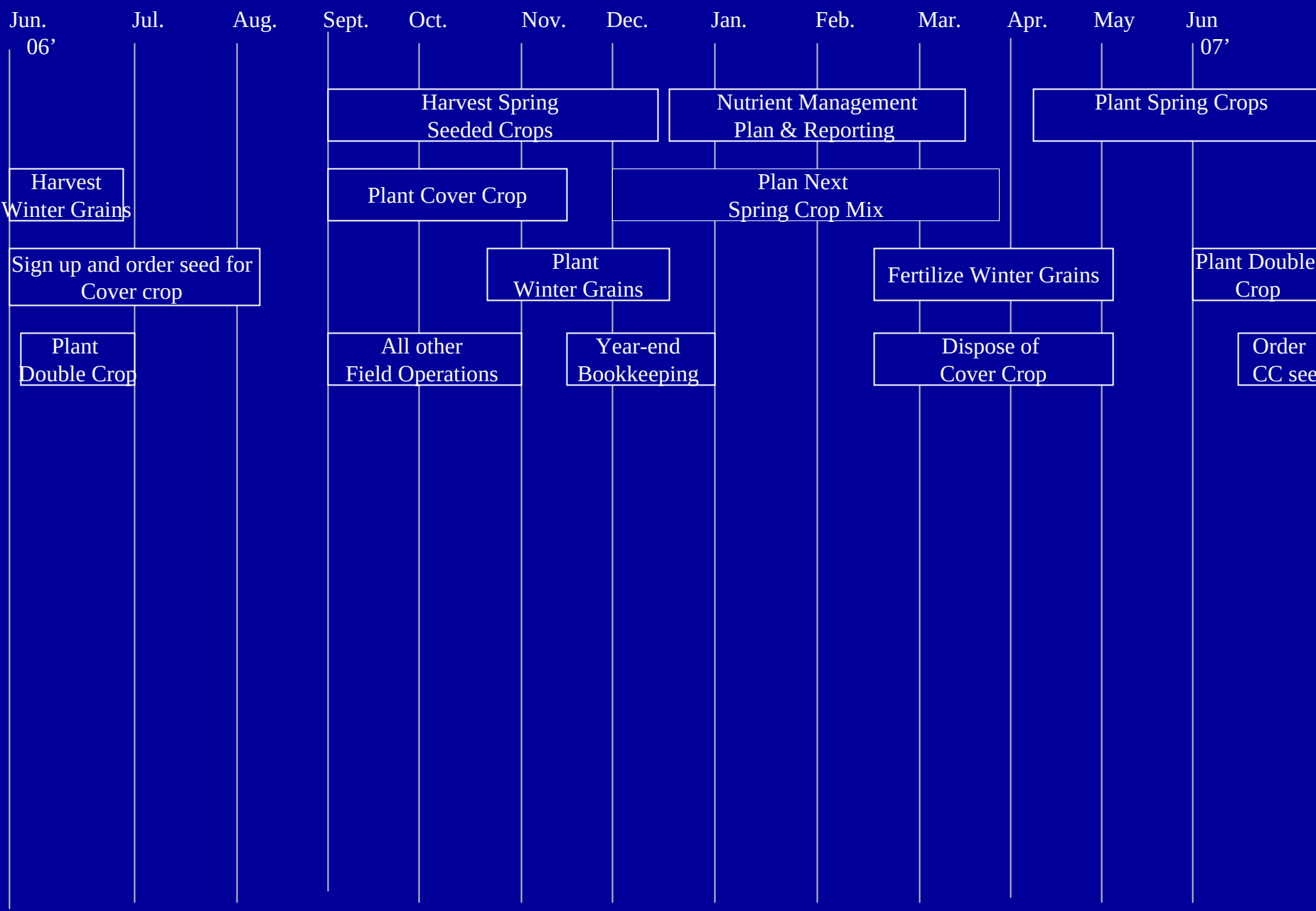
COVER CROP DISCUSSION

Bay Restoration Fund Committee

July 9, 2007

Douglas D. Scott
Assistant Secretary
Office of Resource Conservation


Jun. 06’
Jul.
Aug.
Sept.
Oct.
Nov.
Dec.
Jan.
Feb.
Mar.
Apr.
May
Jun 07’
Harvest Spring Seeded Crops
Nutrient Management Plan & Reporting
Plant Spring Crops
Harvest Winter Grains
Plant Cover Crop
Plan Next Spring Crop Mix
Sign up and order seed for Cover crop
Plant Winter Grains
Fertilize Winter Grains
Plant Double Crop
Plant Double Crop
All other Field Operations
Year-end Bookkeeping
Dispose of Cover Crop
Order CC see

Cover crops

Environmental Benefits

Benefits

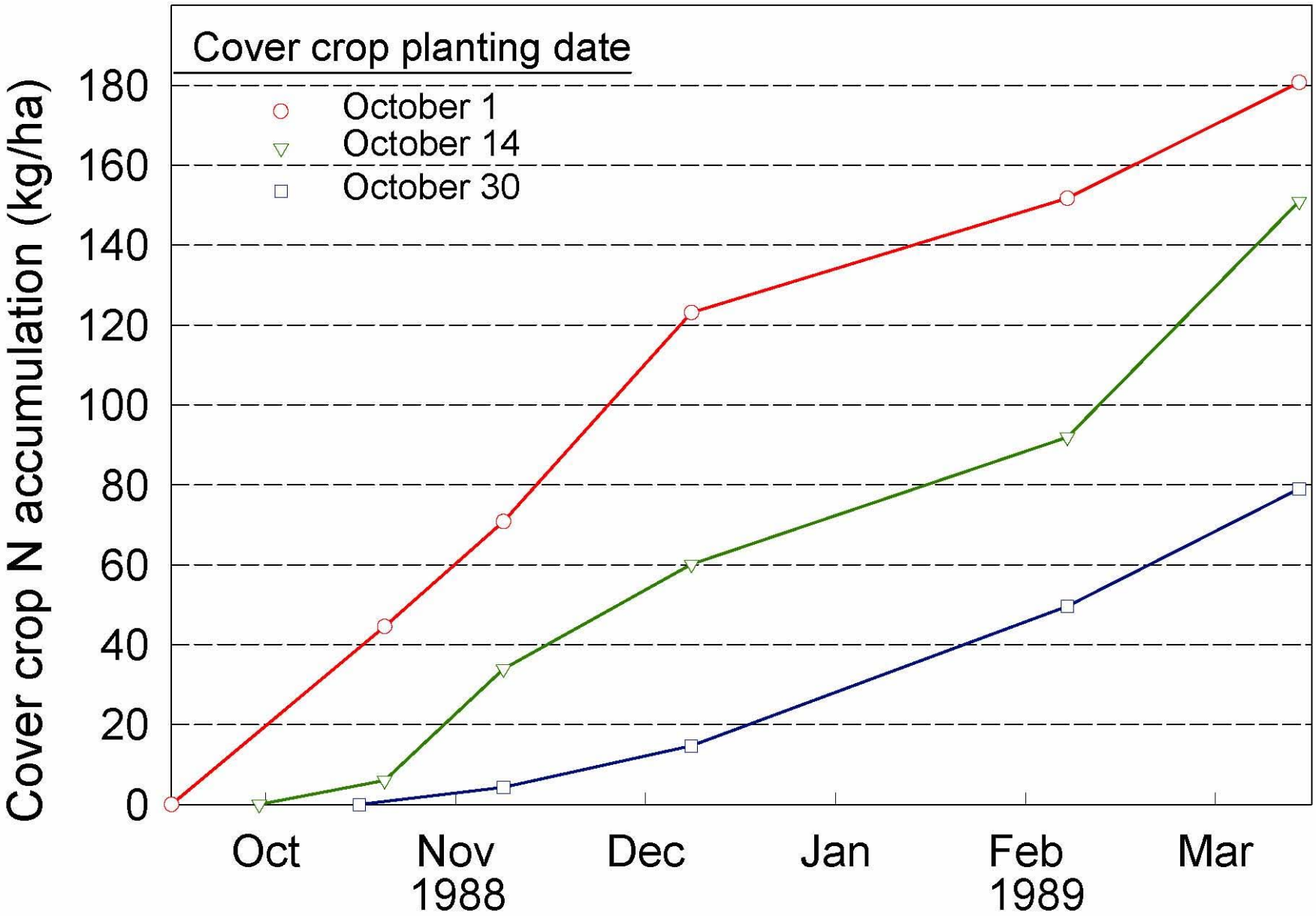
- Tie up nutrients during fall & winter
- Stabilize soil and prevent erosion
- Improve soil quality
- Improve water retention & infiltration
- Suppress weeds & reduce insect pests

Nitrate loss through leaching tends to be 5 times greater than annual N loss through surface water

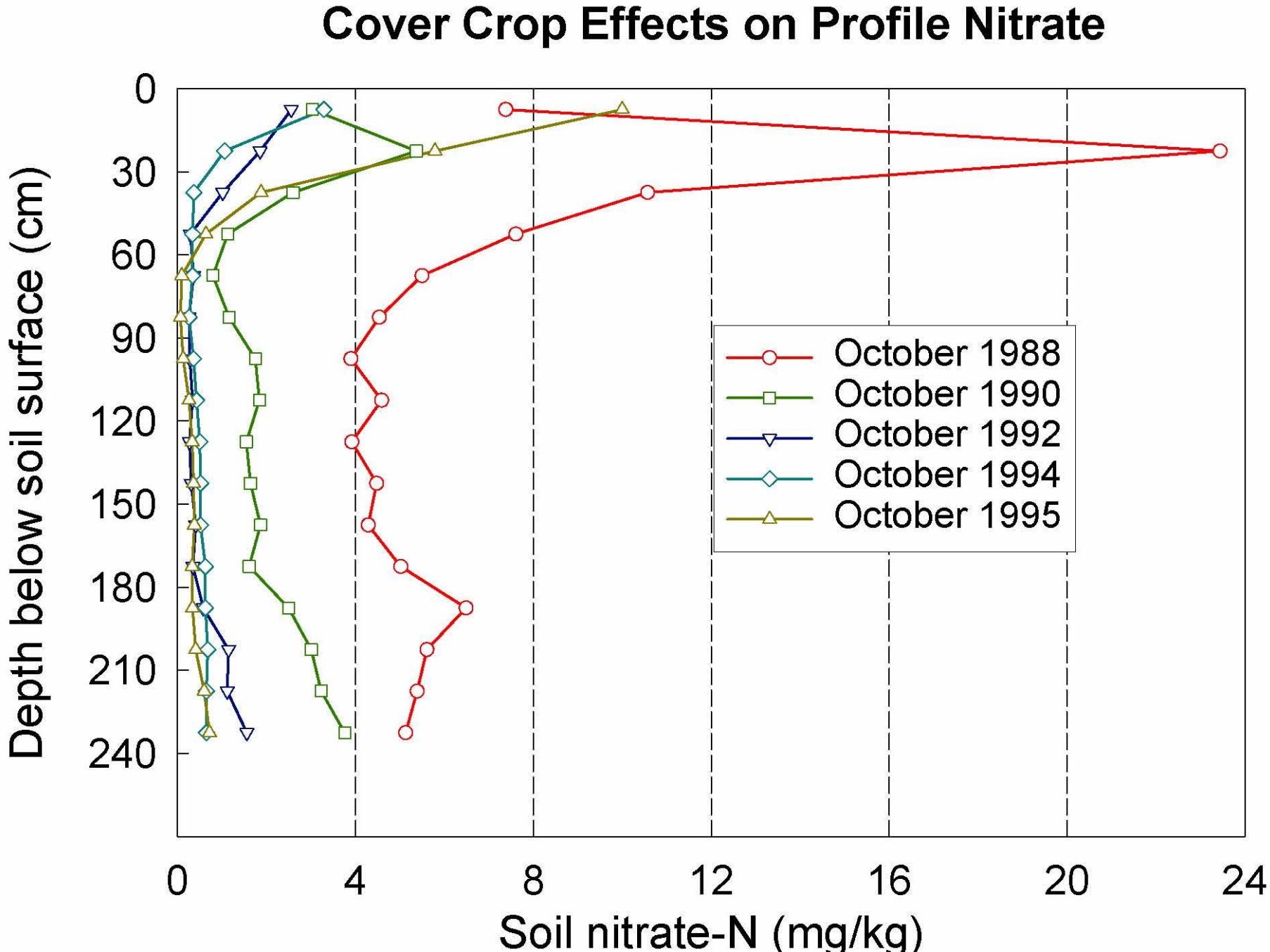
Nitrate uptake of a rye cover crop planted after corn consistently reduced nitrate-N concentrations to less than 1ppm

Annual Nitrate-N Leaching Losses (lb/acre)

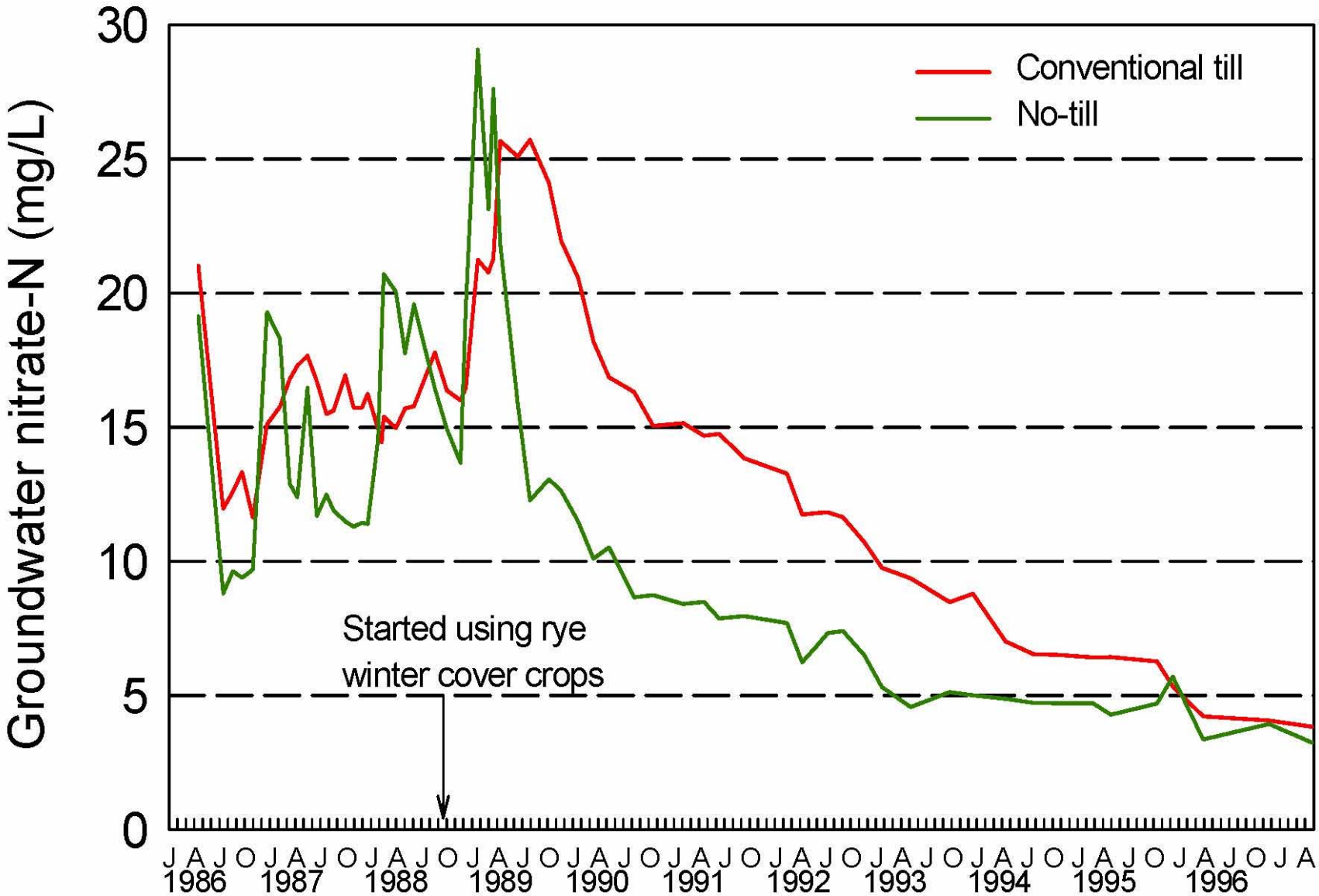
	Rye Cover Crop	Winter-fallow	Percent Reduction
Corn	3.7	25.5	85
Soybean	18.6	34.0	45
dc-Soybeans	8.9	22.6	60
Corn/wheat	5.9		76
Corn/corn	2.6	28.3	90
Corn-soybean	8.6	28.8	70
Corn/wheat/dc-soybean	6.5	15.4	57


Cover crop planting date
October 1
October 14
October 30
Cover crop N accumulation (kg/ha)
0
20
40
60
80
100
120
140
160
180
Oct
Nov
1988
Dec
Jan
Feb
1989
Mar

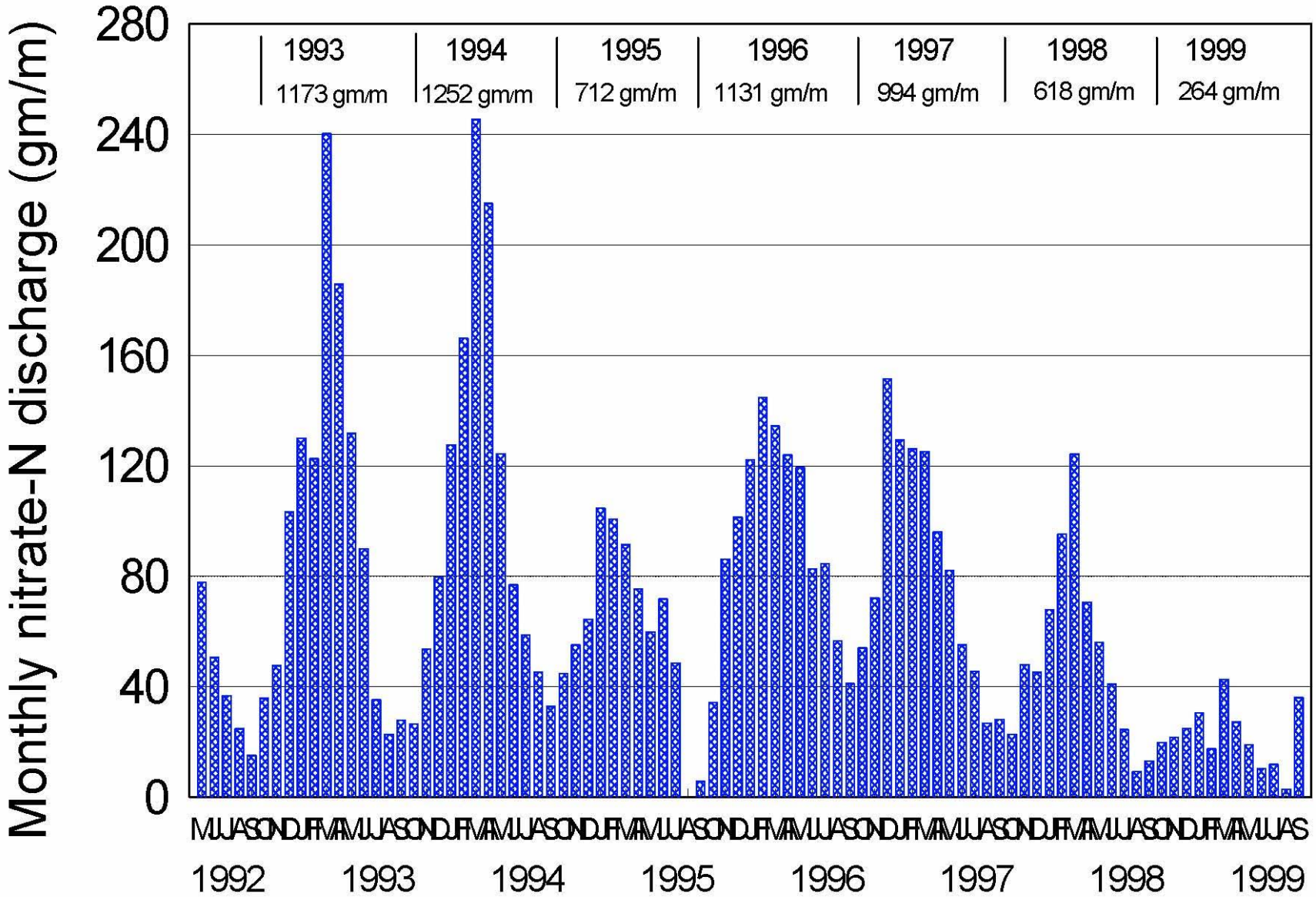
Reductions in nitrate leaching eventually reduce nitrate in the soil profile below the rootzone


Cover Crop Effects on Profile Nitrate
Depth below soil surface (cm)
0
30
60
90
120
150
180
210
240
0
4
8
12
16
20
24
Soil nitrate-N (mg/kg)
October 1988
October 1990
October 1992
October 1994
October 1995

Use of cover crop reduces nitrate concentrations in shallow groundwater under crop fields


Groundwater nitrate-N (mg/L)
30
25
20
15
10
5
0
Conventional till
No-till
Started using rye
winter cover crops
J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996

Although it takes several years, use of cover crops eventually reduces subsurface N loads to streams


Monthly nitrate-N discharge (gm/m)
280
240
200
160
120
80
40
0
1993
1173 gm/m
1994
1252 gm/m
1995
712 gm/m
1996
1131 gm/m
1997
994 gm/m
1998
618 gm/m
1999
264 gm/m
MJJASONDJFMAMJJASONDJFMAMJJASONDJFMAMJJASONDJFMAMJJASONDJFMAMJJASONDJFMAMJJAS
1992
1993
1994
1995
1996
1997
1998
1999

Why are Cover Crops needed to tie up nitrogen ?

- 2-3 times more water moves through subsurface versus overland flow
- Nitrate is water soluble & leaches from root zone
- Nitrate loss through leaching tends to be 5 times greater than annual N loss through surface water
- Leaching elevates nitrate levels in shallow groundwater and stream flow

Conclusions

- Annual losses of 40-50 lbs nitrogen observed in studies (without cover crops) at the Wye Research & Education Center
- Consistent use of cover crops can reduce nitrogen leaching losses as much as 60%
- Cover crops are one of the most cost effective practices for $ per pound of nitrogen reduction of any in MD's Tributary Strategies
- Maryland's Chesapeake Bay goal is to annually plant 600,000 acres of traditional cover crop + 200,000 acres of commodity cover crop

Cover Crops... Protecting the Bay

MARYLAND