

# STRAWBERRY MANAGEMENT PLAN (CONT.)



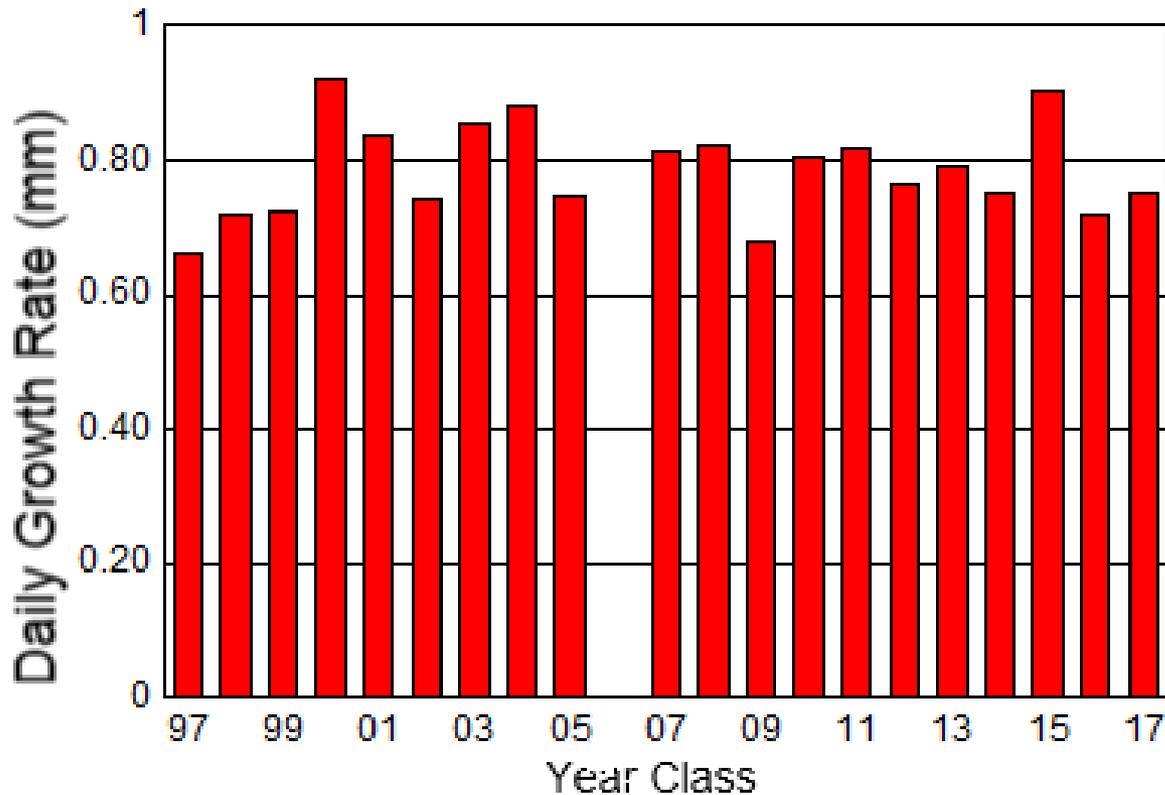
# 1. Prevent chubs from negatively impacting the sport fishery at Strawberry Reservoir

- ▣ **Objective 1** - Maintain minimum daily growth rate of 0.8mm per day for Age I cutthroat trout (June-October)

Response Summary

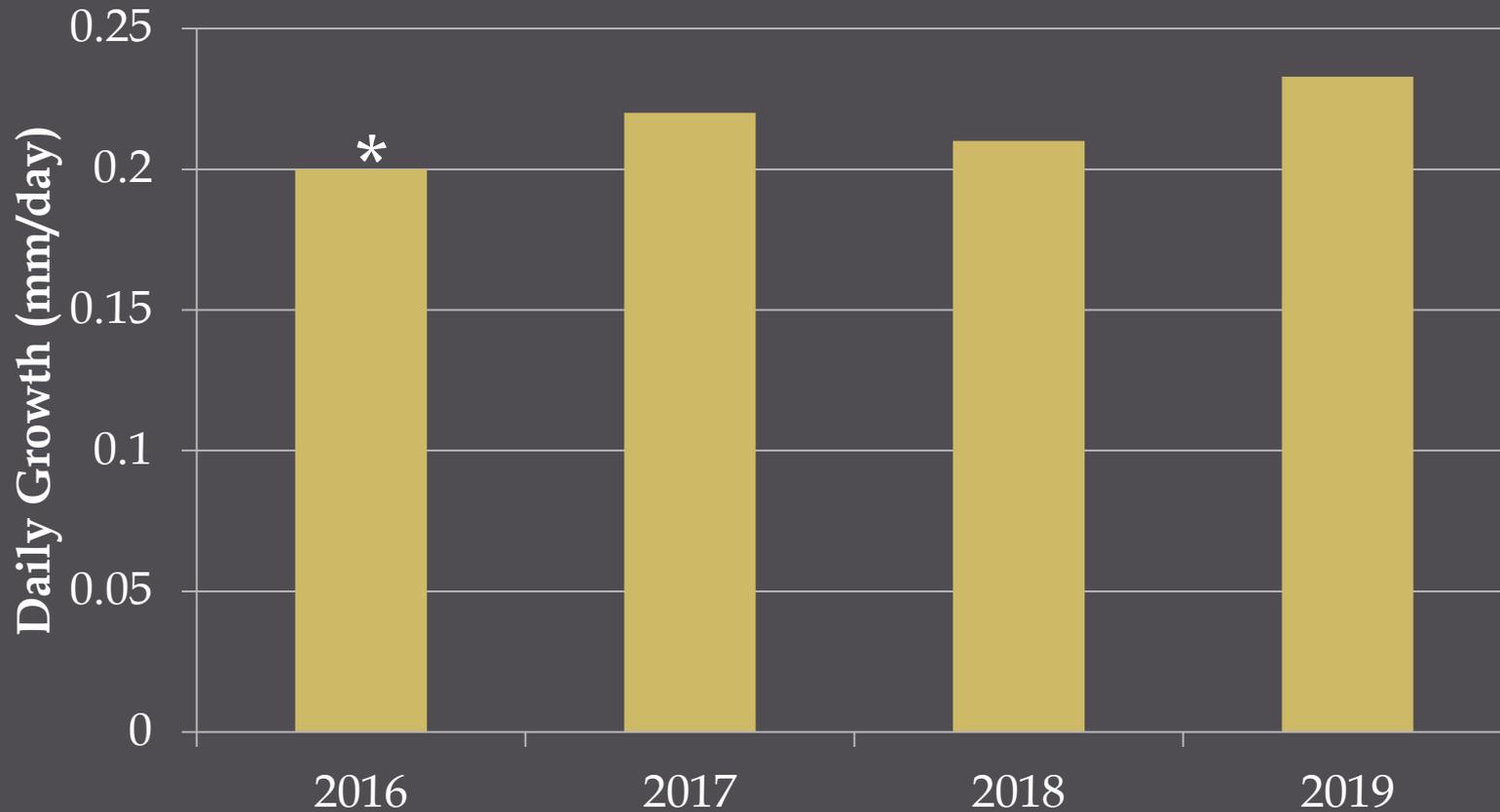
*Voted to Keep, but adjust to new stocking regime*

# Age 1 Growth Rate (old stocking program)



# Age I Cutthroat Growth Rates (fall to fall) 2016 to 2018 Year Classes

## Daily Growth



\* 2016 was spring 8" only stocks, 2017 and 2018 were a mix of spring and fall 8" and 10"

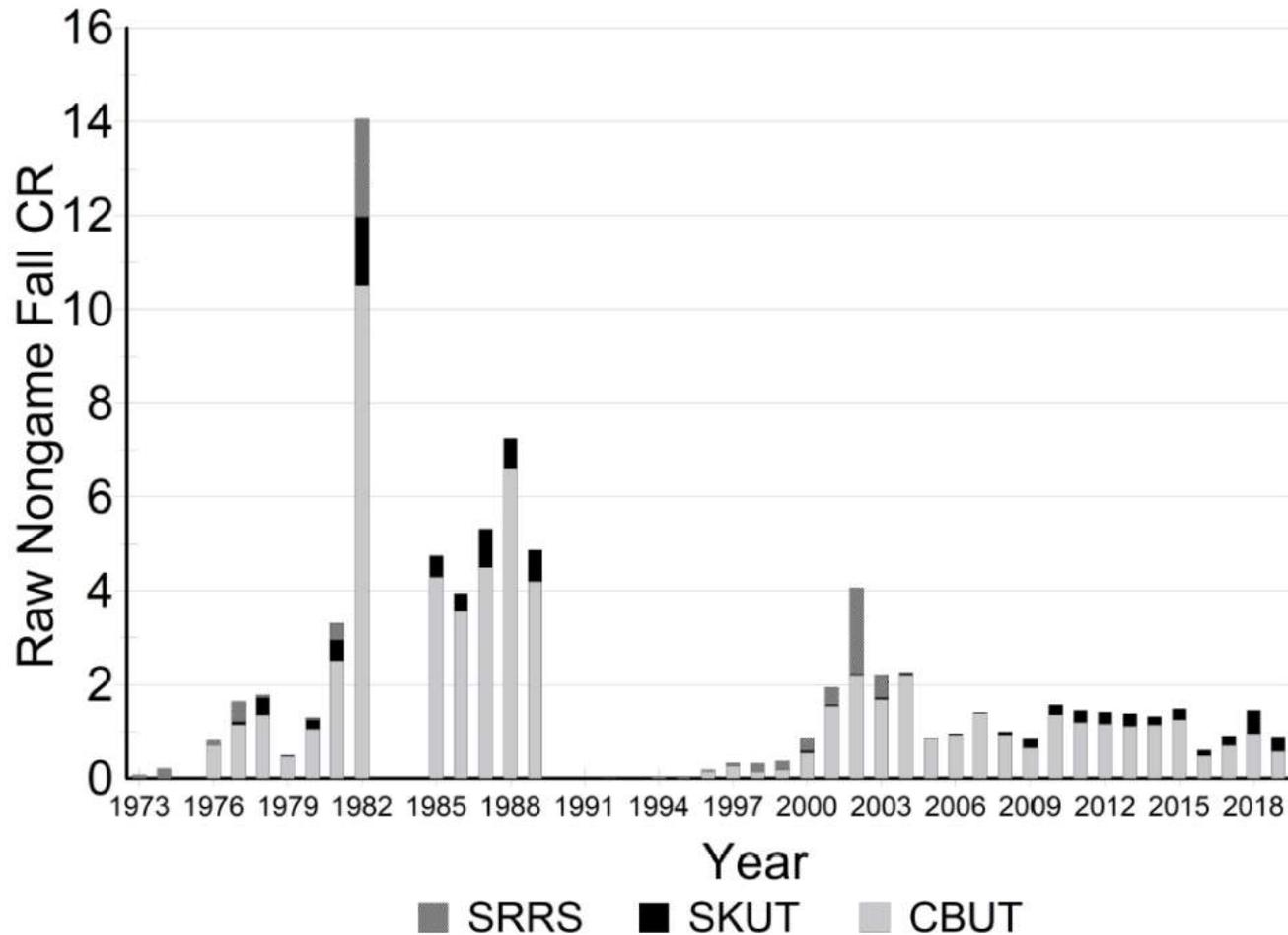
# 1. Prevent chubs from negatively impacting the sport fishery at Strawberry Reservoir (cont.)

- ▣ **Objective 2** - Limit total catch rate of chubs sampled in gillnet surveys to 1.0/net-hour

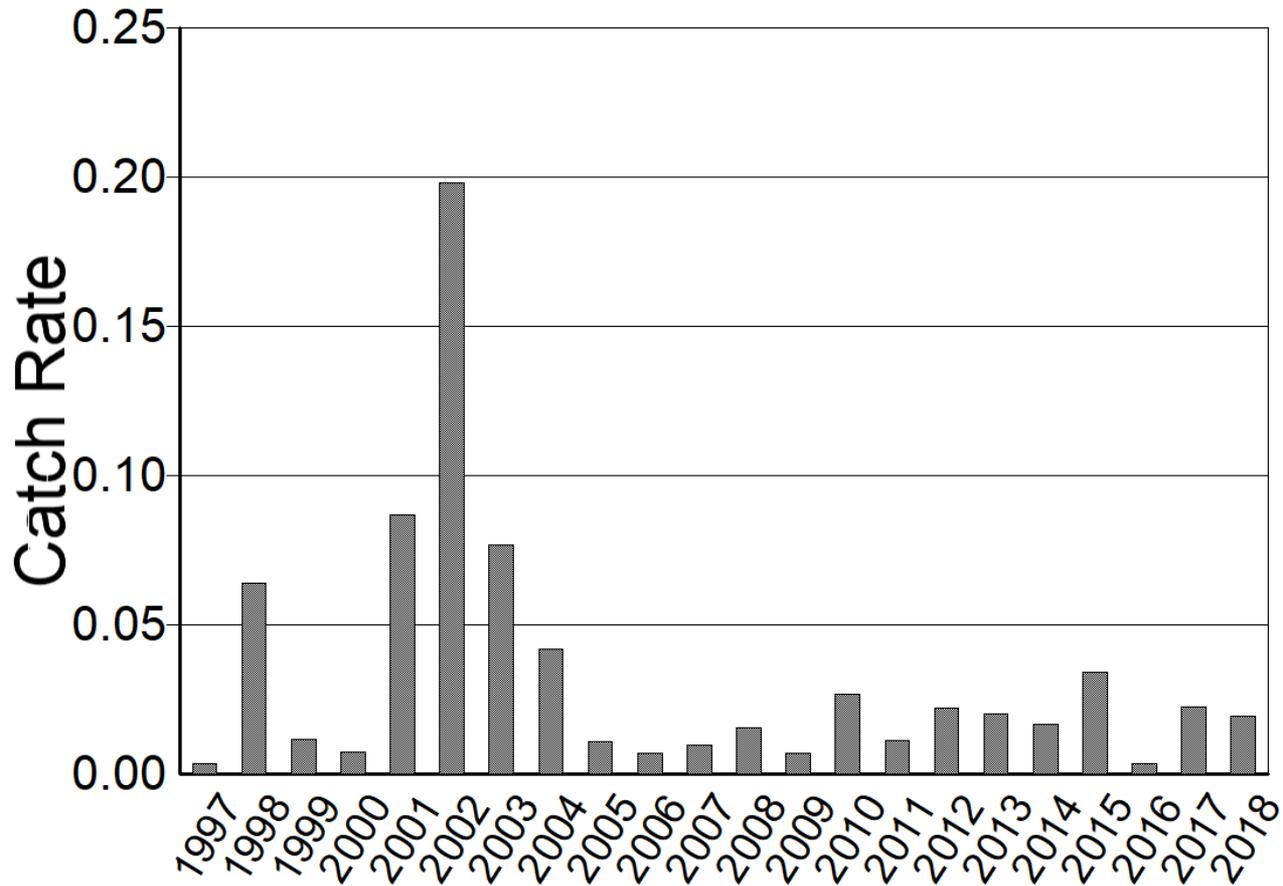
Response Summary

*Voted to keep, but adjust to new sampling.*

# Non-Game Catch Rates



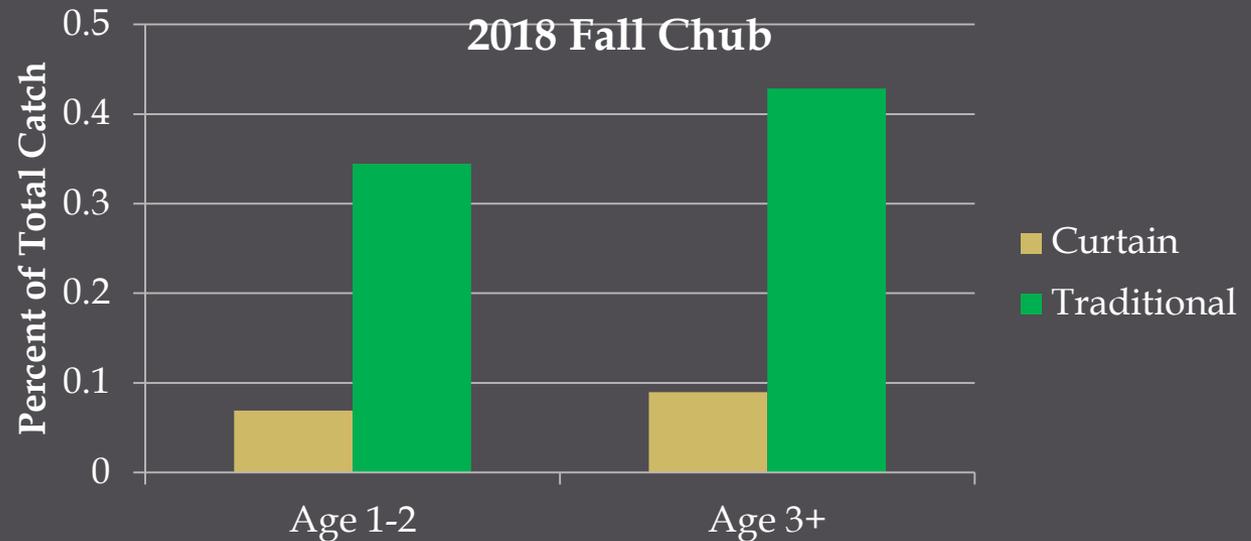
# Age I Chubs



# Traditional vs Curtain Nets



Curtain Net catches are right around 20% of Traditional nets for Age 3 + chubs



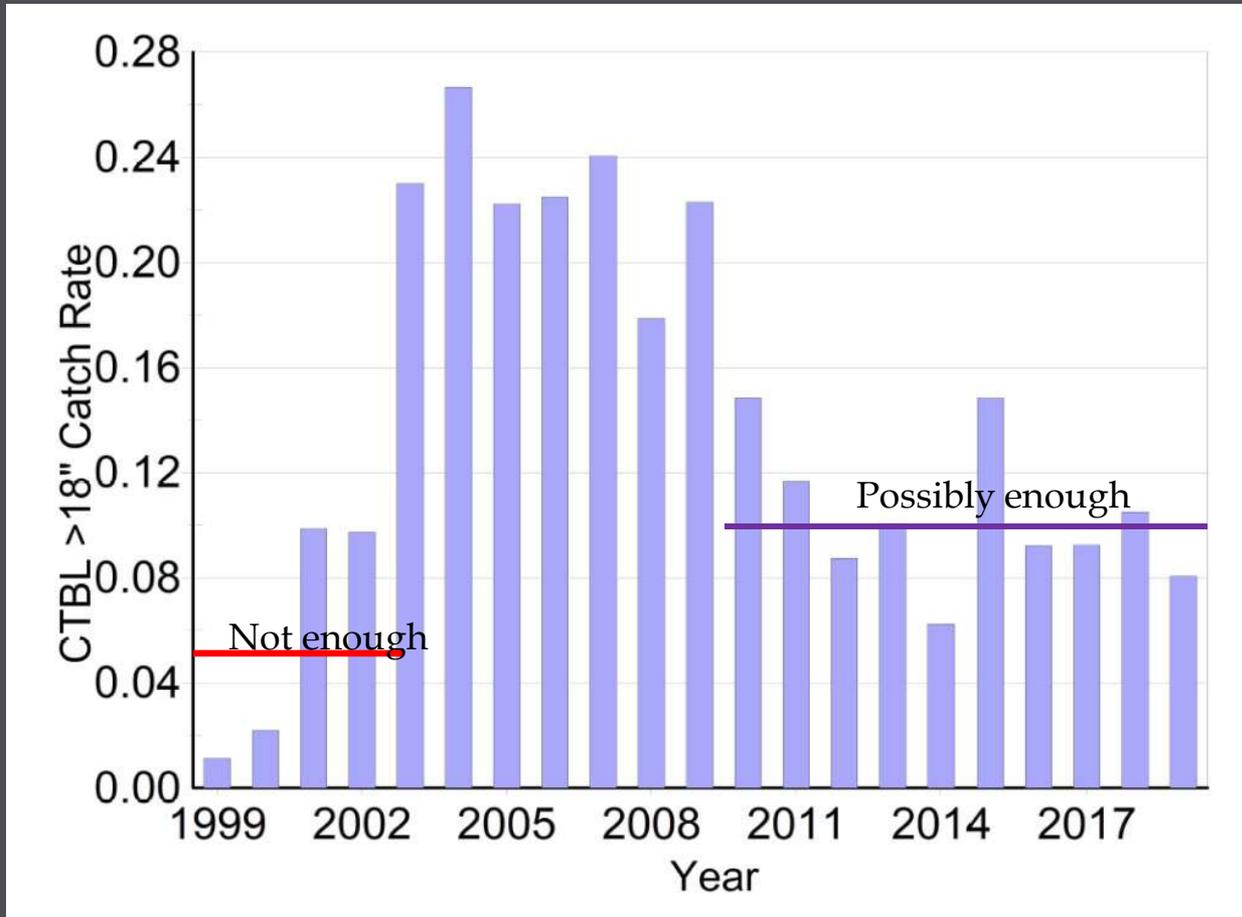
# 1. Prevent chubs from negatively impacting the sport fishery at Strawberry Reservoir (cont.)

- ▣ **Objective 3** - Maintain number of 18" or greater cutthroat trout sampled in gillnet surveys at 0.20/net-hour

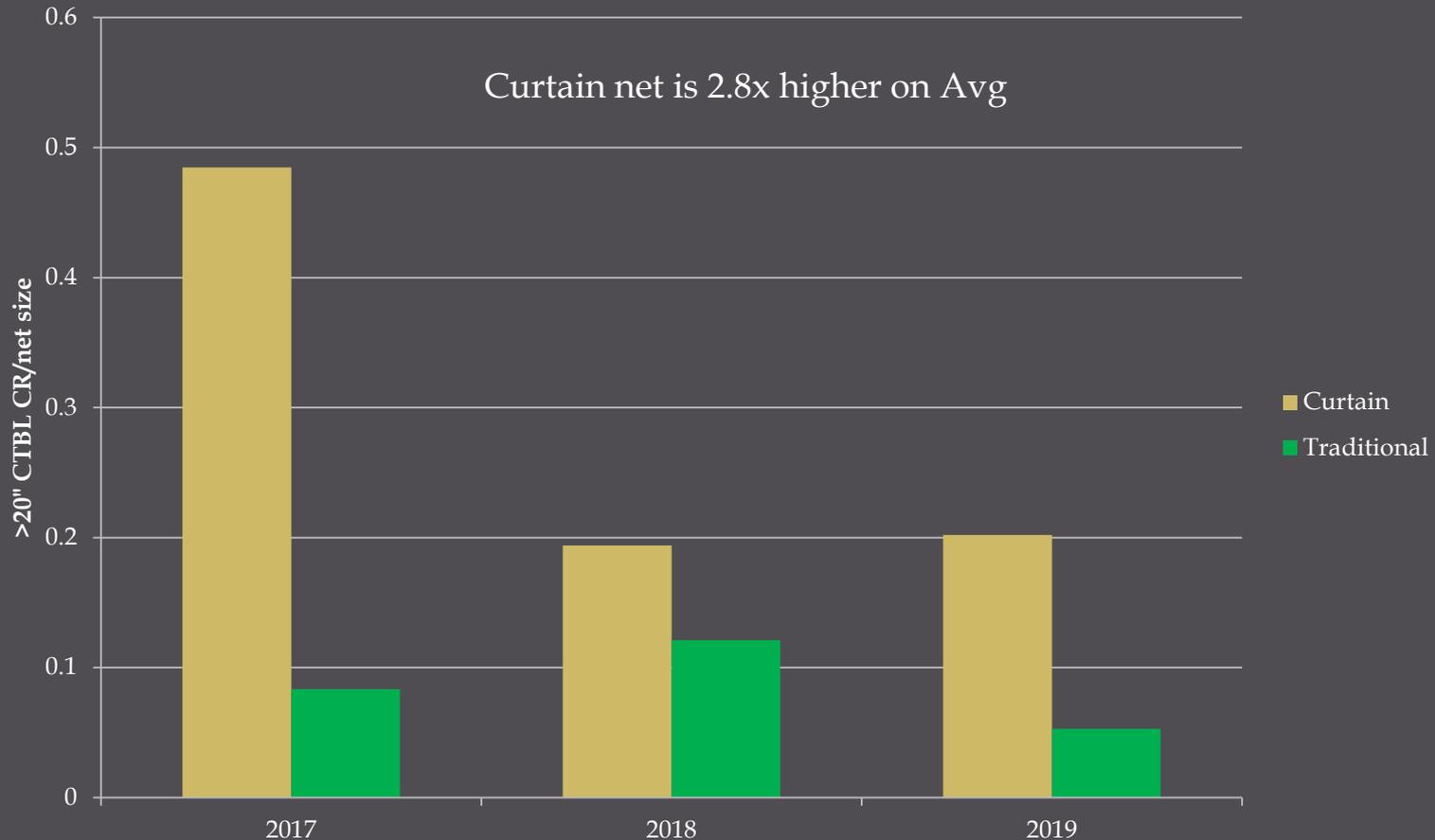
## Response Summary

*Voted to move catch rate on 18" and larger cutthroat to a range of .13-.16 fish/net hour*

# Cutthroat > 18" in Traditional Nets



# Curtain Shore vs Traditional Net Cutthroat >20" (corrected for net size)



# Goal 2 Ensure a high quality, diverse fishery and associated habitats

## Response Summary

Reword goal 2 to address concerns with using “High Quality”, “Associated Habitats”, and “Diverse”

## 2. Ensure a high quality, diverse fishery and associated habitats

- ▣ **Objective 1** - Meet or exceed water quality standards for Strawberry Reservoir and tributaries within 10 years

### Response Summary

*Remove time frame, address more specific TMDLs and DEQ/DWQ water quality standards already set in place, Include any new Strategies as they pertain to stream miles, and restoration*

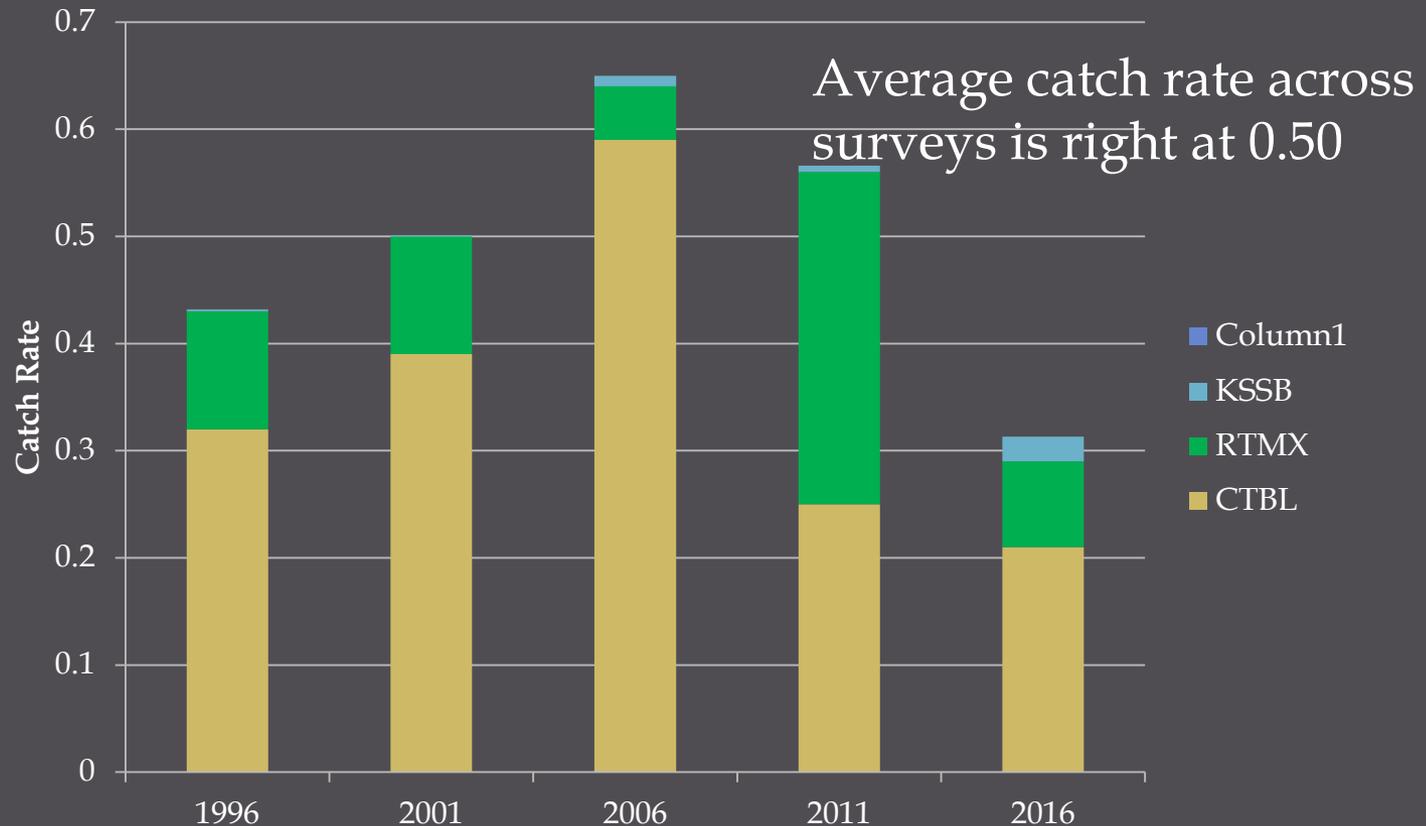
## 2. Ensure a high quality, diverse fishery and associated habitats (cont.)

- ▣ **Objective 2** - Maintain overall gamefish catch rate of 0.5 fish per hour

### Response Summary

*Needs more discussion to develop a balance of species. May need more data to show where cutthroat need to be for chub control.*

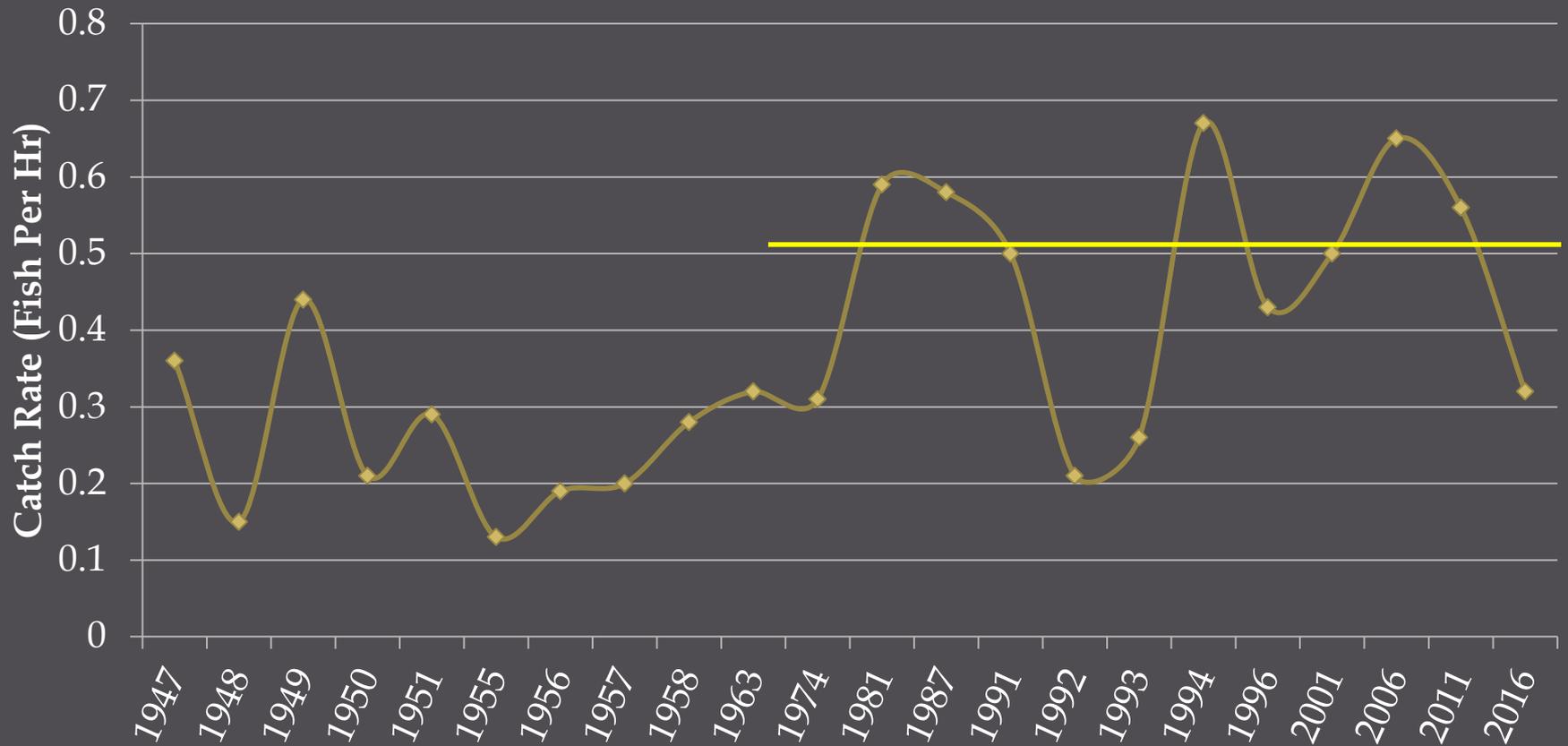
# Angler Catch Rates in Year-Long Surveys



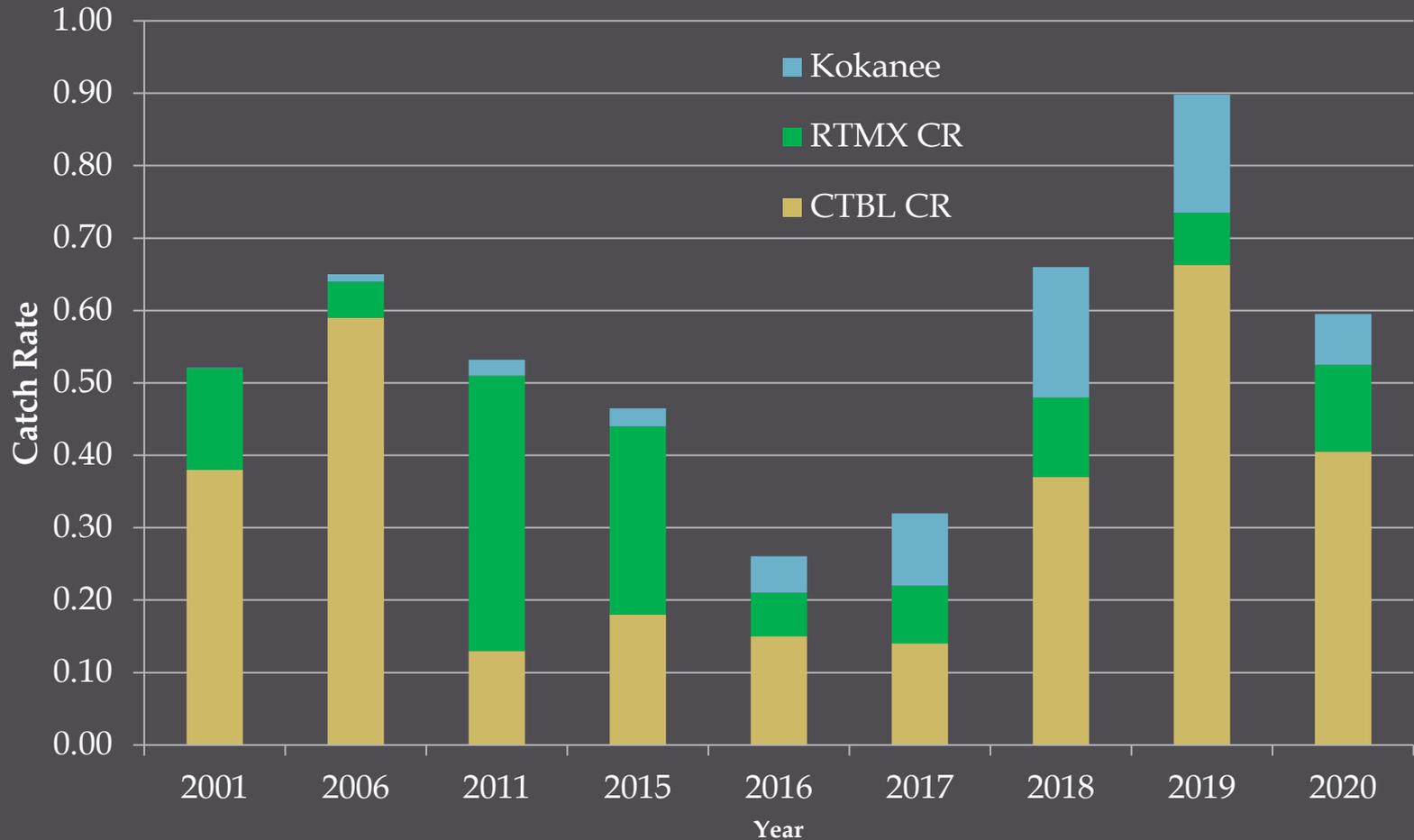
CTBL Average = 0.35 fish/hr  
RTMX Average = 0.13 fish/hr  
KS Average = 0.01 fish/hr

# Annual Total Catch Rate

Annual Catch Rate

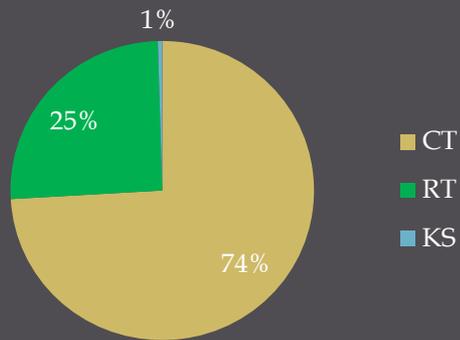


# July Only Creel Catch Rates by Species

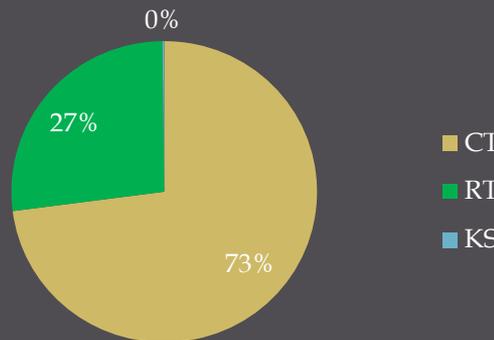


# Year-Long Balance of Species?

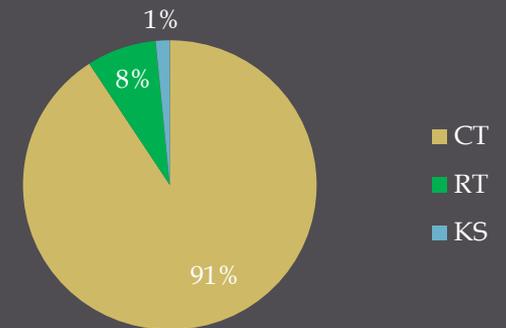
1996



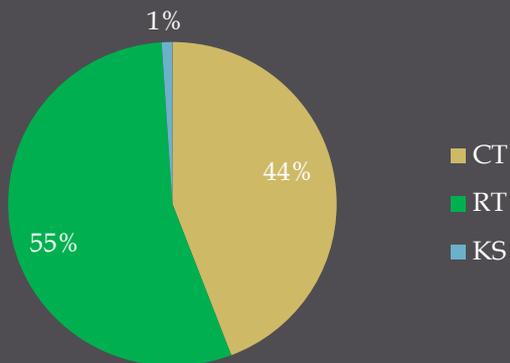
2001



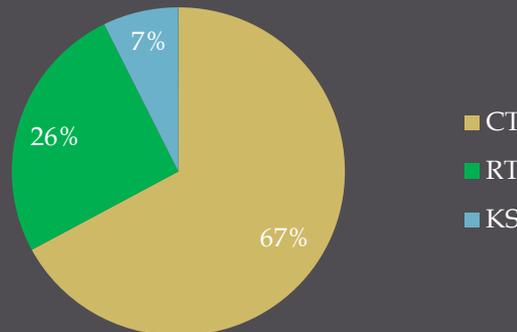
2006



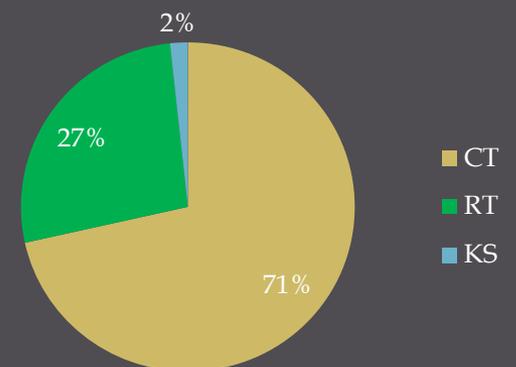
2011



2016



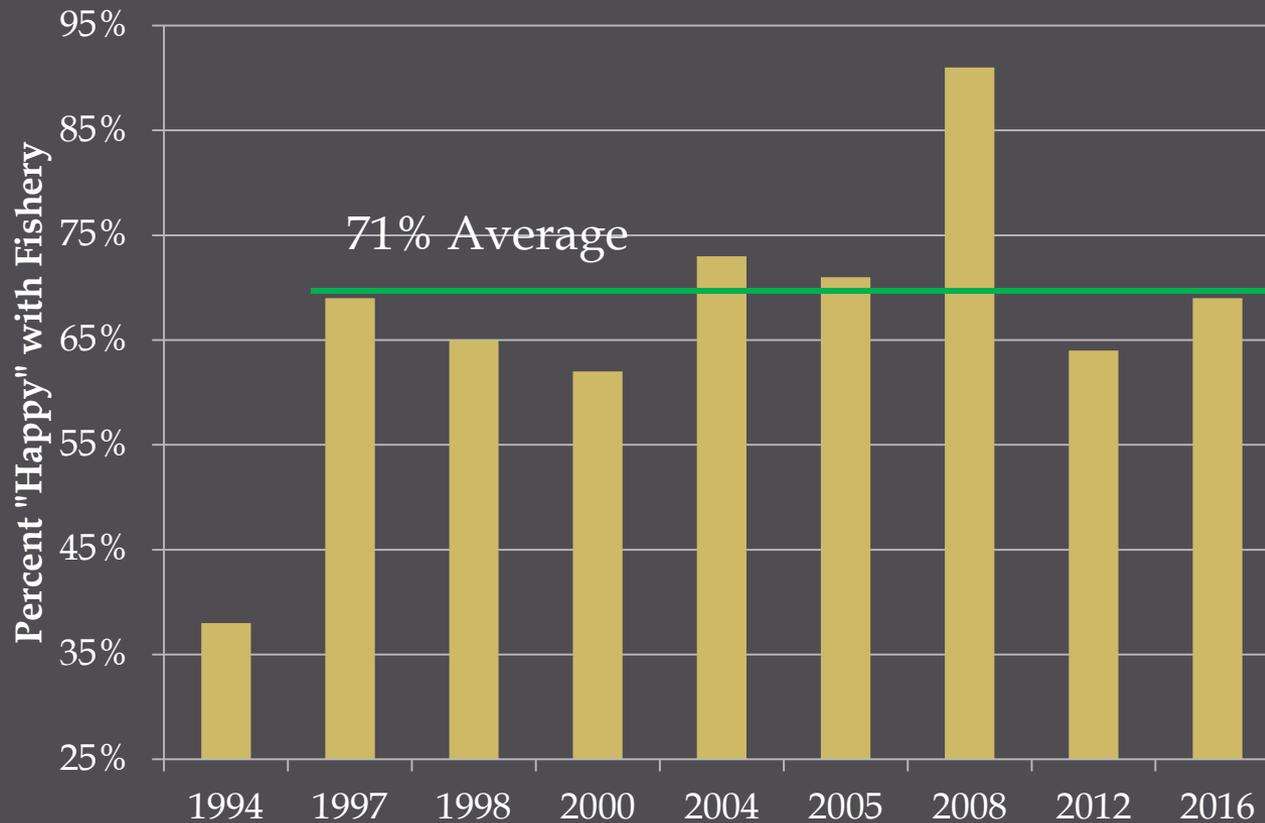
Average



# Current Public Attitudes and Expectations

- ▣ Majority of anglers are “Happy” with the fishery
- ▣ Large majority of anglers support the current fish assemblage, and do not want additional fish species added
- ▣ Rainbow and cutthroat are basically equal as far as the public “status” of species in Strawberry
- ▣ With increasing pressure on them, where do kokanee fit in now?

# Angler Opinion Surveys



Percent of anglers reporting fishing as "Excellent" or "Good"

# Rate the Current Quality of Fishing at Strawberry (2020 Survey)

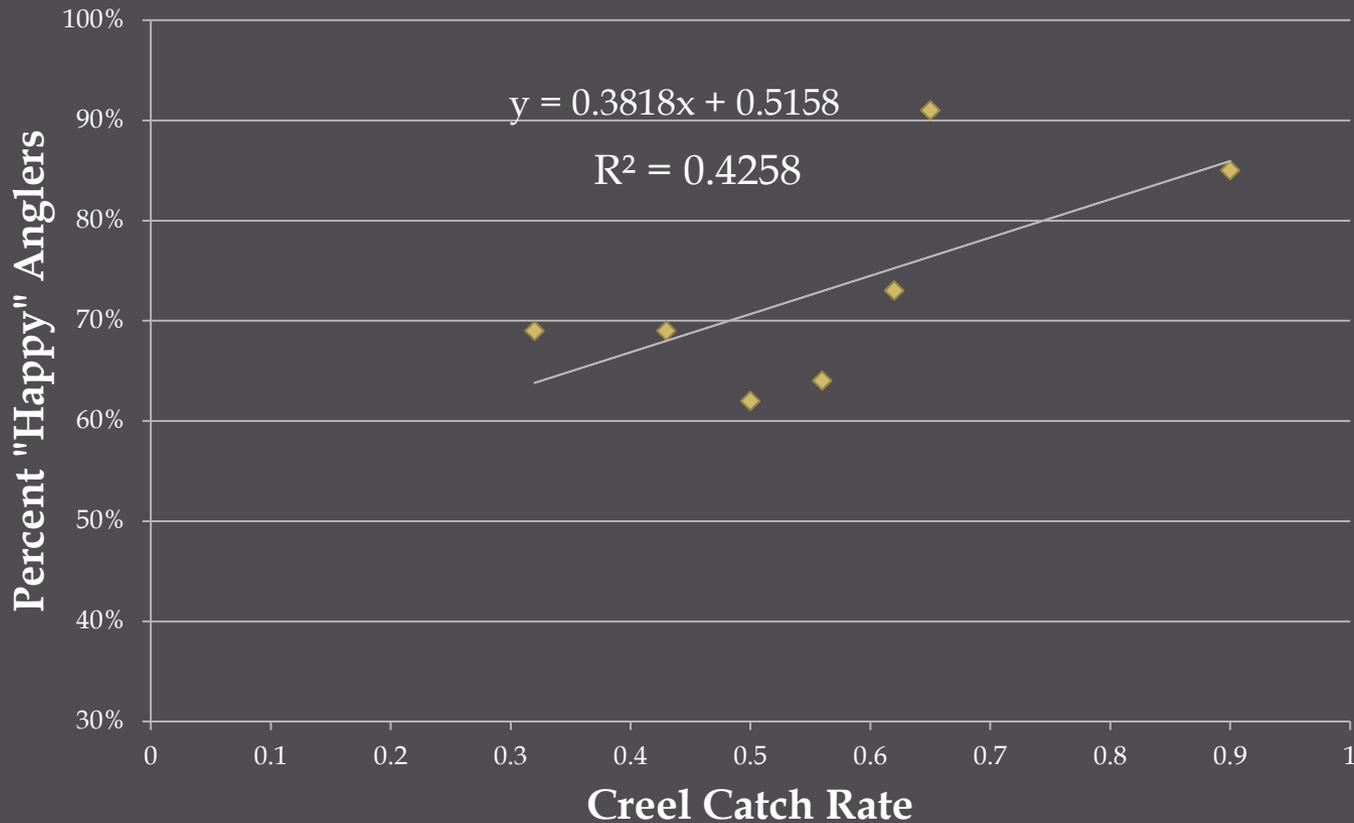
## EMAIL

<b>VG/Good/ACC</b>	<b>84.77%</b>
Poor/VP	15.24%

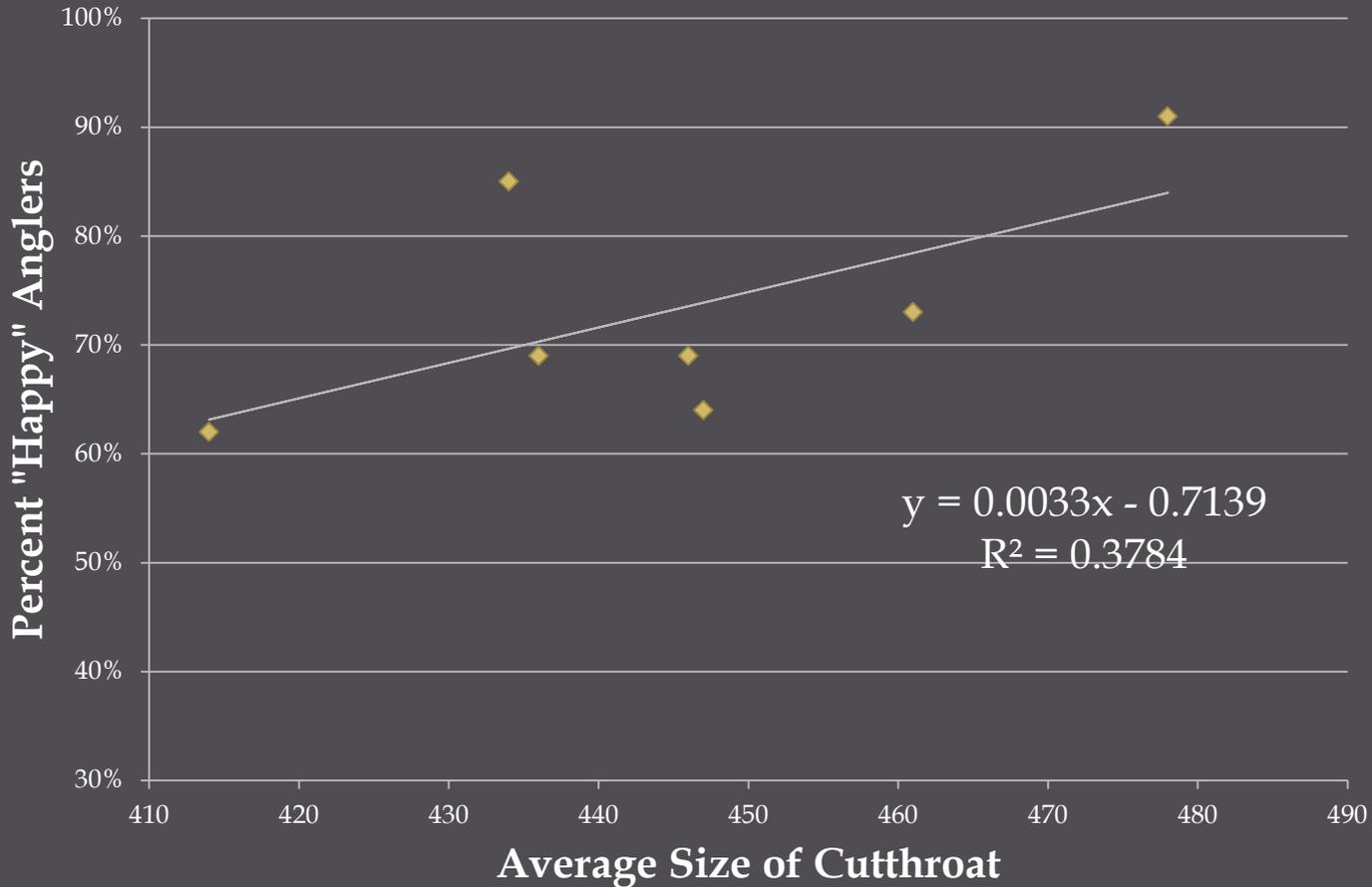
## SOCIAL MEDIA

<b>VG/Good/ACC</b>	<b>87.15%</b>
Poor/VP	12.85%

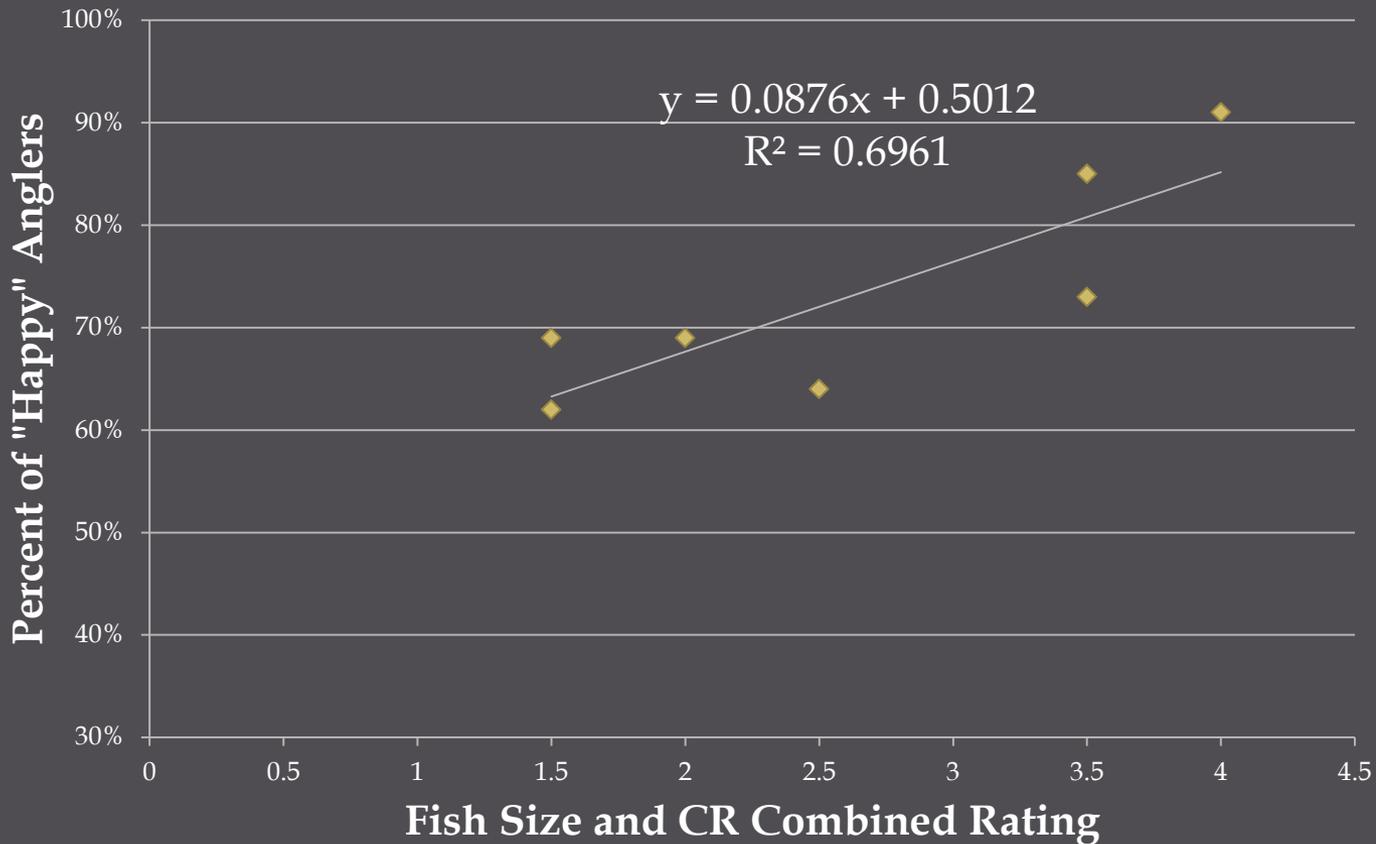
# Why are they Happy? (Catch Rates?)



# Why are they Happy? (Size of Fish?)



# More Likely it is Both Size and Numbers



# Also Need To Consider Role of Cutthroat Outside of “Predator”

## 2020 Survey Results: Most important Sport Fish

### EMAIL

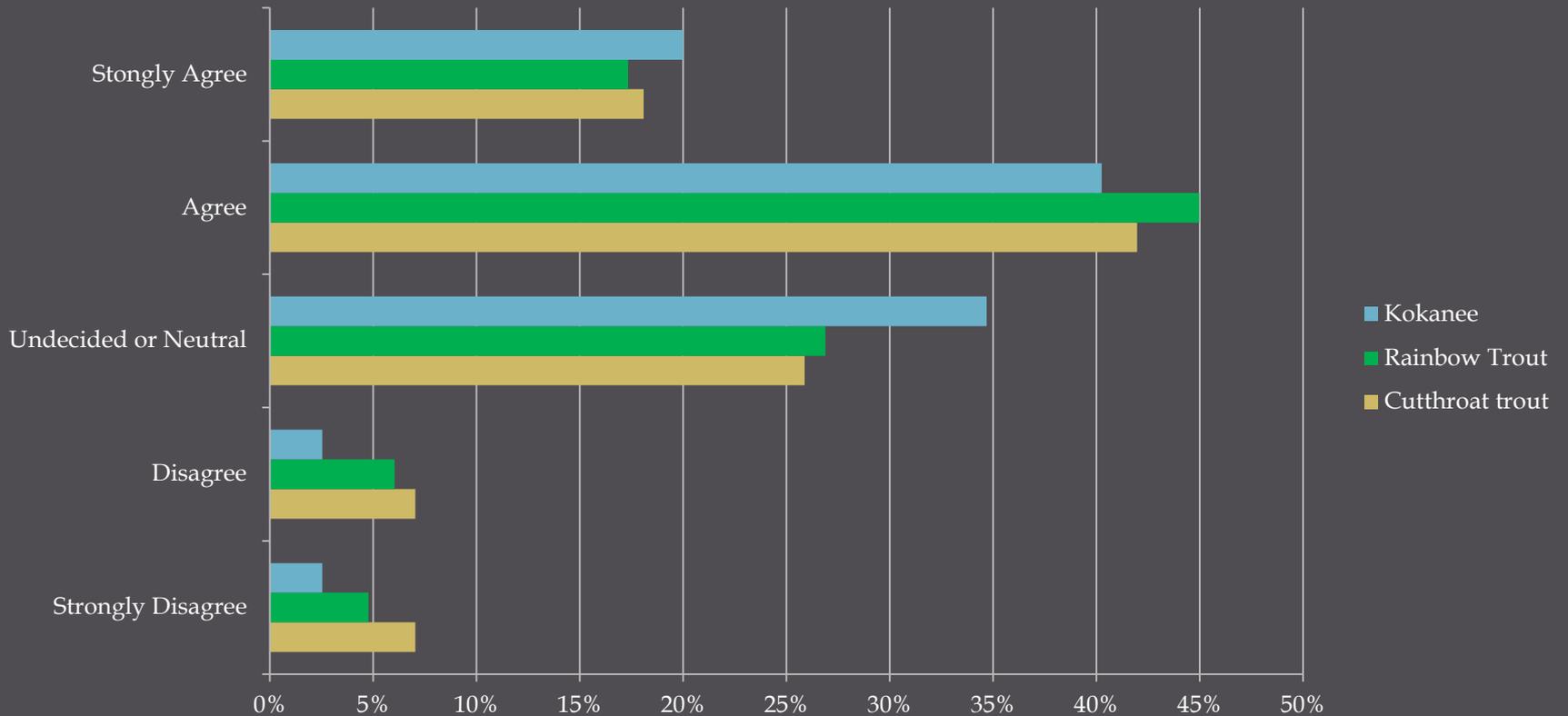
Cutthroat trout	2.1
Rainbow trout	2.2
Kokanee salmon	1.76

### SOCIAL MEDIA

Cutthroat trout	2.13
Rainbow trout	2.04
Kokanee salmon	1.85

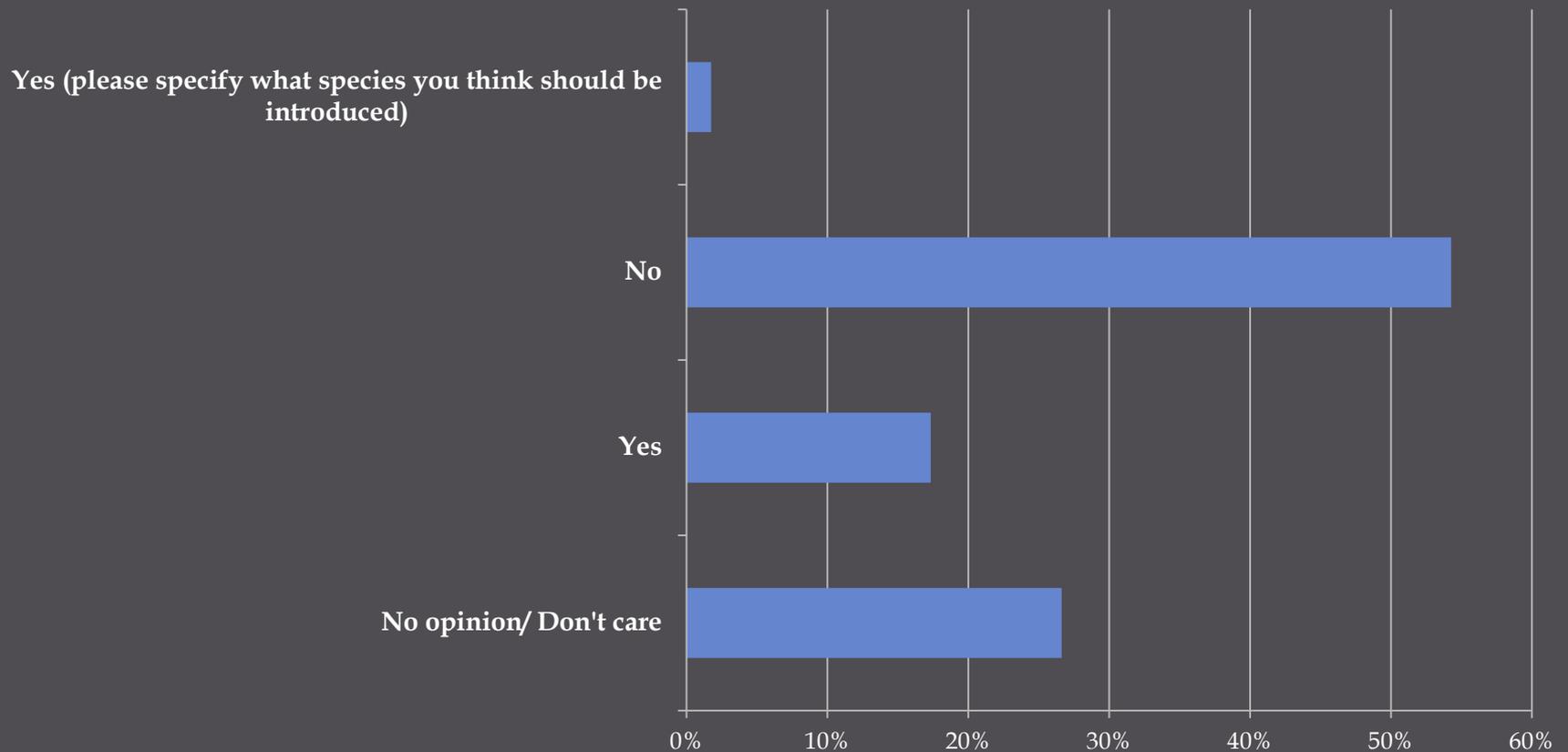
# Question 15

Do you agree or Disagree? The Utah DWR should continue its efforts, as-is, to manage Strawberry Reservoir for the Following Species:

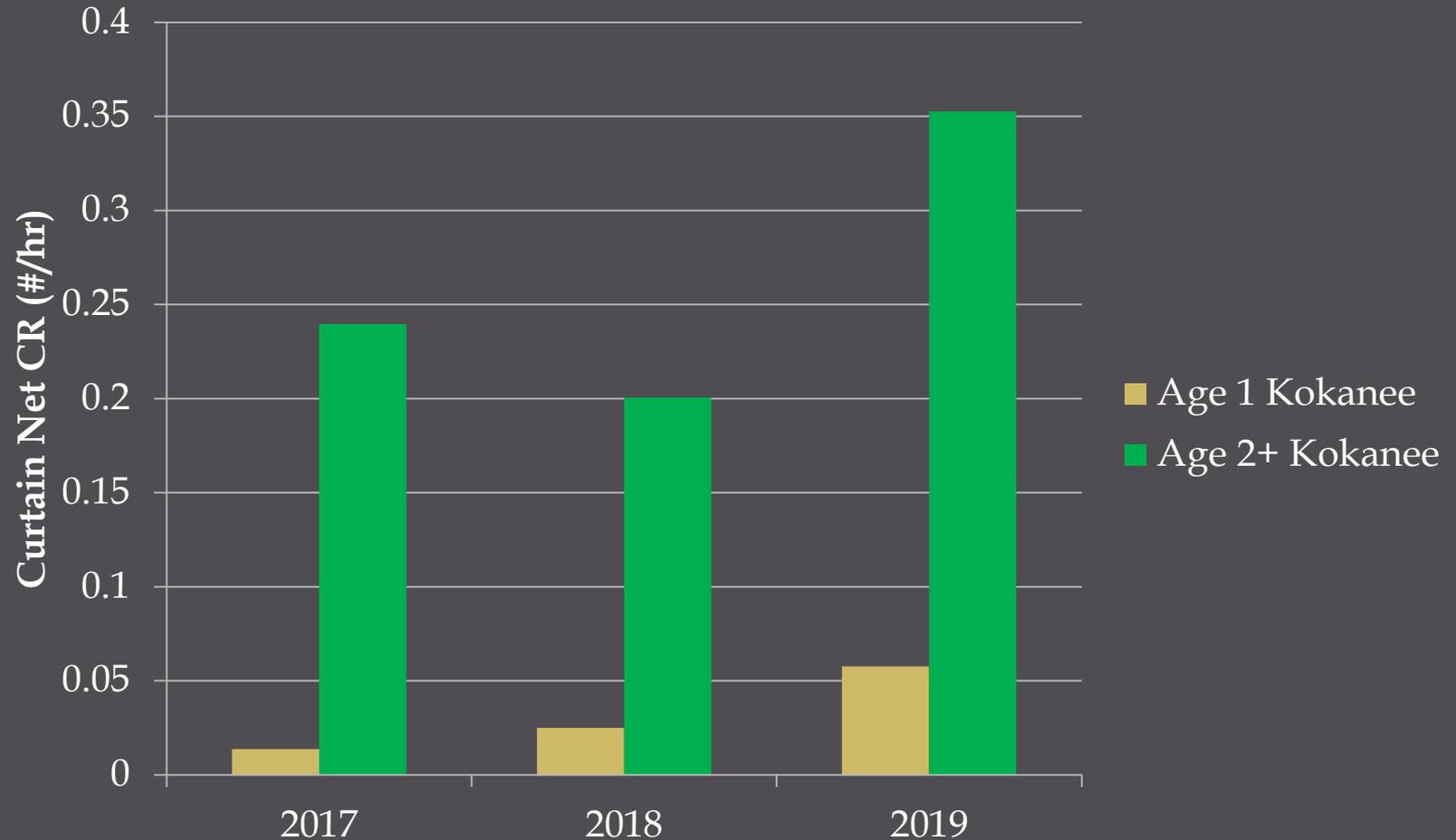


# Question 16

Should the Utah DWR consider introducing other sportfish species into Strawberry Reservoir

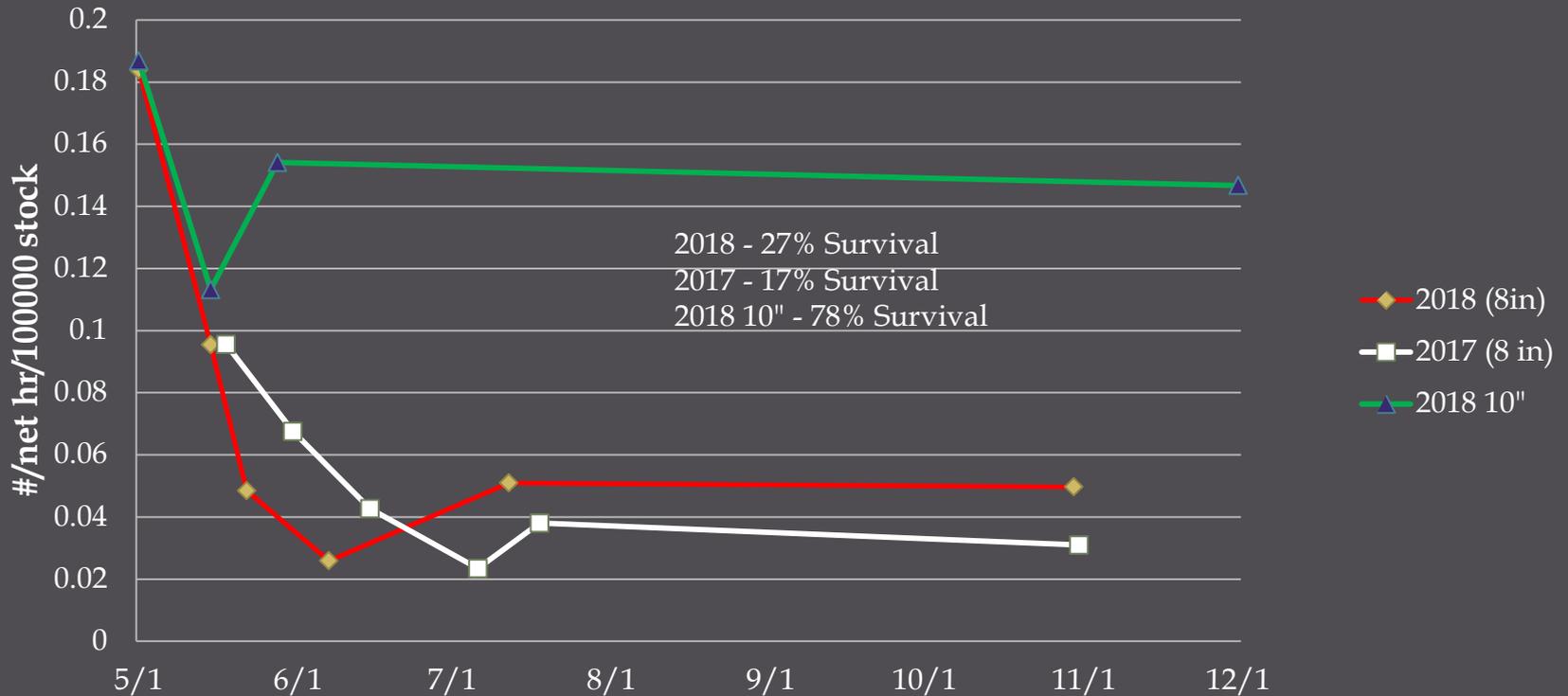


# “Silver” Kokanee Catches in the Fall

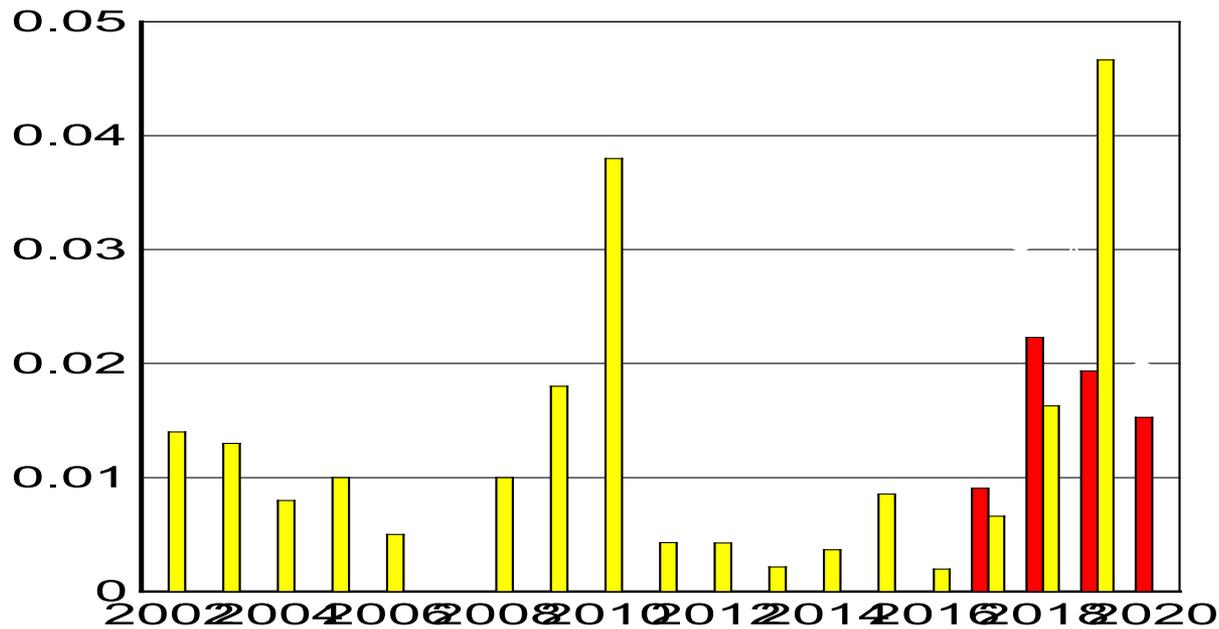


# Cutthroat Survival Study

Catch Rate Weighted by Zone  
(survival to 180 days for 8" fish and 210 days for 10")

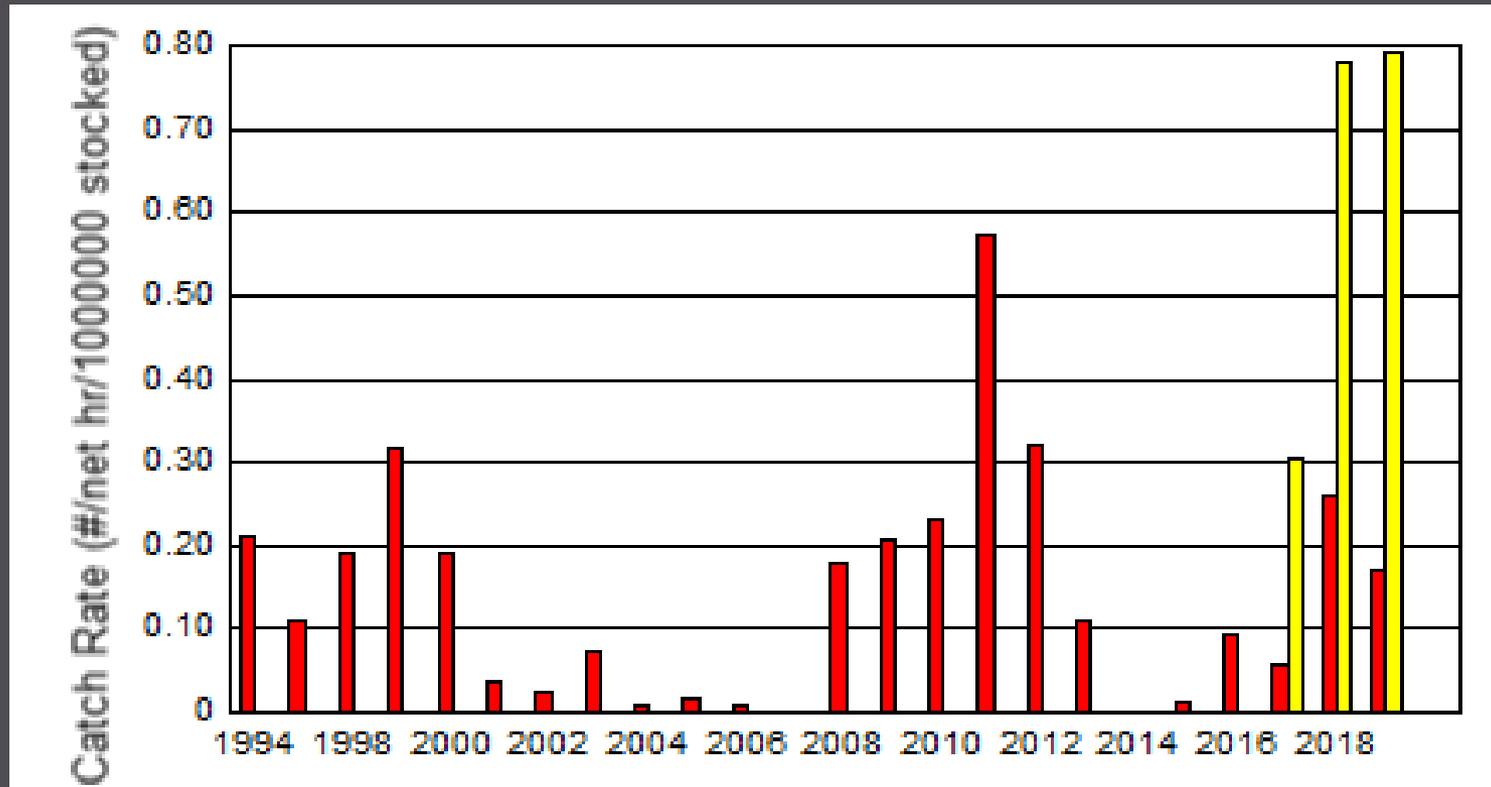


# Age 1 Cutthroat Catch Rate per 100,000 Stocked (Curtain Net and Traditional)



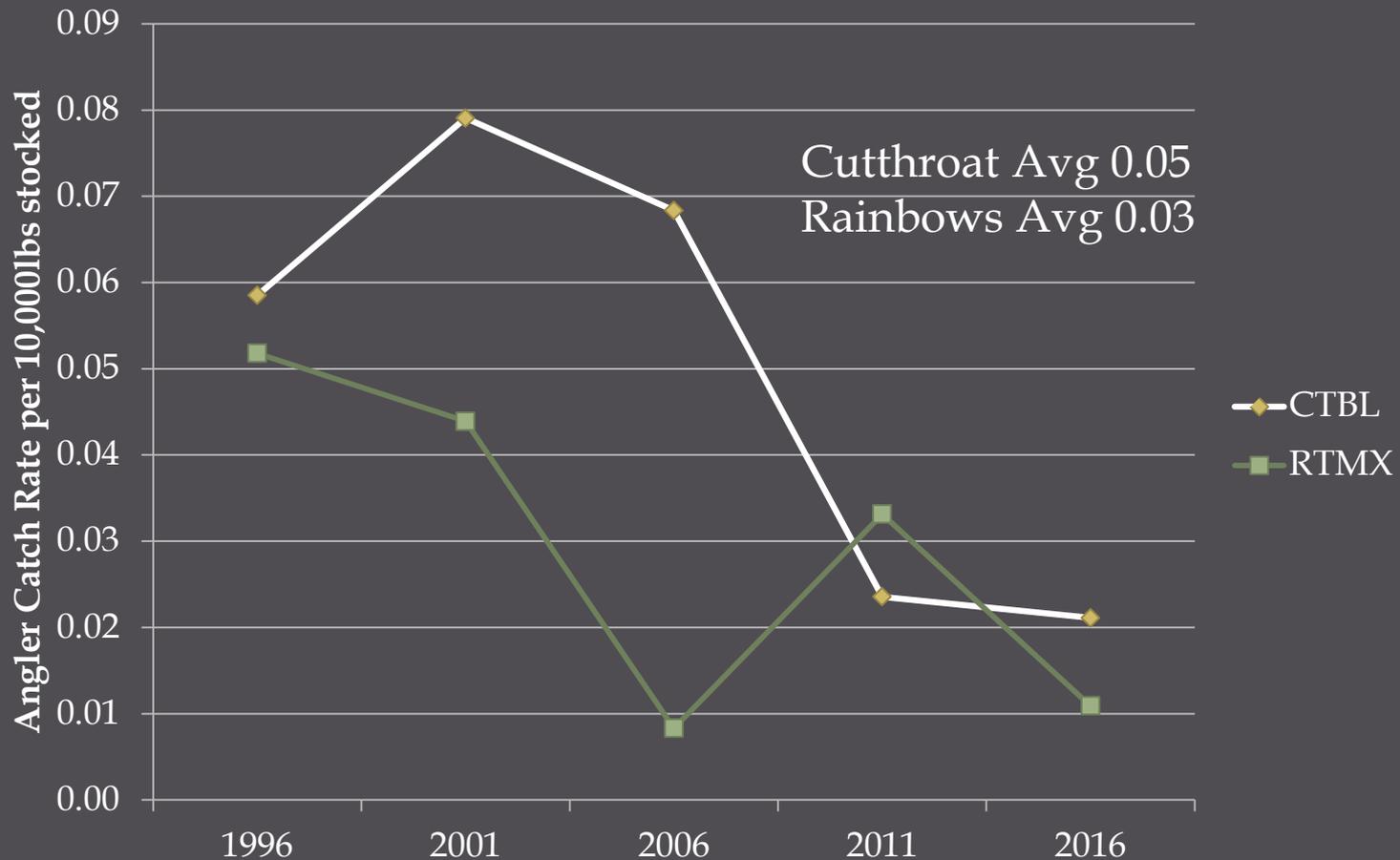
\* Curtain Net Values (in Red) are corrected for square feet of net

# Age 1 Rainbow Catch Rate per Million Stocked



Graph needs to be redone due to inconsistencies with spring vs fall stocking

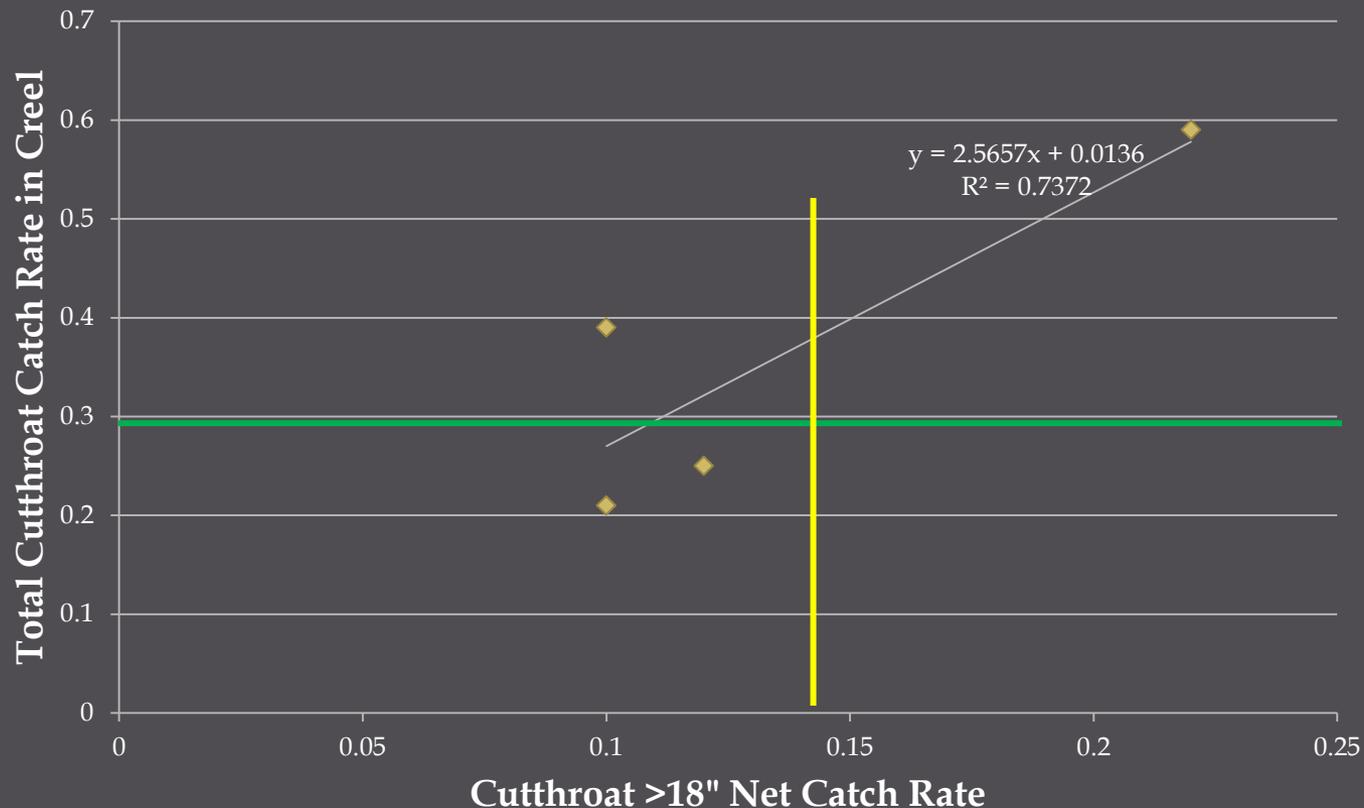
# Angler Catch Rate Per 10,000 lbs Stocked



# Stocking Adjustments (more emphasis on rainbows)

- For 2022 we are proposing a 23,536 lb reduction in 10" CTBL, and a 23,536 increase in 10" Rainbows
- Still only 288,018 Rainbows and 258,536 CTBL (lowest number ever)

# Cutthroat >18" Creel CR vs Trad. Net CR (since regulation change which changed the age structure)



A 0.11 catch rate for cutthroat >18" in the nets would likely lead to roughly a 0.29 fish per hour total cutthroat catch rate in the creel

# Proportional Stock Density and Relative Stock Densities (Kokanee)

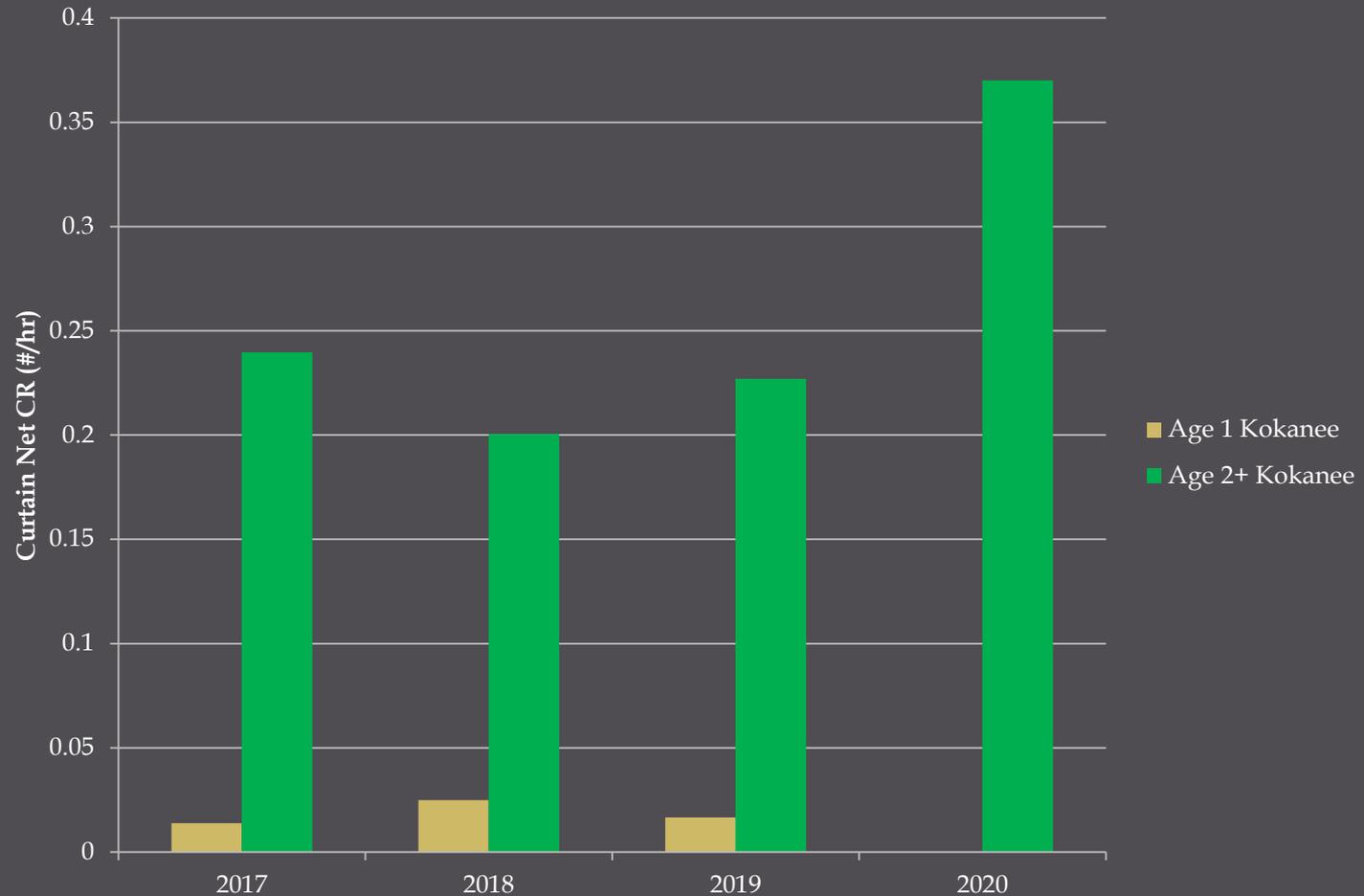
Used the Gablehouse (1984) length values

	Stock	Quality	Preferred	Memorable	Trophy
Min. Size	>5.6"	>9.4"	>12.2"	>15.0"	>18.8"
Rank		65%	53%	38%	11%
Goals					
Trophy		30-60%	30-60%	10-20%	>3%
Balanced		40-70%	10-40%	0-10%	0-2%

We have a true "Trophy" Kokanee fishery

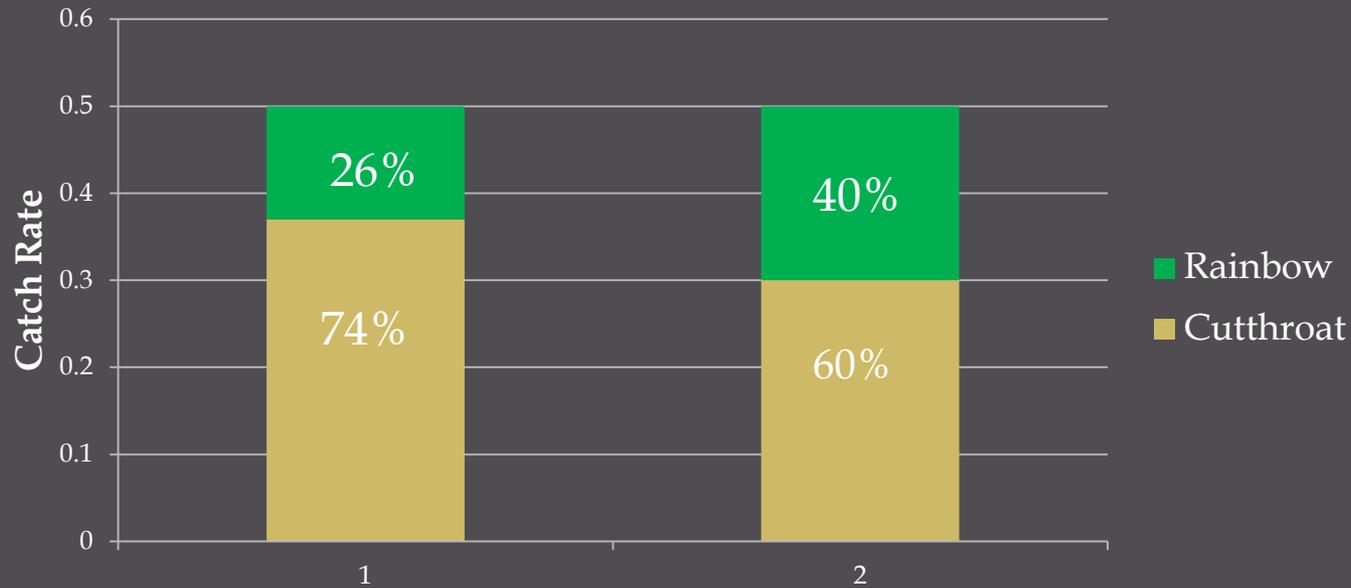
Again, important to note that not all fisheries are equal

# “Silver” Kokanee Catches in the Fall



# Possible Scenarios (within current pounds)

	Avg of 0.50		
	CT >18 Associated CR	Cutthroat	Rainbow
Current CT Level for Chub Control	0.145	0.37	0.13
Theoretical Minimum Level for chub control	0.11	0.3	0.2



Scenario 1 is very close to what we have provided over the years (72% and 28%)

## 2. Ensure a high quality, diverse fishery and associated habitats (cont.)

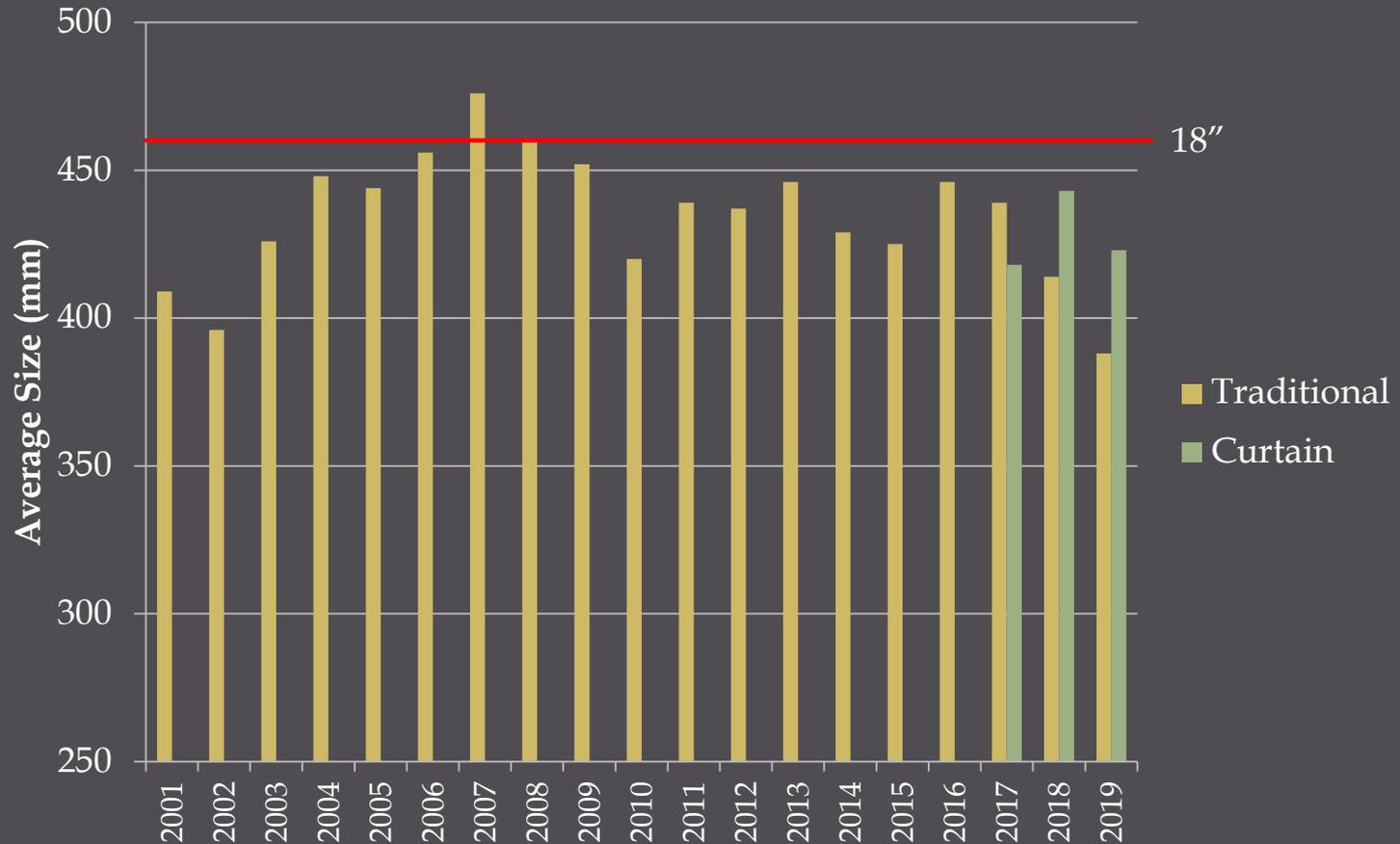
- ▣ **Objective 3** - Maintain average size of cutthroat trout in gillnets at 18"

### Response Summary

Needs more discussion and data to support where this needs to be for chub control, and then incorporate angler desires

Previous Objective in Goal 1 was for chub control, and this one was for angler satisfaction

# Average Size for Cutthroat in Nets



Average for last 10 years = 17"

# Proportional Stock Density and Relative Stock Densities (cutthroat)

Built our own “Trophy” size by strain rather than using actual world record (Lahontan) size

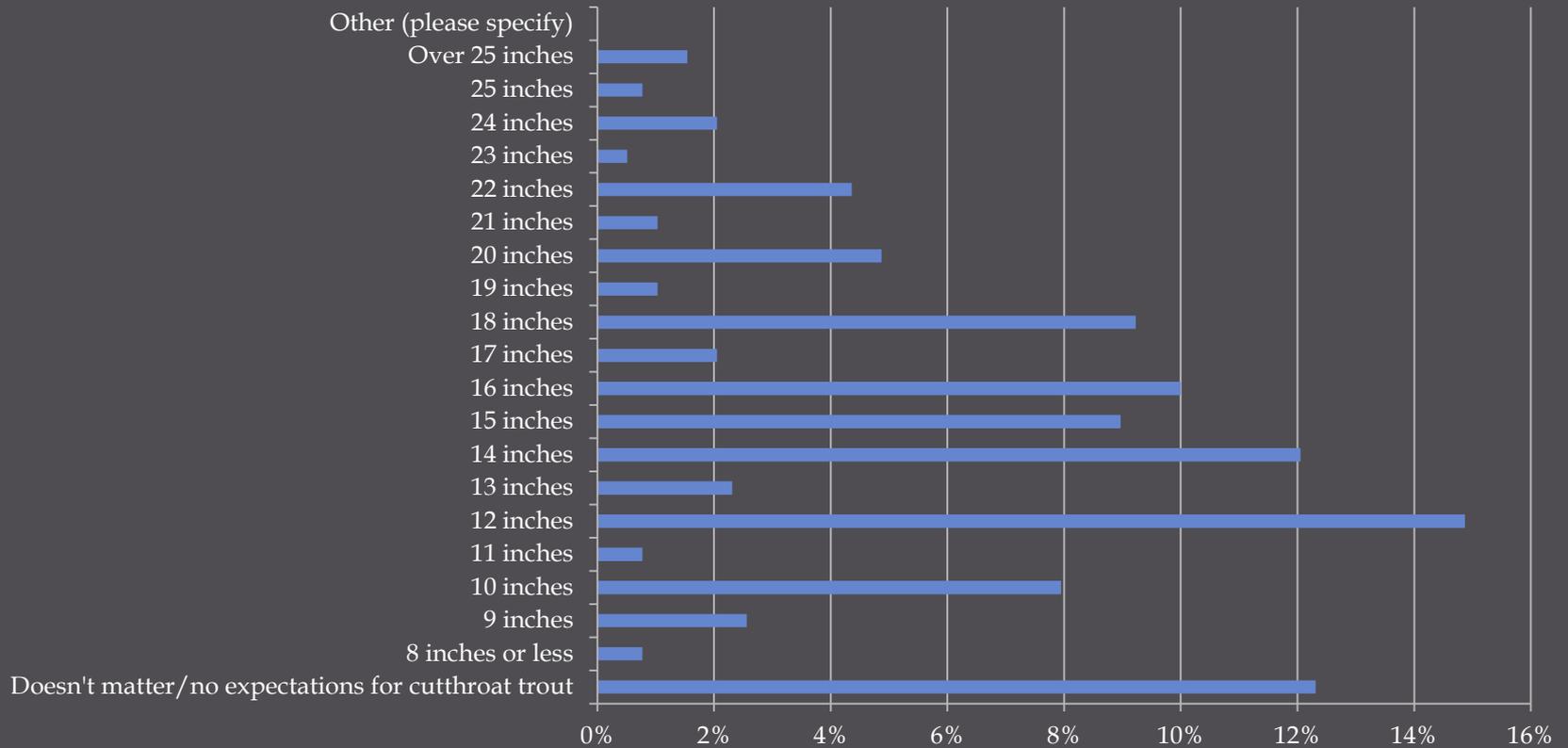
	Stock	Quality	Preferred	Memorable	Trophy
Min. Size	>8.7”	>13.7”	>18.4”	>21.4”	>26.8”
Rank		64%	32%	8%	<1%
Goals					
Trophy		30-60%	30-60%	10-20%	>3%
Balanced		40-70%	10-40%	0-10%	0-2%

We are providing a “Preferred” size cutthroat fishery  
Almost “Memorable”

Important to note that not all fisheries are created equal. Strawberry has a high productivity, and can provide larger fish much easier than many other waters

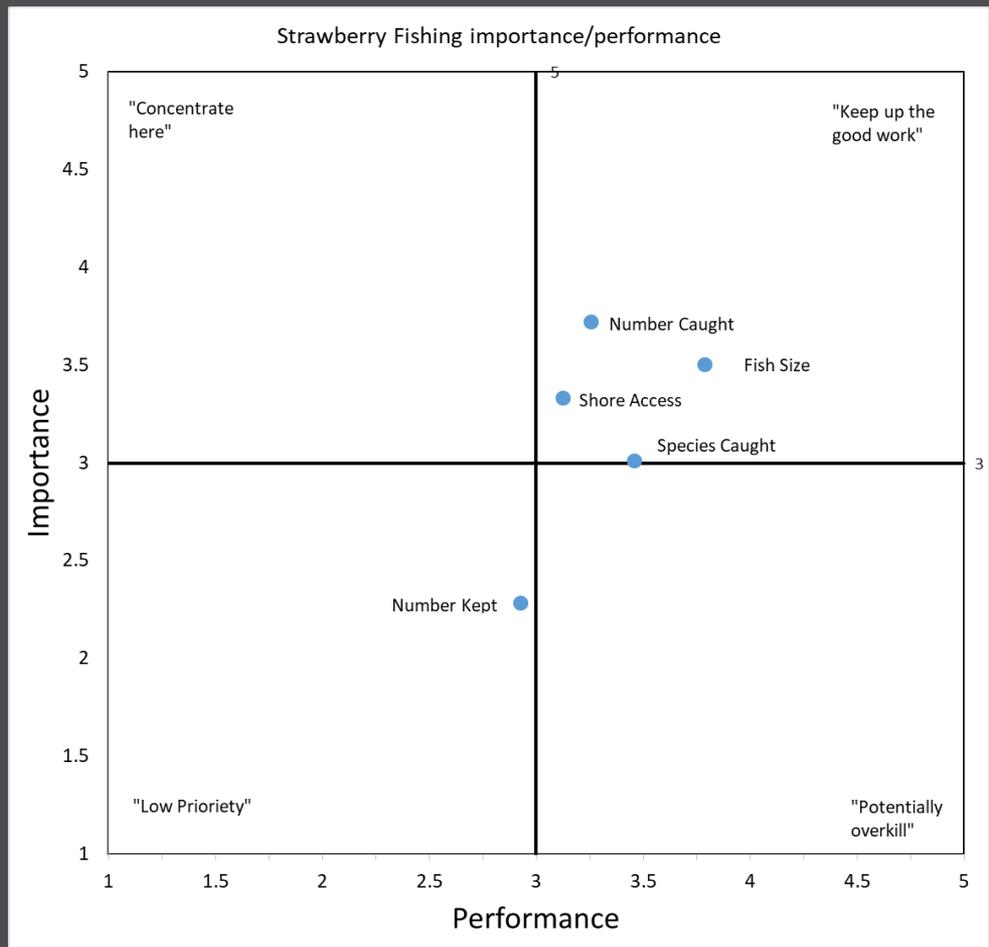
# Question 20

What is the smallest acceptable size for cutthroat trout at Strawberry Reservoir that would satisfy your expectations?



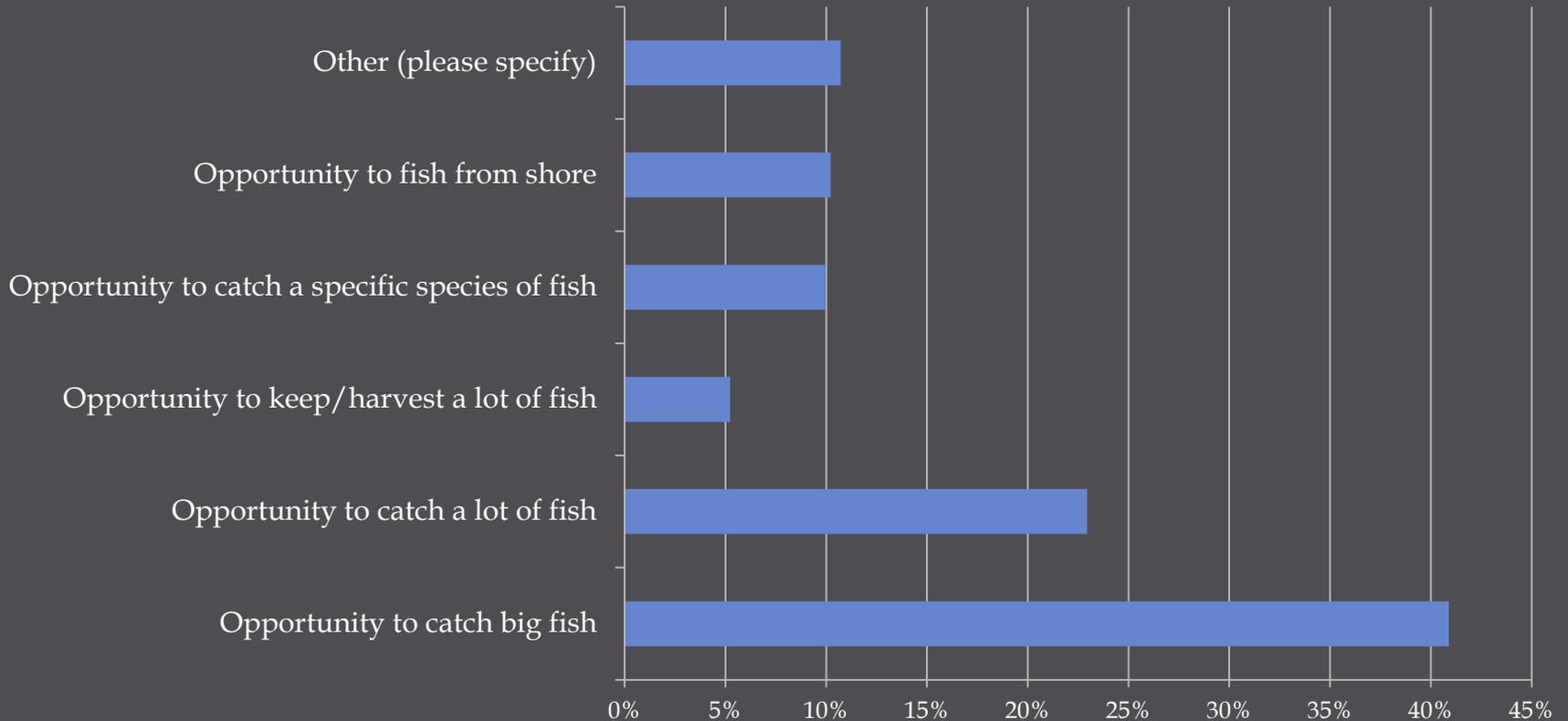
We are possibly exceeding expectations on most years since 2003, but difficult to measure with slot limit

# IPA Analysis of Question 5



# Question 6

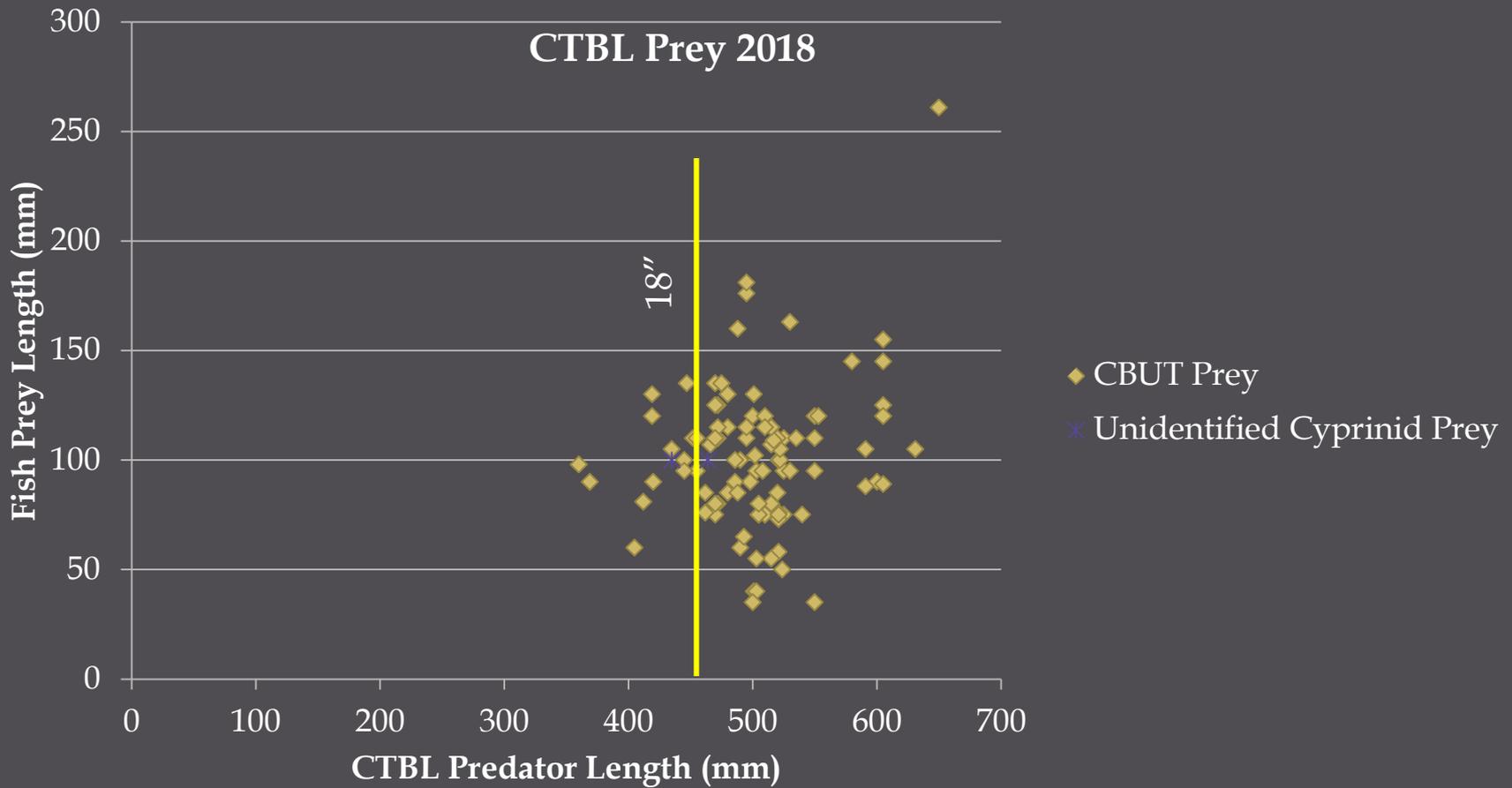
What is the single most important factor relating to the fishing that draws you to fish at Strawberry Reservoir?



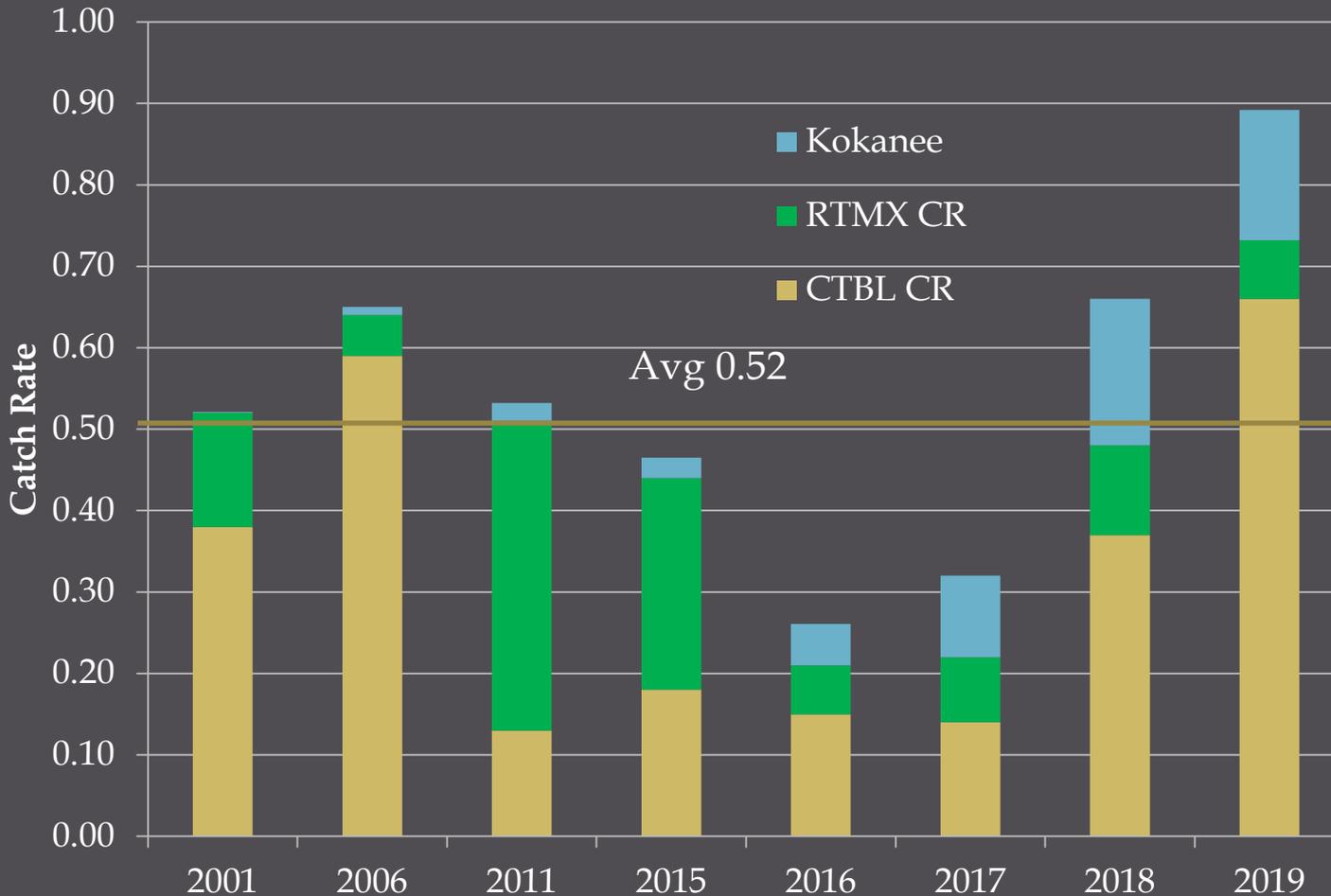
# The Biological Need to Control Chubs Also Factors In

- ▣ Without slot limit, we could not control chubs
- ▣ Cutthroat over 18" are required to control chubs, so there may naturally be more than the minimum size relating to anglers expectations
- ▣ We currently perform very well in "Fish Size", and that always seems to be one of the biggest draw for anglers

# Chub Prey Size vs Cutthroat Predator Size



# July Only Creel Catch Rates by Species



## 2. Ensure a high quality, diverse fishery and associated habitats (cont.)

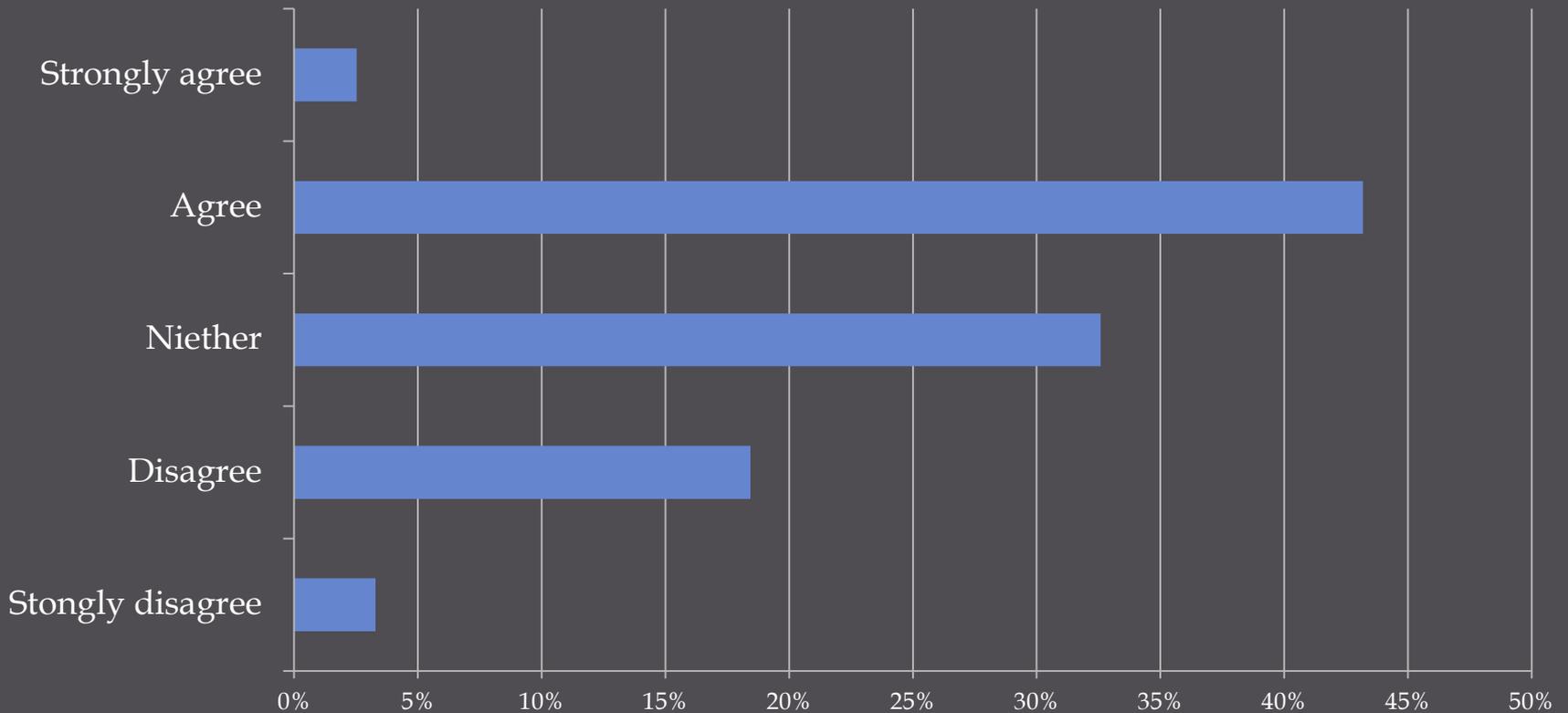
- ▣ **Objective 4** - Maintain average size of rainbows in the creel at 16"

### Response Summary

Needs more discussion. Split on need for larger size vs smaller size, and keep as is

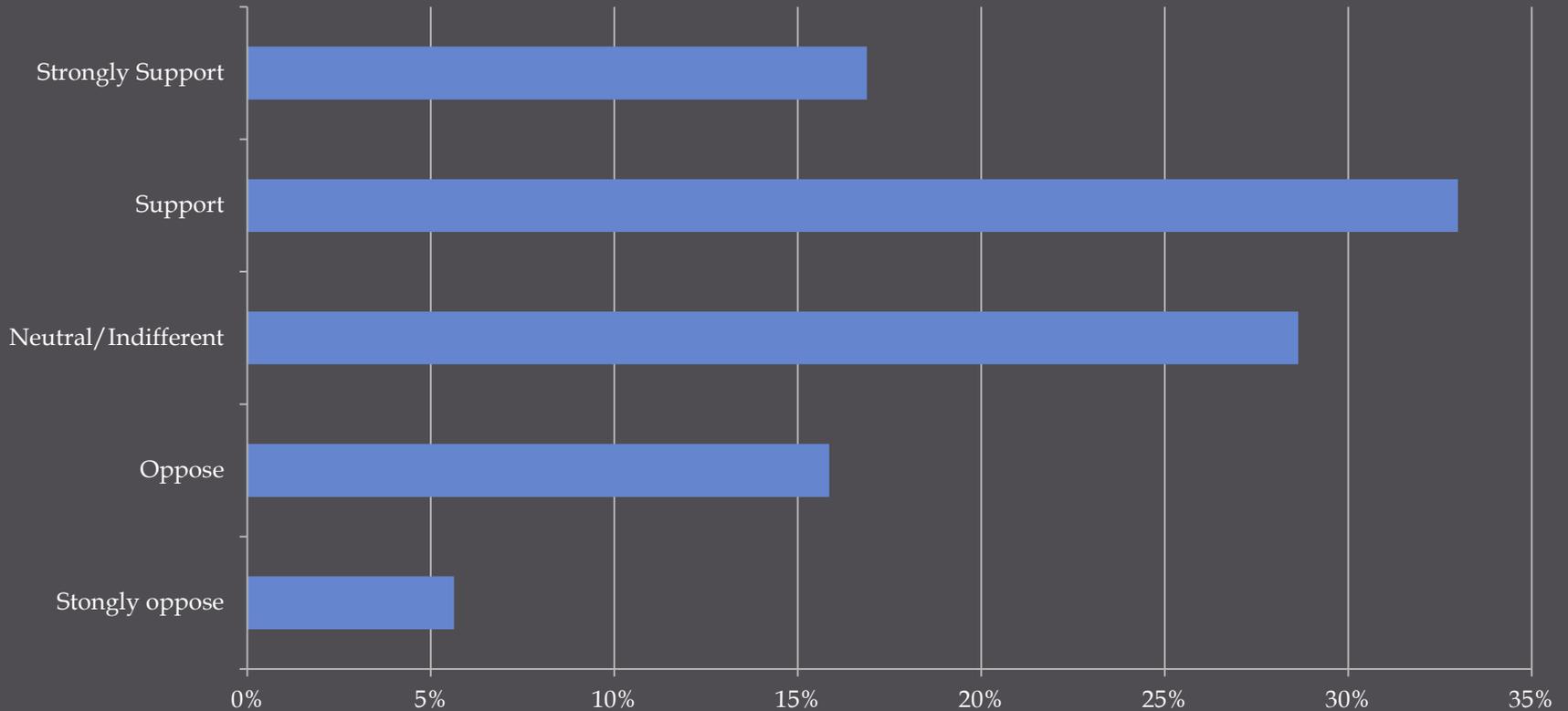
# Question 18

How much do you agree or disagree? The rainbow trout in Strawberry Reservoir are currently large enough to satisfy my expectations.

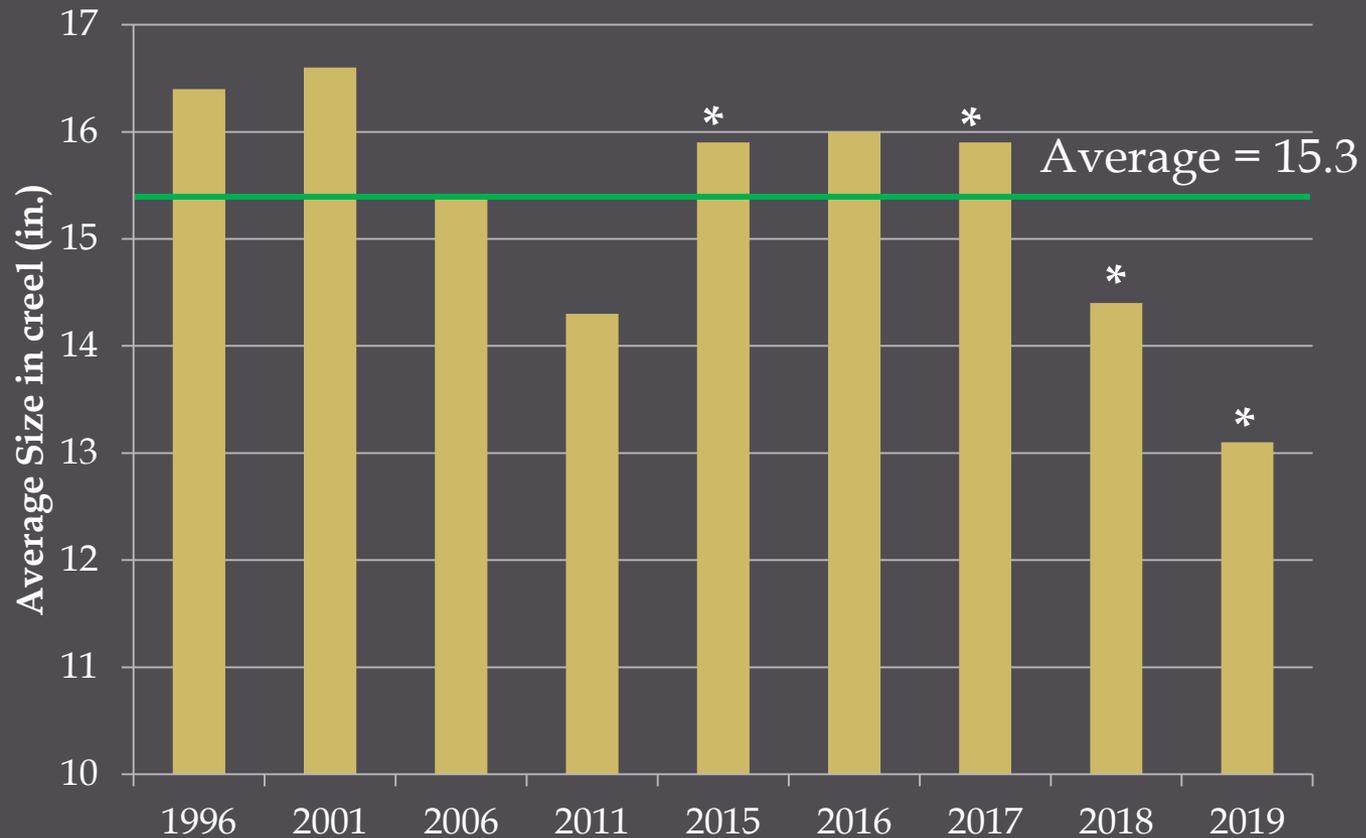


# Question 21

In order to provide larger rainbow trout, would you support or oppose a size restriction on harvest of rainbow trout?



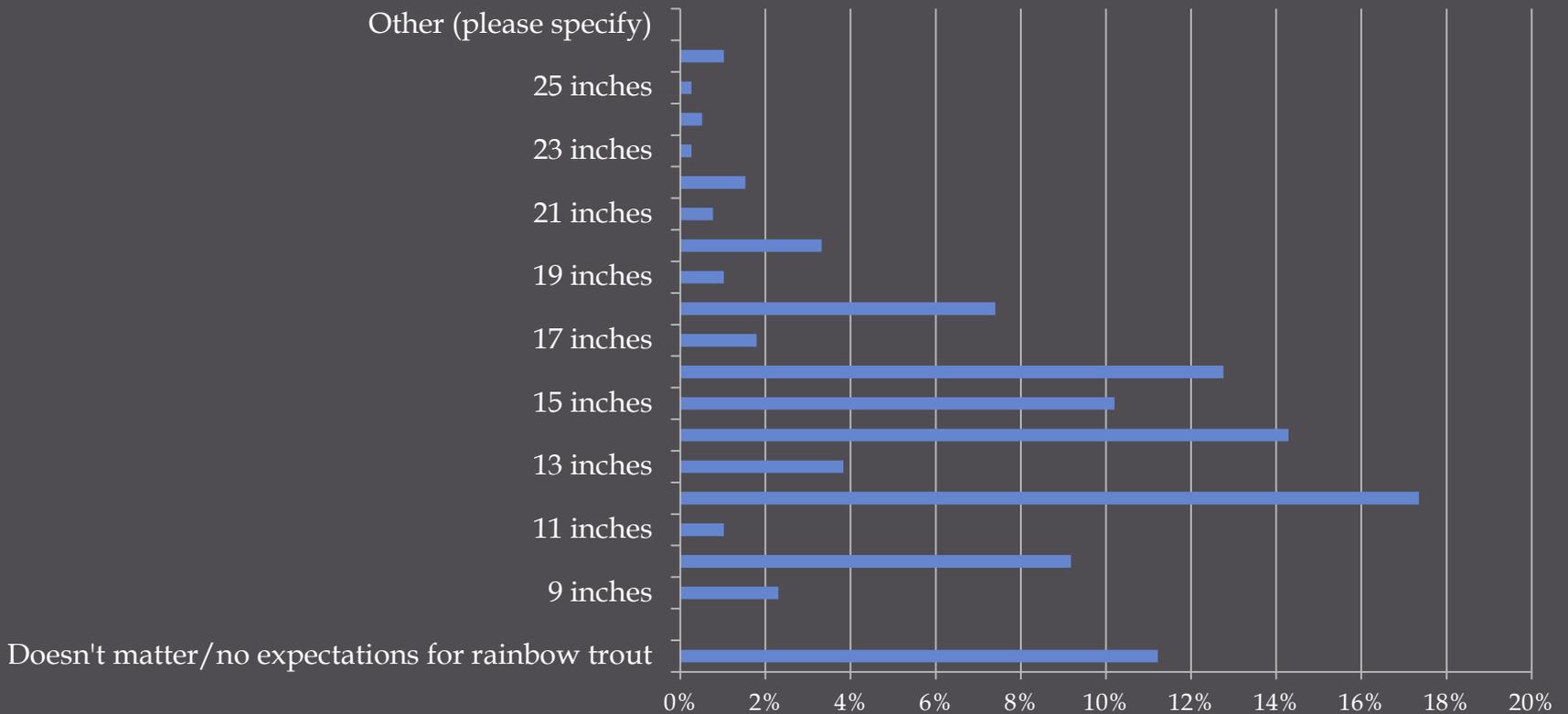
# Average Size of Rainbow in Creel



\* Indicates July only creel

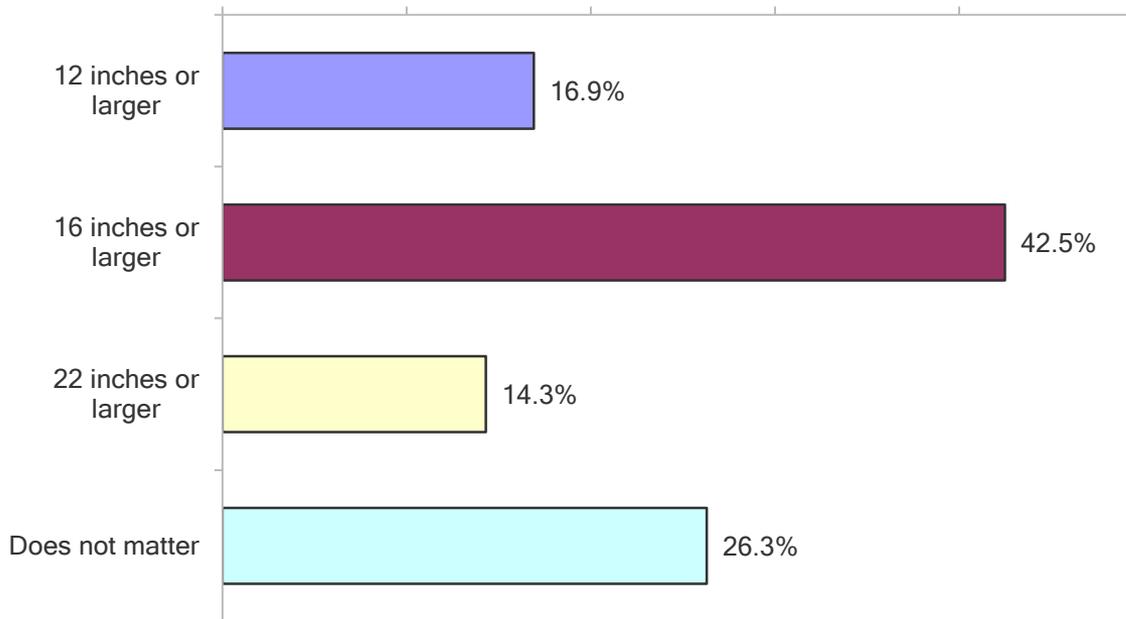
# Question 19

What is the smallest acceptable size for rainbow trout at Strawberry Reservoir that would satisfy your expectations?



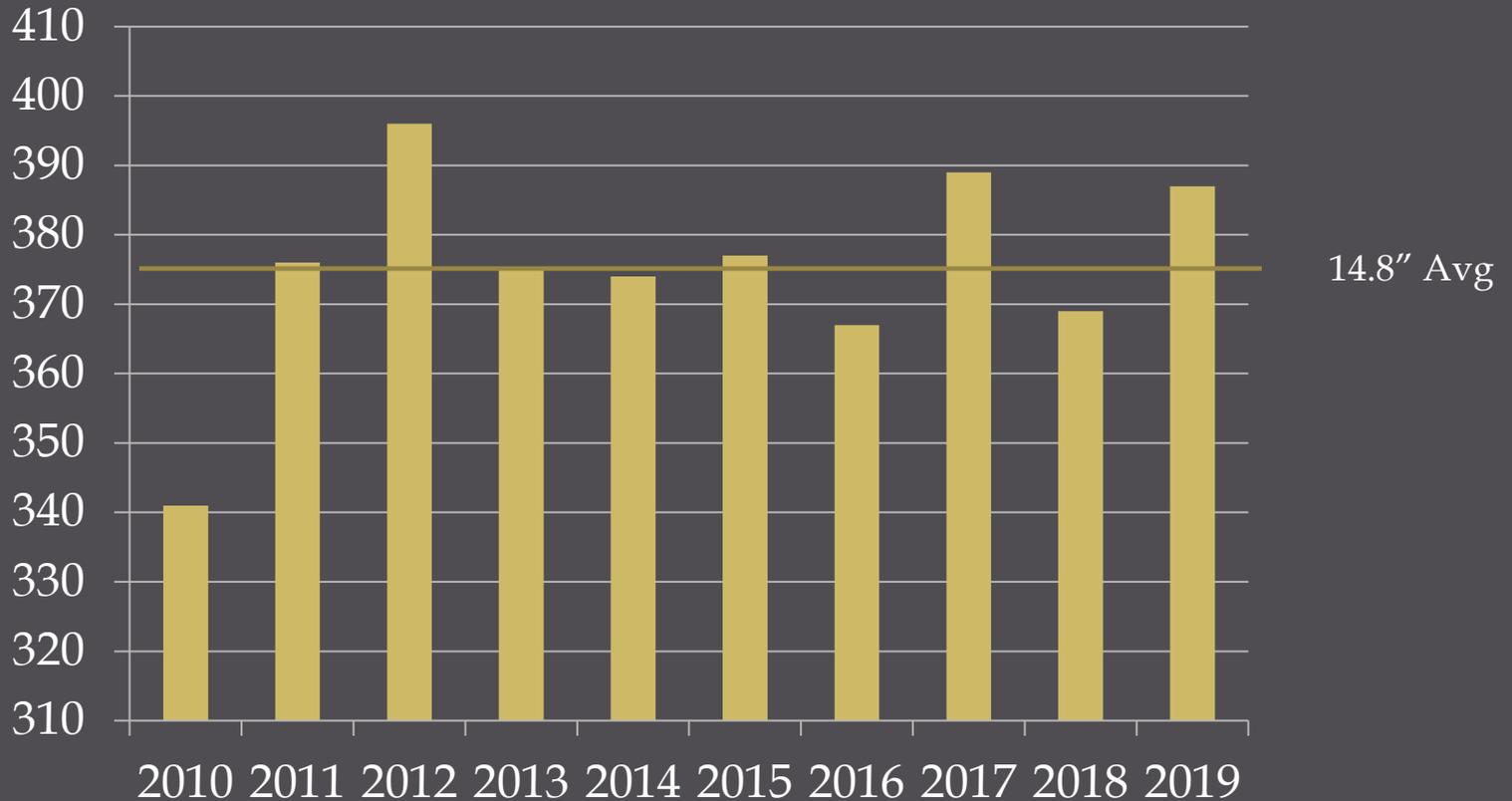
# 2012 Survey

How large does a caught (not harvested) trout or salmon need to be to satisfy your expectations as an angler?



# Rainbow Average Size in Nets, Minus Recent Stocks

(over 300 mm only, less than 3% are harvested under 300 mm)



# Proportional Stock Density and Relative Stock Densities (rainbows)

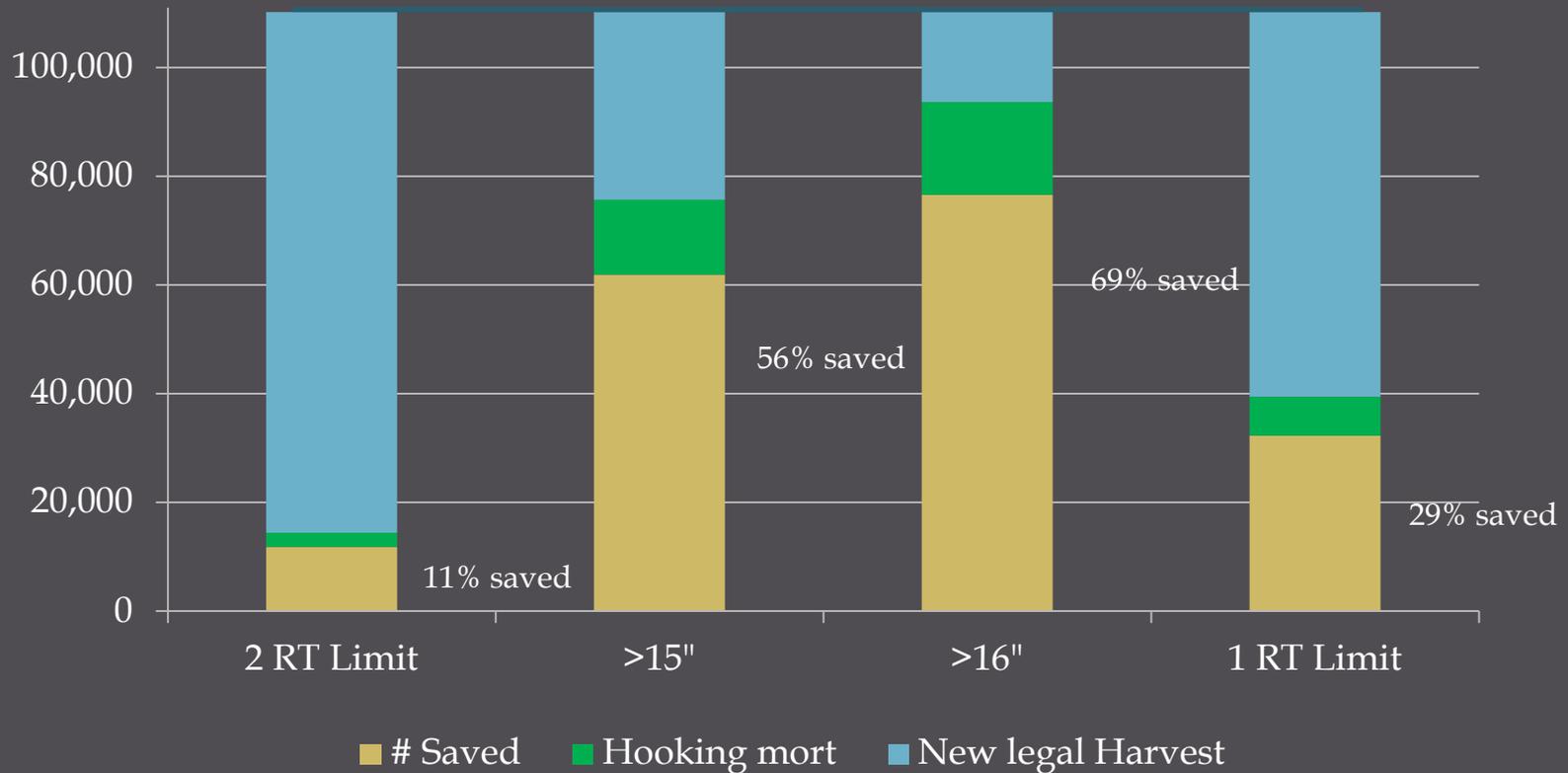
Used the Gablehouse (1984) length values

	Stock	Quality	Preferred	Memorable	Trophy
Min. Size	>8.6"	>15.5"	>19.4"	>25.4"	>31.8"
Rank		19%	4%	0%	0%
Goals					
Trophy		30-60%	30-60%	10-20%	>3%
Balanced		40-70%	10-40%	0-10%	0-2%

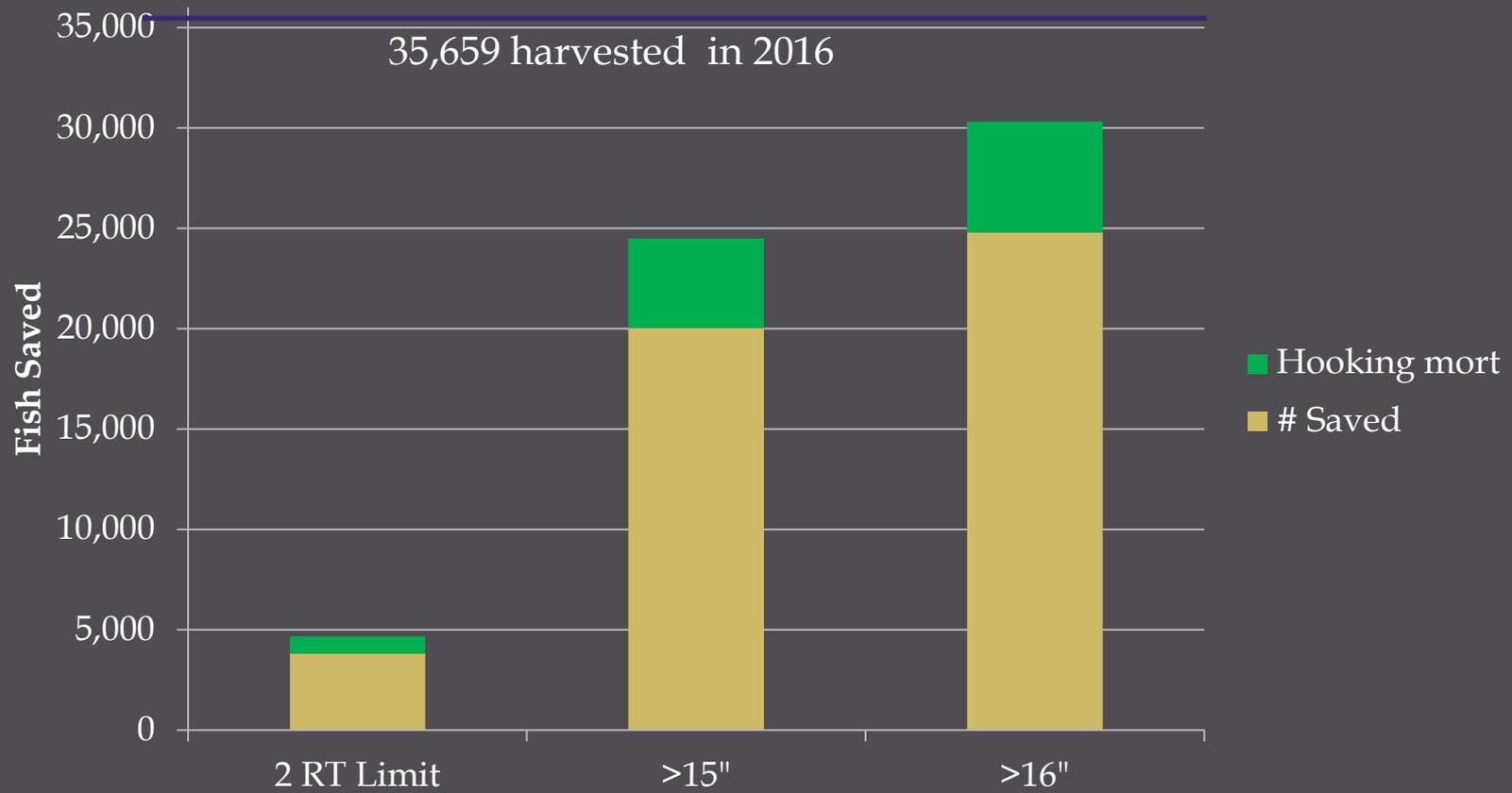
Currently we are not providing a "Quality" rainbow fishery

# Rainbow Regulation Modeling (1<sup>st</sup> year of the reg change only)

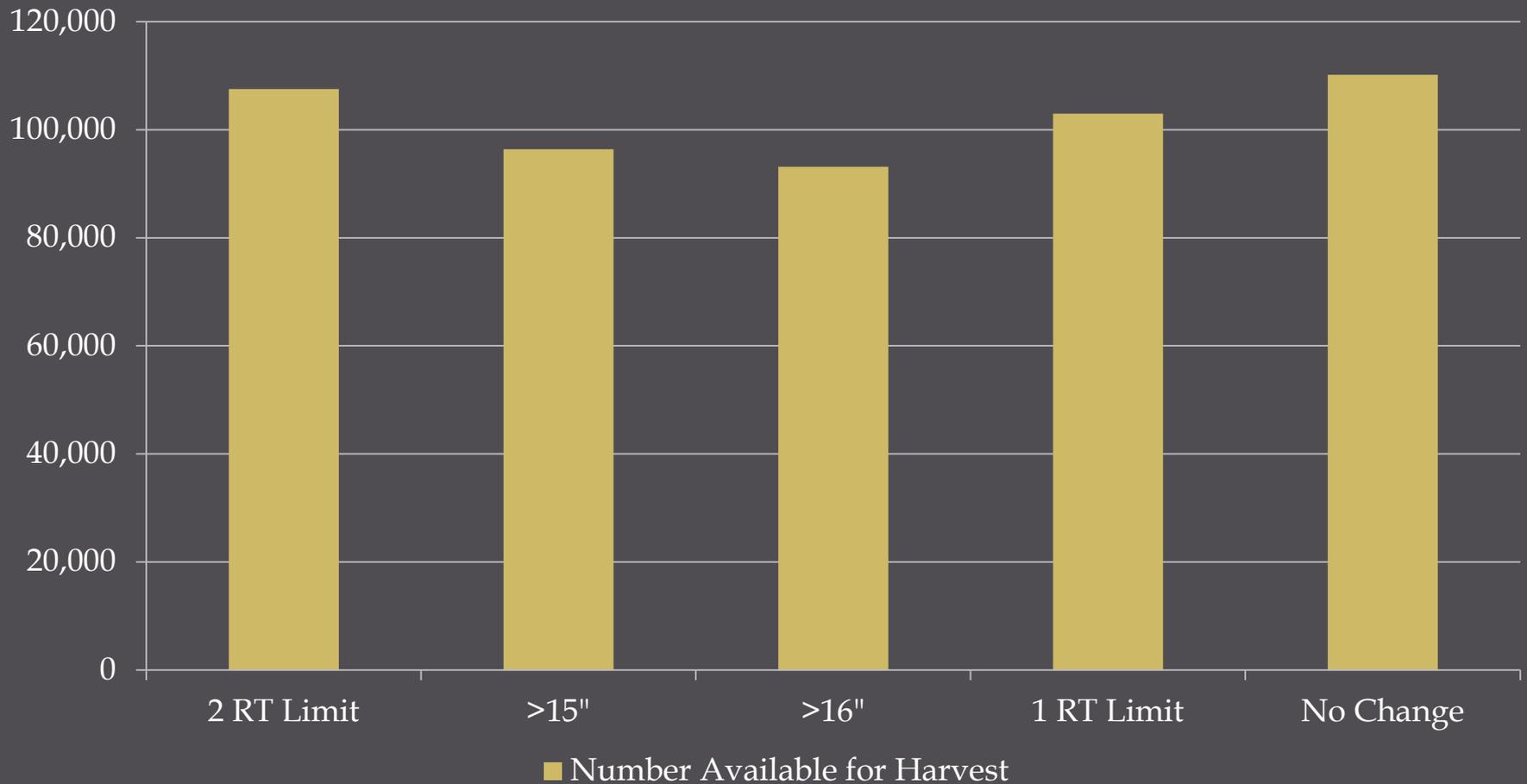
110,187 legally harvested in 2011



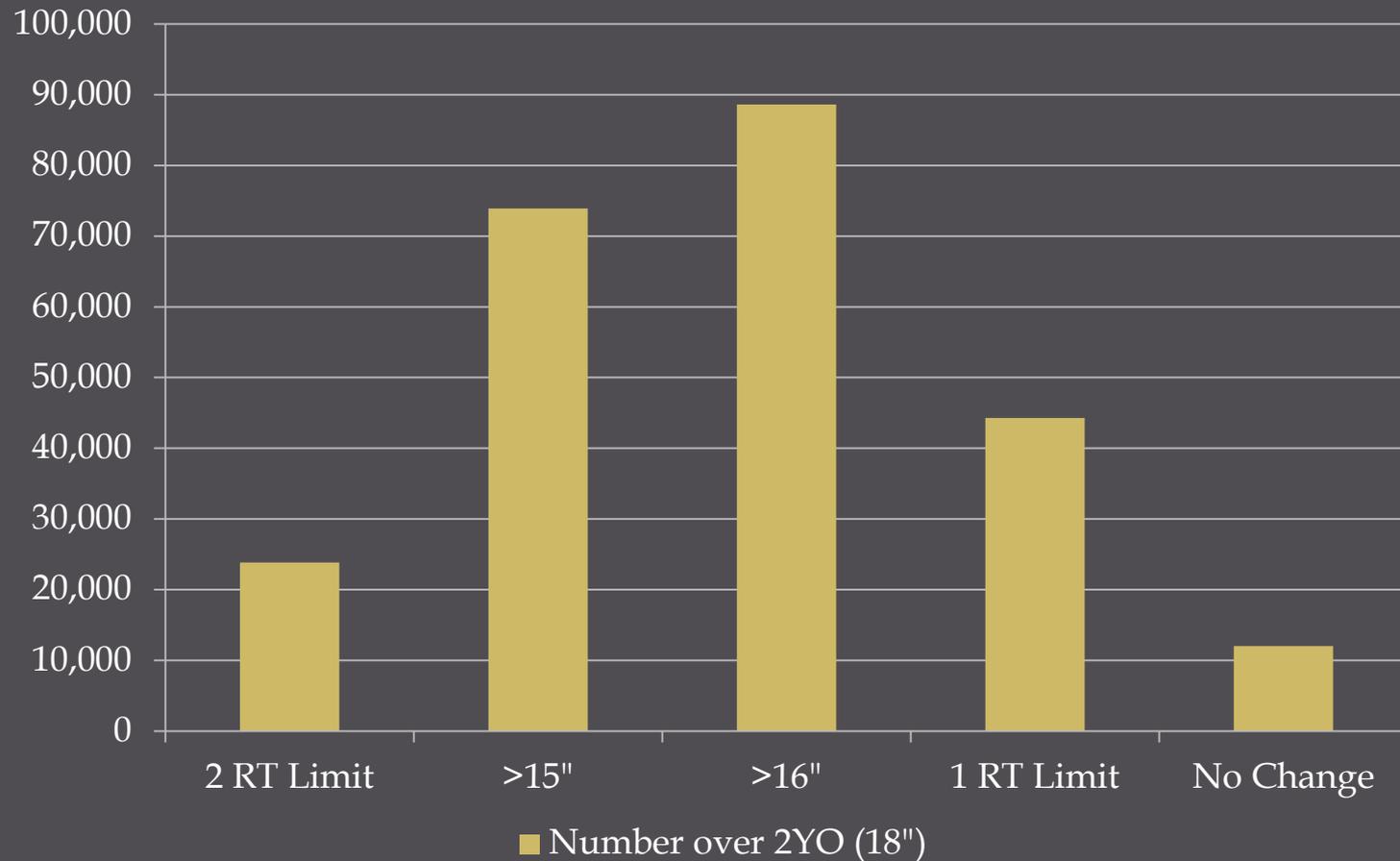
# 2016 Rainbow Modeling (1<sup>st</sup> Year Savings)



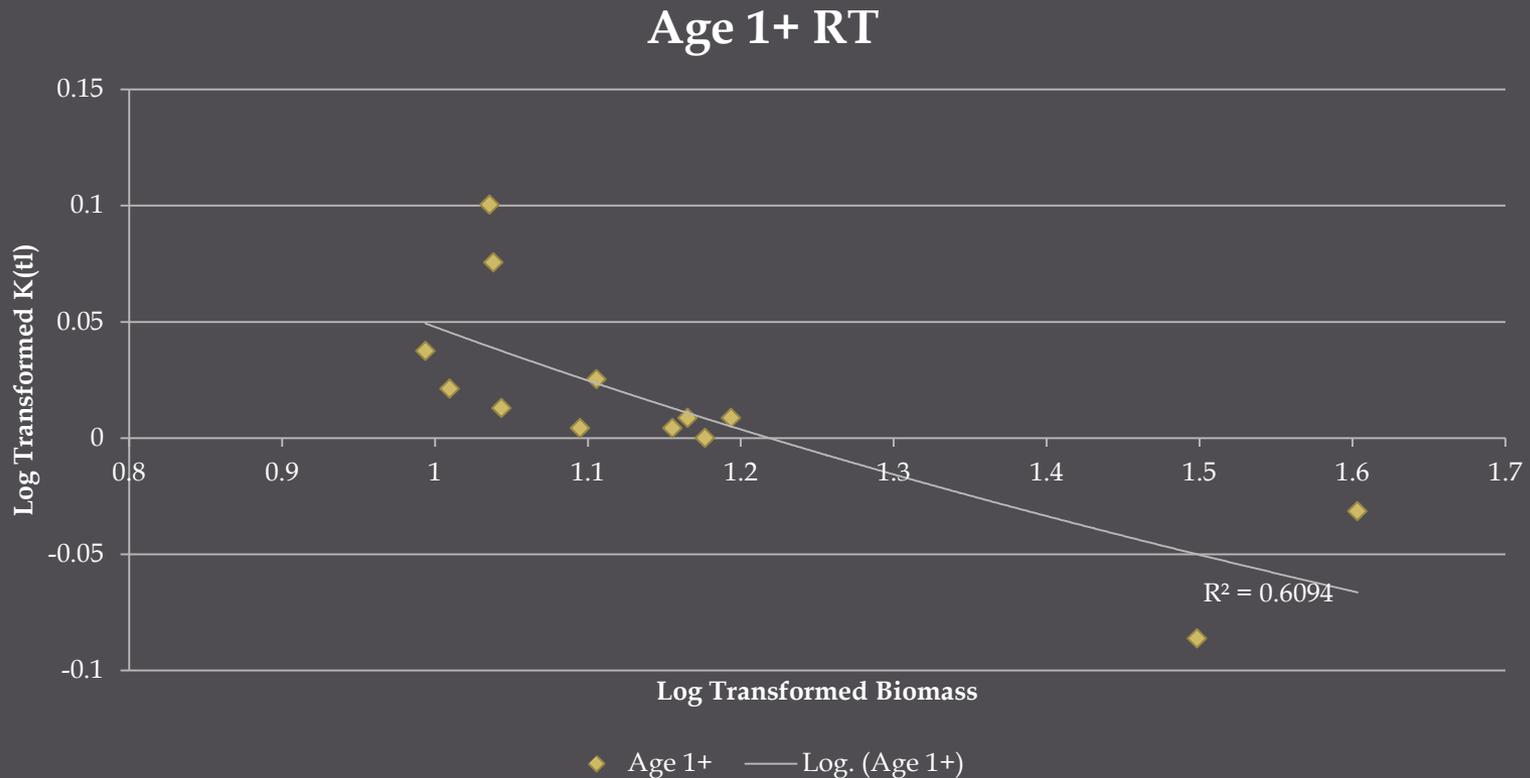
# Number Available for Harvest (Year 2)



# Number Over 2 Years Old (Year 2)

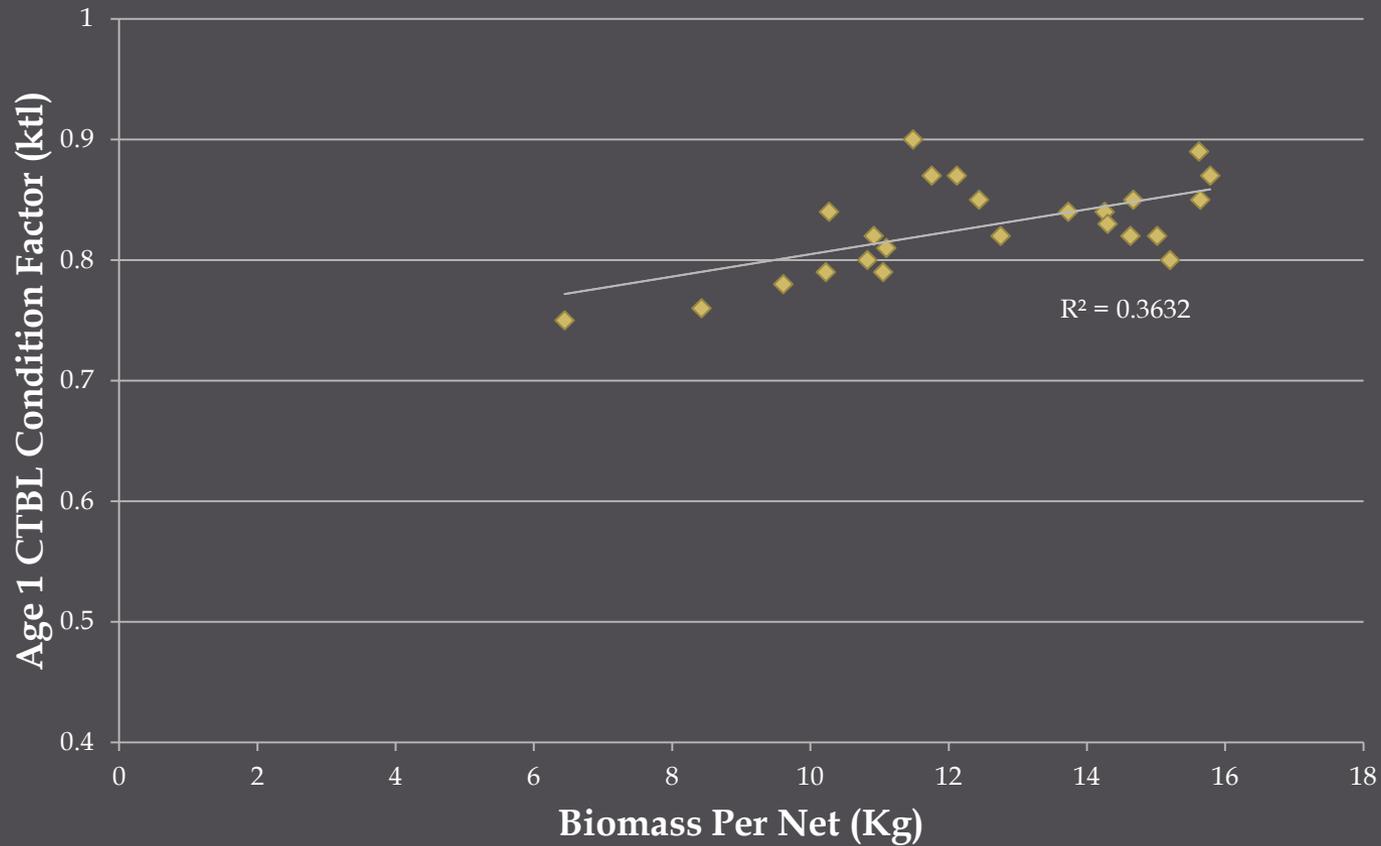


# Biomass/Condition Factor Relationship for Rainbows



Low chub numbers helps Rainbow condition factors

# Biomass/Condition Factor Relationship for Age 1 Cutthroat



## Objective 4 - Maintain average size of rainbows in the creel at 16"

- ▣ 4 respondents wanted to keep the objective (1 wanted more numbers than we currently have though)
- ▣ 3 wanted to make rainbows larger (through including in the slot, have a minimum size for harvest, or simply wanting “trophy”)
- ▣ 1 wanted the size objective smaller
- ▣ 1 did not indicate a size, but indicated that we need more of them

# 3. Ensure a variety of fishing experiences

- ▣ **Objective 1** - Maintain fishing pressure at 1.2 million angler-hours annually



### 3. Ensure a variety of fishing experiences (cont.)

- ▣ **Objective 2** - Maintain at least 200,000 ice angler-hours per year



### 3. Ensure a variety of fishing experiences (cont.)

- ▣ **Objective 3** - Explore potential for increasing fishing opportunities on Strawberry tributaries
- ▣ **Objective 4** - Enhance non-angling opportunities



## 4. Improve natural reproduction of cutthroat trout and Kokanee salmon populations

- ▣ **Objective 1** - Increase average annual recruitment of Age I cutthroat trout to 150,000 fish per year within 10 years



## 4. Improve natural reproduction of cutthroat trout and Kokanee salmon populations (cont.)

- ▣ **Objective 2** - Explore opportunities to expand Kokanee salmon population and natural recruitment

