Reductions in nitrogen and phosphorus runoff

Table 5 shows the reductions in N and P runoff under both the conservative and optimistic scenarios by operation type. Container production had the highest estimated reductions ranging from 567,496 pounds to 2,496,981 pounds for N and 337,433 pounds to 1,484,701 pounds for P. To put these numbers in perspective, we can use an application rate of 200 lb/acre for N and 100 lb/acre for P to determine how much land we would "remove" from production using sensor networks. At a rate of 200 lb/acre for N, that would be like removing 2,800 to 12,500 acres of container production. At a rate of 100 lb/acre for P, that would be like removing 3,375 to 14,850 acres of container production. Greenhouse operations had the second highest reductions although the reduction rates were about 5 to 18 times lower than those estimated for containers. Field reductions were the lowest and ranged from almost 7,000 pounds to over 22,000 pounds. Regional breakdowns can be found at the end of this module.

Field operations in the eastern part of the United States typically have vegetated buffers between rows which stabilize the soil and reduce sediment runoff where rainfall is more abundant.

Bare ground production methods are typically used in drier climates to reduce water loss, but they pose a problem with nutrient and sediment runoff during rain events.

Application rates for all values were based on data collected from site visits to operations in Maryland, since no regional information was available. Greenhouse and container production practices are likely similar in terms of application rates of fertilizer across the country. Fertilizer application and runoff in field operations are likely variable from one region to another. For field production, practices in Maryland are likely similar to production practices along the East Coast, where most growers likely use grassed buffers around production areas. This may not be the case in other regions, like the West Coast, where bare ground production is typical. For this reason, P runoff was not estimated, since management practices, which have a large impact on P runoff rates, are varied across the country.

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Table 5. Potential reductions in annual nitrogen (N) and phosphorus (P) runoff in pounds (lb) for ornamental production with adoption of wireless sensor irrigation networks using two different scenarios (conservative and optimistic) with two different adoption rates (50% and 100%). Reductions in nitrogen (N) and phosphorus (P) emissions are based on conservative and optimistic scenarios (Table 3 and 4 respectively). Note: P values are not reported for field operations because reliable data for P runoff could not be obtained outside of Maryland.

		Conservative scenario				Optimistic scenario			
		50% adoption		100% adoption		50% adoption		100% adoption	
Region	**Operation type**	**Pounds of N reduced[z]**	**Pounds of P reduced[z]**	**Pounds of N reduced[z]**	**Pounds of P reduced[z]**	**Pounds of N reduced[z]**	**Pounds of P reduced[z]**	**Pounds of N reduced[z]**	**Pounds of P reduced[z]**
All regions	Greenhouse	48,246	63,301	96,492	126,600	70,576	92,087	141,153	184,176
	Container	567,496	337,433	1,134,991	674,865	1,248,492	742,351	2,496,981	1,484,701
	Field	6,896	---	13,794	---	11,034	---	22,070	---
	Total	622,638	400,734	1,245,277	801,465	1,330,102	834,438	2,660,204	1,668,877

[z] 1 lb = 0.4535924 Kg

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