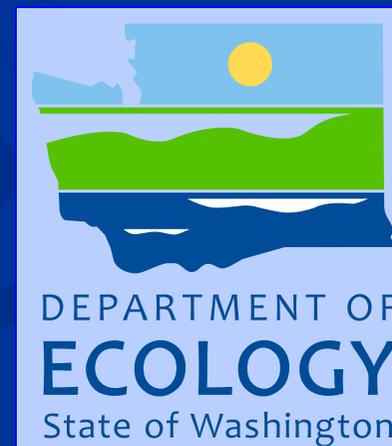


***Biomass Endpoint  
Freshwater Sediment Bioassay  
Status Report***

***SMARM  
May 6, 2015***

***Russ McMillan  
Arthur Buchan  
Brendan Dowling***



# *Biomass Endpoint Goals For Today*

- Why bother with Biomass?
- Provide an update on the Biomass Endpoint development.
- Touch on what comes next.

# *Freshwater Sediment Bioassays*

- Limited Options Compared to Marine
  - 2 Species
  - Endpoints
    - Mortality
    - Growth



# *What is the Biomass Endpoint?*

- Takes into account both survival and growth but normalizes to initial count.
- Calculated as:

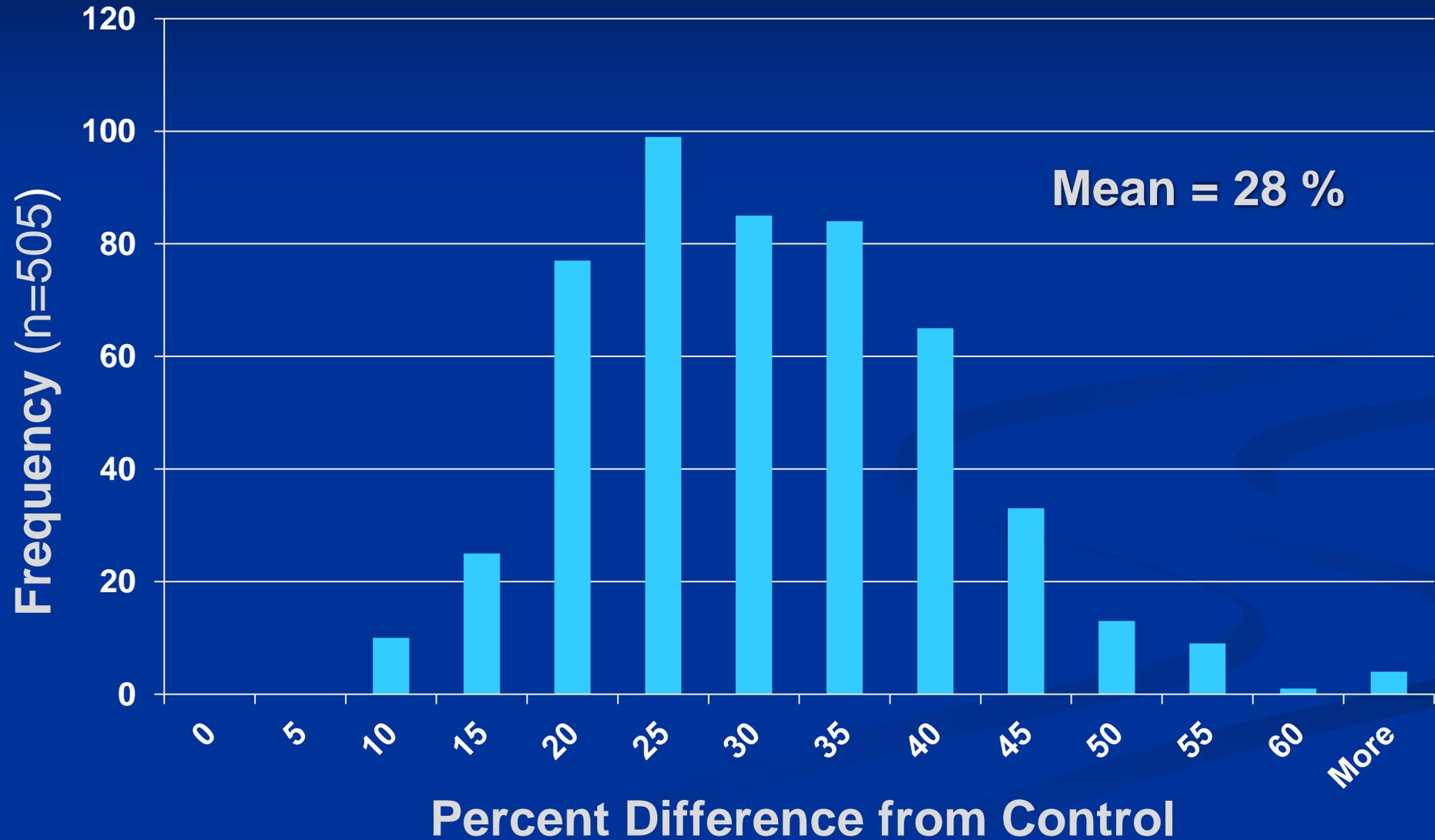
$$\text{Biomass} = \frac{\text{Weight of Surviving Organisms}}{\text{Number of Initial Organisms}}$$

Weight = Dry weight for *H. azteca*; Ash-free dry weight for *C. dilutus*

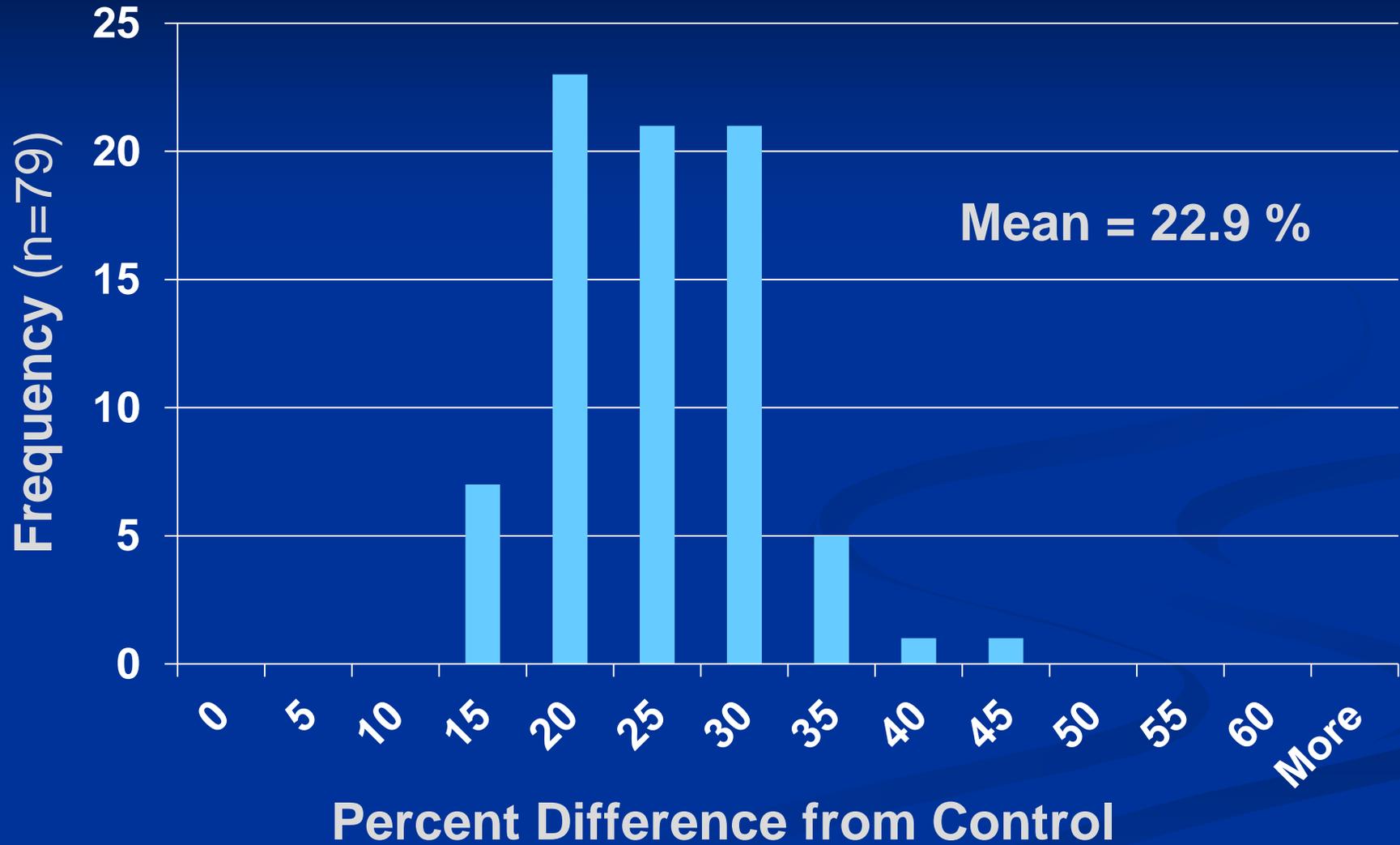
# *Biomass Methods*

- Used same data as FW criteria in SMS.
- Paired the Growth & Mortality data.
- Used Biostat to discern statistical difference.
- Minimum Detectable Difference.

# MDD for CH10 Biomass



# MDD for HY28 Biomass



# *Next Steps*

- Develop Interpretive Criteria
  - Allow comparison to Growth & Mortality.
  - Review
    - Ecology Experts
    - RSET
    - Sediment Technical & Policy Workgroup
    - National Experts

# *Next Steps*

- Collect additional data
- Reexamine performance
- Propose final interpretive criteria
- How to Integrate into SMS bioassay suite
  - External Review/Public Comment
  - Clarification Paper at SMARM
  - Update SCUM II Guidance

# Questions?





# *Statistical methods for comparing test sediment to control*

<b>Outcome of Shapiro-Wilke's Test</b>	<b>Outcome of Levene's Test</b>	<b>Statistical Test of Experimental Hypothesis</b>
Normal Distribution	Variances Homogeneous	Student's t-test
Normal Distribution	Variances Heterogeneous	Approximate t-test
Non-Normal Distribution	Variances Homogeneous	Mann-Whitney test
Non-Normal Distribution	Variances Heterogeneous	Rankit Analysis

# *Freshwater Biological Standards*

## □ Bioassay suite to include at least:

- 2 Species
- 3 Endpoints
- 1 Chronic Test
- 1 Sublethal Endpoint



## □ Interpretation

- SQS: Single SQS level hit
- CSL: 2+ SQS level hits; 1+ CSL level hit

# *Freshwater Biological Standards*

## *Technical Considerations*

- Objectives in development of biological standards.
  - Protect functions and integrity of a benthic community - Multiple species/sensitive life-history stages.
  - Discern a range of effects bounding minor adverse effects levels.