

Implications of Lower Lake Levels – A Fish's Perspective

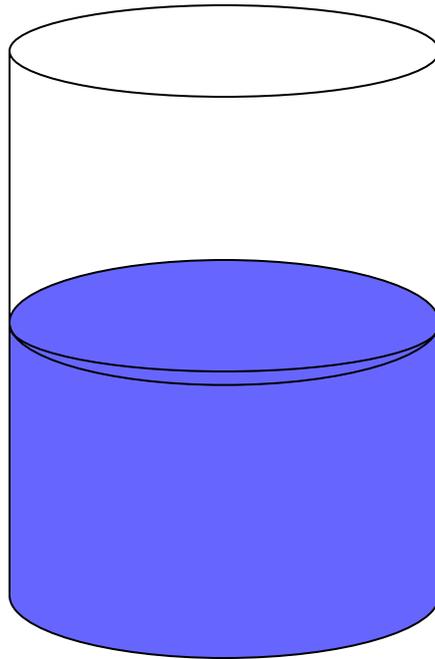
Tom Burke, USBR, Boulder City, NV



The “Good Ole Days” Boulder Basin in 2000 at 1205 ft msl

THE PHILOSOPHICAL

QUESTION
HALF FULL - Optimist



HALF EMPTY – Pessimist

HALF FULL (Optimist) - HALF EMPTY (Pessimist)?

Let's Ask the Fish!

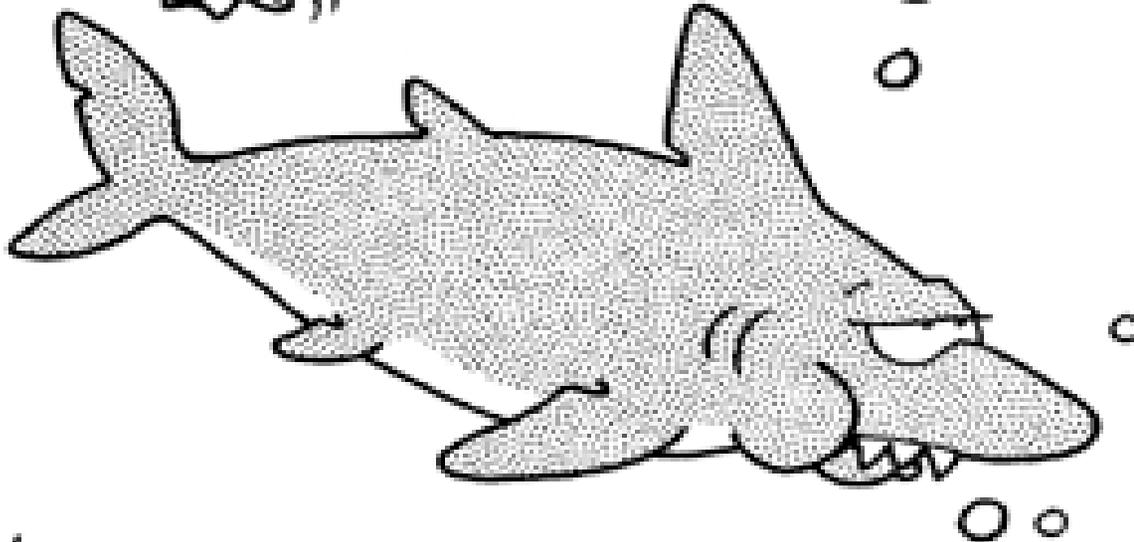


Boulder Basin, 2010

**AAAAAAH! I'M
HALF-EATEN!!**



PESSIMIST...



MARK
PARISI 4-18



In this talk I will

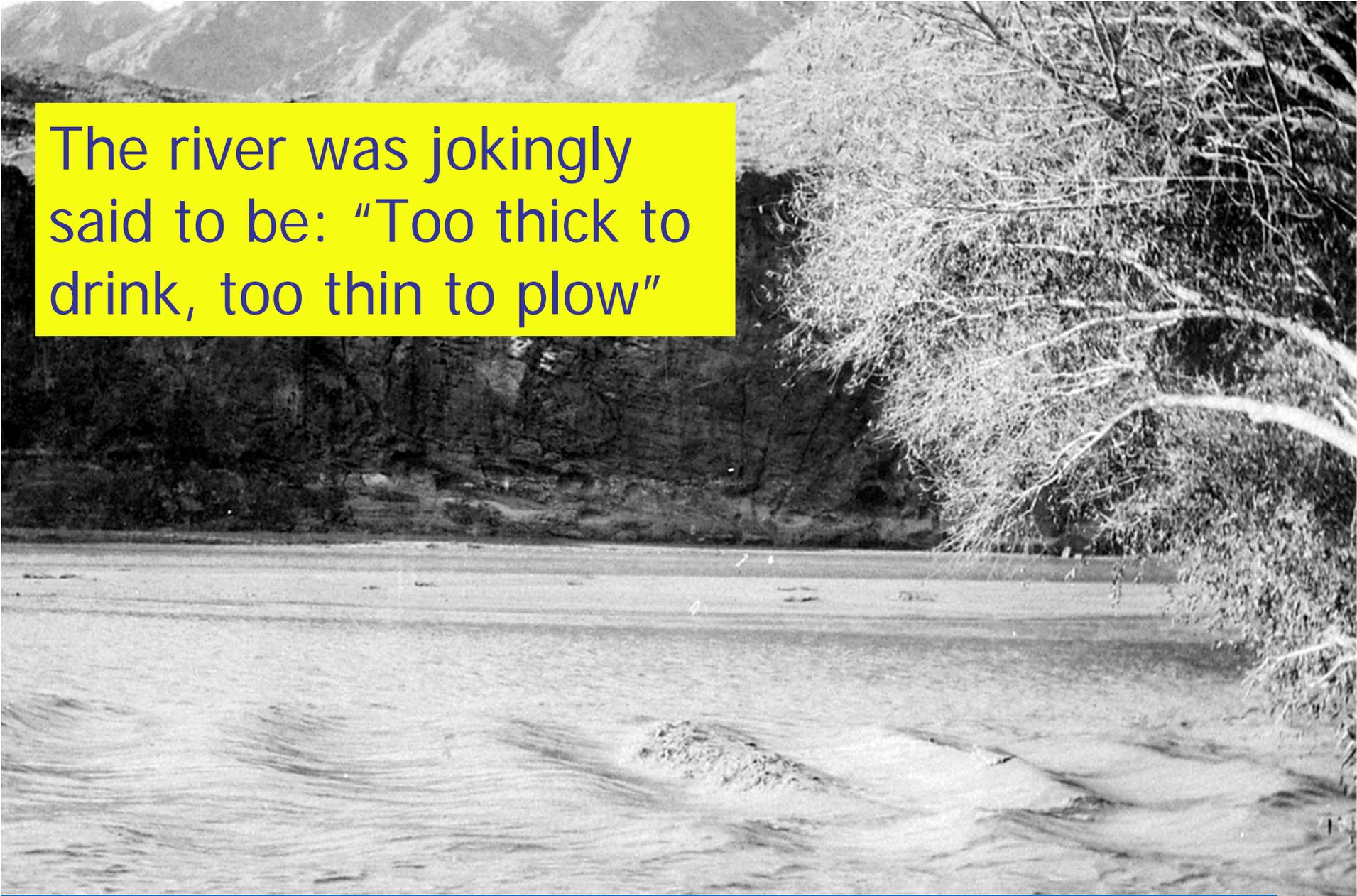
- Describe the current fishery**
- Predict effect of low lake levels**
- Provide supporting information**

**Upstream of Lake Mead is Grand Canyon:
a beautiful example of erosion**



Historically, the river carried more than 100 million metric tons of sediment out of the canyon each year.





The river was jokingly said to be: "Too thick to drink, too thin to plow"

"Sand Waves" caused by moving bed-load photographed in 1924 by USBR sediment survey crew.

RIVER OF EXTREMES

HIGHLY VARIED FLOW	3000 to 150,000 cfs
TREMENDOUS SEDIMENT LOAD	>100,000,000 metric tons
WIDE ANNUAL CHANGE TEMPERATURE	39 – 85 F
POOR VISIBILITY OR WATER CLARITY	0 ft
WIDE RANGE OF SALINITY	500 – 15,000 μ S

...and the native fish were as extreme as the river



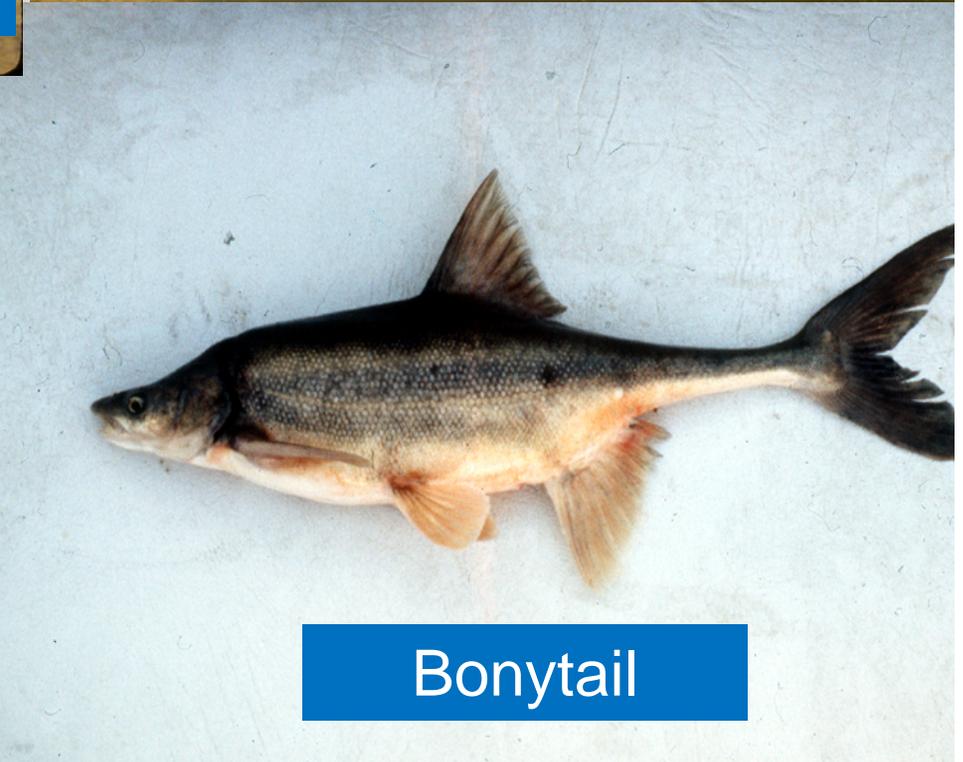
Colorado Squawfish



Humpback Chub



Razorback Sucker



Bonytail

Boulder Canyon Project approved in 1920's to harness the Colorado River. Selected Black Canyon as dam site.



**Initial flooding of Boulder Basin, shown here,
began in 1933. The lake first filled in 1942.**



As lake filled, extremes were reduced

HIGHLY VARIED FLOW	3000 to 150,000 cfs <i>Only at inflow</i>
TREMENDOUS SEDIMENT LOAD	>100,000,000 metric tons <i>Gone</i>
WIDE CHANGE TEMPERATURE	39 – 85 F <i>Most of lake is 55 F</i>
POOR VISIBILITY OR WATER CLARITY	0 ft <i>Only at inflows, most of lake is clear</i>
WIDE RANGE OF SALINITY	500 – 15,000 μ S <i>1200 μS</i>

The expression,

“Go west, young man...”

Must have been followed with,

“...and take your local fish
with you.”

Because they did !

Introductions began prior to formation of lake and continue still...

Species	First Occurrence
Catfish, Carp	Pre-1900
Largemouth bass, Sunfish	1935
Threadfin Shad	1954
Striped Bass, Trout	1969
Tilapia	1994
Smallmouth Bass	1995
Gizzard Shad	2005
Quagga mussels	2007

The Fishery Today

- Important Sport Fishery – Highly desirable and sought after species such as largemouth bass, striped bass and channel catfish
- Important Native, non-game Fishery – The largest population of wild razorback sucker in the entire Colorado River Basin; a candidate recovery population for delisting this species

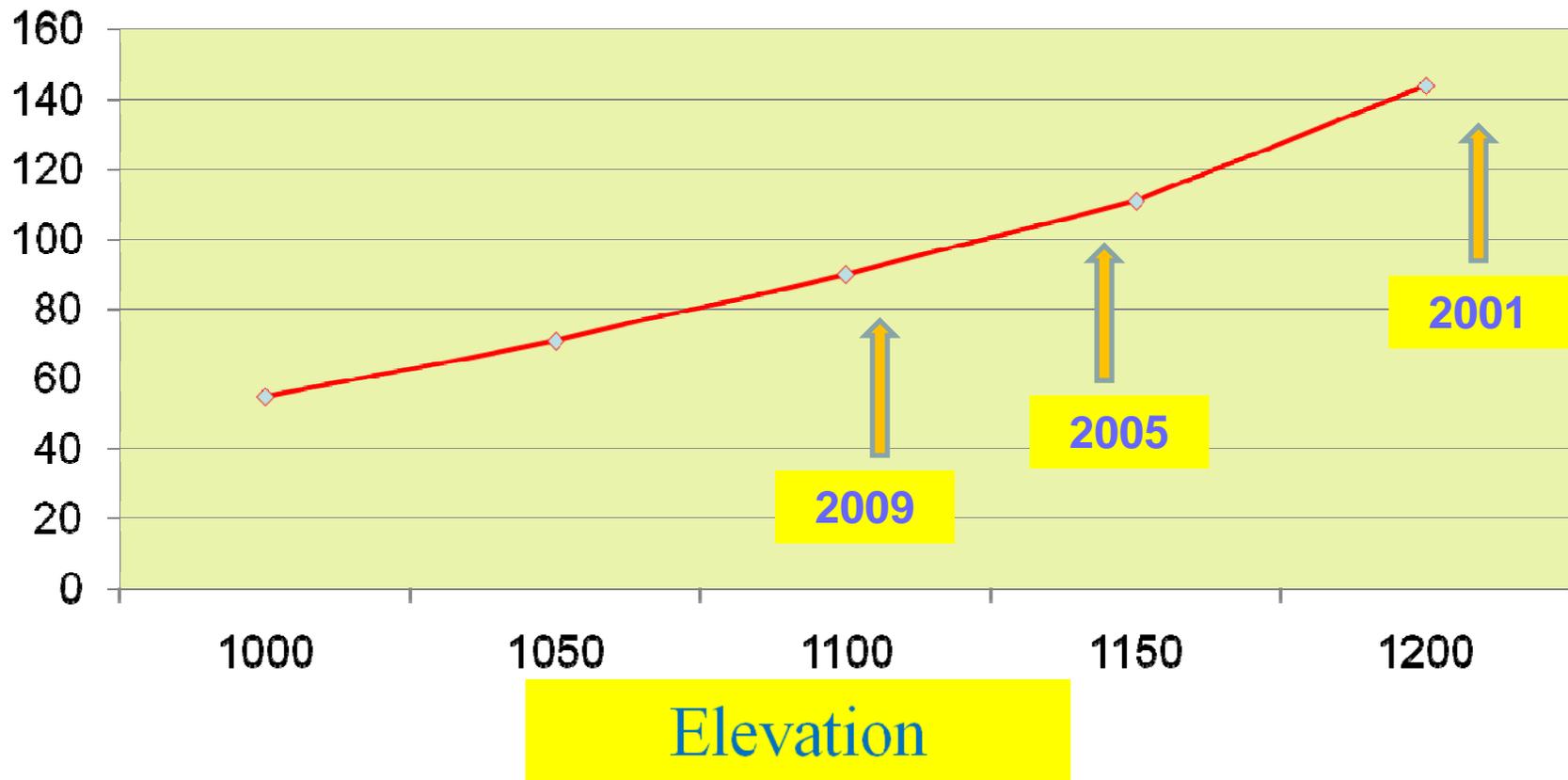
Will the decline in Lake Mead levels
impact this fishery?

In my opinion, *YES* !

And, intuitively, it already has.

Surface Area has declined from 140,000 acres in 2001 to less than 90,000 in 2009

Acres (1000's)



Area/Capacity Data from Lara and Sanders, 1963 Survey

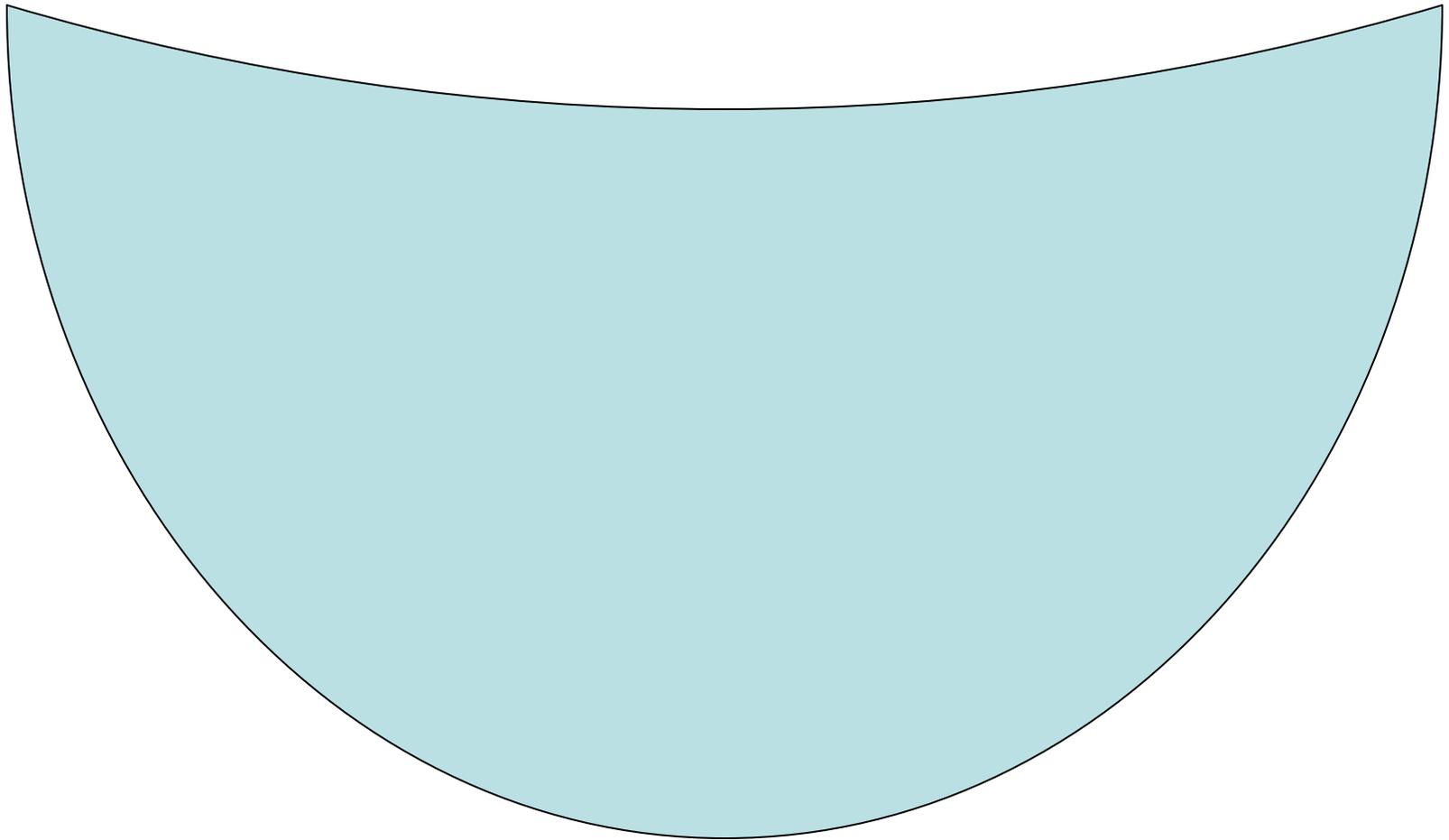
Initial changes hard to detect

- (a) Lots of habitat (40 rm house)**
- (b) Fishery is dynamic (fish and habitat move)**
- (c) Other influences present (pests, nutrients, weather, diseases)**

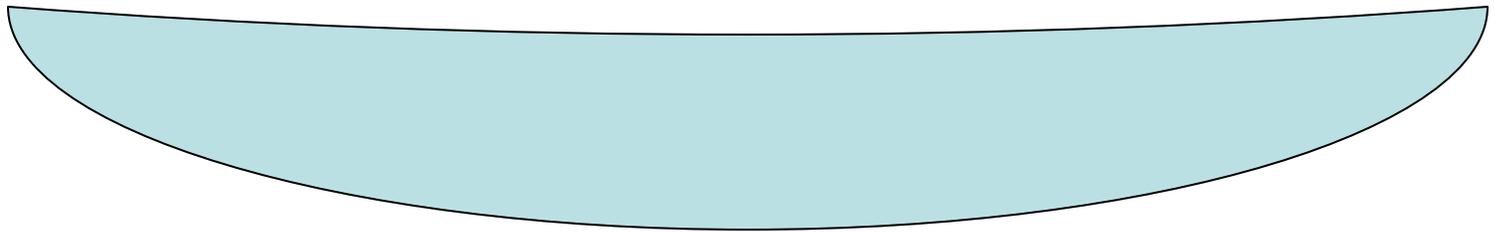
Even if we could detect small changes to the fishery, there are so many possibly causes for change that it is doubtful we could ever assign these changes to lowering lake levels.



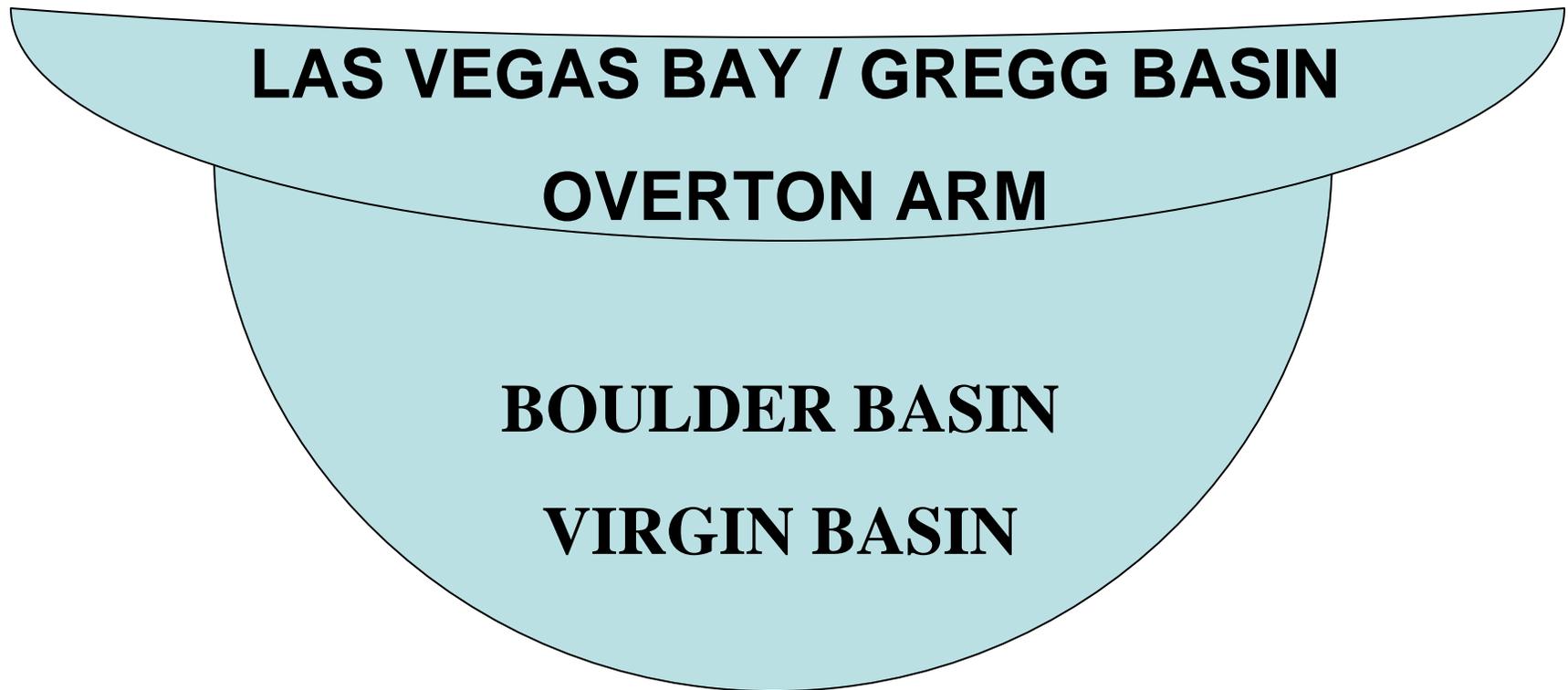
**Steep Canyon Bound Lakes
Have Abundant Pelagic Zones, but Limited
Littoral Zones**



Shallow Lakes Have Abundant Littoral Zones but Limited Pelagic Zones



**LAKE MEAD HAS MULTIPLE BASINS
AND A HEALTHY MIX OF BOTH**



LAKE ZONES

Littoral Zone

(Inshore, Shallow,
Warm water fishes)

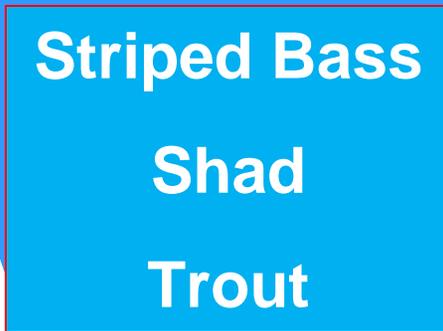
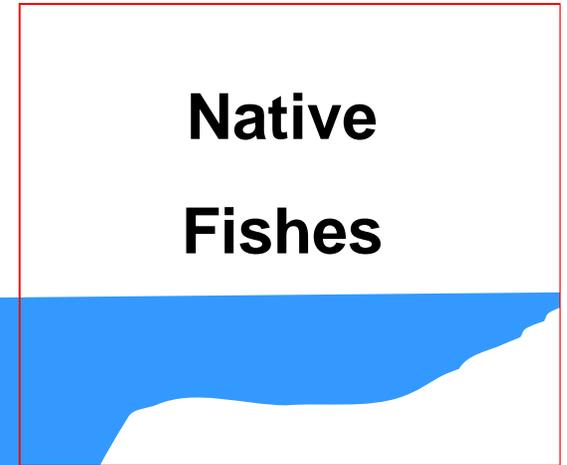
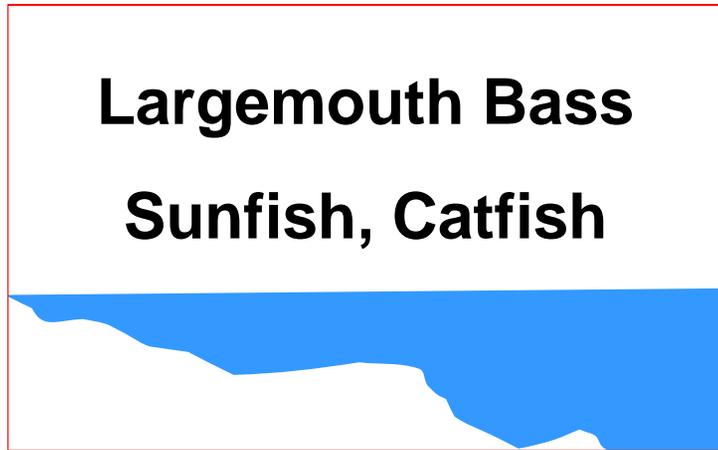
Largemouth Bass
Sunfish, Catfish

Native
Fishes

Pelagic Zone

(Off-shore, Deep
Cool water fishes)

Striped Bass
Shad
Trout



Below water contour often mimics the above water contour. As you see in this picture, large areas of shallow coves and sheer drop offs will be present in Virgin Basin and Overton Arm as lake recedes



Introductions have been both intentional and non-intentional. The fish populations have been constantly adjusting, never stable.

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There are subtractions as well as additions such as the 2008/2009 Coi Herpes virus which killed 10,000's of common carp



Quagga mussels are having both direct and indirect impacts to fish and wildlife



Will the decline in Lake Mead levels impact the fishery?

In my opinion, YES !

- **Eventually, if declines continue, I believe that native fishes may benefit, but non-native, introduced fishes will be adversely impacted**

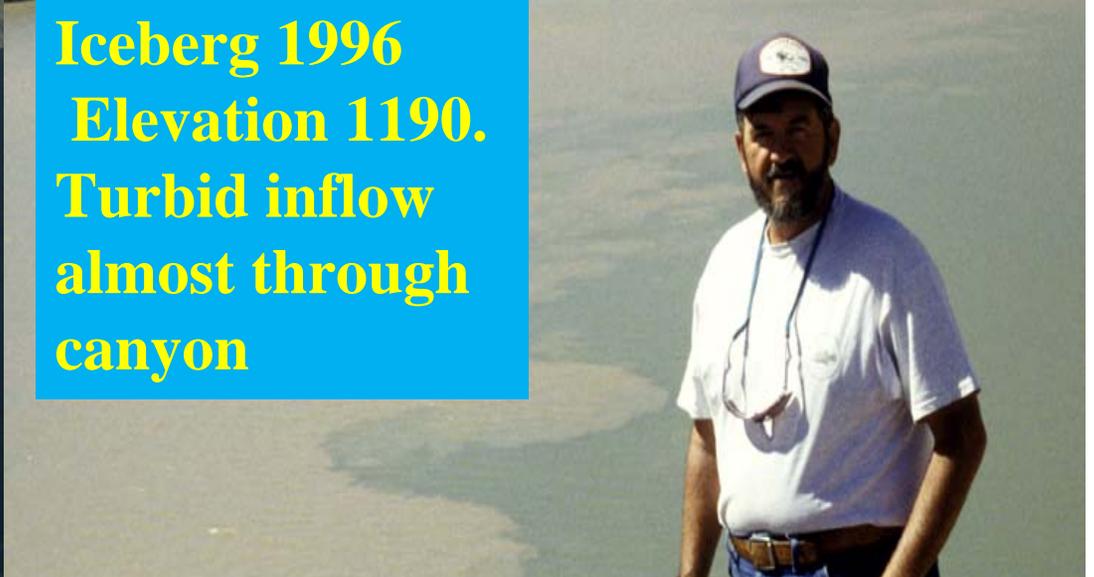
Continued lowering of the lake makes the habitat more similar to historical habitat which should benefit native fishes



Iceberg Canyon 2008
Elevation 1115.
Turbid inflow now present through canyon and into Gregg Reservoir



Iceberg 1996
Elevation 1190.
Turbid inflow almost through canyon



As Lake Mead levels continue to decline, shallow bays become isolated and then dry





**Driftwood Cove was
isolated from main
flow of Colorado
River at elevation
1135**

**Driftwood Cove
when visited in
September 2007**

**Cove was dry in
January 2010**



Echo Bay (March 2010)

2007

2010

2009

At both Echo Bay and Las Vegas Bay, razorback sucker have annually adjusted to lowering lake levels and successfully spawned

Las Vegas Bay – Razorback Sucker Spawning Areas



Will the decline in Lake Mead levels impact the fishery?

In my opinion, YES!

But whether or not these impacts will be long-lasting cannot be predicted any better than we can predict future snowpacks!

We will just have to wait, observe,
And learn!

EDUCATION IS THE TRANSITION

FROM COCKSURE IGNORANCE

TO THOUGHTFUL UNCERTAINTY

A NATURAL SMILE

