Research Update Meeting 2006 - Sanding Research 2005 Physiology and Insect Control

Sanding Research 2005
Physiology and Insect Control

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Cranberry Station, UMass Amherst

Natural Sanding

- Most commonly used cultural practice
- First practice used in cultivating cranberry
- Henry Hall noticed beneficial effect in Dennis in1816

Why Sand?

- Promote growth
- Improve overall productivity
- Suppress disease
- Reduce insect populations
- Act as a pruning mechanism

½”-2” every 2-5 years

Sanding

- Covers the runners
  - Anchors runners
  - Encourages uprights
  - Encourages rooting
- Stimulates organic matter decomposition
  - Free fertilizer!
  - Nitrogen release!
  - Use less fertilizer in sanding year

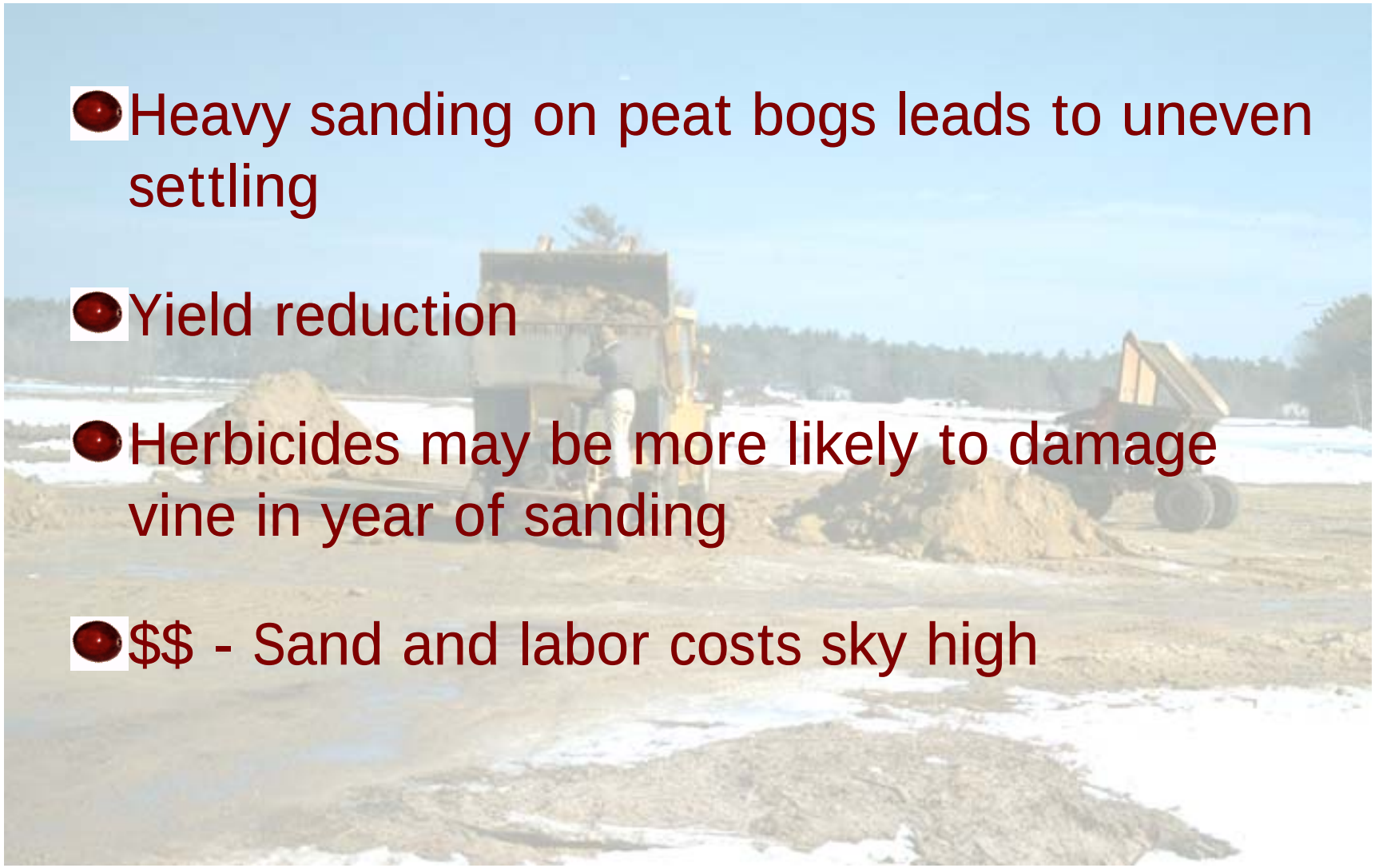
Sanding

- Buries the trash layer
  - Suppress fruit rot inoculum
  - Limits girdler habitat and slow infestations

Sanding on New Plantings

- Anchor runners
- Encourages rooting
- ½” at least in first or second year

Sanding Negatives



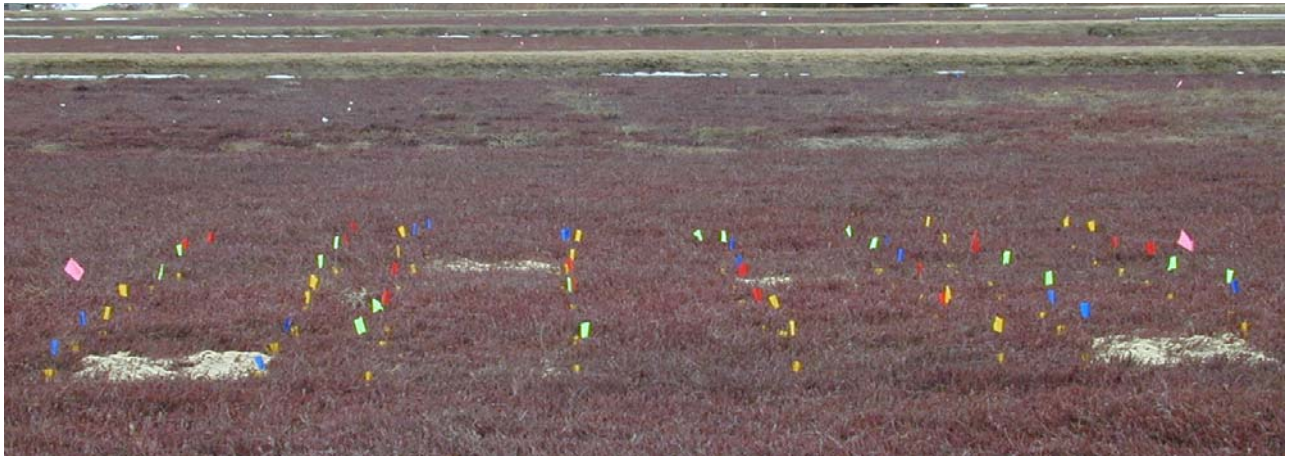
- Heavy sanding on peat bogs leads to uneven settling
- Yield reduction
- Herbicides may be more likely to damage vine in year of sanding
- $$ - Sand and labor costs sky high

Sanding - Physiology

- 2 cultivars sanded at State Bog
  - Early Black
  - Stevens
- Estimated plant density
- Yield
- Fruit color test - TAcy values
- Flooding interaction - CHO analysis

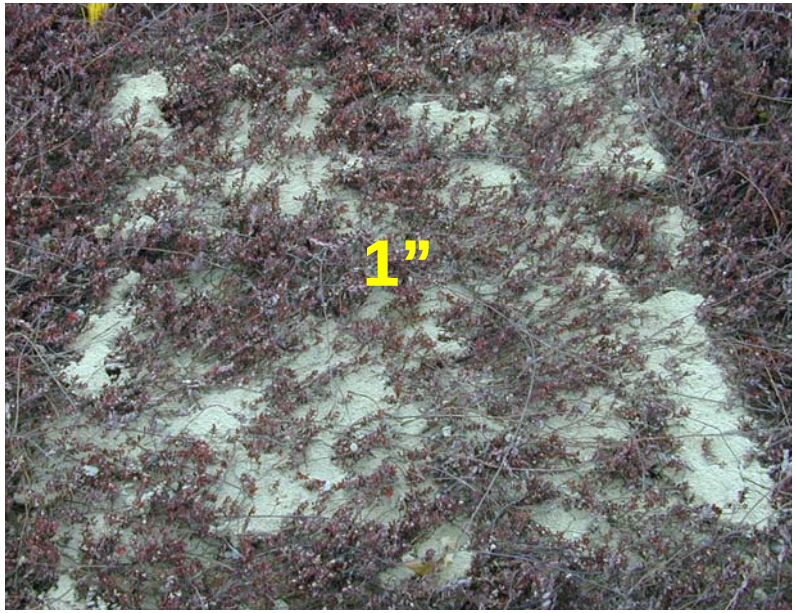
Sand Application 3/23/05

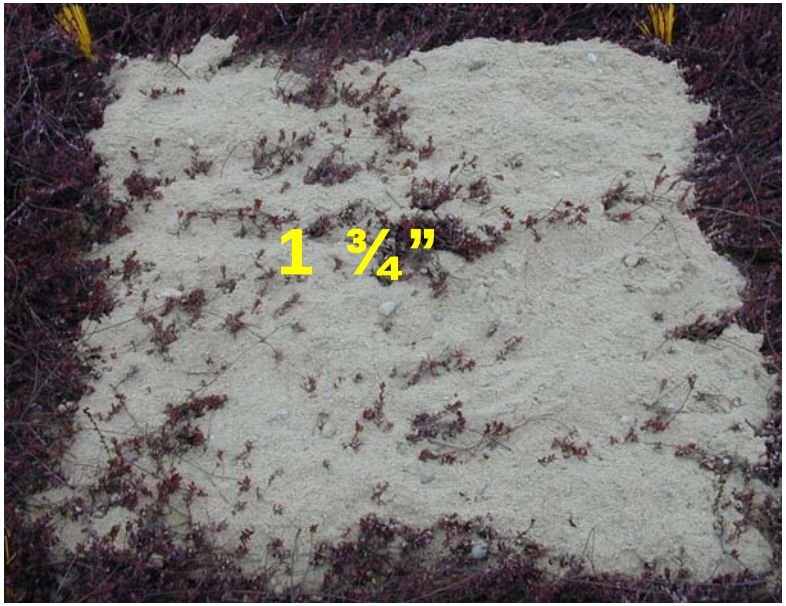
Stevens



Early Black

Stevens 3/23/05





Early Black 3/23/05

Plant Density - Stevens

March 23 – sand applied




0” **½”** **1”** **1 ¾”**




May 5 – six wks after sanding

Plant Density - Stevens

March 23 – sand applied




0” **½”** **1”** **1 ¾”**



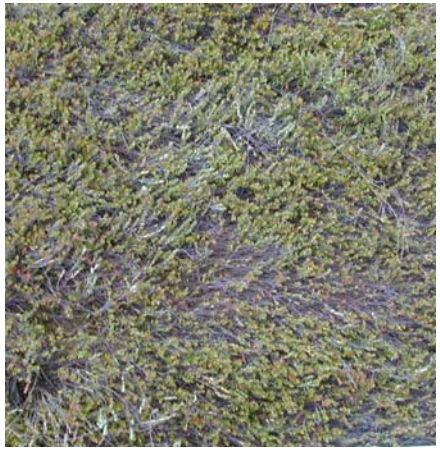

July 29 – 18 wks after sanding

Plant Density - Early Black

March 23 – sand applied




0” **½”** **1”** **1 ¾”**




May 5 – six wks after sanding

Plant Density - Early Black

March 23 – sand applied

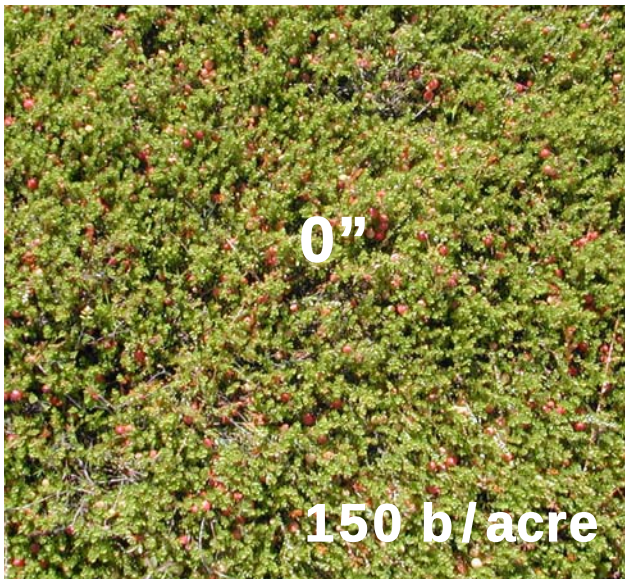


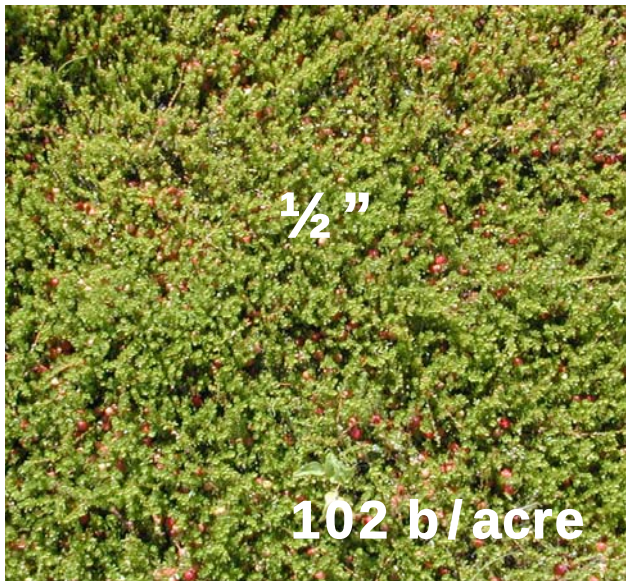

0” **½”** **1”** **1 ¾”**

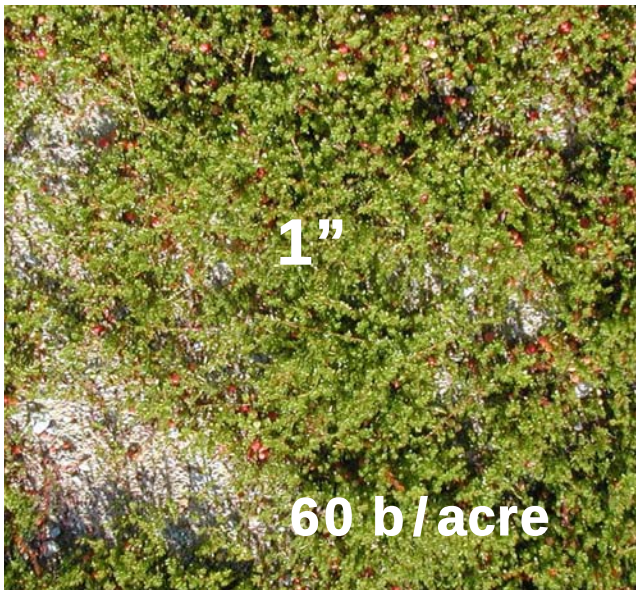


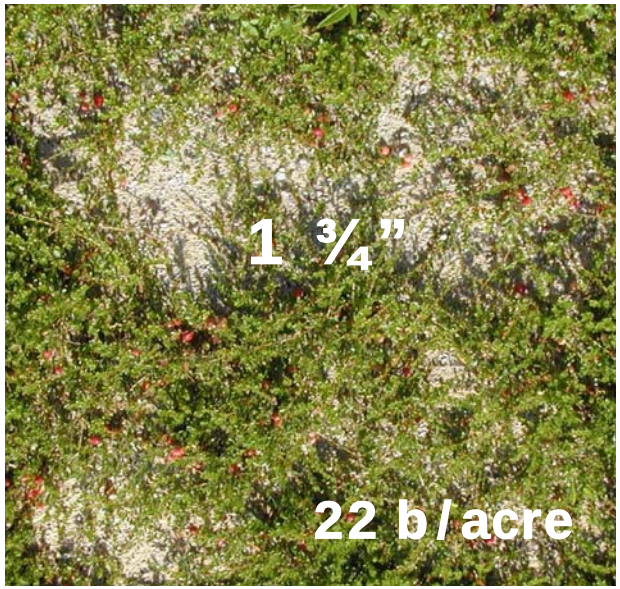

July 29 – 18 wks after sanding

Results – Yield, Early Black

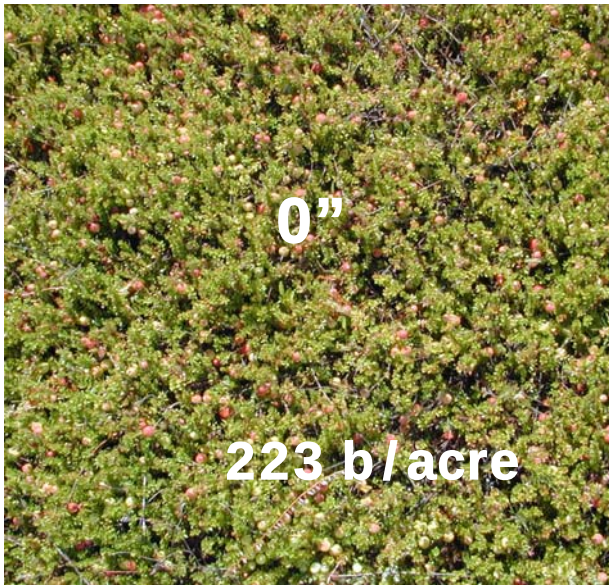


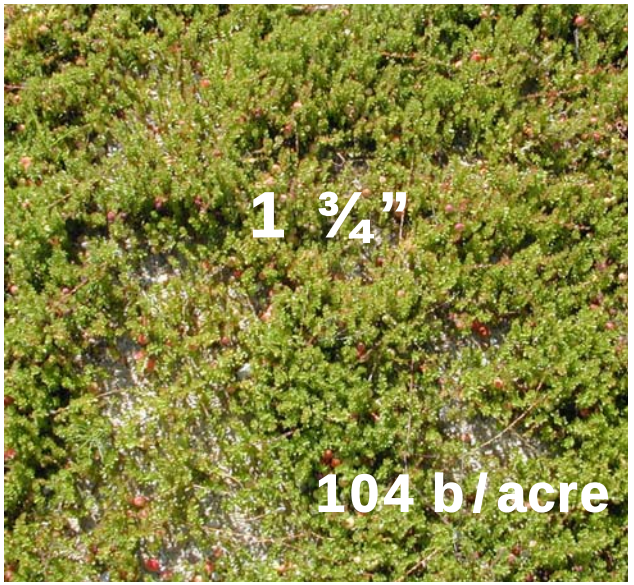




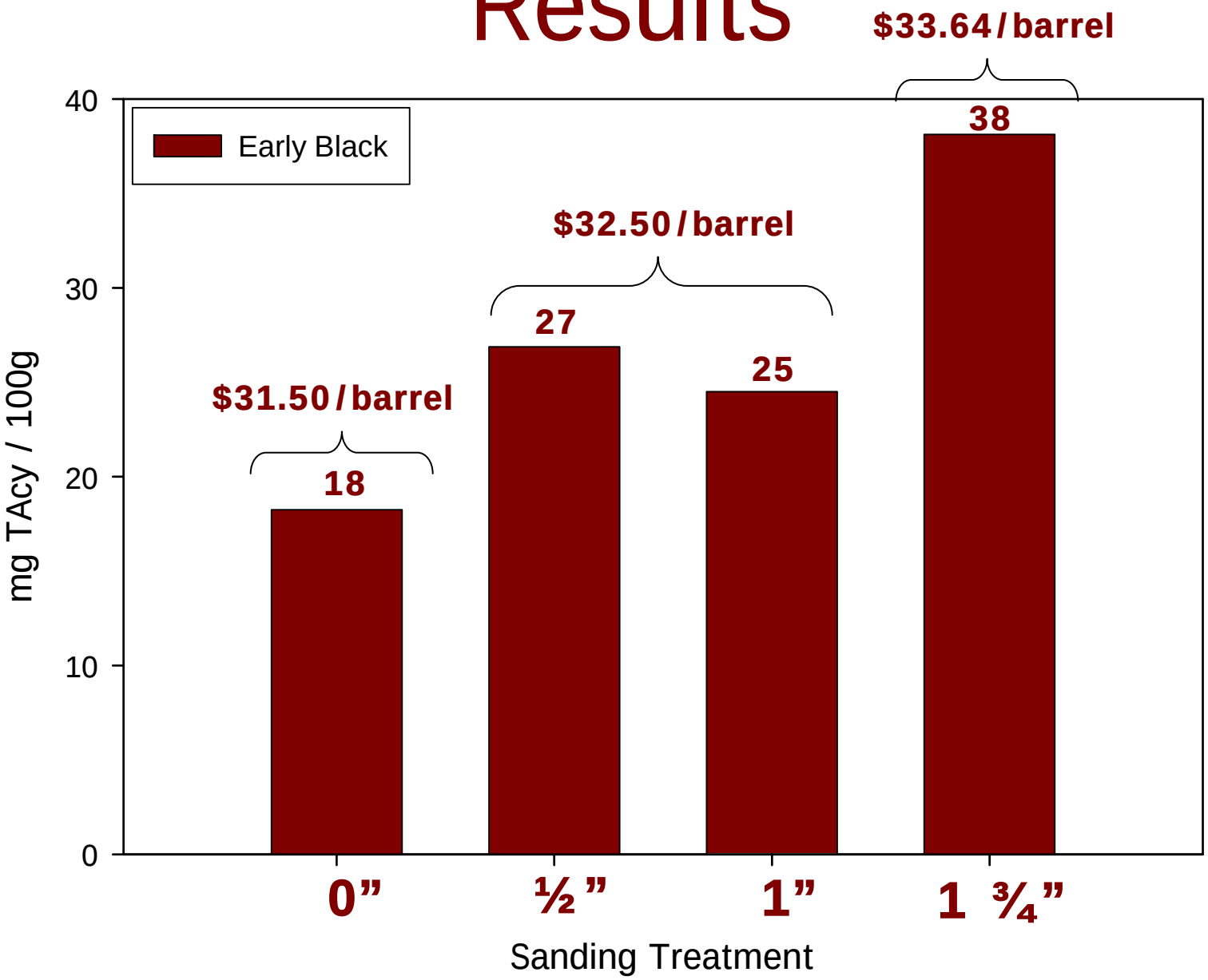


Results – Yield, Stevens





Results


$33.64/barrel
40
Early Black
38
$32.50/barrel
30
27
25
$31.50/barrel
mg TAcy / 100g
20
18
10
0
0”
½”
1”
1 ¾”
Sanding Treatment

Results

- Processed Fruit Price ($/acre): EB
  - 0” sanding treatment: $4725
  - ½” sanding treatment: $3315
  - 1” sanding treatment: $1950
  - 1 ¾” sanding treatment: $740

Conclusions

- Sanding affects cultivars differently
  - EB is much more severely affected compared to Stevens
- Estimated plant density and yield
  - Stevens: Vegetative growth with respect to PD recovers in 4 months but yield was negatively affected by all sanding treatments
  - EB: Vegetative growth only recovers in ½" treatment in 4 months; yield is negatively affected by all treatments

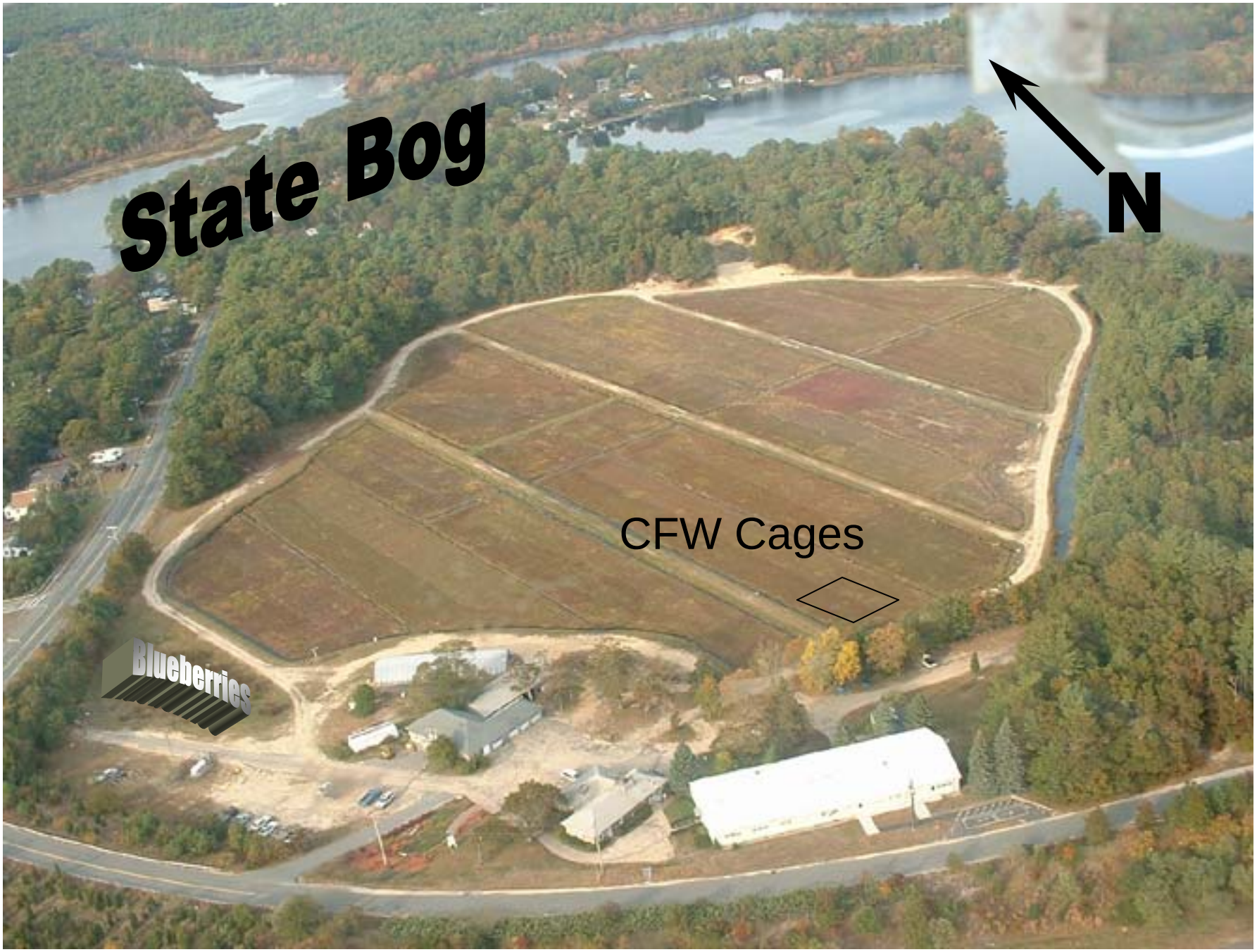
Conclusions

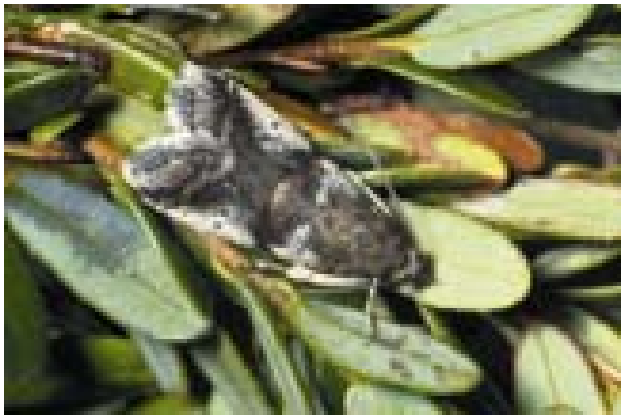
- Anthocyanin test -TAcy values
  - In EB, sanding increases anthocyanins
  - Low yield negates color incentive
- Flooding interaction - CHO analysis TBD

Sand Application December 04

Does sand suppress cranberry fruitworm?

Early Blacks

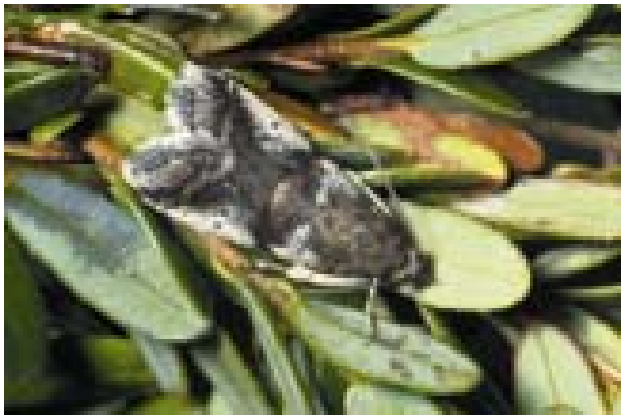

State Bog
N
CFW Cages
Blueberries



Cranberry Fruitworm

Acrobasis vaccinii (Pyralidae)

TREATMENT		# of CFW Moths EMERGED
Control	(600)	80
½ inch	(600)	110
1 inch	(600)	80
1 ½ inch	(600)	27

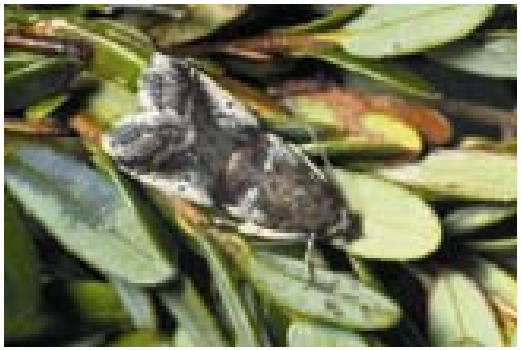


Cranberry Fruitworm

Acrobasis vaccinii (Pyralidae)

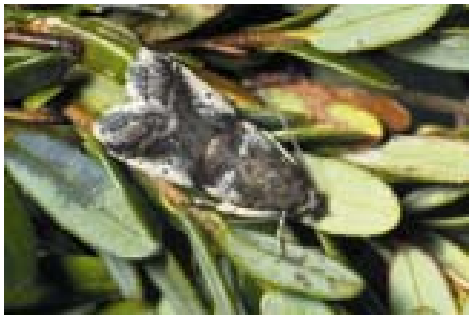
# of CFW Moths

TREATMENT		EMERGED	
Control	(600)	80	(54)
½ inch	(600)	110	(24)
1 inch	(600)	80	(12)
1 ½ inch	(600)	27	(10)



Cranberry Fruitworm

- Huge mortality, in field or lab
- Greater mortality when hibernacula were sunk into bog soil
- Maybe pathogens in soil attack hibernacula
- Maybe damaged from handling



Cranberry Fruitworm

- Ran trial in the lab
  - Dropped 10 wandering larvae into buckets

- In pure sand, 92% larvae spin cocoons at ½” but a few larvae go farther down
- In bog soil, 100% larvae spin cocoons at ½” or less
- BUT in bog soil, about ½ the hibernacula went moldy

“Uniformity of sanding methods on cranberry bogs and its potential impact on swamp dodder control”

Authors: Laura Hunsberger, Carolyn DeMoranville, Wesley Autio, and Hilary Sandler

- Dodder emergence can be reduced by applying sand
  - 67% with 1 inch
  - 4% with ½ inch

“Uniformity of sanding methods on cranberry bogs and its potential impact on swamp dodder control”

Authors: Laura Hunsberger, Carolyn DeMoranville, Wesley Autio, and Hilary Sandler

- 1996-1997, 24 farms were measured
- 15 barge sanded, 9 ice sanded
- Measured target depth vs. actual depth applied

“Uniformity of sanding methods on cranberry bogs and its potential impact on swamp dodder control”

Authors: Laura Hunsberger, Carolyn DeMoranville, Wesley Autio, and Hilary Sandler

- 9 ice sanded
- 6 applied ½ of their target depth
- 3 were very close to target depth

- 15 barge sanded
- 12 applied ½ or less of target depth
- 3 were very close to target depth

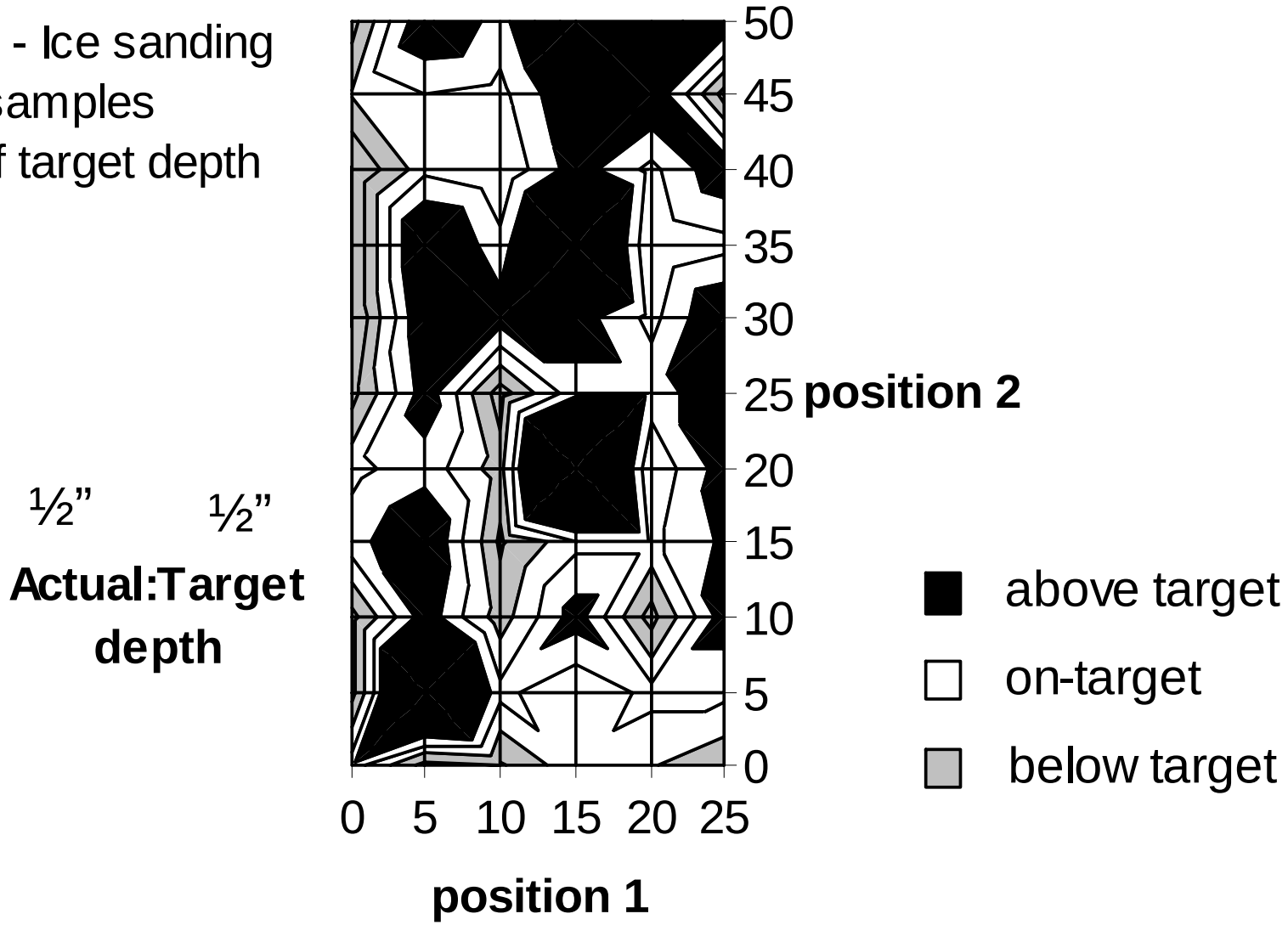
“Uniformity of sanding methods on cranberry bogs and its potential impact on swamp dodder control”

Authors: Laura Hunsberger, Carolyn DeMoranville, Wesley Autio, and Hilary Sandler

- In all cases, 47-100% of the bog received less than the targeted depth
- Non-uniform layer of sand applied

Non-Uniformity – ½” Ice Sanded

Farm 16 - Ice sanding
40% of samples
± 25% of target depth

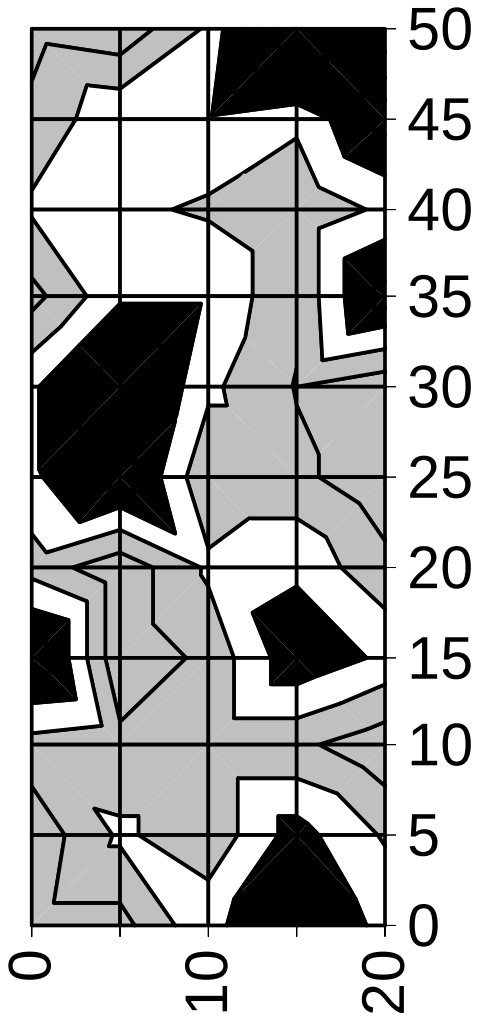


Non-uniformity – 5/8” Ice Sanded

Farm 19 - Ice
33% samples
± 5% target

5/8” 5/8”

Actual:Target ratio



above target

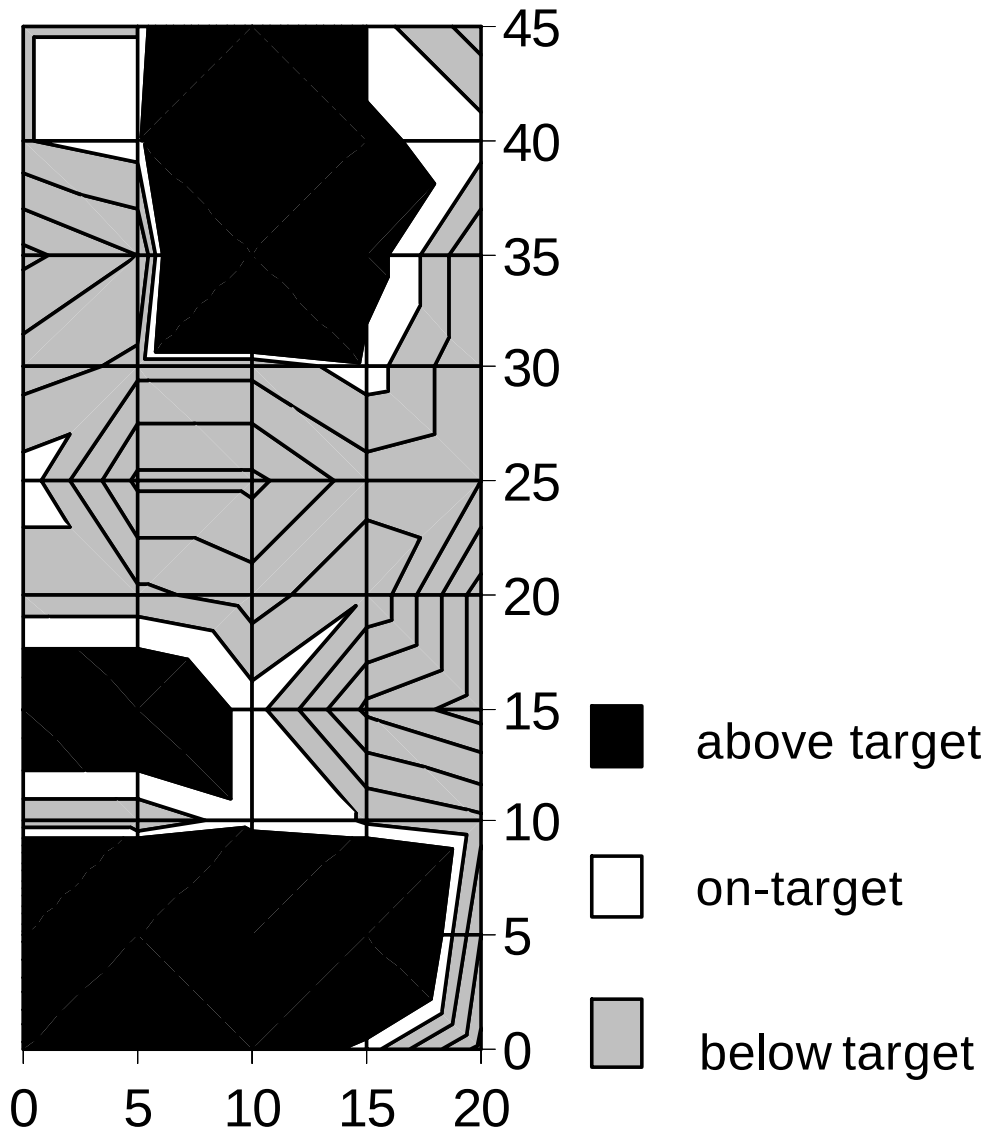
on-target

below target

Non-uniformity – ¾” Barge Sanded

Farm 10 - Barge
18% samples
± 5% target

¾” ¾”
Actual:target ratio



Grand Sand Conclusions