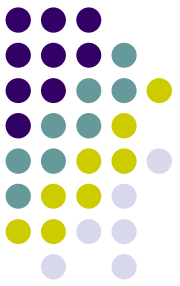


Wisconsin's Soil Disturbance Guidelines for State Lands

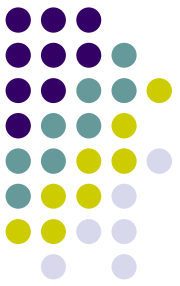




Overview

- Why were the guidelines developed?
- What are the guidelines?
- How are the guidelines working?

Why?

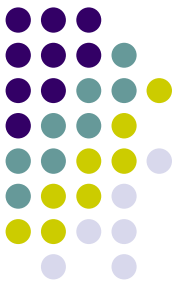


In 2004, during the State Forest Certification Audit, the Department received a CAR from FSC and OFI from SFI to...

“...develop written and preferably quantitative guidelines for defining the limits of acceptable rutting...”

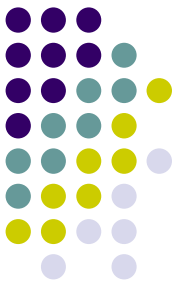
County Forests received a similar CAR & OFI

Policy Development Timeline



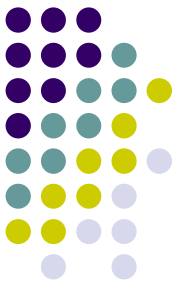
- October 2004 – Received FSC & SFI Audit Review
- June 2005 – Shared 1st draft of policy with state forest working group, WCFA & WPLA
- August 2005 – Shared 2nd draft of policy with state forest working group, WCFA & WPLA
- November 2005 – Shared 3rd draft of policy with broad audience for comments
- March 2006 – Interim Guidelines for State Lands available
- May 2006 – Guidelines incorporated into State Land Timber Sale contracts

Other Components



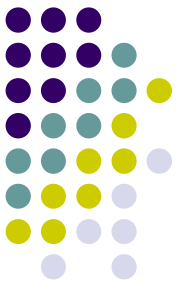
- Training
 - Presented at 2006 Loggers Conferences and Cooperating Foresters Meeting
 - Received grant to develop 1-day workshop and materials
- Monitoring
 - Evaluated 30 state land timber sales in 2006
- Interim Guideline Evaluation
 - In early summer 2007, use results of monitoring and solicit feedback from timber sale administrators and contractors on how the guidelines are working for them

Goals

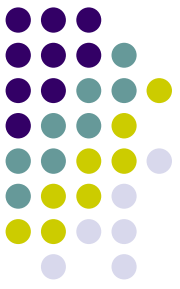


- Minimize inadvertent soil disturbances during timber harvests and potential adverse impacts to soil productivity, water quality, fish and wildlife habitat, and other natural resources.
- Protect public investment in state forests.
- Maintain existing roads and related structures to intended design standards.
- Combine professional level expertise and operator experience in the formation of on-the-ground decisions.
- Provide a protocol for identifying and responding to maintenance needs.

Focus of Policy



- Avoid and minimize soil disturbances
- Recognize some soil disturbance is inevitable
- If soil disturbances do occur, mitigate or repair when possible
- In some instances “doing nothing” is preferable to trying to repair damage
- Not to mandate decisions, but guide timber sale administrators and contractors in management decisions, considering on-the-ground conditions, availability of equipment and other resources

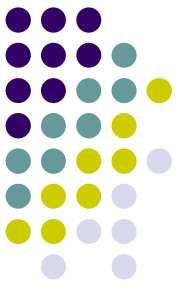


Avoid and Minimize

- Preferred over repair and mitigation because:
 - Cost of implementing repair/mitigation practices
 - Loss of productivity until repair/mitigation occurs
 - Possibility that disturbance may not be “repairable”



Potential Impacts of Soil Disturbances



- Decline in tree growth or tree mortality
- Reduced forest productivity
- Disruption of surface water flow and infiltration
- Soil erosion and sedimentation
- Visually suggest poor stewardship
- Duration & severity of impact is site-dependent

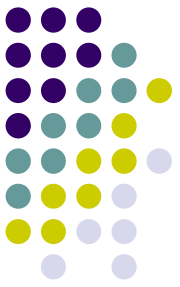


The Guidelines...



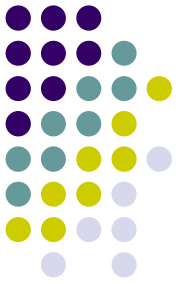
The Terms...

- A gully is an erosion channel cut into the soil along a line of water flow



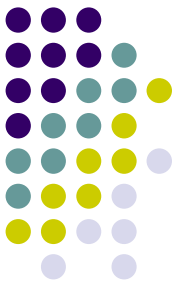
The Terms...

- A rut is a elongated depression caused by dragging logs or by wheels or tracks of harvesting machinery, equipment or other vehicles.
- Ruts are often exacerbated by erosion from uncontrolled storm water runoff



The Terms...

- A primary skid trail is used for three or more passes.
- A secondary skid trail is used for one or two passes.



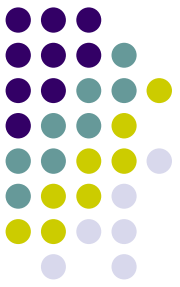
Infrastructure	Soil disturbance is excessive if:
Roads, Landings, Skid Trails and General Harvest Area	A gully or rut is 6 inches deep or more and is resulting in channelized flow to a wetland, stream or lake.
Roads, Landings and Primary Skid Trails	In an RMZ or wetland, a gully or rut is 6 inches deep or more and is 100 feet long or more. In an upland area (outside of RMZ), a gully or rut is 10 inches deep or more and is 66 feet long or more.
Secondary Skid Trails and General Harvest Area	A gully or rut is 6 inches deep or more and is 100 feet long or more.

Administering the Guidelines

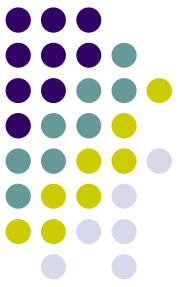


- Management expectation is that all steps and precautions will be taken to avoid and minimize soil disturbances
- If disturbances occur below the excessive threshold, expectation is that contractor will repair prior to close of contract
- If disturbances exceed the excessive threshold, expectation is that contractor will notify administrator when it happens and they will work together on appropriate remedy

Monitoring



Monitoring - Broad Objectives

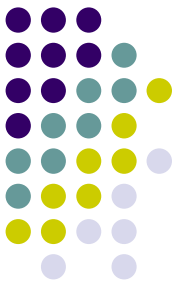


- The broad objective in collecting information on soil disturbances is to determine whether forestry practices on state lands are protecting soil resources.

Specifically:

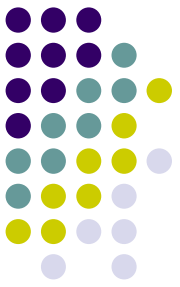
- Are soil disturbances, such as soil compaction and rutting, affecting soil productivity and hydrologic functions?

Monitoring – Specific Objectives



- Quantify and describe the effects of soil disturbances on natural drainage patterns and soil erosion.
- Compare collected data with operational standards, where applicable, and determine if results are consistent with sustainable forestry management goals.
- Monitor data that is collected over time to establish soil productivity benchmarks and trends.

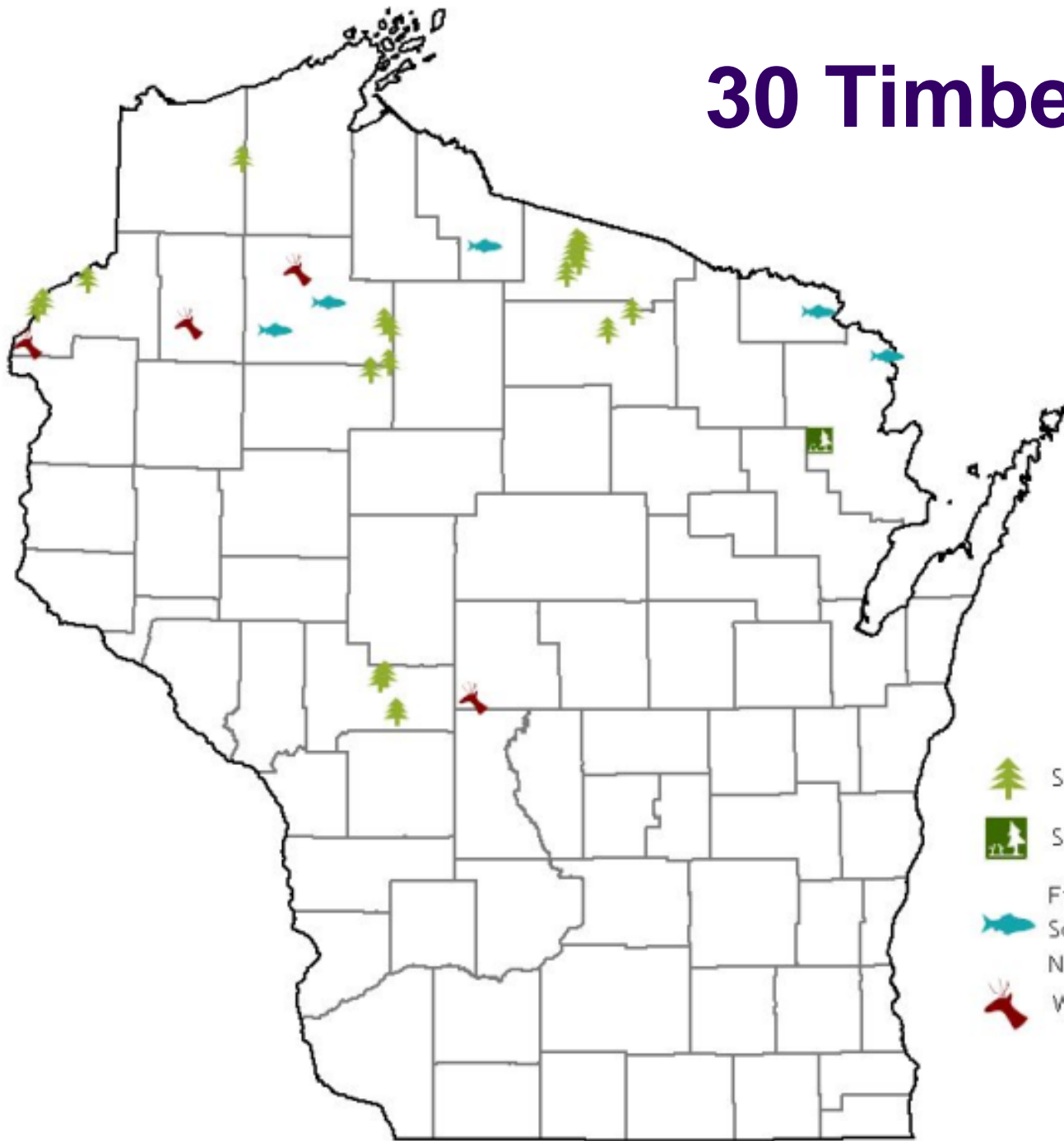
Results of 2006 Monitoring



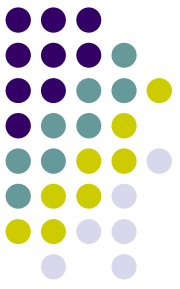
- Randomly selected 30 sales from 381 sales open as of July 1, 2006
- Selected sales that had harvesting started or completed



30 Timber Sales



-  State Forests
-  State Park
-  Fishery Areas, Wild Rivers, Scenic Waters, and Natural Resource Areas
-  Wildlife Areas



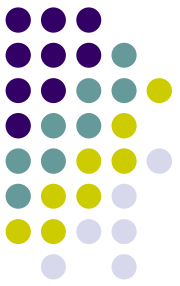
State Forests – 20 Sales

- American Legion – 2
- Black River – 5
- Brule River – 1
- Flambeau River – 4
- Gov. Knowles – 3
- N. Highland – 5



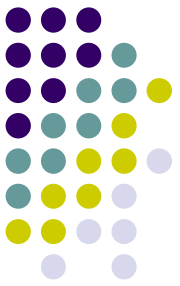
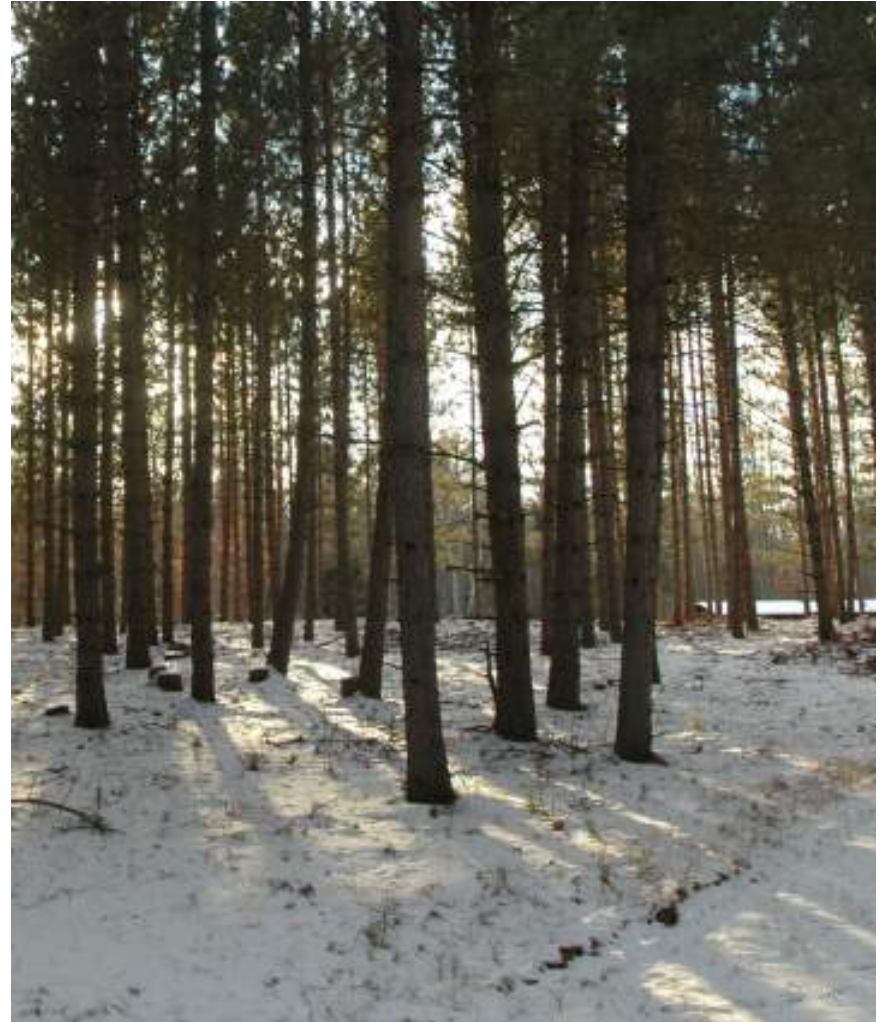
Wildlife Areas - 4

- Beaver Brook
- Chief River
- Fish Lake
- Wood County



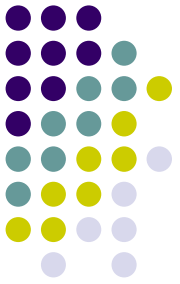
Other Sales - 6

- Chippewa Flowage Scenic Waters Area
- Turtle Flambeau Scenic Waters Area
- Beverly Lake Fishery Area
- Gov. Thompson State Park
- Menominee Natural Resource Area
- Pine-Popple Wild Rivers



Sale Size

- Averaged 90 acres
- Largest = 282 acres
- Smallest = 22 acres



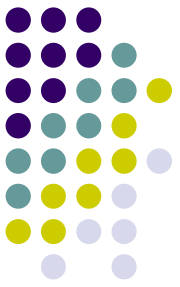
Harvesting Status

- 10 sales in progress
 - Averaged over 50% of sale completed
- 20 sales completed
 - Averaged 5 months since sale completed

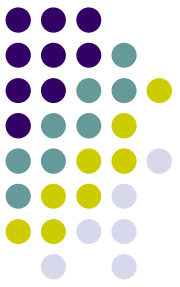


Infrastructure

- On average, 4.2% of sale harvested was devoted to roads, landings and primary skid trails
 - Min = 0.4%
 - Max = 18.6%
- On average, 50% of infrastructure removed from harvestable area



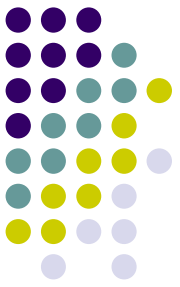
Where Ruts or Gullies Observed?



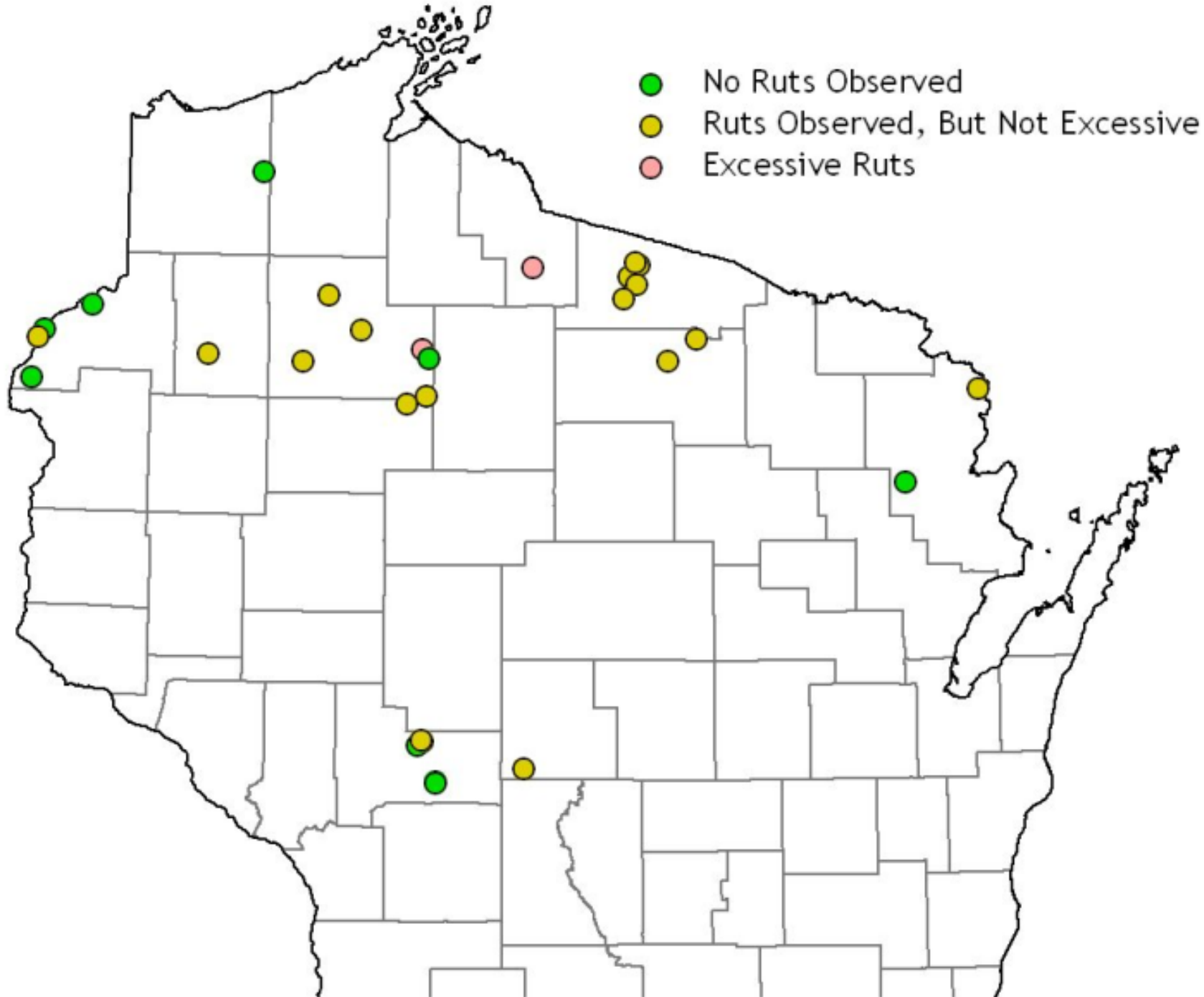
- No – on 10 sales
 - 8 on sandy soils
 - 1 on sandy loam soil
 - 1 on silt loam soil
- Yes – on 20 sales
 - 9 on sandy soils
 - 6 on sandy loam soils
 - 5 on silt loam soils

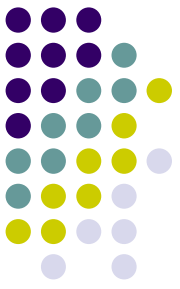


20 Sales with Observed Ruts or Gullies



- 2 sales had excessive rutting
 - 1 was caused by harvesting equipment
 - 1 was a mix of harvesting equipment & off-road vehicles
 - Both sales were harvested prior to guidelines being put in place
- 18 sales had ruts/gullies, but not excessive
 - Caused primarily by harvesting equipment

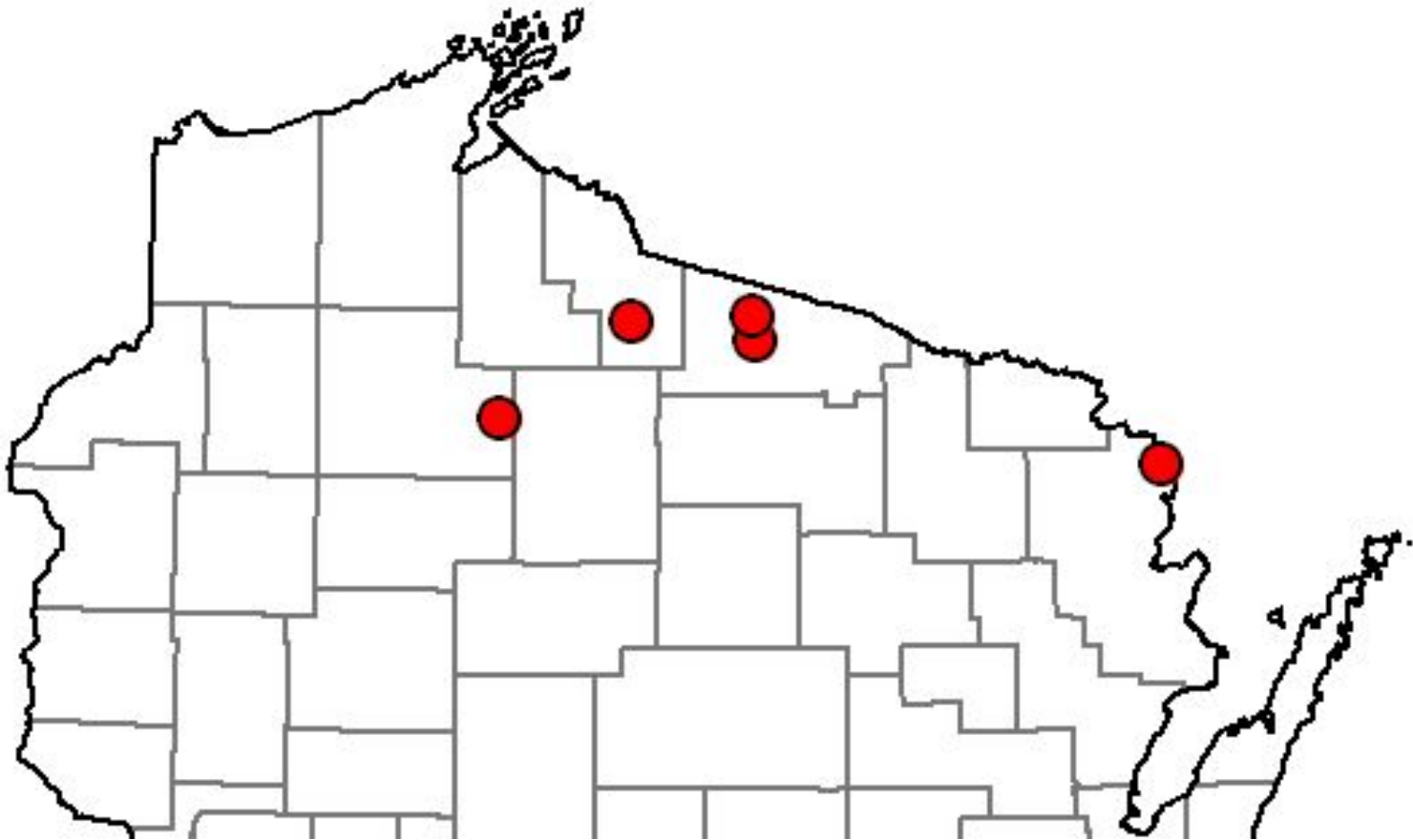
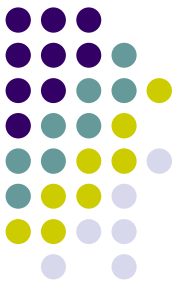




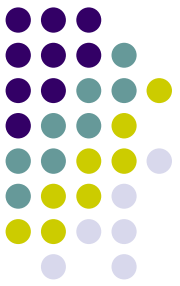
Recorded Ruts

- Measurements were taken on ruts that occurred on roads, landings, primary skid trails and transects
- Measurements were not taken if:
 - Depth was less than 6 inches in entirety
 - Length was less than 5 feet in entirety
 - Did not bisect a transect in harvest area
- Collected detailed information on 51 ruts on 5 sales

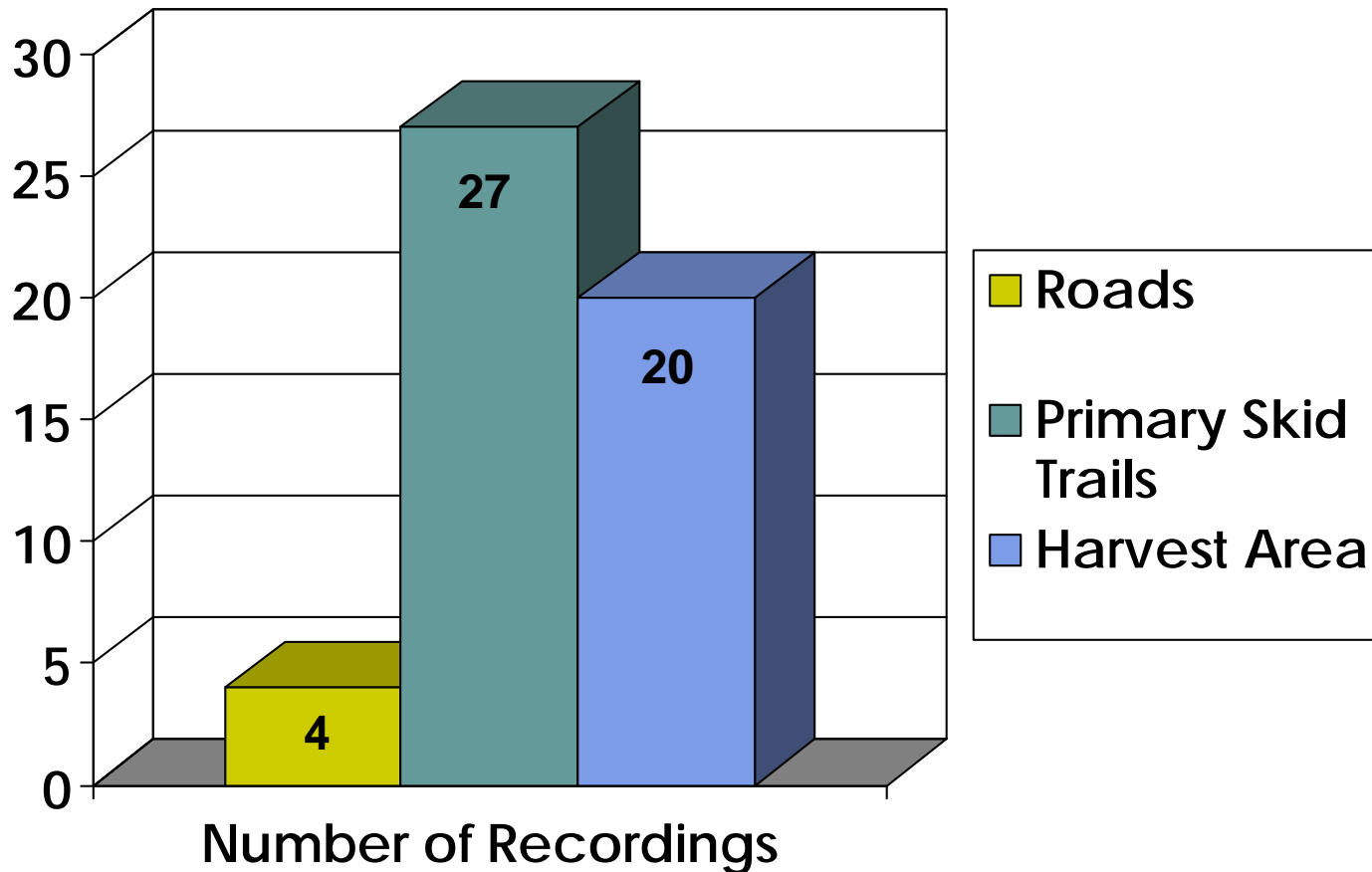
Sales with Recorded Ruts



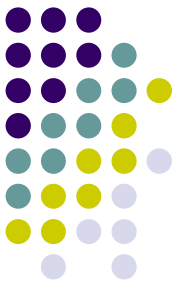
Recorded Ruts



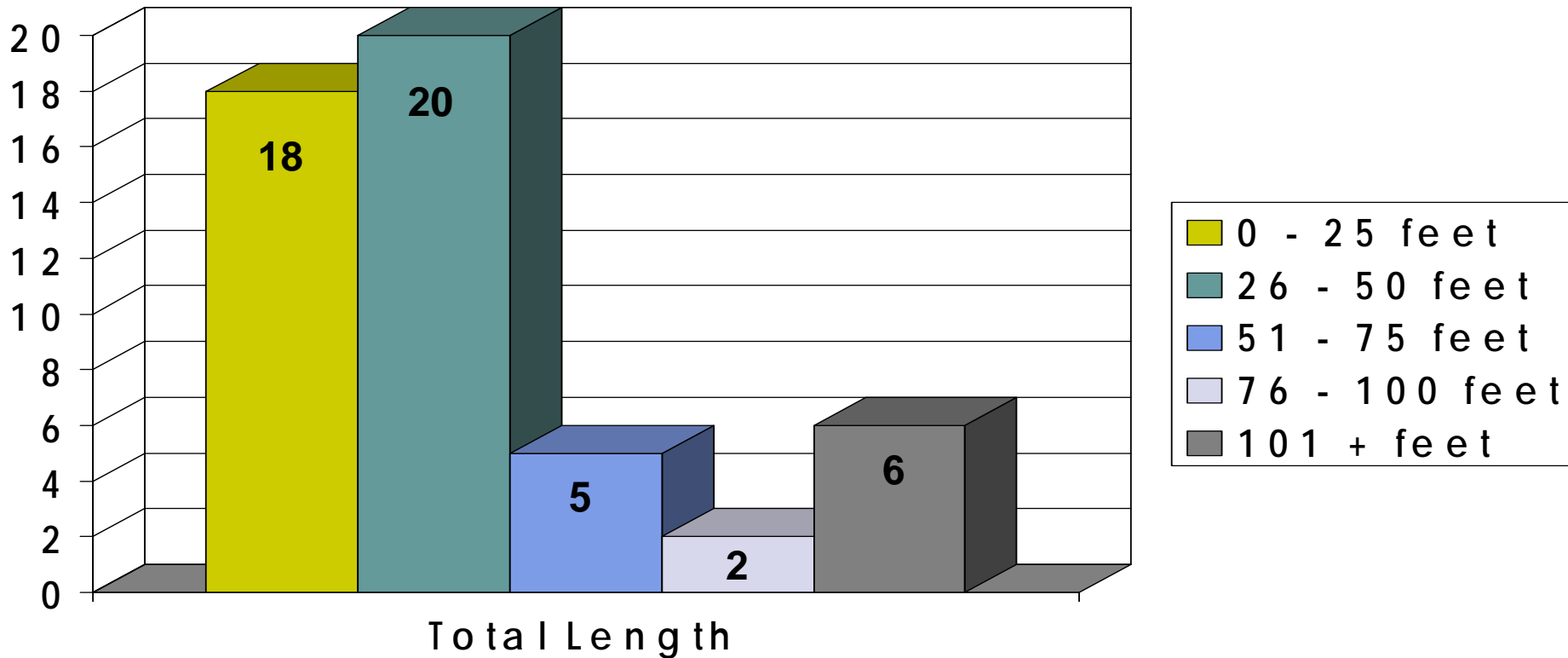
- 51 ruts recorded on 5 sales



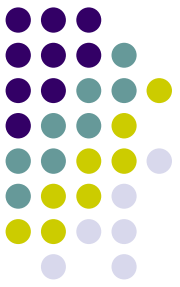
Total Length of Ruts



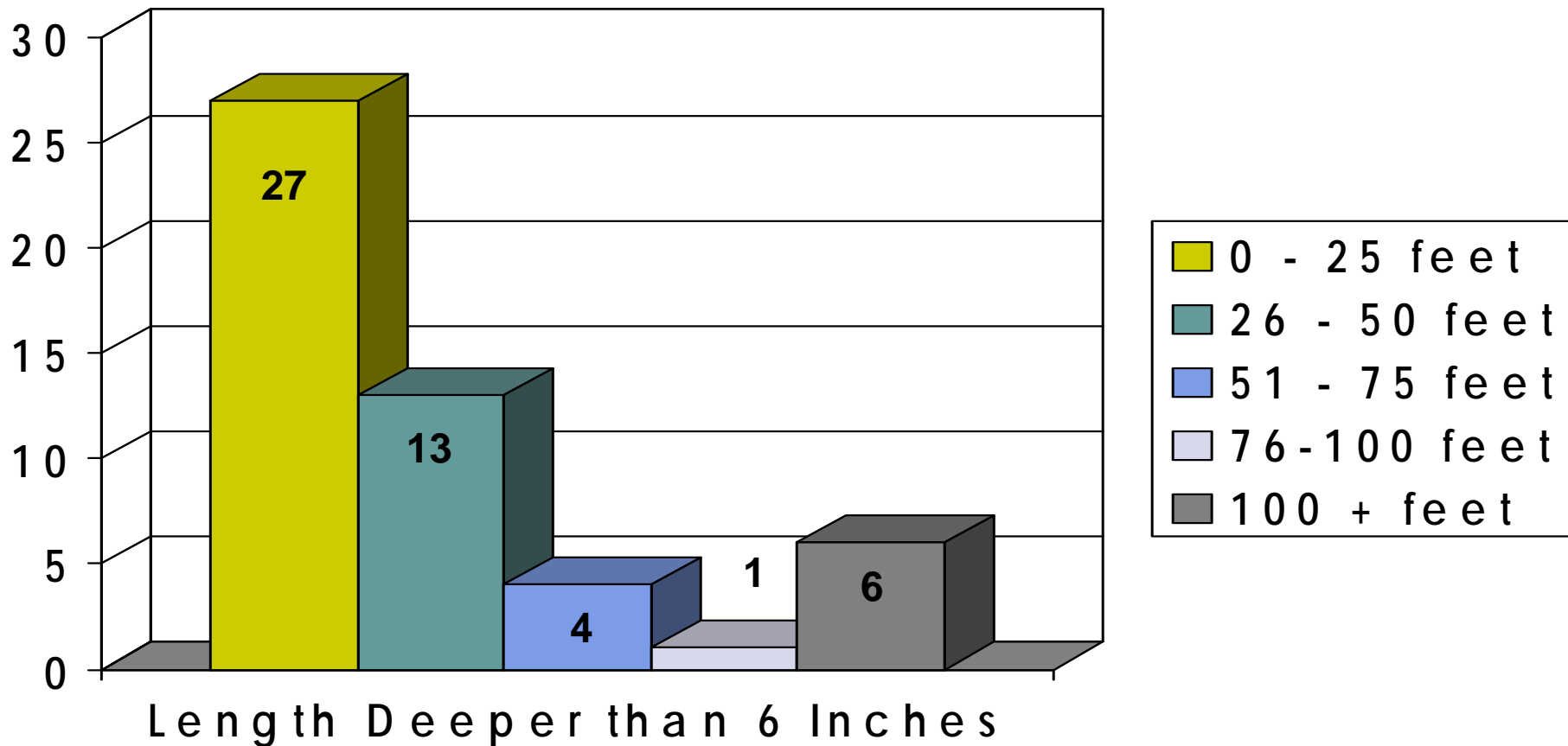
Average = 52 ft Min = 10 ft Max = 225 ft



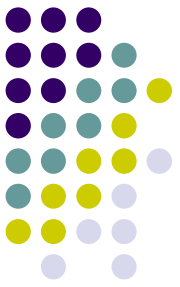
Length Deeper than 6 Inches



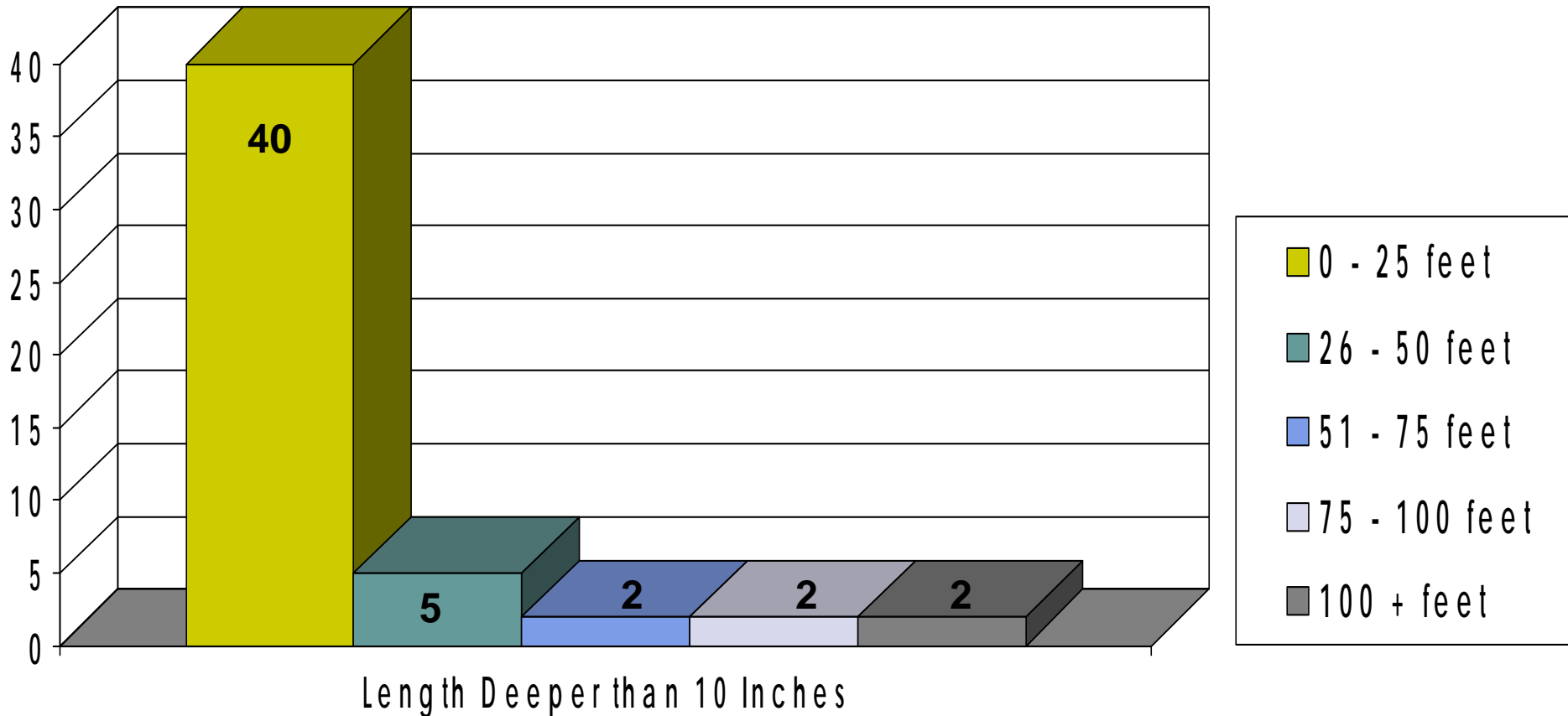
Average = 44 ft Min = 3 ft Max = 200 ft



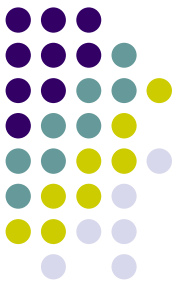
Length Deeper than 10 Inches



Average = 21 ft Min = 0 ft Max = 120 ft



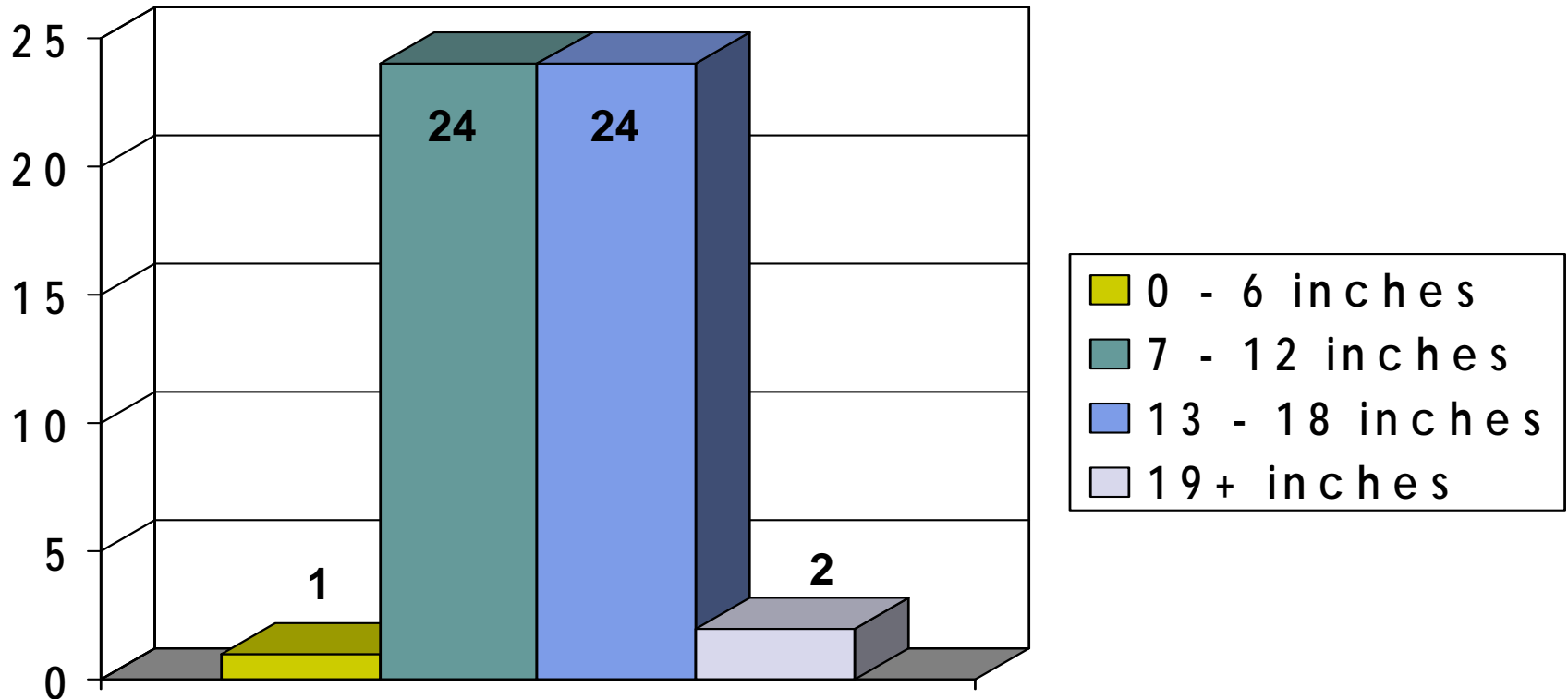
Maximum Depth from Soil Surface



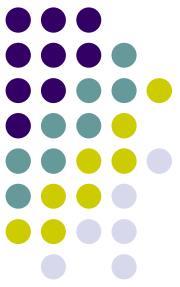
Average = 12 in

Min = 6 in

Max = 20 in



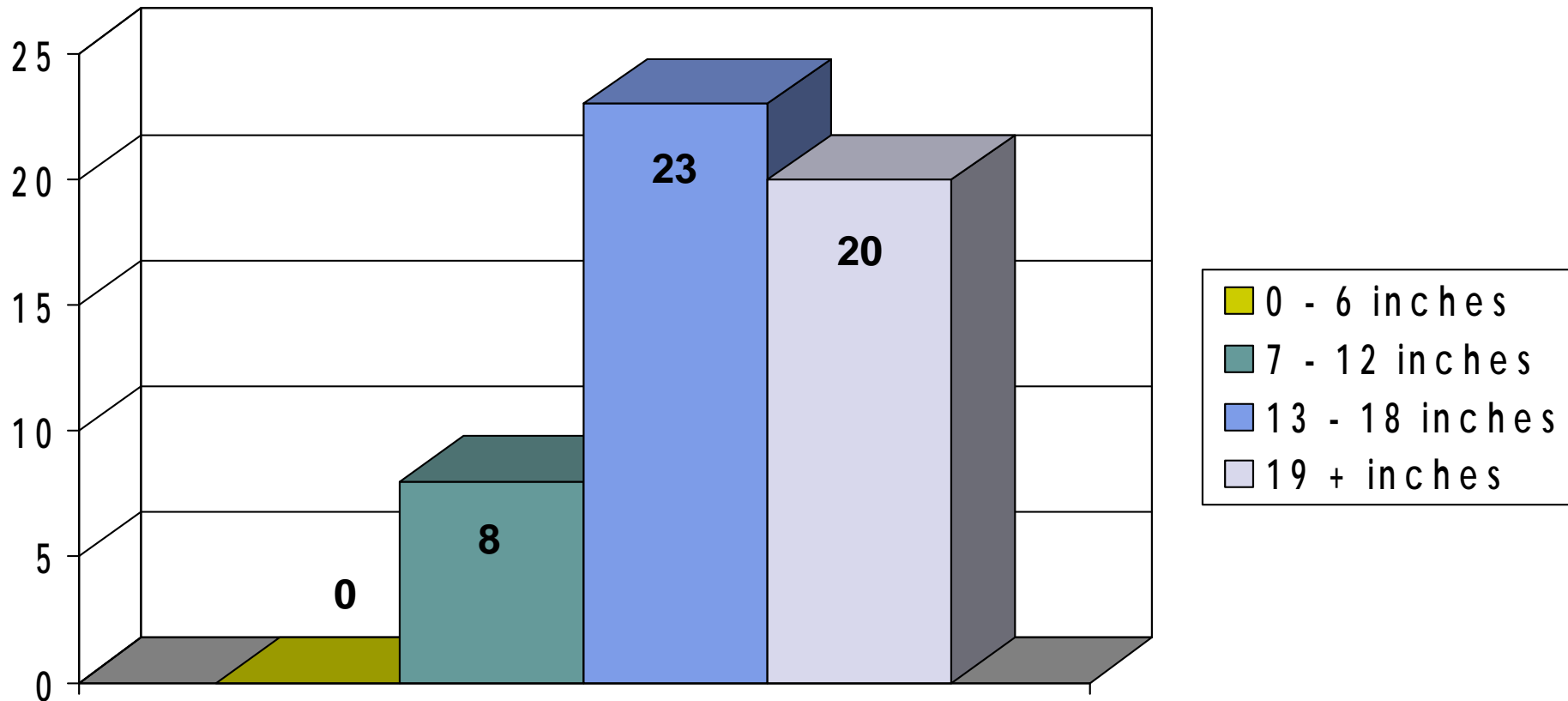
Maximum Depth from Top of Rut



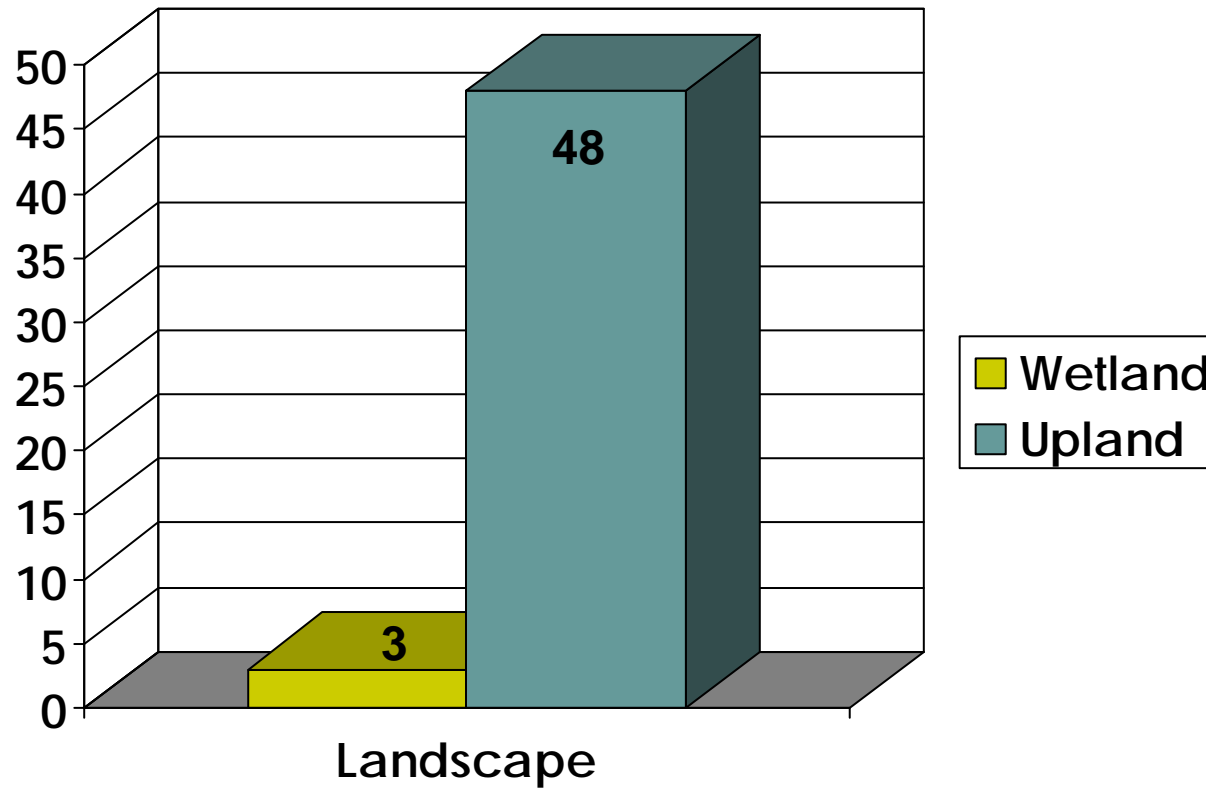
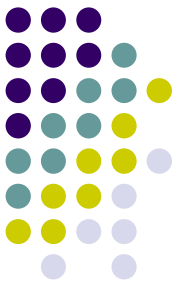
Average = 17 in

Min = 8 in

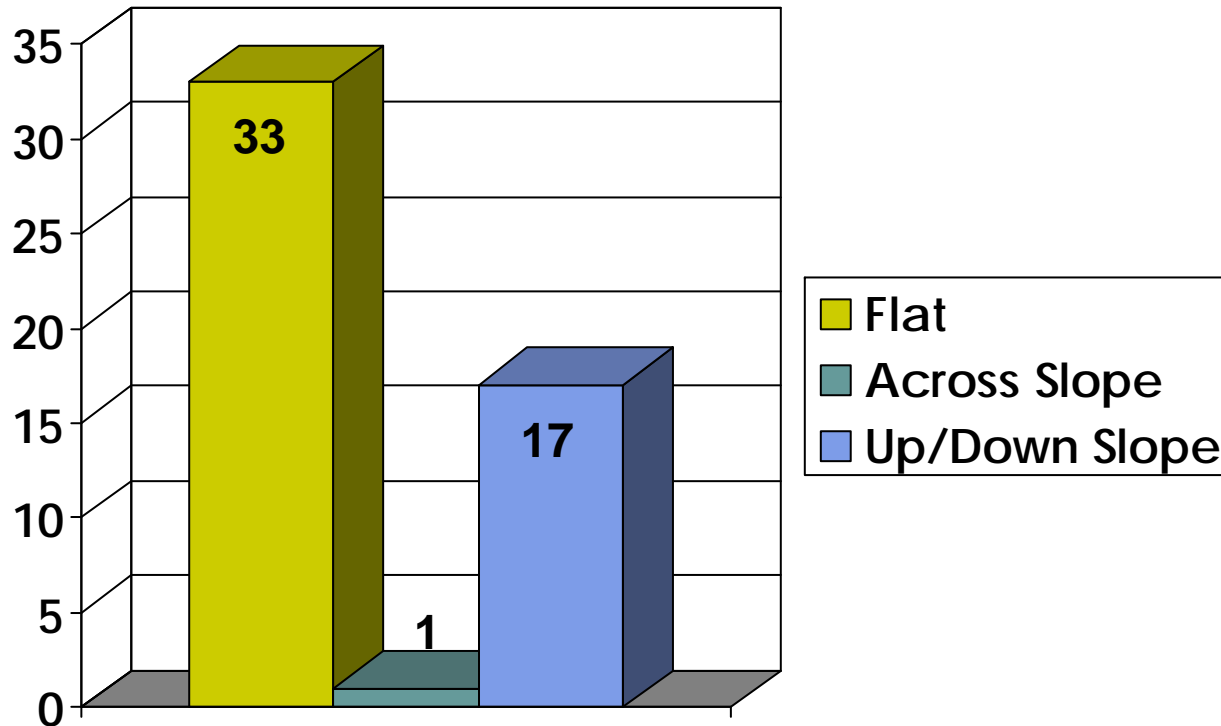
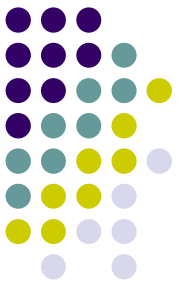
Max = 26 in



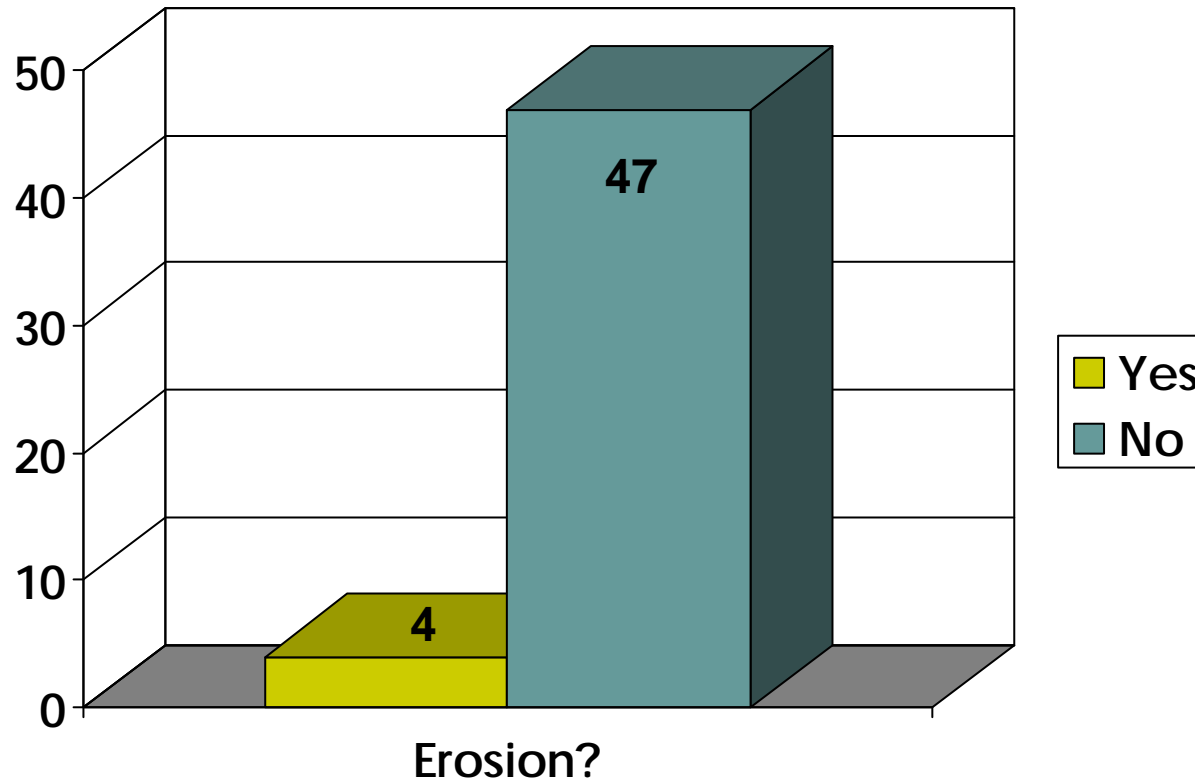
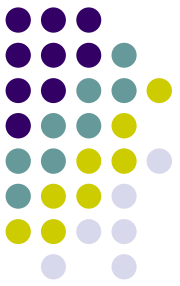
Landscape Position of Ruts



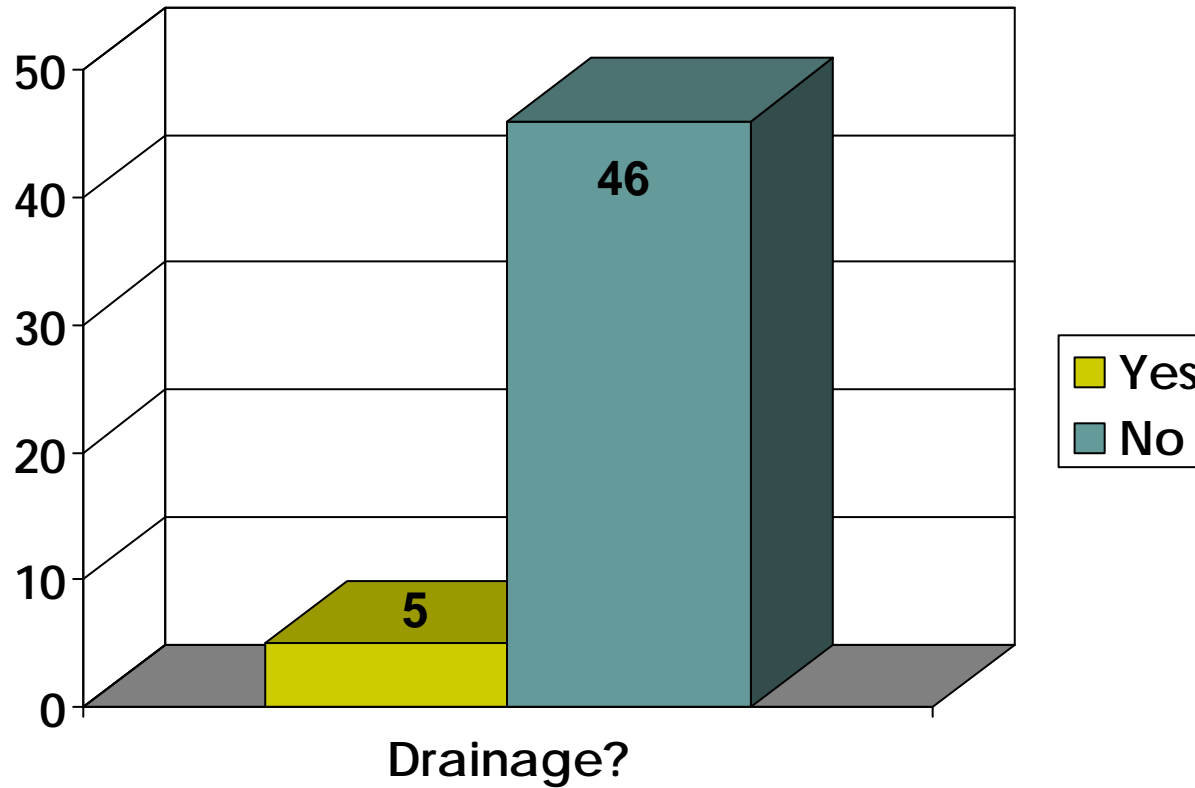
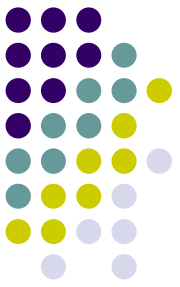
Orientation of Ruts



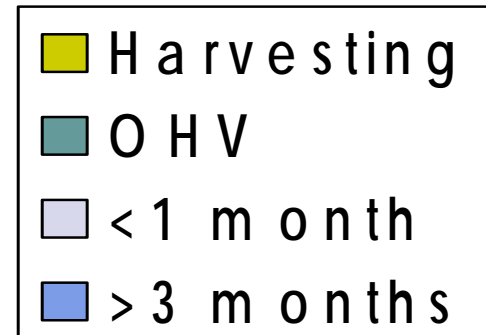
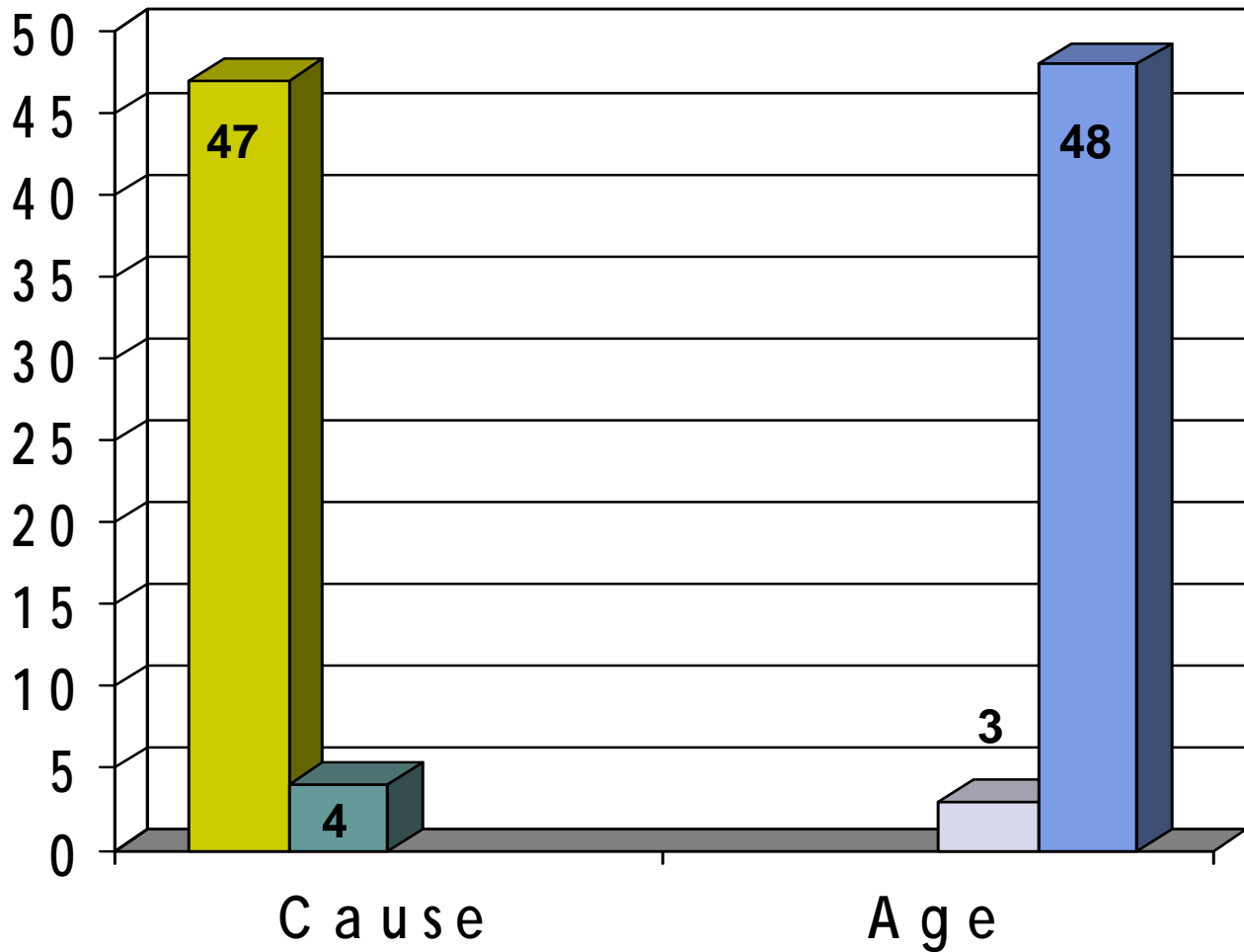
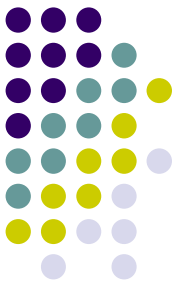
Ruts Leading to Erosion

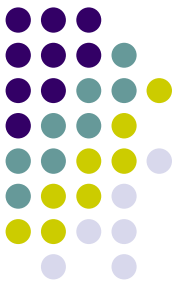


Ruts Leading to Drainage Problems



Cause and Age of Ruts

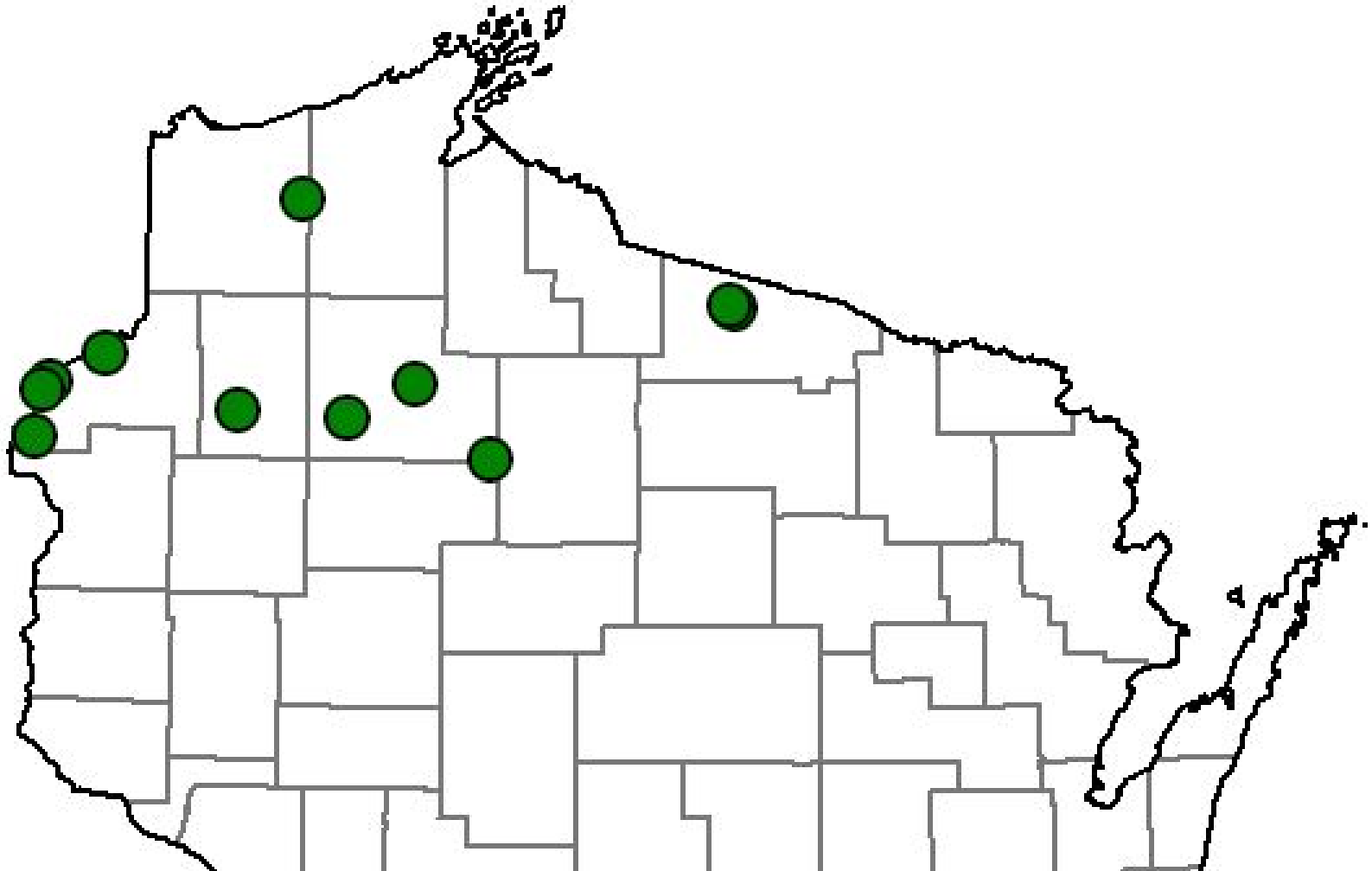
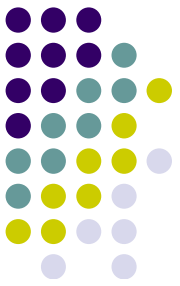




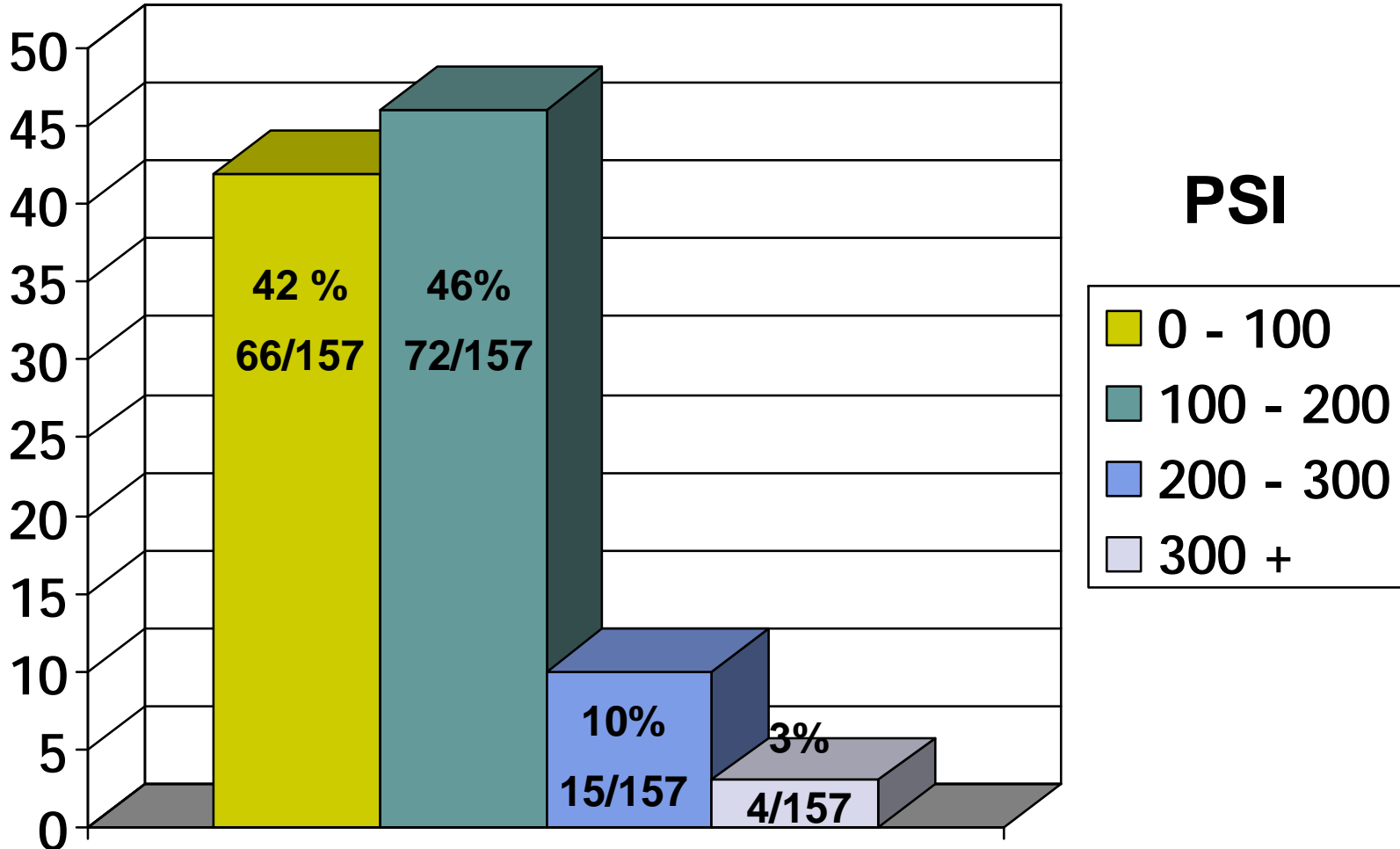
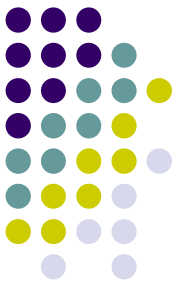
Soil Compaction

- 51 transects taken at 11 sales
 - 7 on sandy soils
 - 2 on sandy loam soils
 - 2 on silt loam soils
- Transects were 300 feet long
- Measurements taken at 0, 100, 200 and 300 feet
- 5 readings taken at each point
- Readings taken at a depth of 9 inches

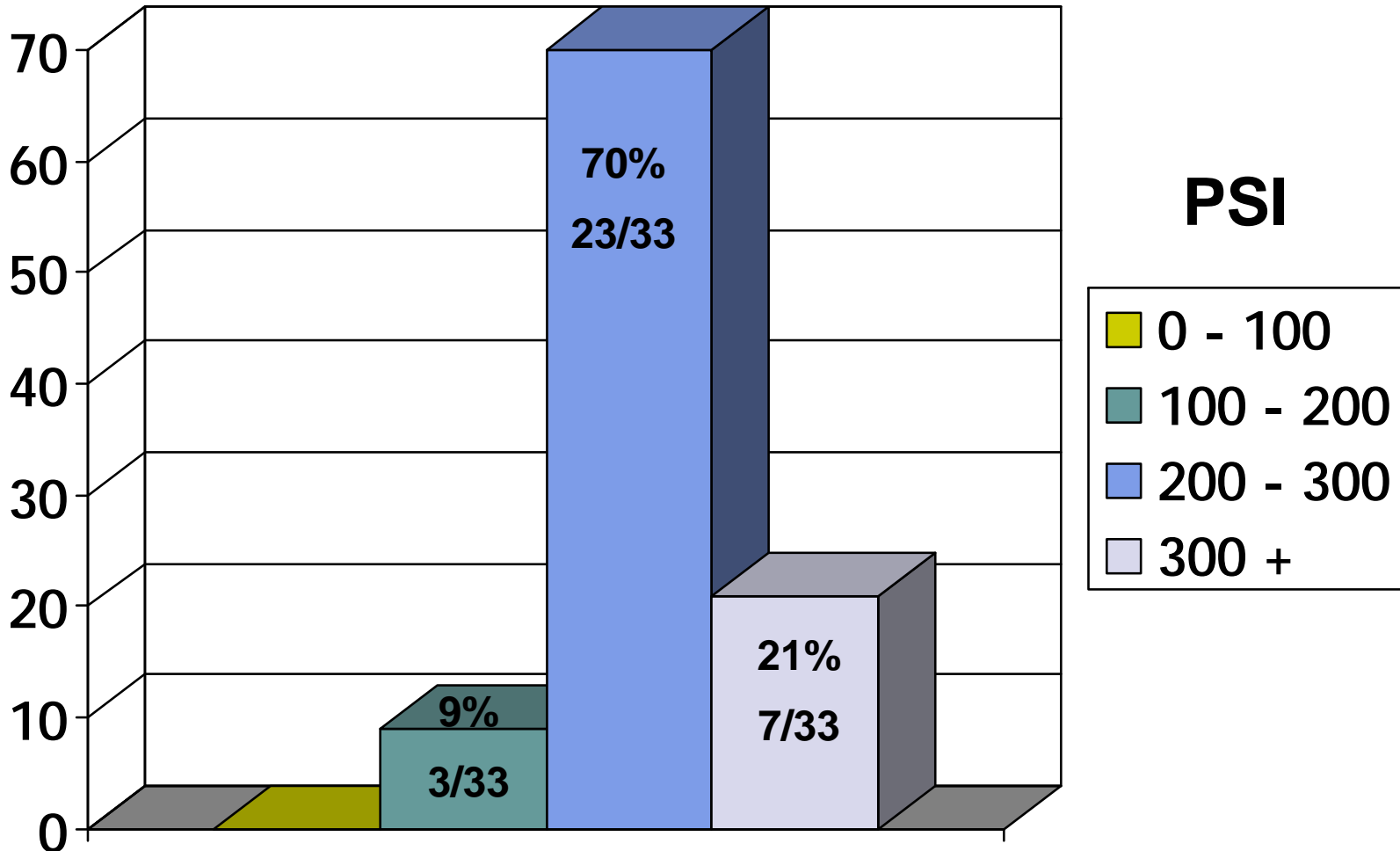
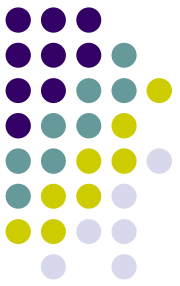
Sales with Soil Compaction Readings



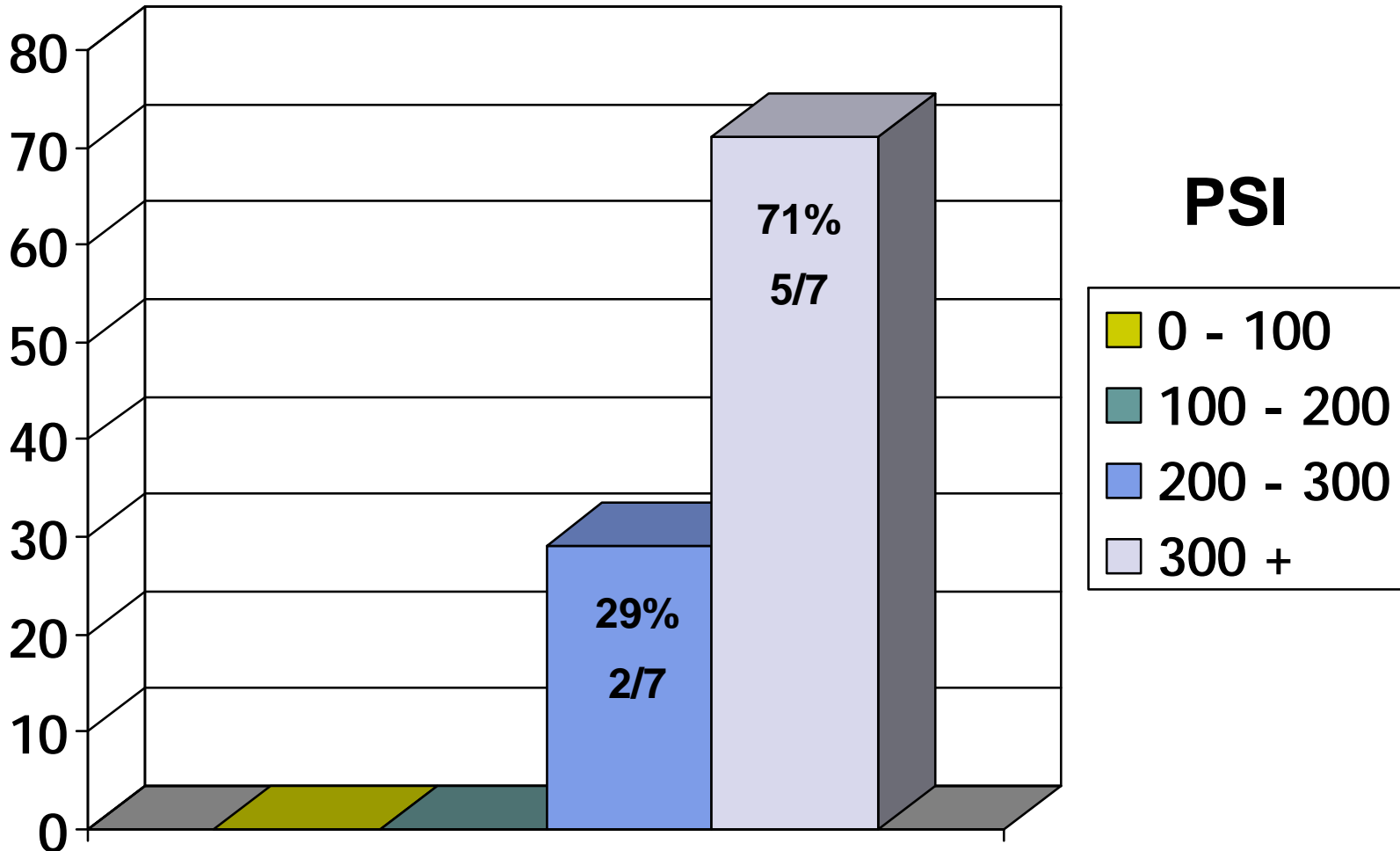
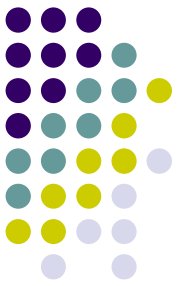
Harvest Area



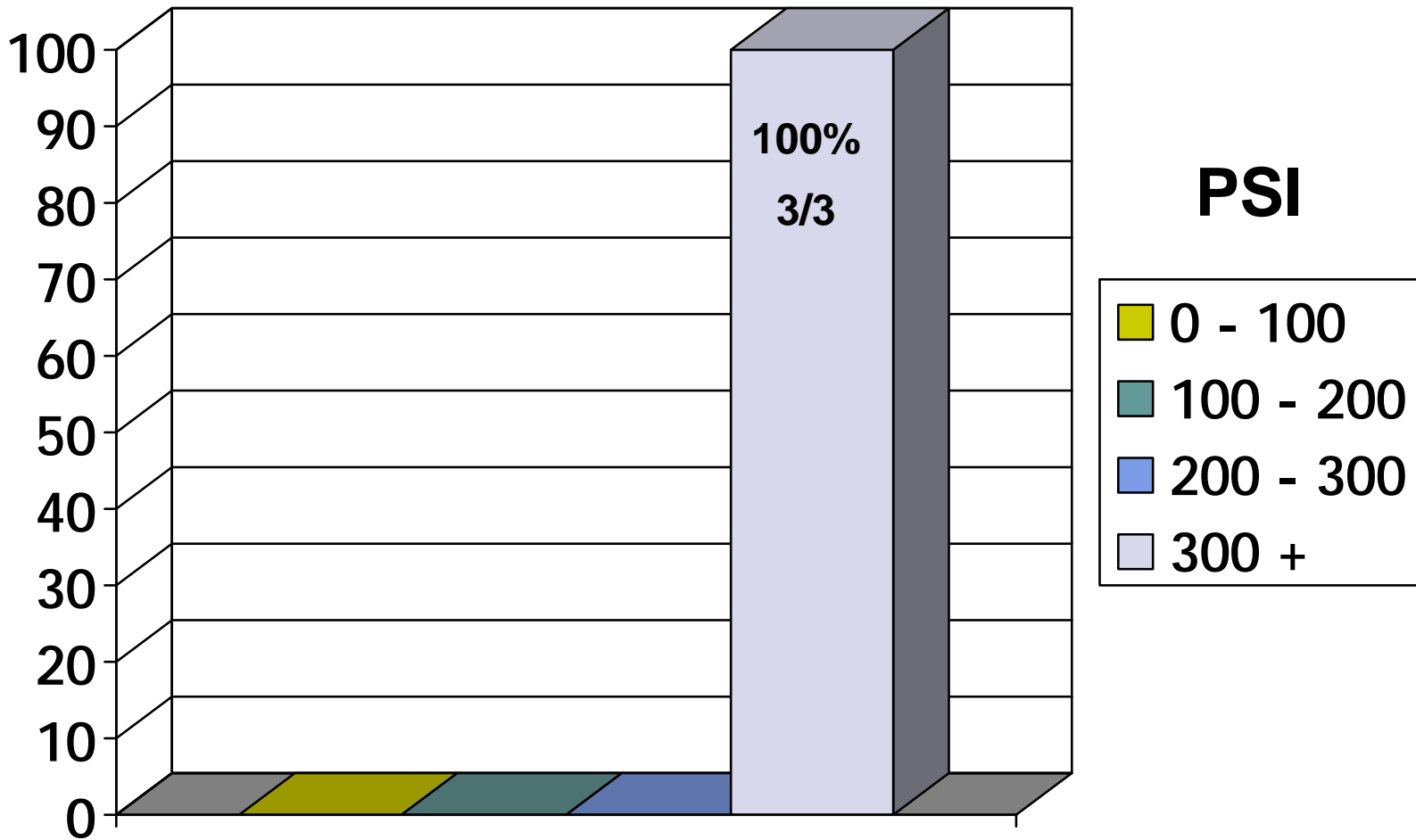
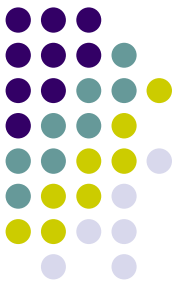
Secondary Skid Trails



Primary Skid Trails

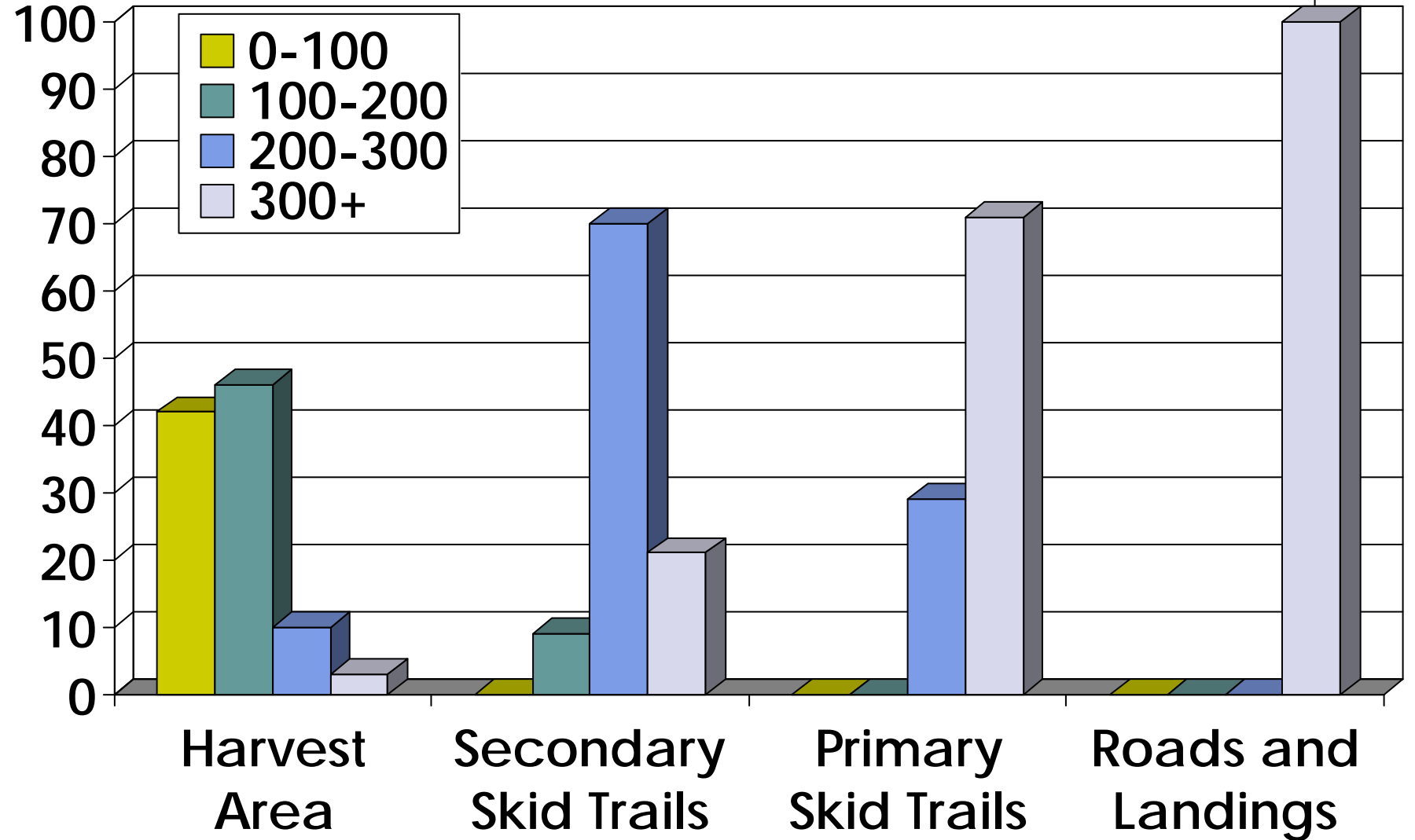
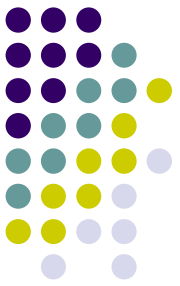


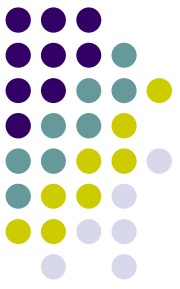
Roads and Landings



In most cases, roads and landing were too compacted to get a reading

Soil Compaction by Area





Conclusions

- Existing sales did not seem to have problems meeting guidelines
- Most ruts observed/recorded were not excessive, but when ruts became excessive, they were really excessive
- Ruts on roads are being repaired, but ruts found on skid trails and in harvest area are less likely to be repaired
- Soil compaction increases quickly with more traffic