

# Mortality of Walleye Caught in Live-Release Tournaments

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# Background

- Previous assessments suggest initial mortality from 1-67%, and total mortality from 0-98%
- However, these assessments were limited in scope
  - did not evaluate a range of environmental or fishing-related variables, e.g.,  
time fish were caught, catch depth,  
distance traveled, wave height

# Objectives

1. Estimate mortality during live-release walleye tournaments in 2006-2007,
2. Evaluate mortality under simulated tournament conditions in the laboratory, and
3. Evaluate biologically and socially acceptable levels of mortality



# Objective 1

## Evaluation at tournaments

- initial mortality
- pre-release mortality
- post-release mortality  
(5-day assessment in  
net pens)
- reference fish



# Evaluated 14 tournaments

Petenwell Reservoir

Mississippi River at Red Wing (2)

Devils Lake

Green Bay

Menominee

Escanaba (2)

Lake Oahe

Detroit River

Wolf River System

Mille Lacs

Oconto

Lake Bemidji



# Interviewed anglers (n=801) to obtain information about:

Time fish were caught

Catch depth

Distance traveled

Live well operation

Number of fish caught

Use of chemicals or ice

Wave height

Surface temperature

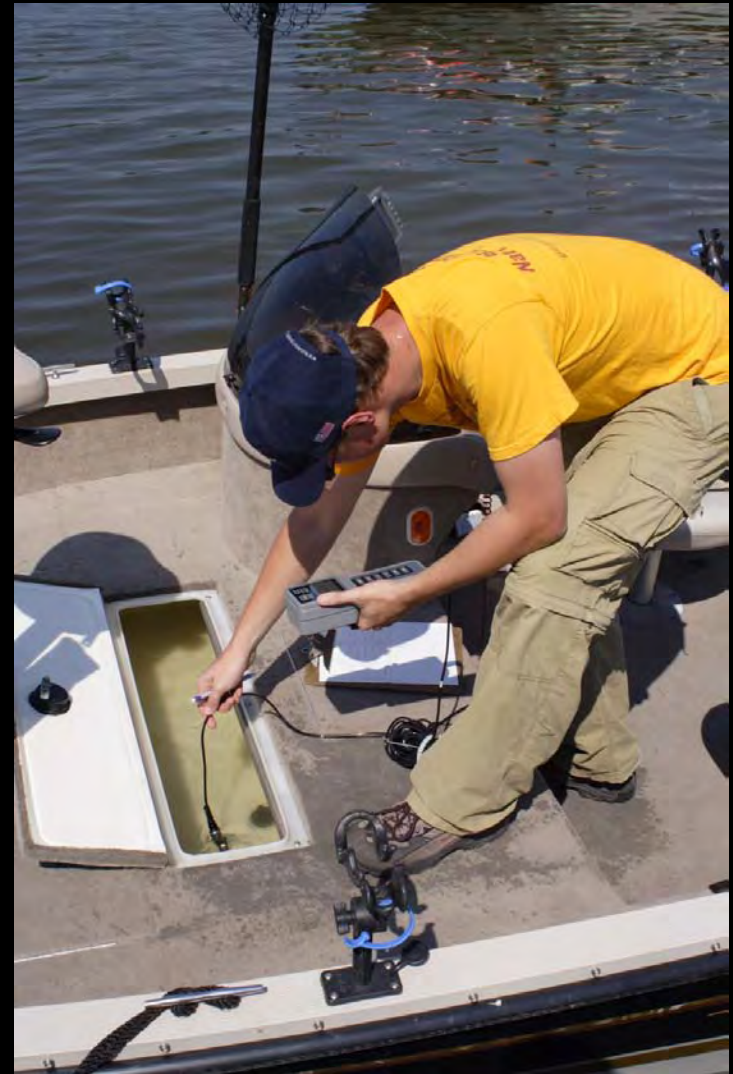


- Linked to initial mortality for each boat

Measured temperature and dissolved oxygen in live wells (n=883)

Weight of fish per boat  
(FLW Outdoors™)

- Linked to initial mortality for each boat



# Results: Objective 1

- Initial mortality 0-28%
- Pre-release mortality 3-54%
- Total mortality 7-100%
- Mortality of reference fish 2-100%

# Methods for Objective 2

Three sets of experiments:

## 1. Temperature

- Acclimation temperatures 12, 18, and 24° C
- 3 livewell temperature treatments; acclimation, acclimation -4° C, and acclimation +4° C

Example: for acclimation to 12° C  
8, 12, and 16°

# Methods for Objective 2

Three sets of experiments:

## 2. Dissolved Oxygen

- Acclimation temperature 18° C
- Three DO treatments; 2, 5, and 12-15 mg/L
- No adjustment of temperature

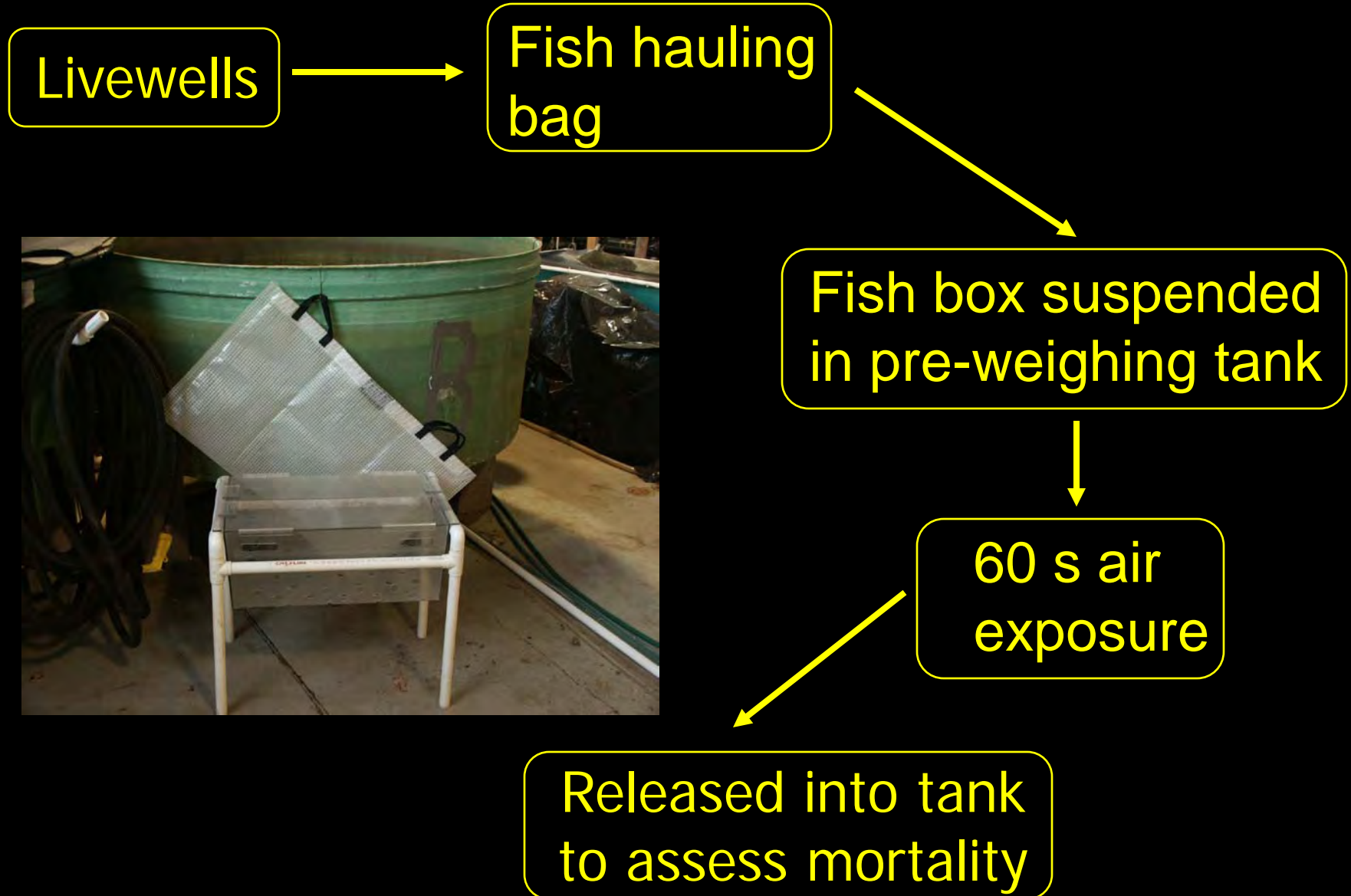
# Methods for Objective 2

Three sets of experiments:

3. Blood Chemistry (blood glucose, plasma chloride, and plasma osmolality)

- Acclimation temperature  $12^{\circ}$  C and acclimation  $\pm 4^{\circ}$  C

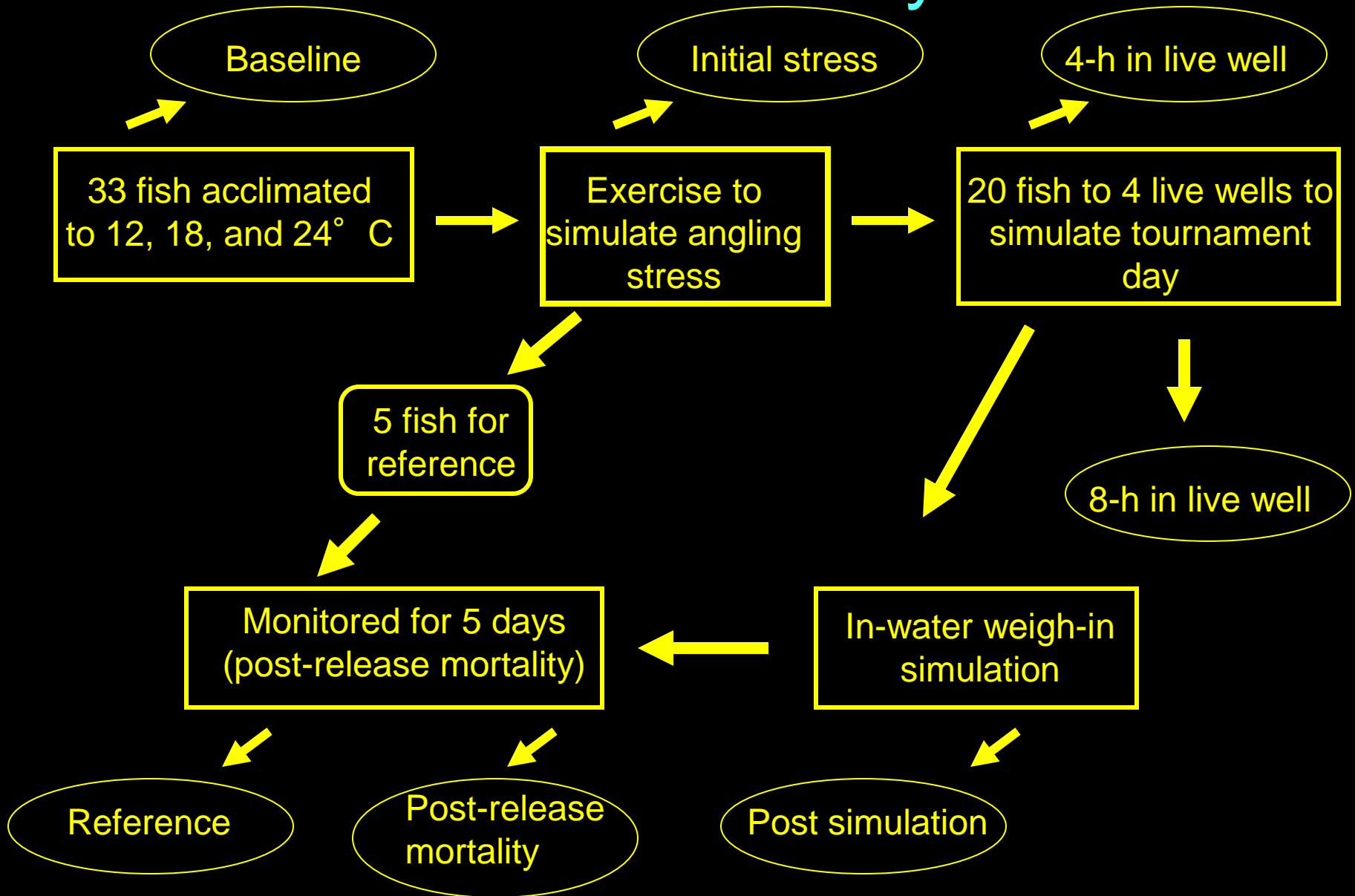
# Weigh-in Simulation



# Results Objective 2: Temperature and DO

- Threshold for mortality between 18° and 20° C
- $\leq$  30% mortality at 5, and 12-15 mg/L, but 100% mortality at 2 mg/L

# Blood chemistry



# Results: Objective 2

## Blood Chemistry

- Evidence of a cumulative response to tournament stressors (blood glucose)
- Indication of prolonged osmoregulatory stress (plasma choride, plasma osmolality)

## Objective 3

Determine socially acceptable levels of mortality

Evaluated for 5 states:

Iowa

Michigan

Minnesota

South Dakota

Wisconsin

and

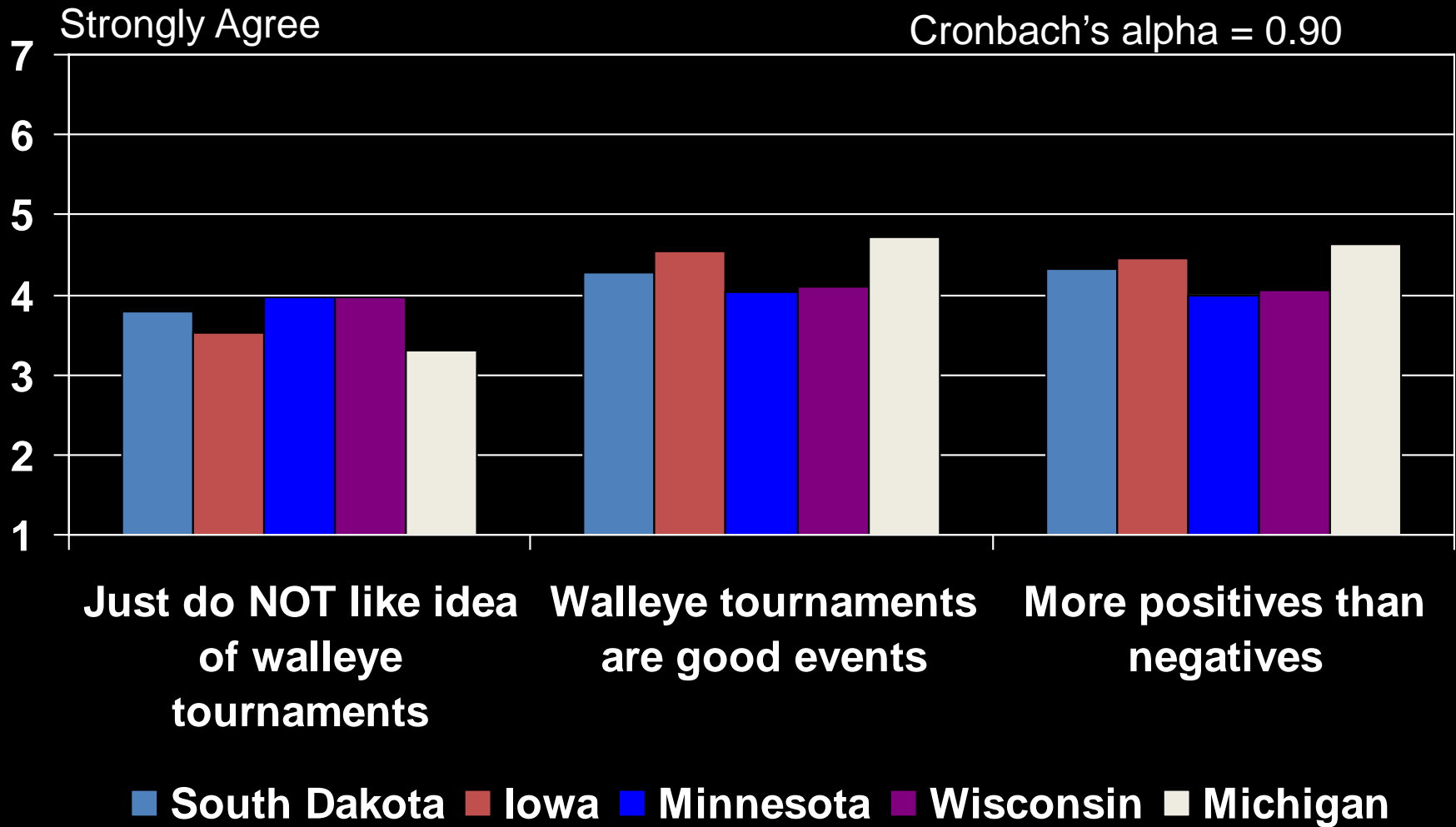
FLW tournament anglers

# Methods for Objective 3

## Mail survey to licensed and tournament anglers

- Fishing background & involvement
- Beliefs about walleye fishing tournaments
  - 8 question comparing small, medium, and large tournaments
  - 11 questions general beliefs about tournaments and tournament anglers
- General attitudes toward tournaments
- Fishing experiences & sociodemographics
- **Acceptable mortality at walleye tournaments**

# General attitudes toward walleye tournaments



# Methods for Objective 3

- Acceptable mortality at walleye tournaments
  - Acceptable initial and total mortality

**What is the maximum initial/*total* walleye mortality (i.e. % of fish that die as a result of tournament) that you would find acceptable for a catch-and-release fishing tournament?**  
(Write in your answer OR check the appropriate box)

ACCEPTABLE *INITIAL/TOTAL* MORTALITY \_\_\_\_\_ %

IT DOESN'T MATTER TO ME

IT MATTERS, BUT I CANNOT PROVIDE A NUMBER

# Results: Objective 3

## Acceptability Initial and Total Mortality

### Minnesota

Median for initial mortality = 5.0%

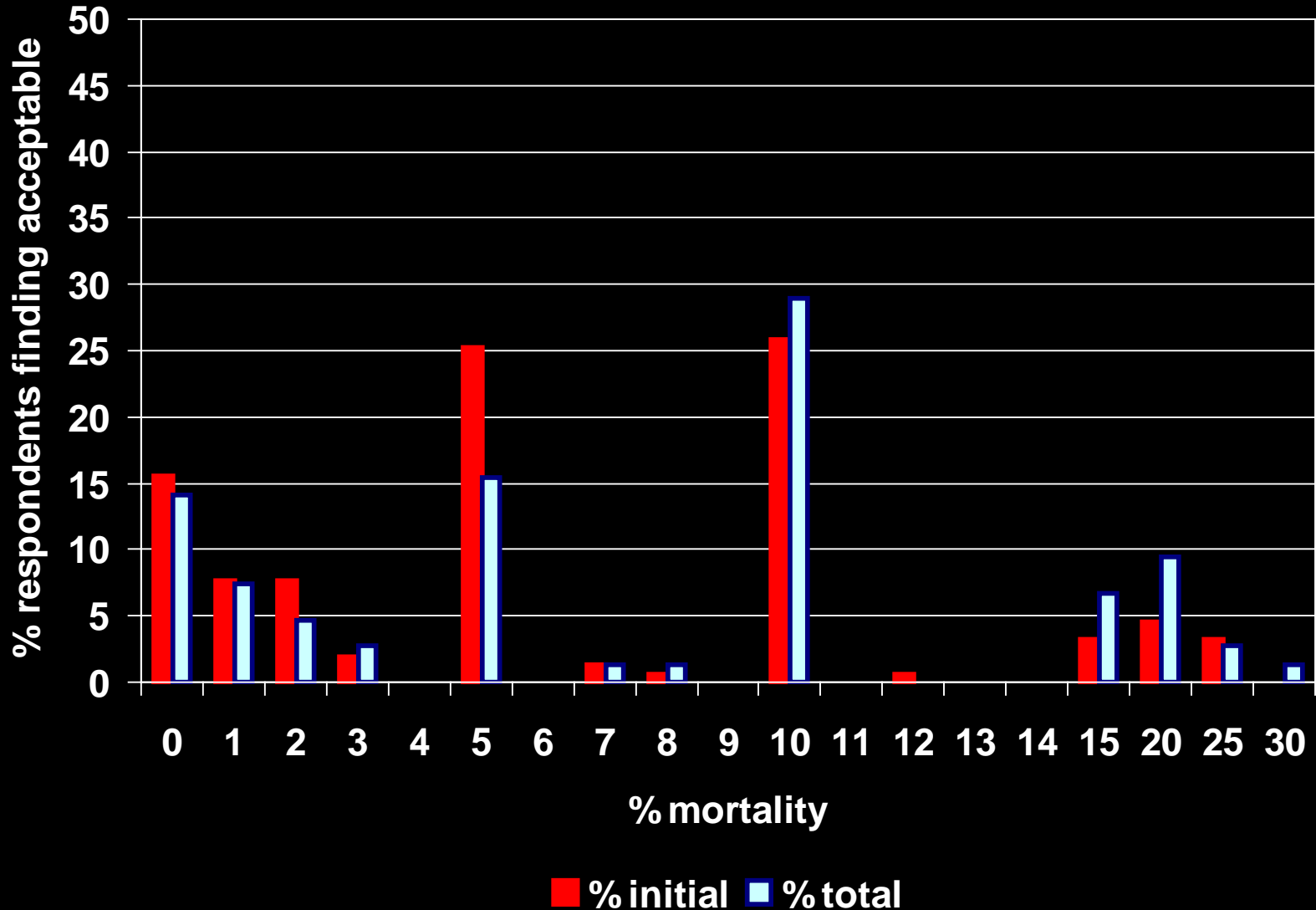
Median for total mortality = 10.0%

### Tournament Anglers

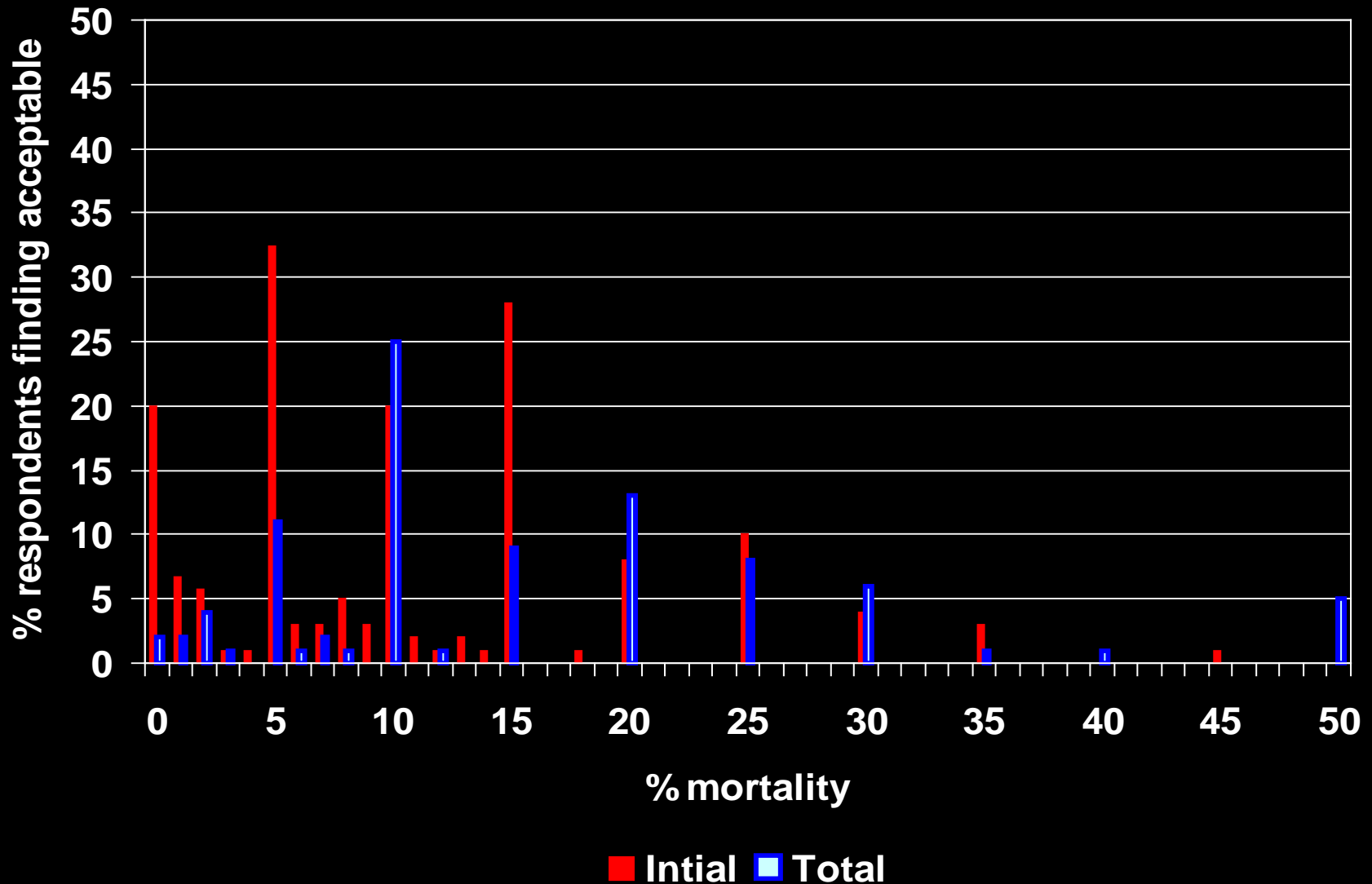
Median for initial mortality = 10.0%

Median for total mortality = 12.0%

# Acceptability of Initial and Total Tournament Mortality--Minnesota



# Acceptability of Initial and Total Mortality—Tournament Anglers



# Results: Objective 3

Estimates of survival of walleye immediately released or released after a tournament

Cool weather ( $< 18^{\circ}$  C)

Immediately released

Walleye anglers	90%
Tournament anglers	95%

Weighed in

Walleye anglers	75%
Tournament anglers	90%

# Results: Objective 3

Estimates of survival of walleye immediately released or released after a tournament

Hot weather ( $> 18^{\circ}$  C)

Immediately released

Walleye anglers	75%
Tournament anglers	85%

Weighed in

Walleye anglers	60%
Tournament anglers	75%

# Conclusions

Objective 1:

- Temperature (among other variables) affects mortality in live-release walleye tournaments

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## Objective 2:

- Mortality likely related to cumulative and osmoregulatory stress and indicates a mechanism for increasing mortality with increasing temperature and weigh-in process

# Conclusions

## Objective 1:

- Temperature (among other variables) affects mortality in live-release walleye tournaments and simulated conditions in the laboratory

## Objective 2:

- Mortality likely related to cumulative and osmoregulatory stress and indicates a mechanism for increasing mortality with increasing temperature and weigh-in process

## Objective 3:

- Acceptable mortality was low <12%
- Estimates of mortality higher than acceptable ~40%