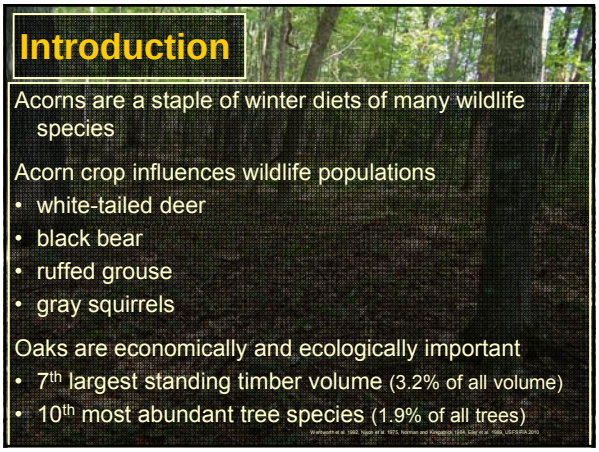




## Introduction

**Oak masting is variable**

- Among species (*Erythrobalanus* vs. *Leucobalanus*)
- Year to year (masting cycles and weather)
- Site to site (topography and stand conditions)
- Tree to tree (genetics, size, and age)

Greenberg and Parresol 2002, Sharp and Sprague 1967, Goodrum et al. 1971

## Introduction

- Previous literature has focused on red oaks
- Thinning may increase mast production in red oaks
- Fertilizing oaks is often suggested in popular literature, but has not been tested
- White oaks are the most common oak in the eastern US
- Commonly believed that white oak acorns are preferred by some species of wildlife

Healy 1997, Guariguata and Saenz 2002, Perry and Thrill 2003, Lombardo and McCarthy 2008

## Objectives

Determine baseline acorn production potential of individual white oaks

Determine the effects of fertilization and thinning on white oak acorn production

## Study site

Chuck Swan SF and WMA

30 km N of Knoxville

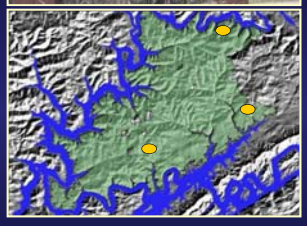
Elevation: 310 – 520 m

24,444 acres; 92% forested

Mixed hardwoods

130 cm annual rainfall

Well drained, acidic soils

## Data collection

120 white oaks
- dominant / codominant
- DBH 12.7 – 32.2 inches

Three, 1 m² baskets per tree

Acorns collected biweekly
- Sept – Nov

DBH and crowns measured

## Data collection

Acorn soundness estimated by float-testing

Marked acorns returned to monitor depredation in baskets

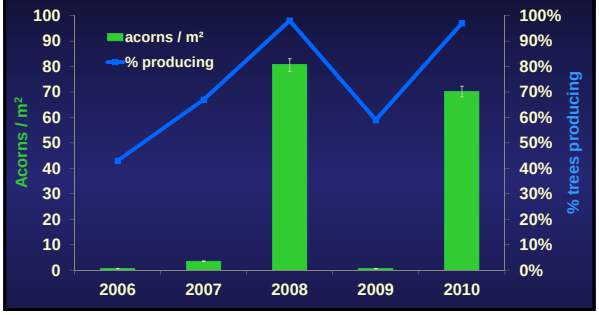
Up to 50 acorns from each tree dried and weighed to estimate biomass in 2008

## Data analysis

Production classes (modified from Healy et al. 1999)
Based on mean acorn production / m²
- Excellent: ≥ 2x the mean acorns / m²
- Good: < 2x but > mean acorns / m²
- Moderate: < mean but ≥60% mean acorns / m²
- Poor: < 60% mean acorns / m²

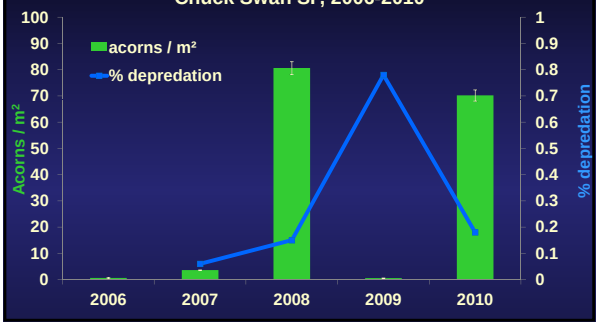
## Annual variability

White oak mast crop variability,
Chuck Swan SF, 2006-2010



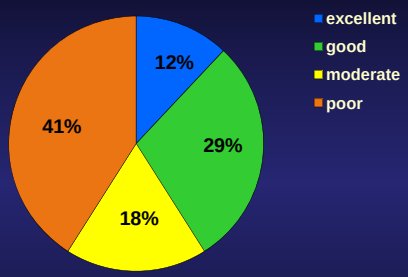

## Annual variability

White oak mast crop depredation,
Chuck Swan SF, 2006-2010



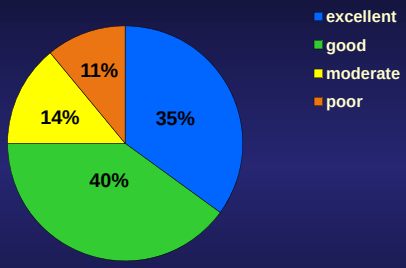

## Production classes

Proportion of white oaks by production class,
Chuck Swan SF, 2006-2010



## Production classes

Proportion of acorns produced by production class, Chuck Swan SF, 2006-2010



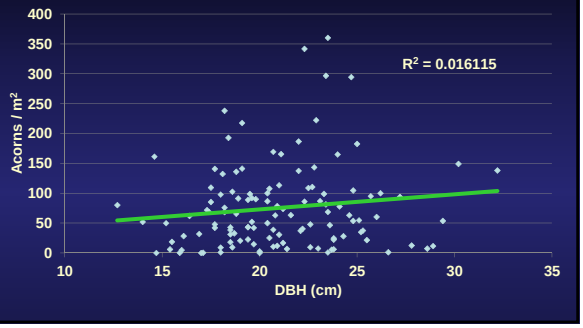

## Production classes

Production Characteristics, Chuck Swan SF, 2006 – 2010

| | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| Poor Trees | 78% | 69% | 50% | 67% | 47% |
| Poor Trees: % of acorns | 20% | 6% | 18% | 17% | 11% |
| Excellent Trees | 11% | 13% | 14% | 14% | 18% |
| Excellent Trees: % of acorns | 62% | 81% | 36% | 53% | 55% |

## Identifying strong producers

Relationship between DBH and Acorns / m², Chuck Swan SF, 2008 & 2010

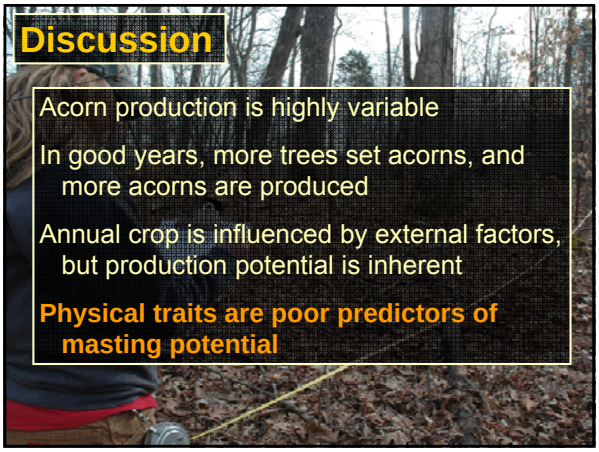


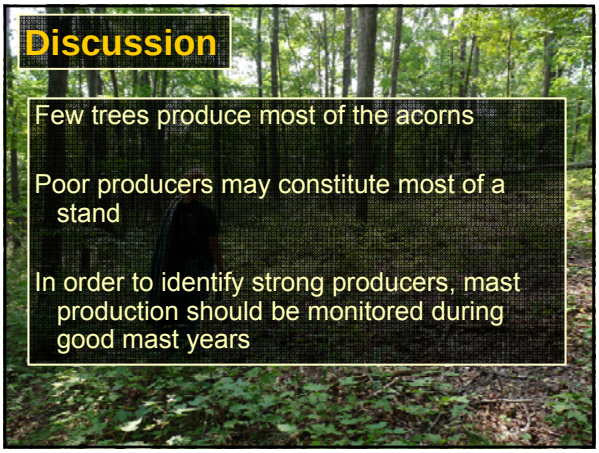
## Identifying strong producers

**When should we monitor trees to predict production class?**

| | Trees per production class | % Correct strong years | % Correct poor years |
|---|---|---|---|
| Excellent | 14 | 75% | 14%* |
| Good | 35 | 36% | 11% |
| Moderate | 22 | 50% | 14% |
| Poor | 49 | 87% | 59% |
| Overall | | 64% | 32% |

*7 out of 14 excellent producers misidentified as poor producers



## Management Implications

To increase mast production monitor individuals first

When thinning for wildlife:
- remove spp. with low wildlife value first
- then poor producers

Retain strong producers and a diversity of spp.

## Management Implications

Monitoring Options:

- fall surveys for acorns
- spring surveys for seedlings

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