

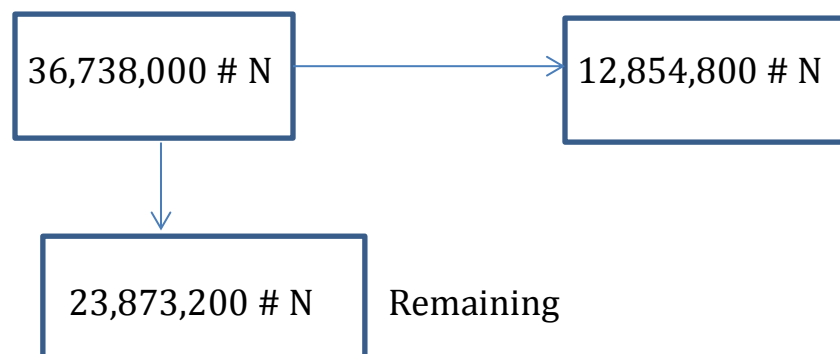
A Possible Pathway for Nitrogen Produced by Dairy Cattle in Yakima County

According to the WSDA dairies in Yakima County produce:

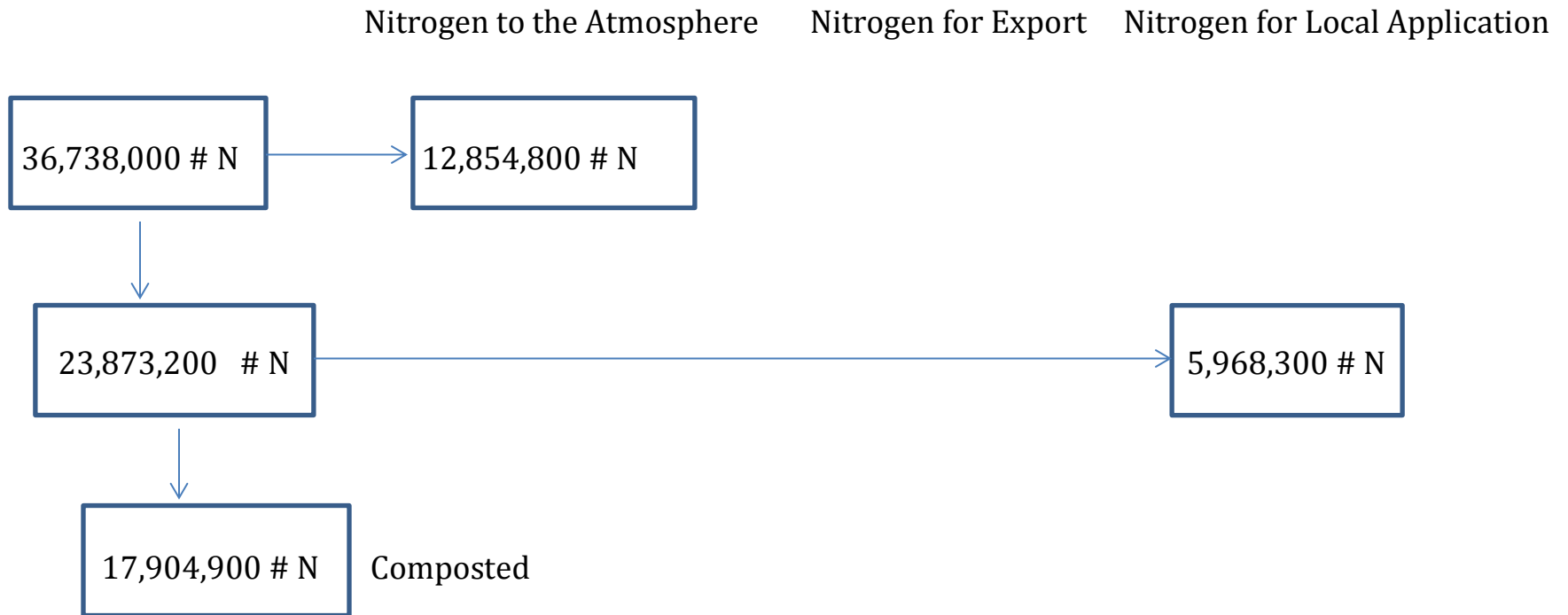
18,364 tons of nitrogen per year or 36,738,000 # N per year

After losses due to volatilization (35%) there is 23,873,200 # N per year available for land application

Nitrogen to the Atmosphere Nitrogen for Export Nitrogen for Local Application

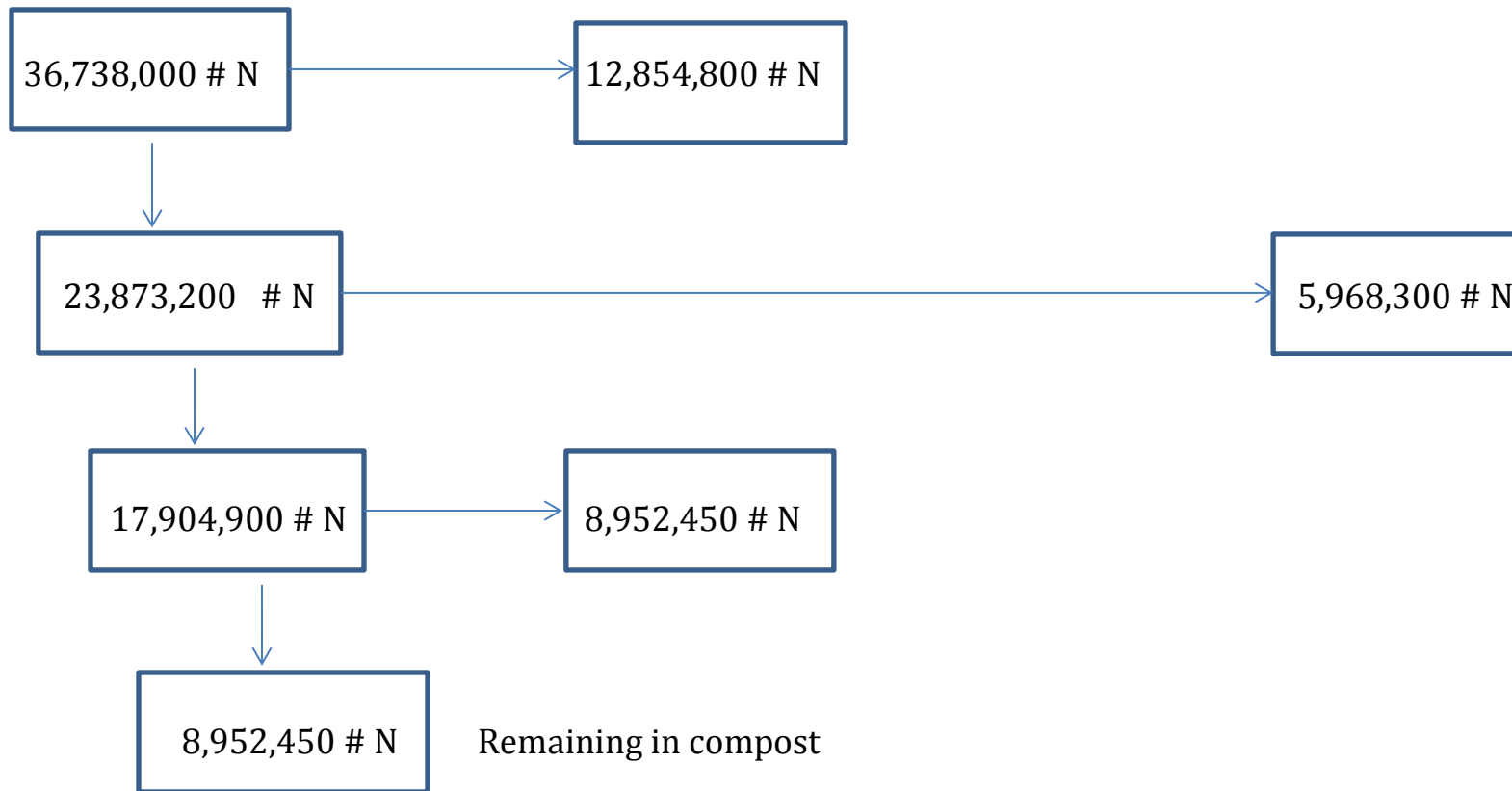


According to Steve George and Laurie Crowe “75% of the manure is composted which reduces the volume by 50%. Over 50% of this compost is exported out of Yakima County” (We need documentation to support this statement)



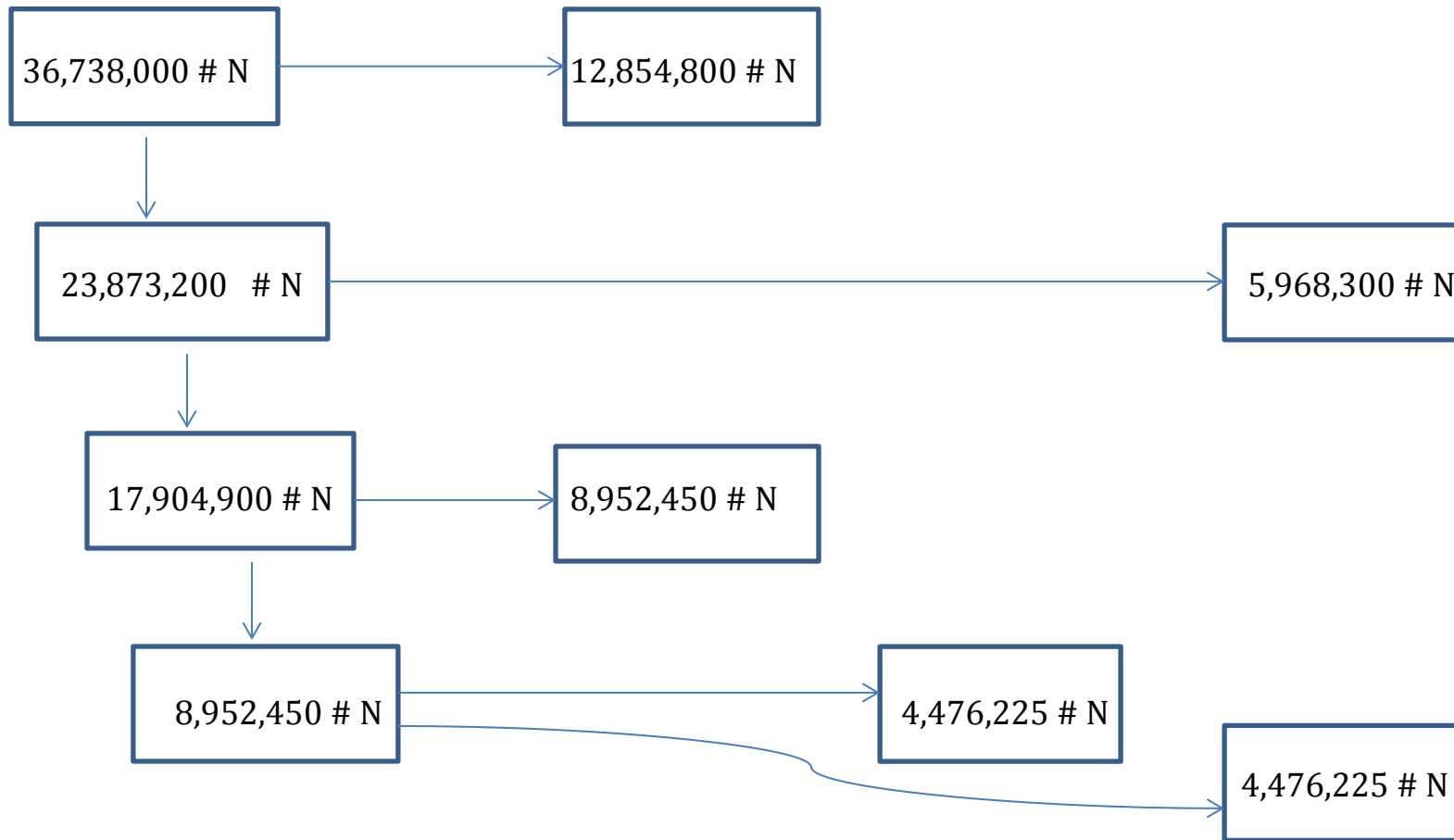
Assuming that 50% of the N in compost follows the 50% loss by weight:

Nitrogen to the Atmosphere Nitrogen for Export Nitrogen for Local Application



And accepting the statement that 50% of compost is exported from the county

Nitrogen to the Atmosphere Nitrogen for Export Nitrogen for Local Application



	Nitrogen to the Atmosphere	Nitrogen for Export	Nitrogen for Local Application
Totals	21,707,250 # N	4,476,225 # N	10,444,525 # N

How much land is needed for agronomic application of 10,444,525# N?

According to WSDA's Nitrogen Availability Analysis major crops in the GWMA area are:

WSDA Crop 2015	GWMA Acreage	N Comm-Avg lbs/ac	Comm N Use % crop ac	N Manure-Avg lbs/ac	N Manure Use % crop ac
		lbs/acre	% crop acres	lbs/acre	% crop acres
Apple	17,333	59.78	86.3%	0.0	0.0%
Corn (Silage)	16,778	214.14	49.6%	203.3	53.9%
Triticale	10,780	107.03	27.2%	104.4	74.8%
Grapes (Juice)	10,257	79.64	91.0%	0.0	0.0%
Alfalfa*	7,989	73.76	91.8%	161.0	8.2%
Pasture	6,731	120.21	97.2%	17.0	2.8%
Cherry	6,336	55.65	80.5%	0.0	0.0%
Hops	5,961	191.80	97.3%	132.0	2.7%
Grapes (Wine)	5,126	25.00	100.0%	0.0	0.0%
Pear	3,331	56.95	76.6%	0.0	0.0%
Mint	1,418	269.23	100.0%	0.0	0.0%
Wheat	1,283	106.09	93.9%	130.9	22.4%
Corn (Grain)	1,166	214.11	71.3%	134.9	62.6%
Asparagus	854	99.40	100.0%	0.0	0.0%
Peach/Nectarine	843	50.59	81.0%	0.0	0.0%
Total	96,186				

(Much of the land planted in triticale is double cropped with corn silage.)

Looking only at crops that apply manure shows 50,688 acres that receive manures:

WSDA Crop 2015	GWMA Acreage	N Comm-Avg lbs/ac	Comm N Use % crop ac	N Manure-Avg lbs/ac	N Manure Use % crop ac
		lbs/acre	% crop acres	lbs/acre	% crop acres
Corn (Silage)	16778	214.14	49.6%	203.3	53.9%
Triticale	10780	107.03	27.2%	104.4	74.8%
Alfalfa*	7989	73.76	91.8%	161.0	8.2%
Pasture	6731	120.21	97.2%	17.0	2.8%
Hops	5961	191.80	97.3%	132.0	2.7%
Wheat	1283	106.09	93.9%	130.9	22.4%
Corn (Grain)	1166	214.11	71.3%	134.9	62.6%
Total	50688				

Multiplying acreage by the average amount of manure currently applied we see that current fertilizing practices utilize 7,049,146 # N per year in the GWMA target area.

WSDA Crop 2015	# N Received from Manures	N Comm-Avg lbs/ac	Comm N Use % crop ac	N Manure-Avg lbs/ac	N Manure Use % crop ac
		lbs/acre	% crop acres	lbs/acre	% crop acres
Corn (Silage)	3,410,967	214.14	49.6%	203.3	53.9%
Triticale	1,125,432	107.03	27.2%	104.4	74.8%
Alfalfa*	1,286,229	73.76	91.8%	161.0	8.2%
Pasture	114,427	120.21	97.2%	17.0	2.8%
Hops	786,852	191.80	97.3%	132.0	2.7%
Wheat	167,944.7	106.09	93.9%	130.9	22.4%
Corn (Grain)	157,293.4	214.11	71.3%	134.9	62.6%
Total	7,049,146				

10,444,525 # N available for land application minus 7,049,146 # N applied to the GWMA target area leaves an excess of 3,395,379 # N per year that must be stored or applied somewhere.

One obvious place for manure application is the Yakama Reservation with 142,000 acres of irrigated land.

If more farmers used manure rather than synthetic fertilizers then more manure could be applied to land in the GWMA target area.

Growers note that it is unwise to rely entirely on manures since there are many other elements involved and testing must be done to balance phosphorous, potassium, calcium, magnesium, sodium, boron, zinc, manganese, iron and copper as well.

Concerns:

This is only one potential model for manure and fertilizer application in the area.

Not all cropland does or should receive the maximum amounts of fertilizer

It would be illegal and unethical to force farmers to choose manure fertilizer

According to this and other models, about 60% of nitrogen that is excreted by cattle is lost and unavailable for land application. Most of this goes up to the atmosphere. In this model over 10,000 tons of nitrogen per year escapes to the atmosphere. This source of atmospheric deposition and the associated problems must be addressed. What goes up must come down.

WSDA estimates that 36,738,000 # N is produced by 101,541 mature dairy cows and 39,625 heifers and calves. According to USDA, in 2012, there were 258,063 head of cattle and calves in Yakima County. This means that manure from approximately 116,897 head of other cattle and calves must also be applied somewhere.

The GWMA needs to address off farm application of manures within the target area.

Apology: Over the past five years I have frequently cited a 2000 report from USDA entitled *Manure Nutrients Relative to the Capacity of Cropland and Pastureland to Assimilate Nutrients: Spatial and Temporal Trends for the United States*. That report is available at https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_012133.pdf

I stated that the report showed insufficient land in Yakima County for manure application based on nitrogen content. This was incorrect. The report stated that there was insufficient land owned by Yakima County producers for on-farm assimilation of available nitrogen. The report stated that there is sufficient land for manure application if the manures are exported off-farm but remain within the county. That is still true today.

However, this report showed insufficient land within Yakima County for assimilation of manures based on phosphorous content. At the time of that report Yakima County had 192,271 head of cattle and calves according to the National Agricultural Statistics Service.

Respectfully

Jean Mendoza

September 4, 2017