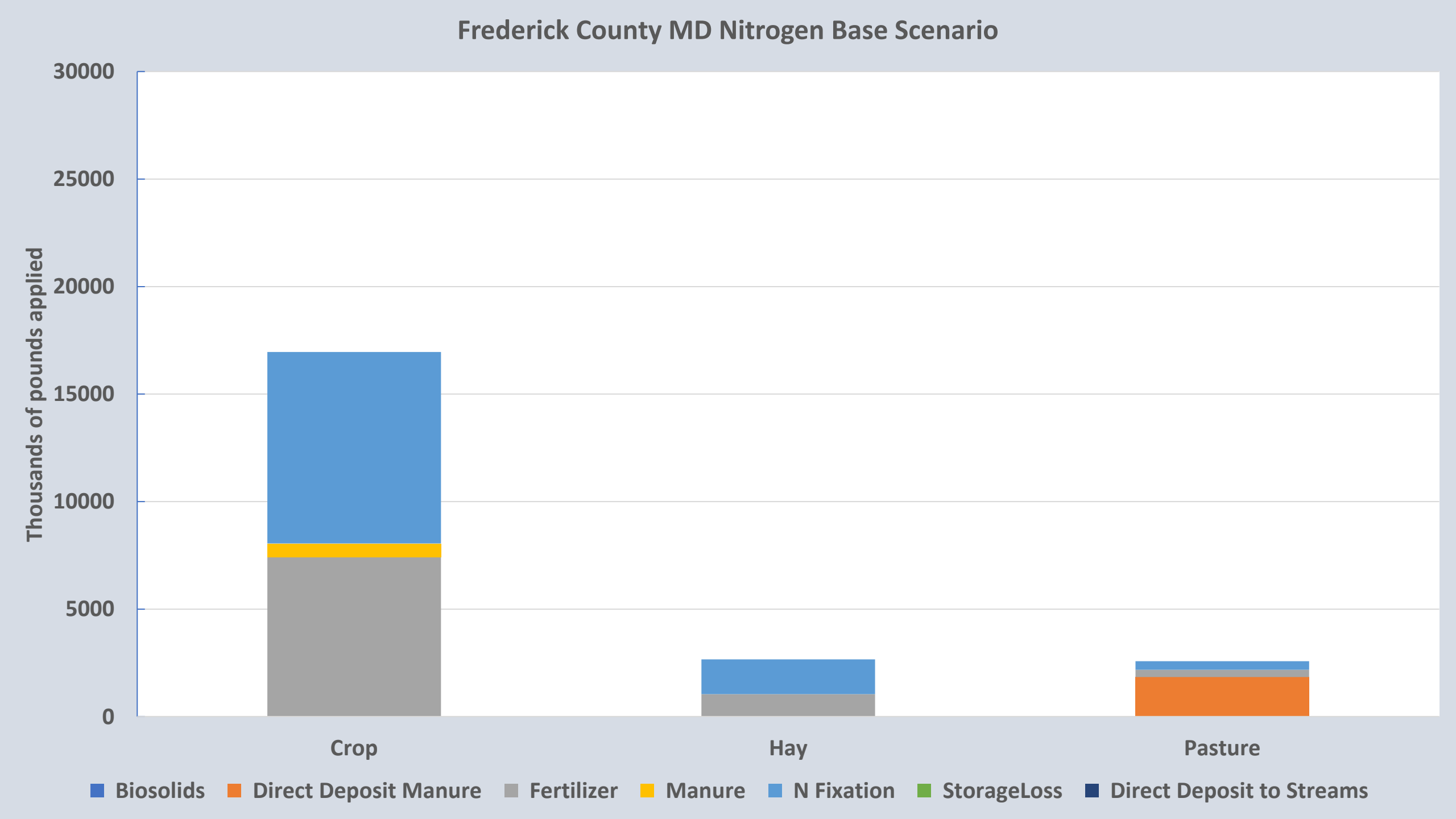
Pasture
Biosolids
Direct Deposit Manure
Fertilizer
Manure
N Fixation
StorageLoss
Direct Deposit to Streams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Thousands of pounds applied
30000
25000
20000
15000
10000
5000
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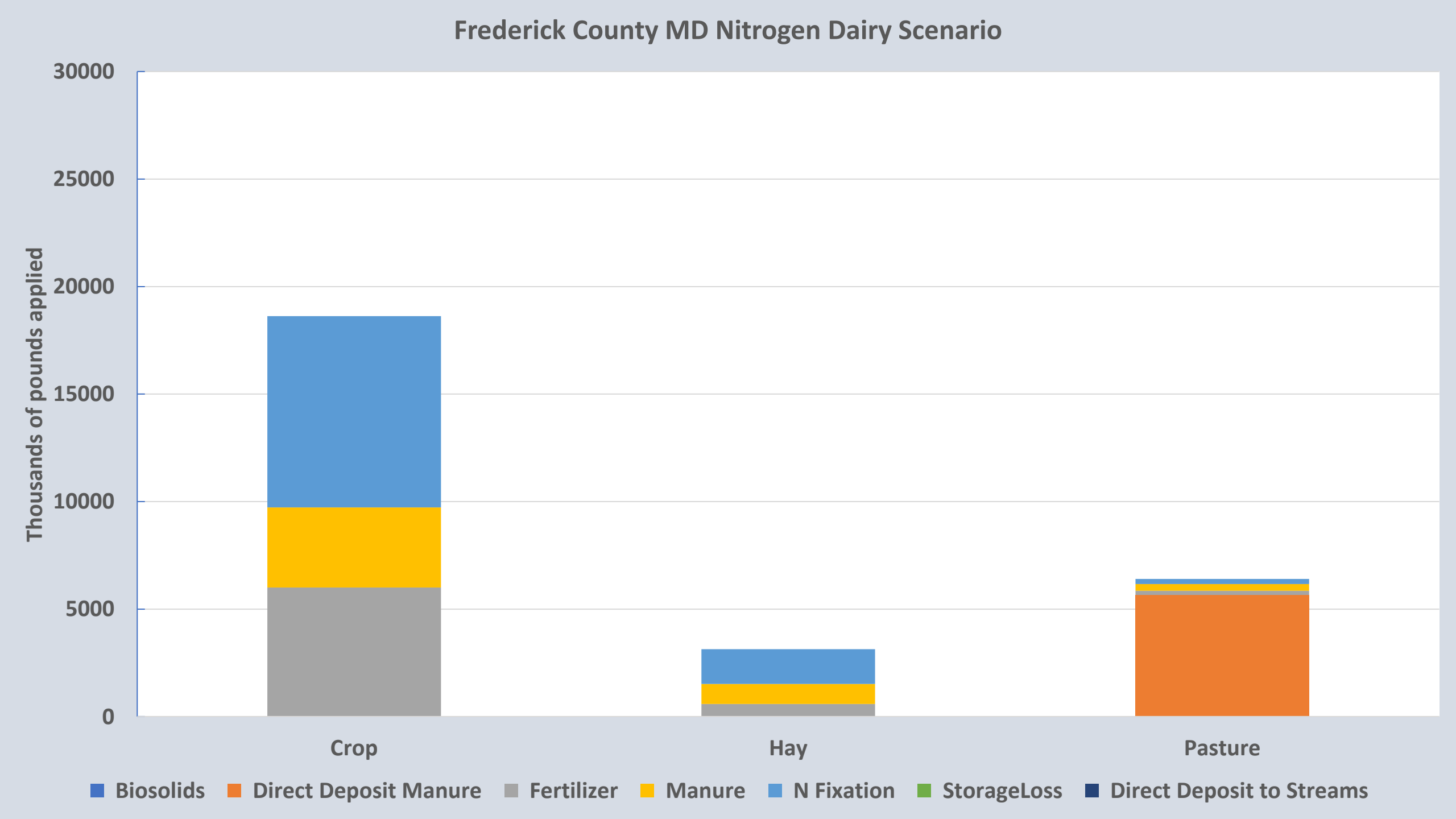
Crop
Hay
Pasture
Biosolids
Direct Deposit Manure
Fertilizer
Manure
N Fixation
StorageLoss
Direct Deposit to Streams


Frederick County MD Nitrogen Dairy Scenario
Thousands of pounds applied
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15000
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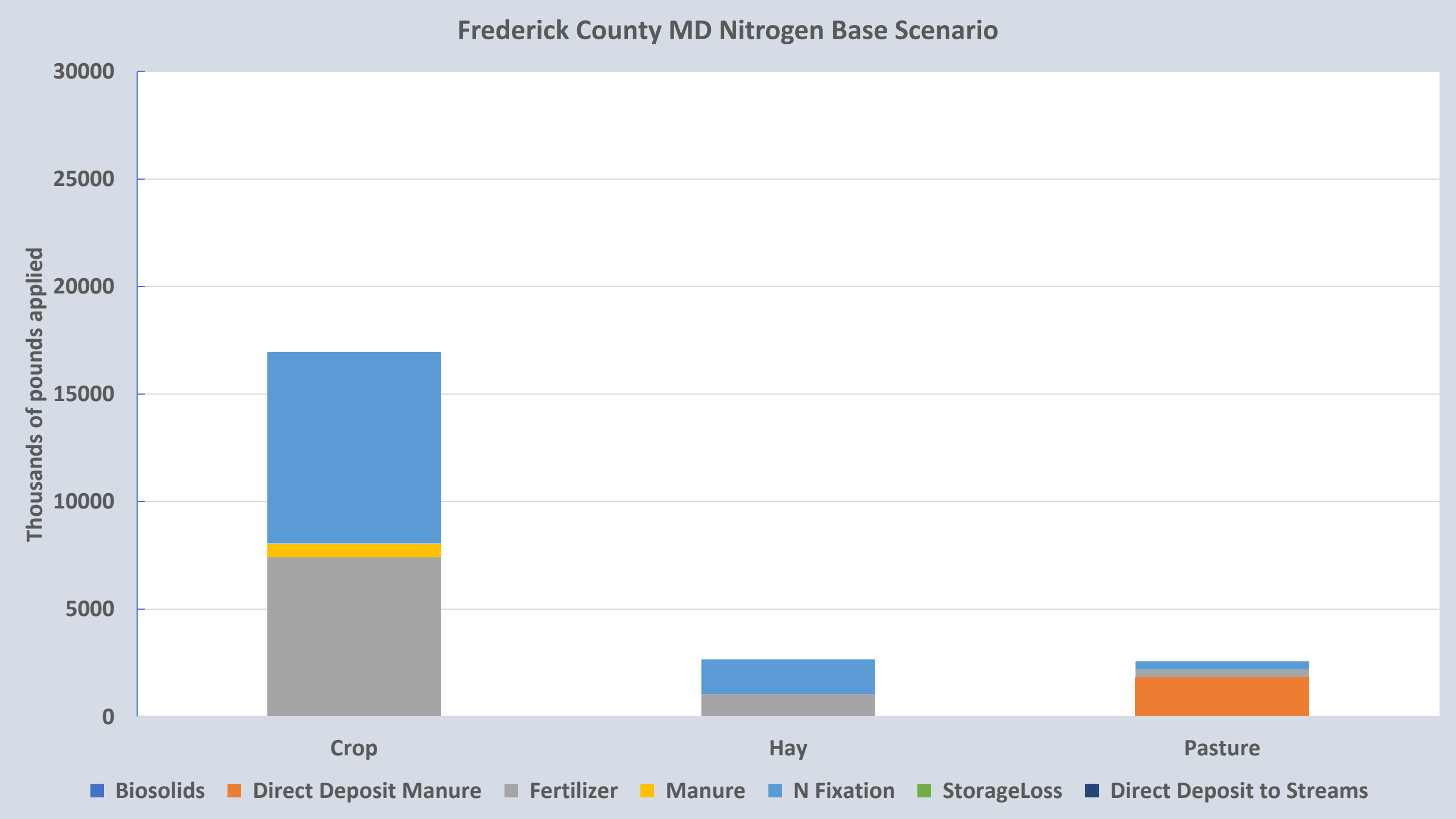
Hay
Pasture
Biosolids
Direct Deposit Manure
Fertilizer
Manure
N Fixation
StorageLoss
Direct Deposit to Streams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Thousands of pounds applied
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25000
20000
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0
Crop
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Direct Deposit Manure
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Manure
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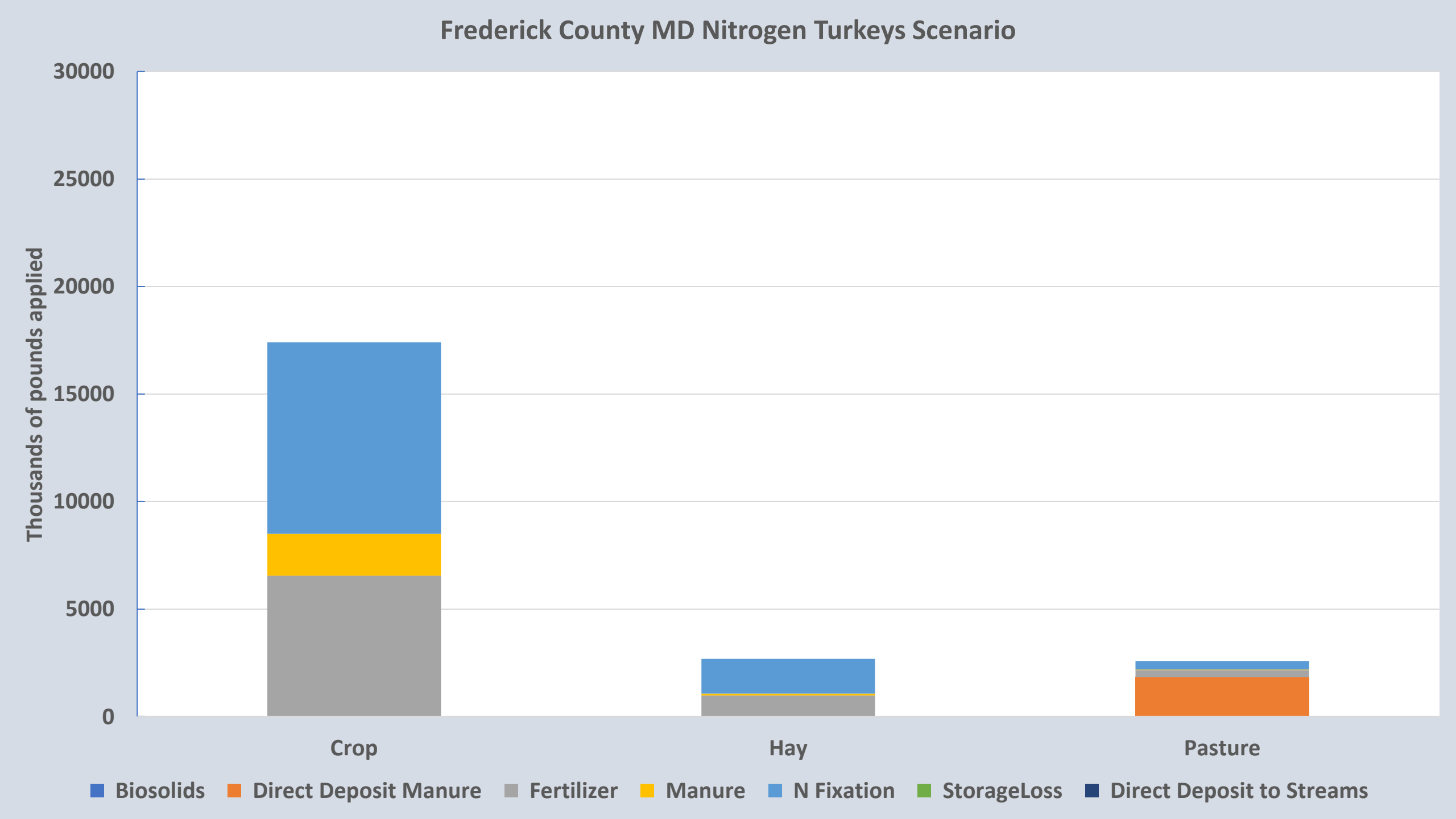
StorageLoss
Direct Deposit to Streams


Frederick County MD Nitrogen Turkeys Scenario
Thousands of pounds applied
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15000
10000
5000
0
Crop
Hay
Pasture
Biosolids
Direct Deposit Manure
Fertilizer
Manure
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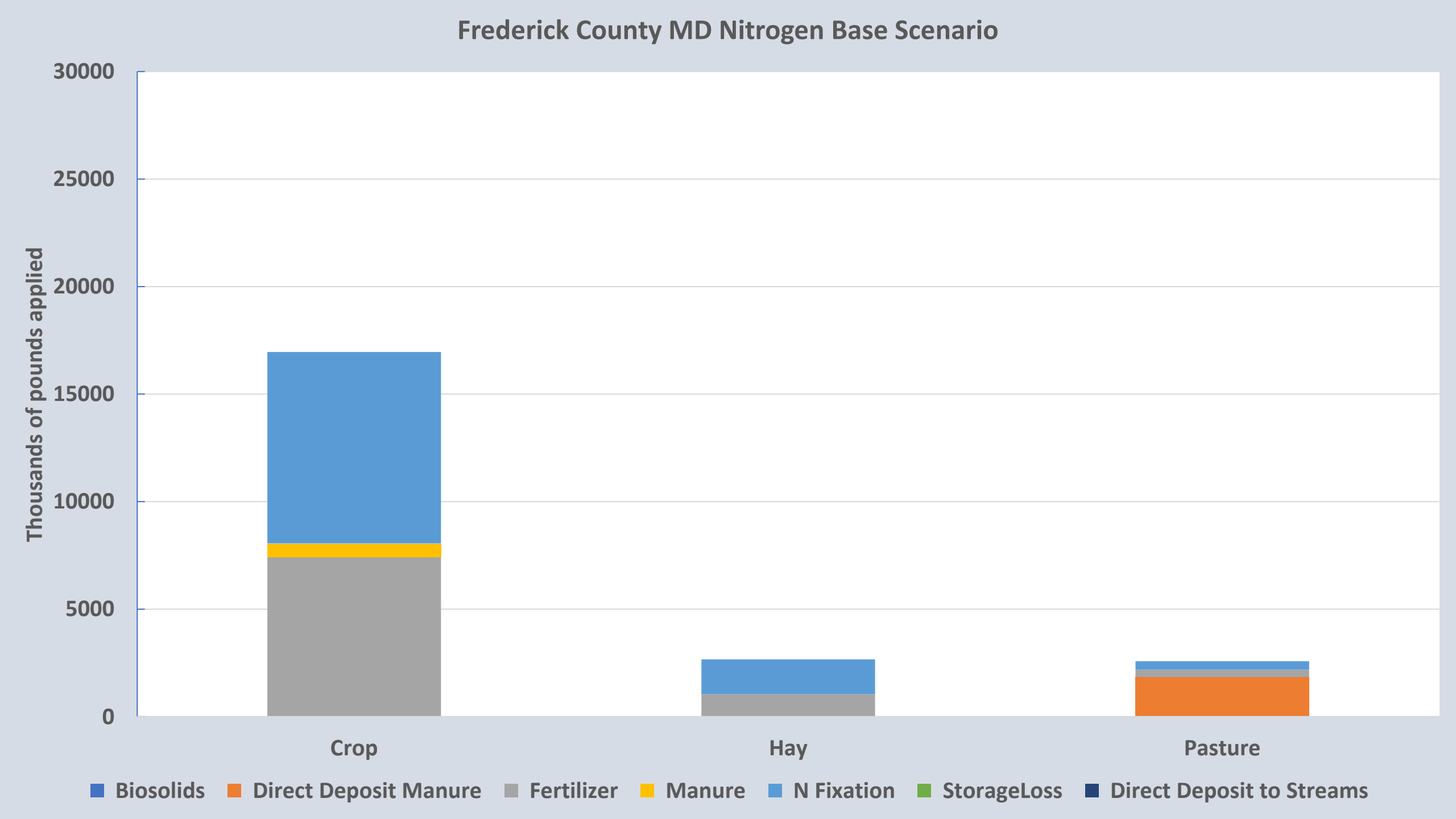
Direct Deposit to Streams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25000
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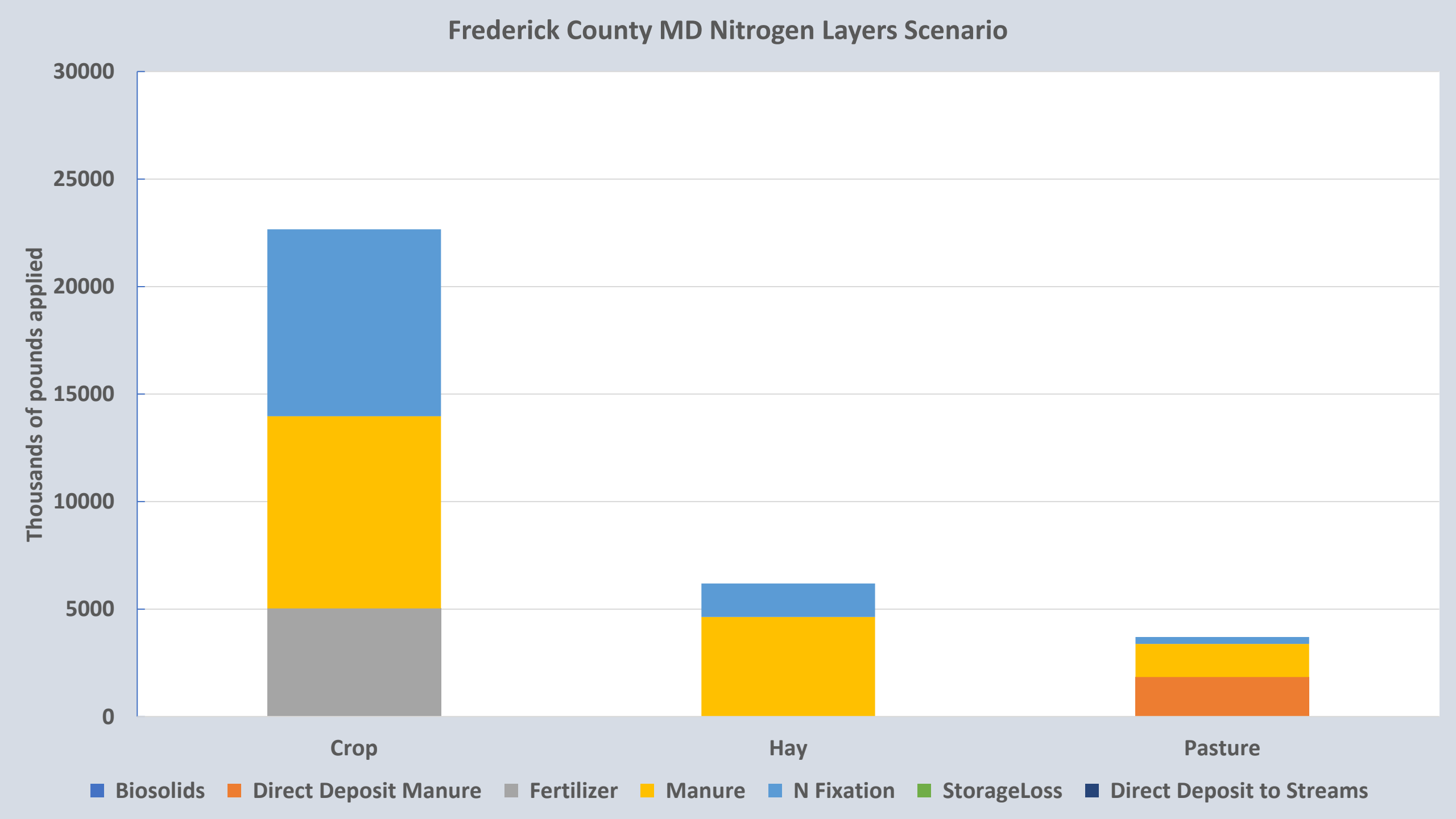
Frederick County MD Nitrogen Layers Scenario
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20000
15000
10000
5000
0
Thousands of pounds applied
Crop
Hay
Pasture
Biosolids
Direct Deposit Manure
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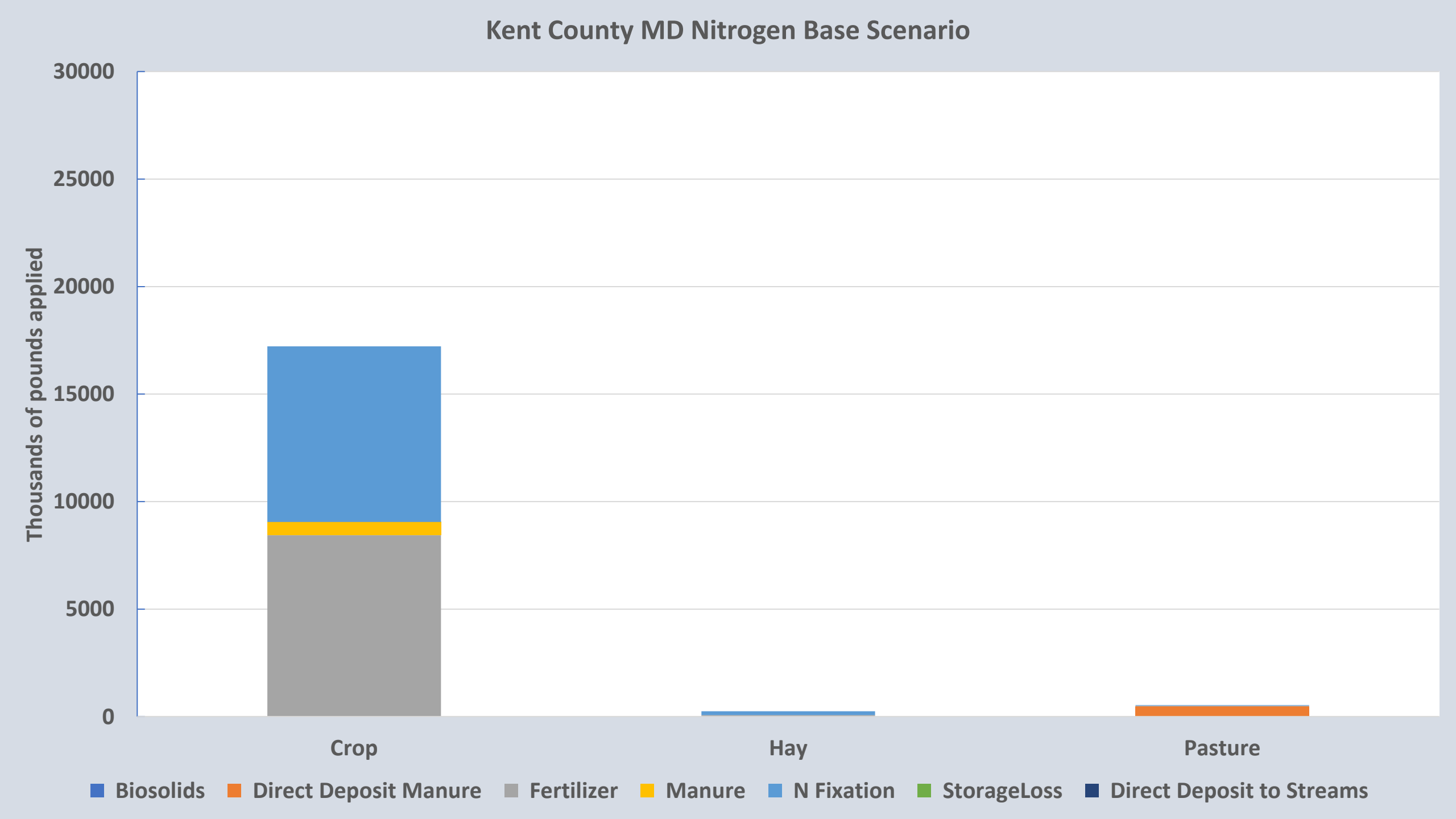
Manure
N Fixation
StorageLoss
Direct Deposit to Streams

Kent County, MD

- Examined the N based on the current number of AUs
- Compared this to increases in:
  - Beef
  - Dairy
  - Turkeys
  - Layers


Kent County MD Nitrogen Base Scenario
30000
25000
20000
15000
10000
5000
0
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Crop
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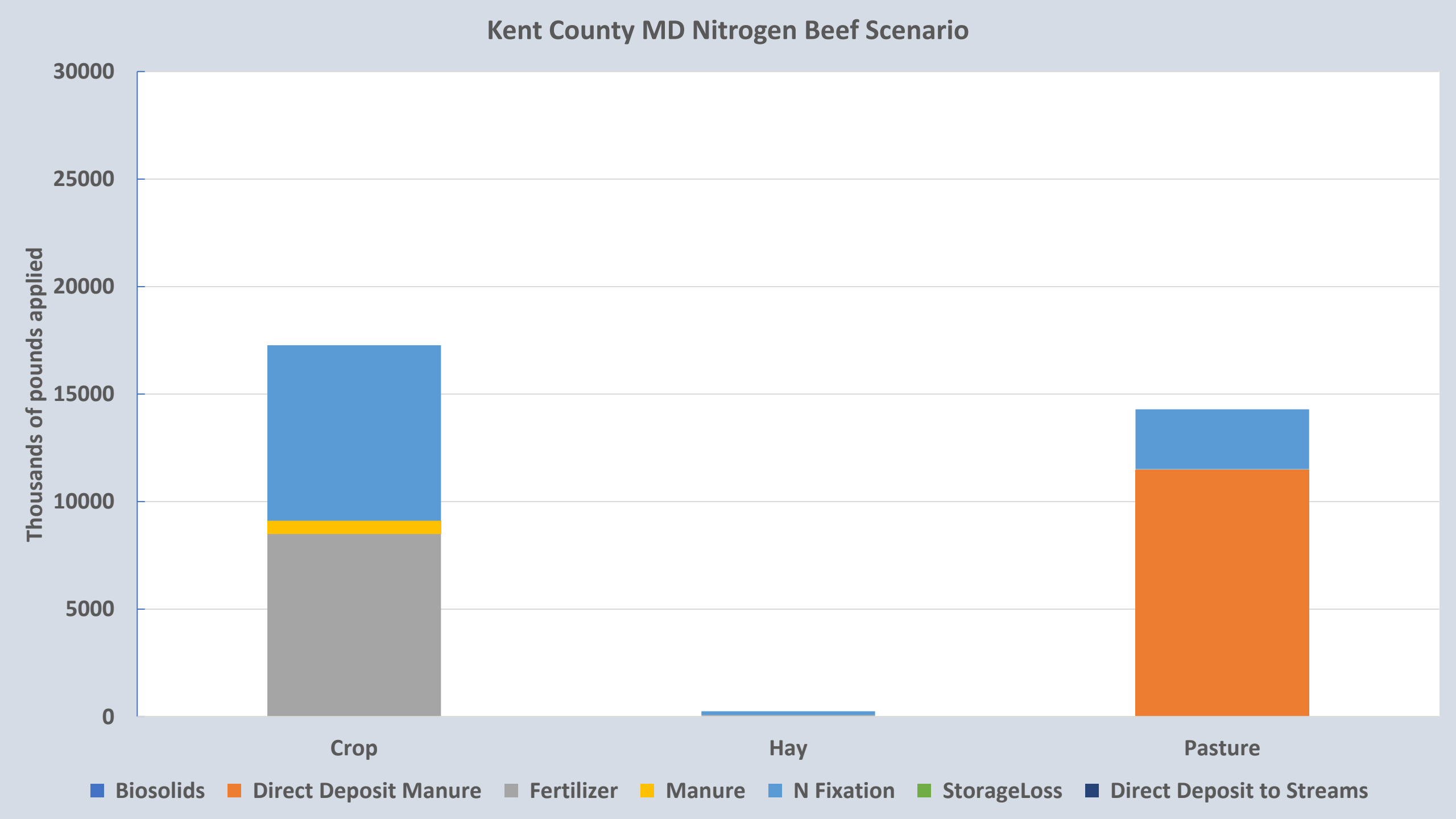
Kent County MD Nitrogen Beef Scenario
Thousands of pounds applied
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20000
15000
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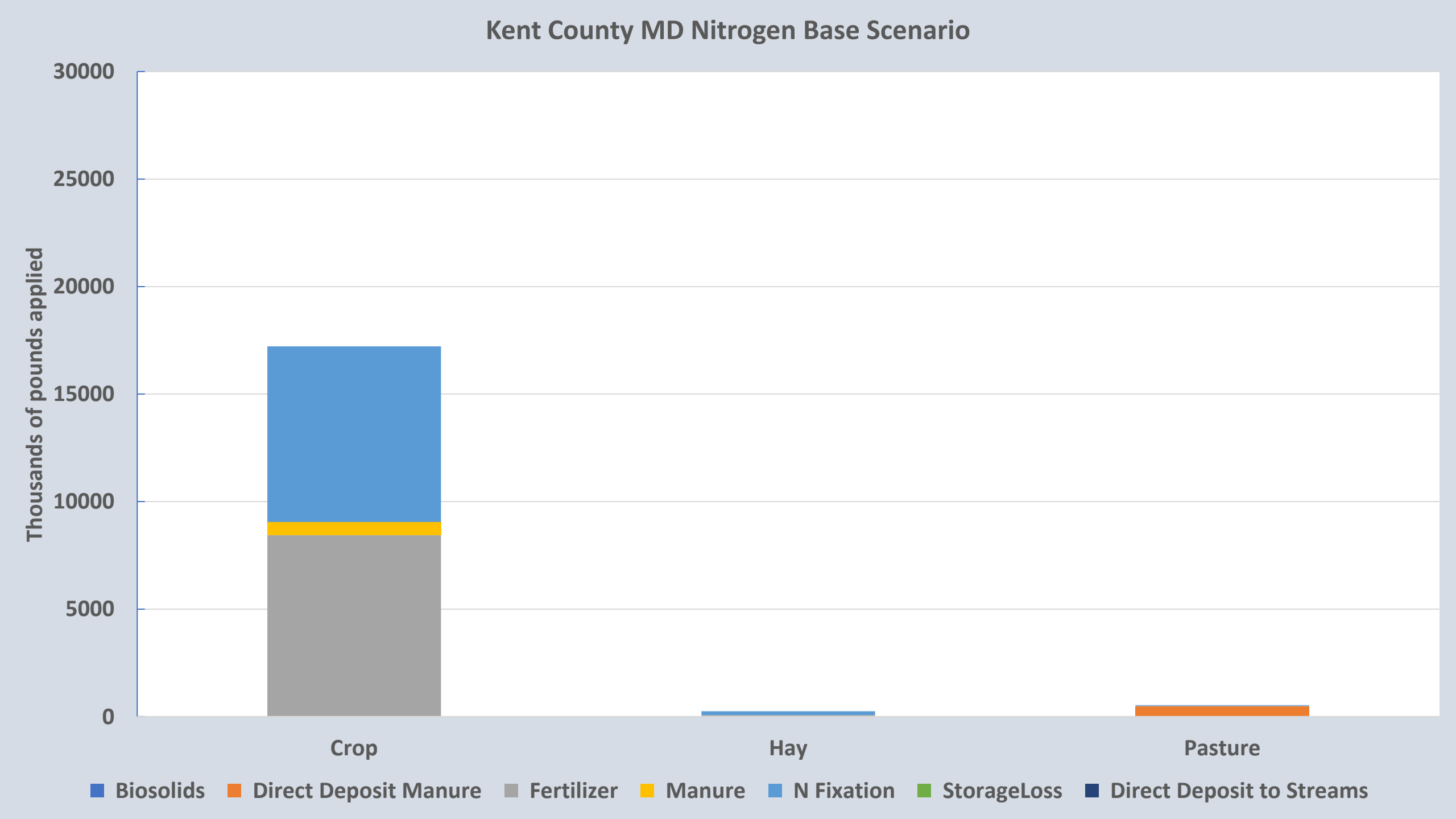
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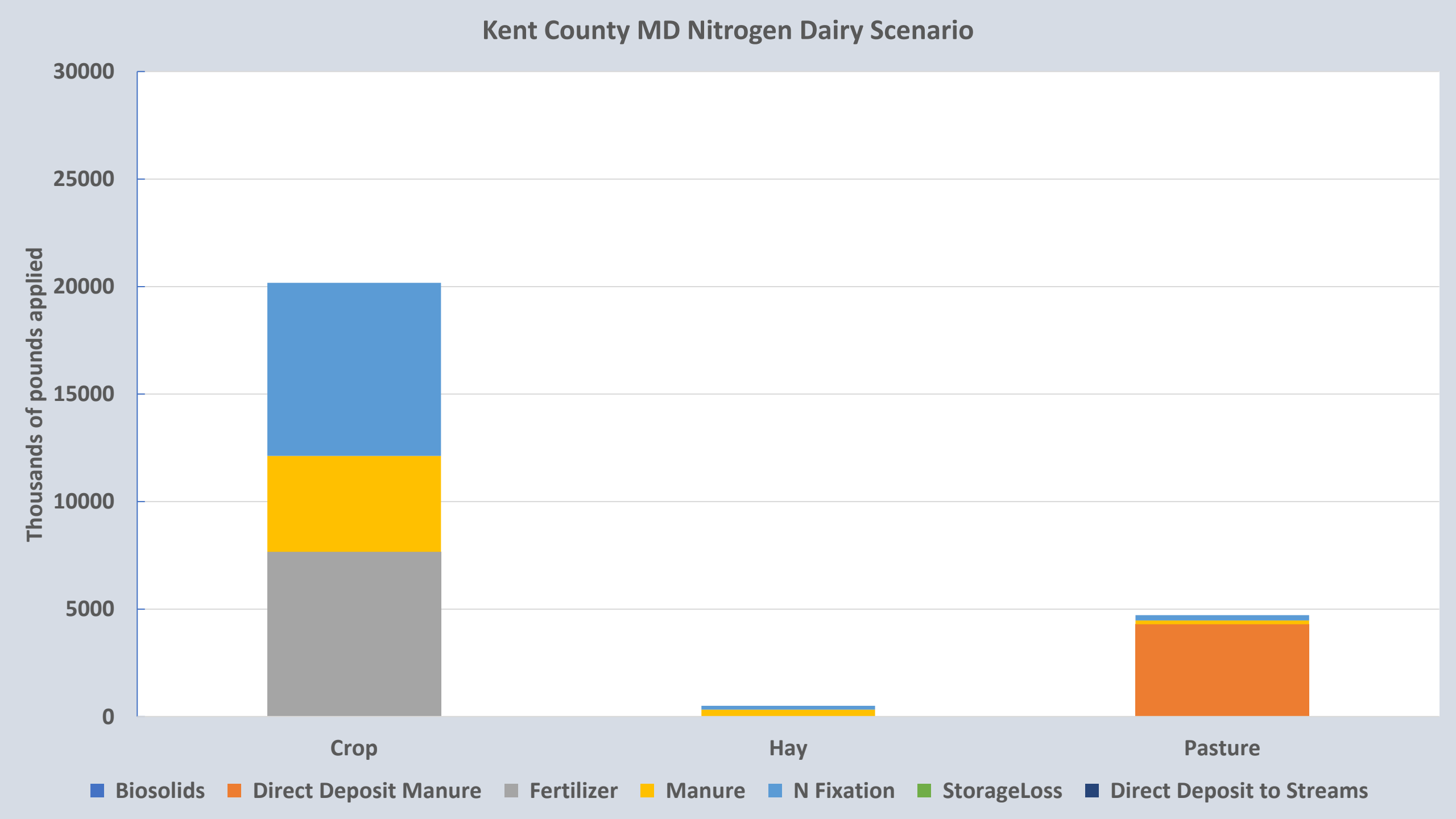
Kent County MD Nitrogen Dairy Scenario
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25000
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15000
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Crop
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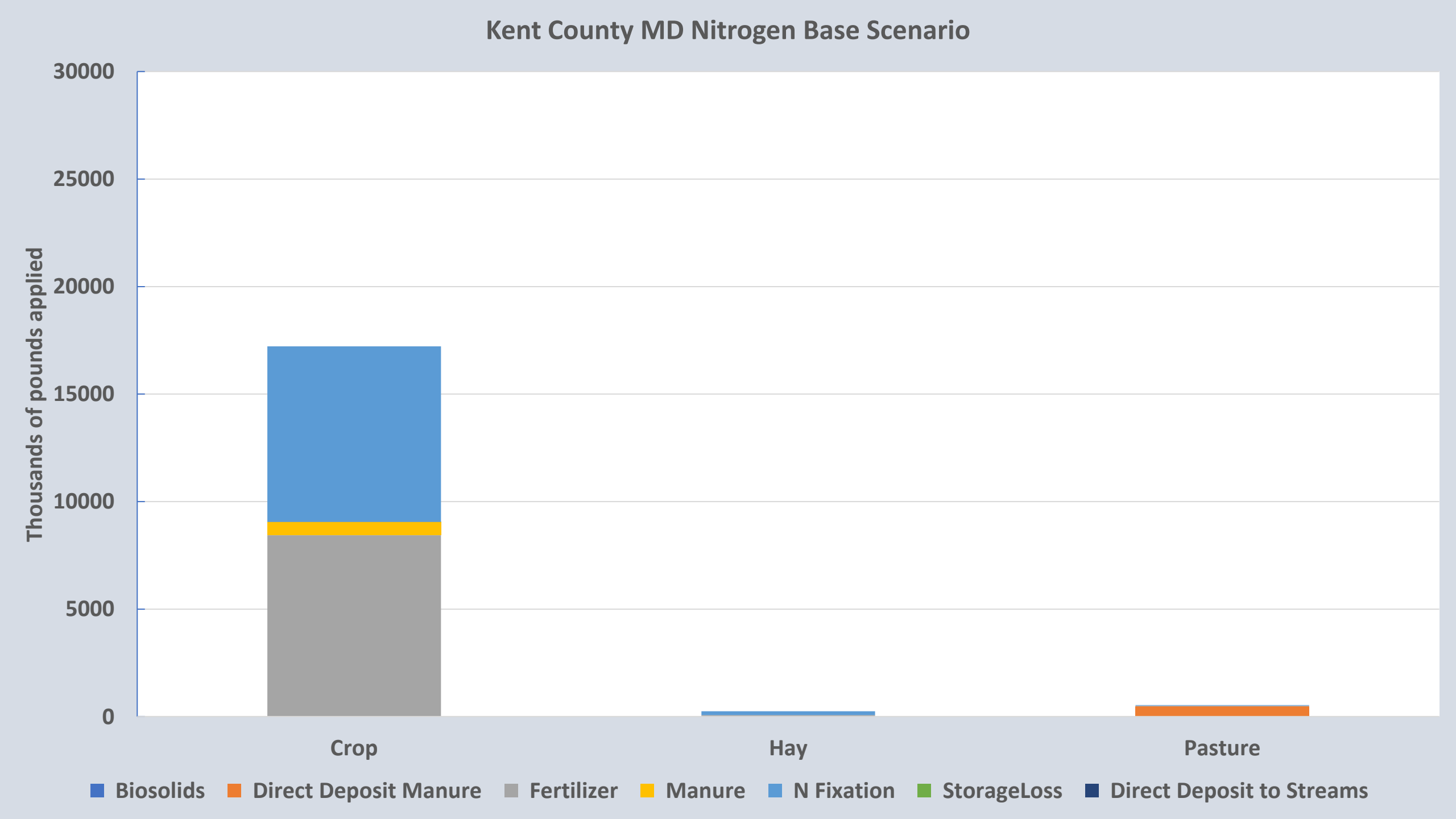
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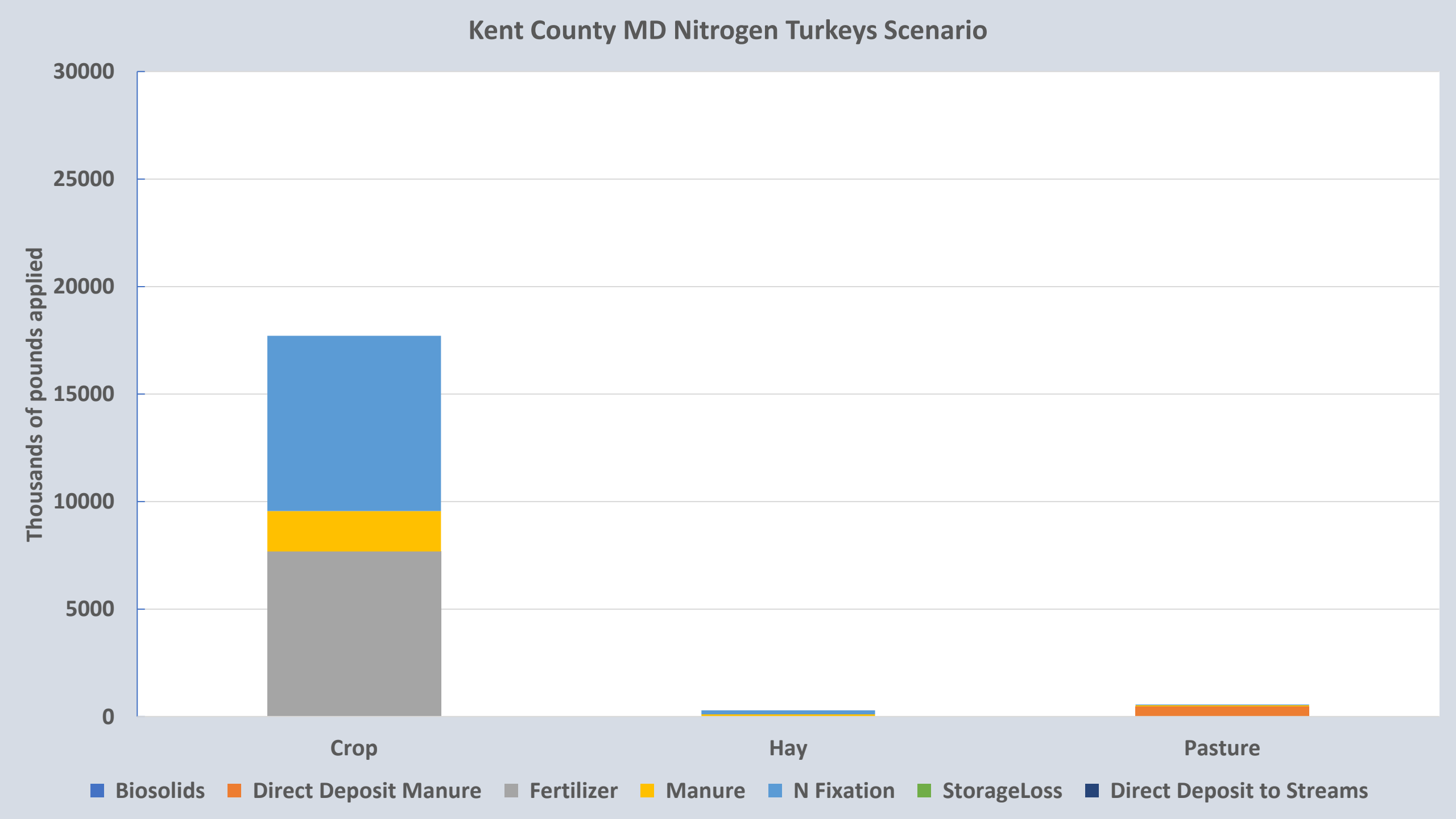
Kent County MD Nitrogen Turkeys Scenario
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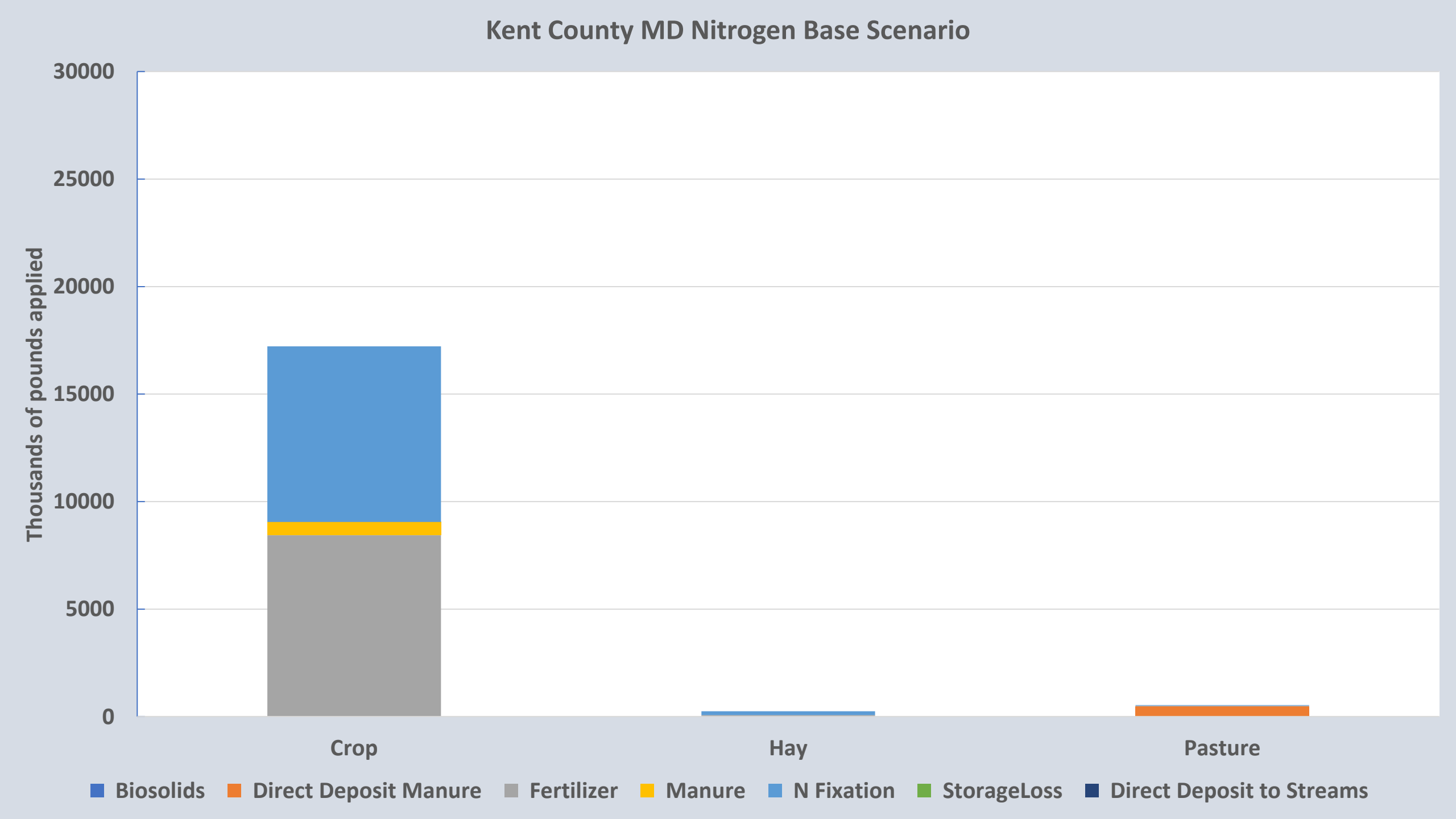
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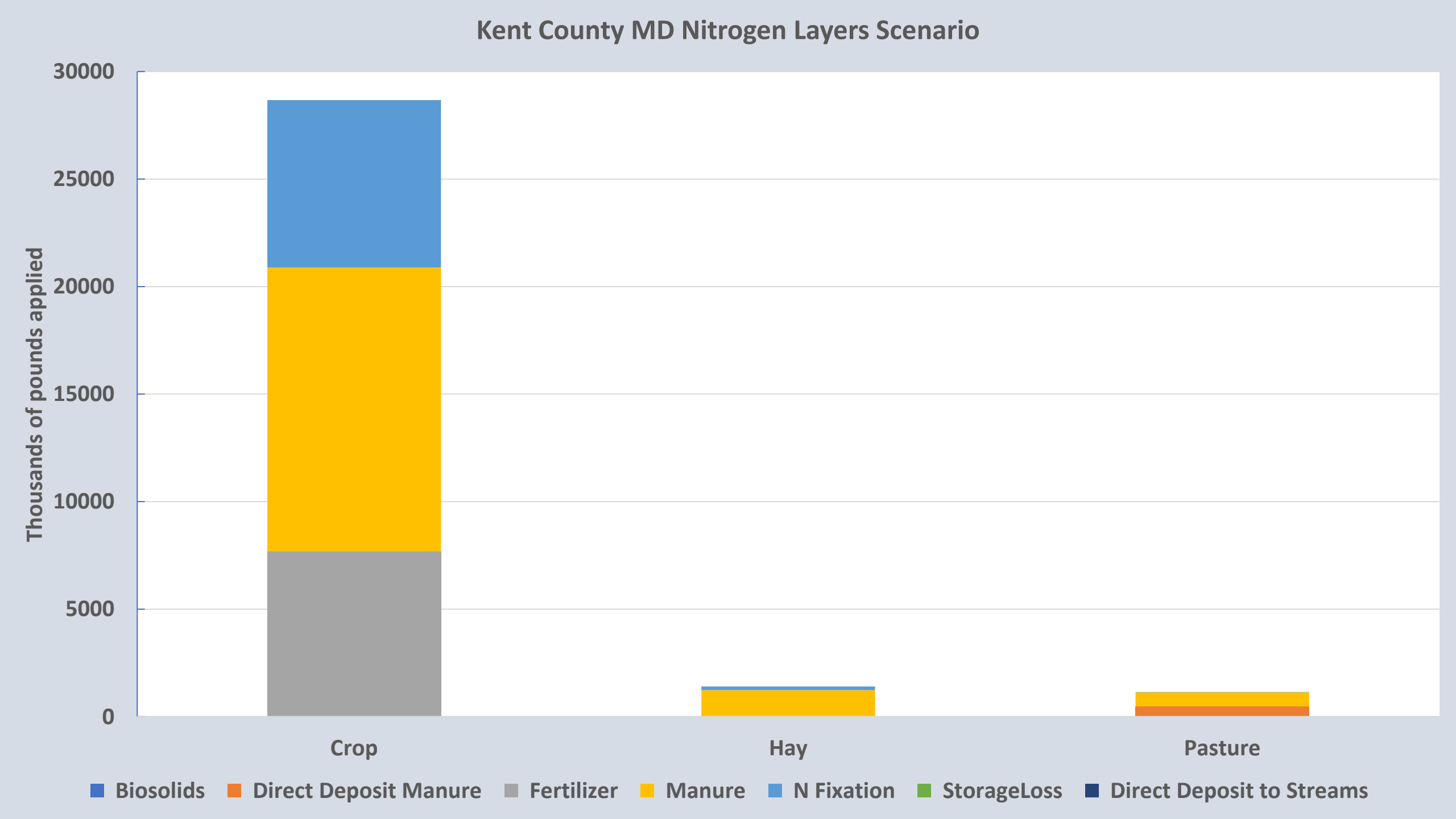
Kent County MD Nitrogen Layers Scenario
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Recap of Frederick and Kent Counties in MD

Both counties have similar amounts of Nitrogen lbs

Timing and application regulations play a role

- Frederick applies more manure
- Kent has more fertilizer only applications

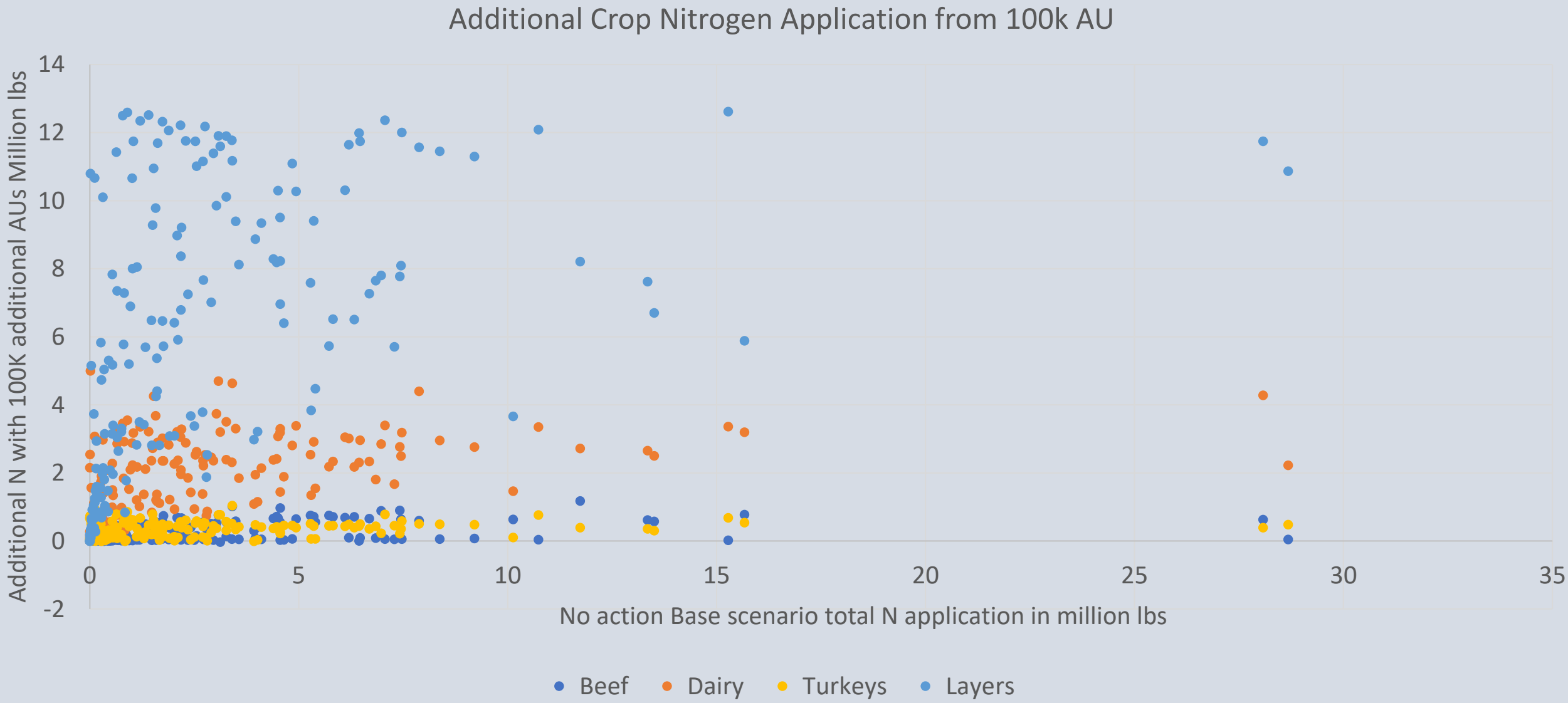
What does this mean?

- Additional manure will sit in Kent County and be used in Frederick County.

This behavior is the same everywhere, right?

- Not exactly
- There is no fast answer to why counties are acting differently
- Each county will act differently
- For an explanation we must dig into the specifics of each county

Visualizing each county



Summary

- Changing the number of Animal Units impacts areas differently
- There is no single answer which will tell us how changes in Animal Units will impact the Chesapeake Bay watershed.
- To get location specific answers we must look at multiple factors in greater detail.

Questions?