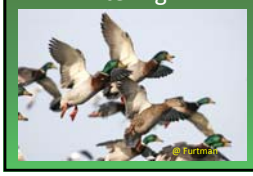
Lessons from Moist Soil Management Opportunities and Challenges

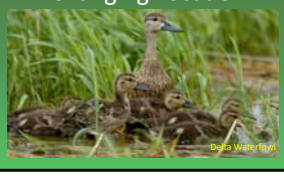
Minnesota Department of Natural Resources
Wildlife Management Section
Ray Norrgard

Wetland Wildlife Needs

Life Cycle Event
- Reproduction
- Molt
- Migration
- Wintering

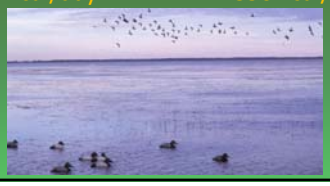
Behavior/Activity
- Roosting or Rest
- Social Interaction
- Foraging
- Changing Location





Recovery after 8 hr flight

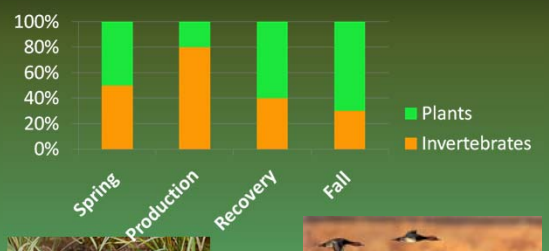
Good Habitat	Poor Habitat
No Disturbance	No Disturbance
3 Days	5 Days
With Disturbance	With Disturbance
5 Days	8 Days
480 kcal/day	390 kcal/day



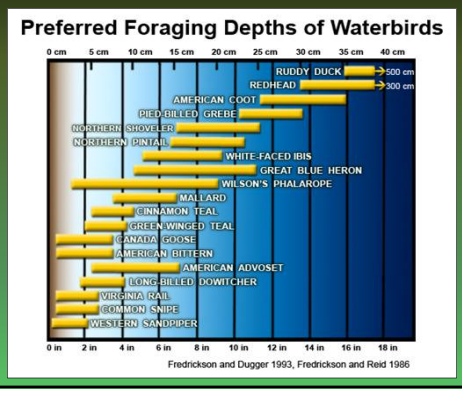
Nutritional Contributions of Foods

	Annual Seeds	Inverts	Acorns	Row Crops
Protein	+	+ + +		
Lipid	+ +		+ + +	+ + +
Minerals	+ +	+ +		
Vitamins	+ +	+ +		

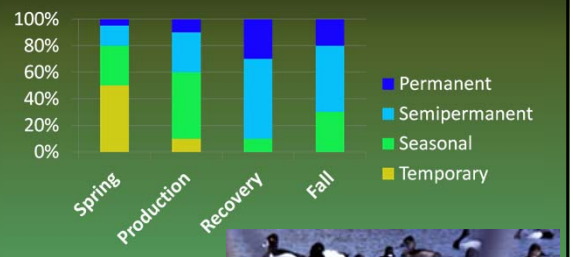
Duck Food Calendar



Access to Food Resources



Wetland Use Calendar



What is a Wetland Complex?

- 4 or more square miles
- 10% temporary and seasonal wetlands
- 10% semi and permanent wetlands
- 40%+ grassland

Habitat Complex Strategies

- Protection
- Restoration
- Management

What is Moist Soil Management?

- Pioneered in Illinois River Valley 1940s
- Refined by Univ. of MO and MS
- Widely practiced in mid-latitude and southern states

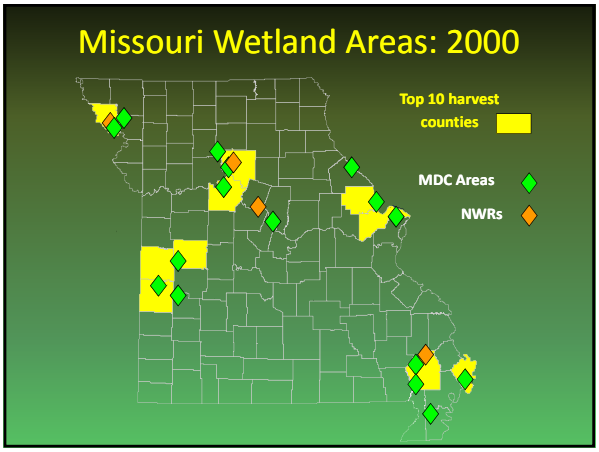
Moist Soil Management

- Seasonal Flooding spring and fall
- Shallow Water - inches, not feet
- Emphasis on annual plants
- Invertebrates

Moist Soil Vegetation Response

Determined by:

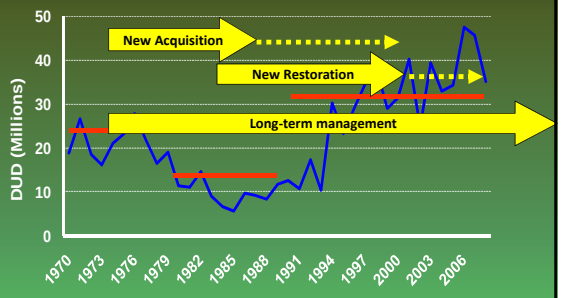
- Seed Bank
- Drawdown:
  - Timing
  - How fast
- Years since disturbance



Grand Pass Conservation Area

- 5,096 acres
- 6 miles river frontage
- 8 shallow pools
- Levees & Pumps
- Max. depth 1 ft.

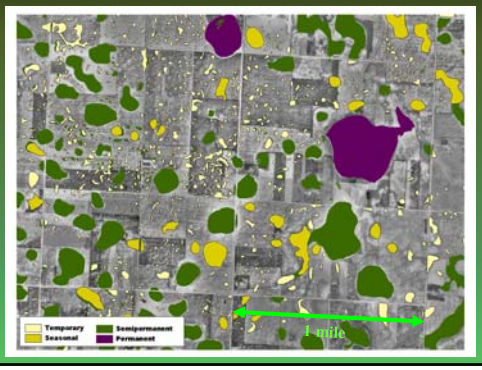
Duck Use Days on Missouri Wetland Areas, 1970-2008



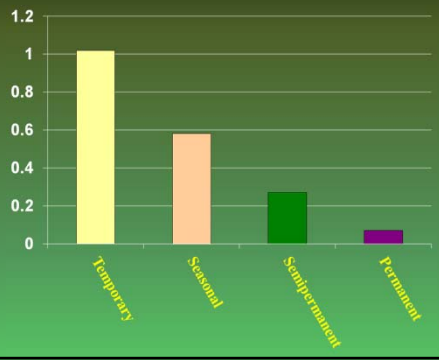
Minnesota is not Missouri

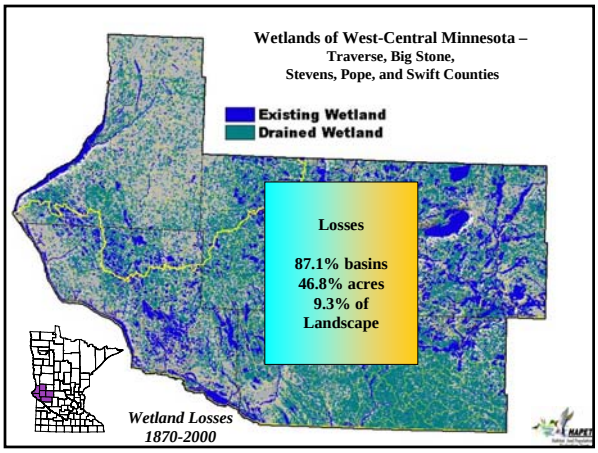
- Shorter Growing Season
- Earlier Freeze up
- Greater Variety of Wetlands and Wildlife
- Different Topography

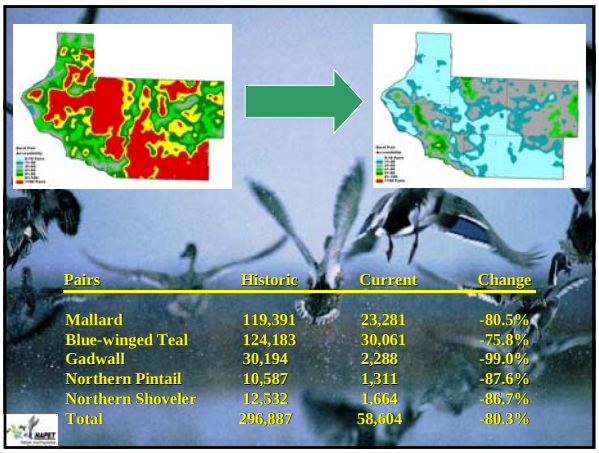
Wetland Loss in Minnesota



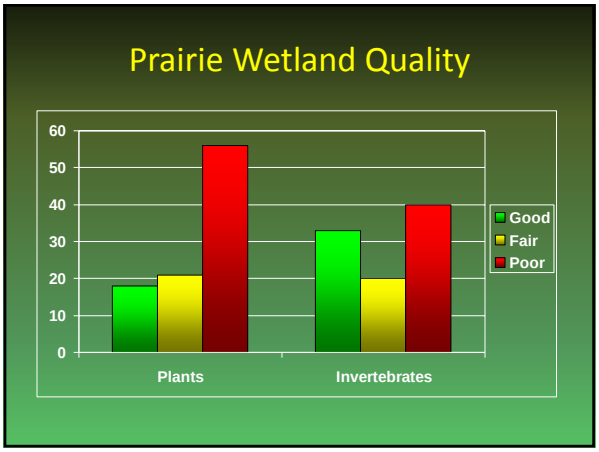
Duck Pairs per Wetland Acre

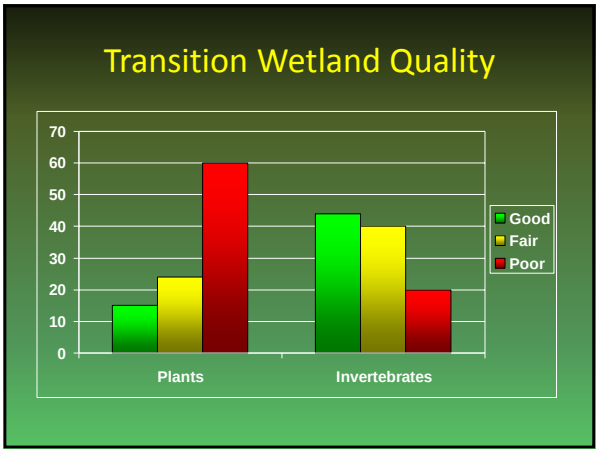






Pairs	Historic	Current	Change
Mallard	119,391	23,281	-80.5%
Blue-winged Teal	124,183	30,061	-75.8%
Gadwall	30,194	2,288	-99.0%
Northern Pintail	10,587	1,311	-87.6%
Northern Shoveler	12,532	1,664	-86.7%
Total	296,887	58,604	-80.3%





Opportunities

Flood Reduction

Rice Paddies

WMA/WPA Wetlands

Cropped Wetlands

Shallow Lakes

What Can We Learn From Moist Soil Management?

Wetland Wildlife Needs

Life Cycle Event

- Reproduction
- Molt
- Migration
- Wintering

Behavior/Activity

- Roosting or Rest
- Social Interaction
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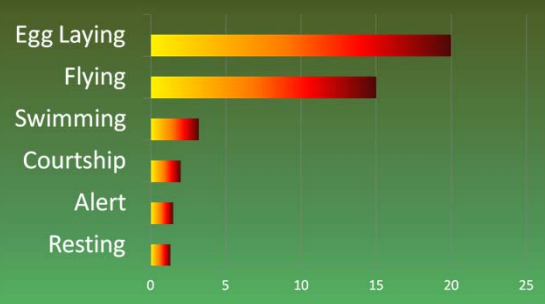
- Changing Location

Energy Cost X Basic Metabolic Rate



It is all about food

	Annual Seeds	Inverts	Acorns	Row Crops
Protein	+	+ + +		
Lipid	+ +		+ + +	+ + +
Minerals	+ +	+ +		
Vitamins	+ +	+ +		

Water Depth

Seasonal Water Management

- Target the 1st third of the growing season
- Key indicators
  - Smartweeds - early drawdown
  - Wild millets - middle drawdowns
  - Beggarticks - late drawdowns
- Slow drawdowns (1”/day) promote variety

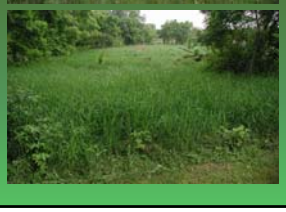
Water Management

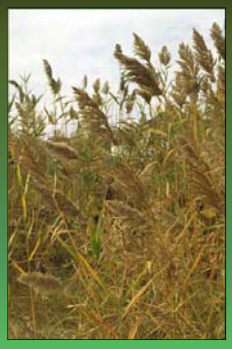
- Use Evapotranspiration when possible for dewatering for maximizing benefits
- Clipping followed by mid growing season irrigation may be necessary
- Monitoring and adaptive management are keys to success.

Wetland Habitat Complexes

- Quantity and Quality
- Active management

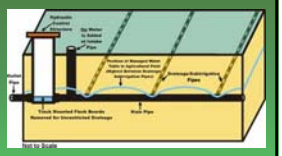
Invasives



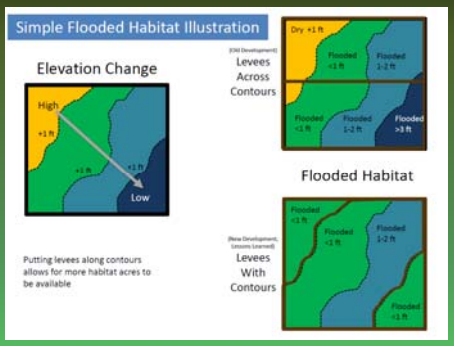


Invasives

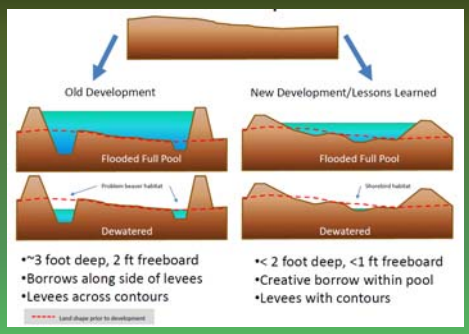
Vigilance
Diligence
Disturbance



Dikes



Dikes



Watershed Ratio

Natural Variation
or
Active Management

Water Source in Fall

Surface Water Only

Pumps

Siphons

Gravity

Minnesota Possibilities

Current Examples

Classic Management

Lac qui Parle WMA
110 acres, 2 pools
Thief Lake WMA
41 acres, 3 pools
Roseau River WMA
111 acres, 6 pools

- All moist soil pools are managed as sanctuary
- Mixture of crops and natives
- Fall flooding with pumps in mid-Sept.

Shallow Lakes

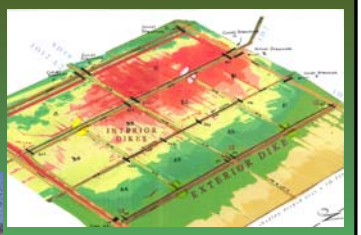
Lakes managed for wildlife

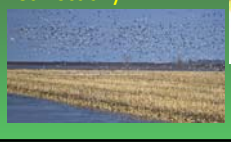
- Take advantage of planned drawdowns
- When possible, mimic moist soil management principles
  - Shallow water
  - Slow drawdowns, reflooding

Flood Reduction Combination

North Ottawa, Grant County, Bois de Sioux WD

- 1200 acres of moist soil
- Gravity flow
- Incorporates sanctuary

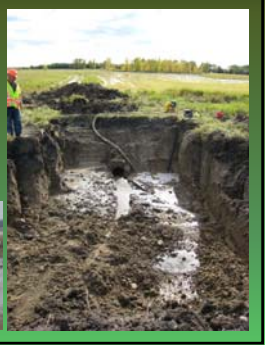




Partial Wetland Restoration

Lines WMA, Lyons County

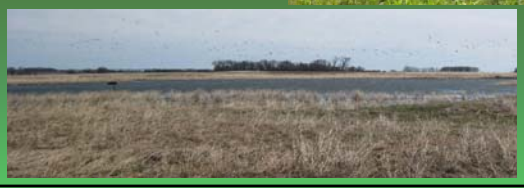
- 51 acre drained wetland
- In-line water gate on existing county tile
- 33 acres seasonally flooded



Enhancing Existing Wetland

Teal Lake WMA, Jackson County

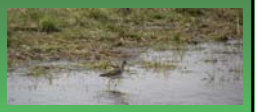
- Fall flooding of existing wetland within complex
- Occasional supplemental millet planting



Enhancing Existing Wetland

Eldorado WMA, Pope County

- Part of biomass harvesting evaluation with UMN Morris
- Fall cutting of rank vegetation
- Reliance on natural water regime
- Existing wetland complex



Enhancing Existing Wetland

Lac qui Parle WMA

- Grazing of existing wetland
- Reliance on natural water regime
- Existing wetland complex

Farmed Wetland

Working Lands Initiative, Big Stone County

- Corn/soybean rotation
- 2 basins, 10 acres
- Controlled drainage system
- Drainage delayed until May in half the years
- Drainage stopped after fall tillage

Opportunities

When good complexes already exist:
- Protect the investment
  - Easements
  - Conservation practices
  - Reduce excessive runoff
  - Maintain natural water flow
  - Improve soil health
  - Nutrient management

Opportunities

When good complexes already exist:
- Improve the quality
  - Managed grazing
  - Adding temp/seasonal wetlands
  - Improving soil health
  - Nutrient management
  - Actively manage wetlands

Opportunities

When complexes fall short:
- Add upland nesting cover
  - Managed grazing
  - Fall planted grains
  - Cover crops
- Add wetlands
  - Restorations
  - Controlled drainage

Questions?