

# RECLAMATION

*Managing Water in the West*

## Fall 2016 HFE Planning

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Reclamation

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GCMRC

TWG presentation  
October 18, 2016



U.S. Department of the Interior  
Bureau of Reclamation



# HFE Decision Making Process

## 1. Planning and Budgeting Component

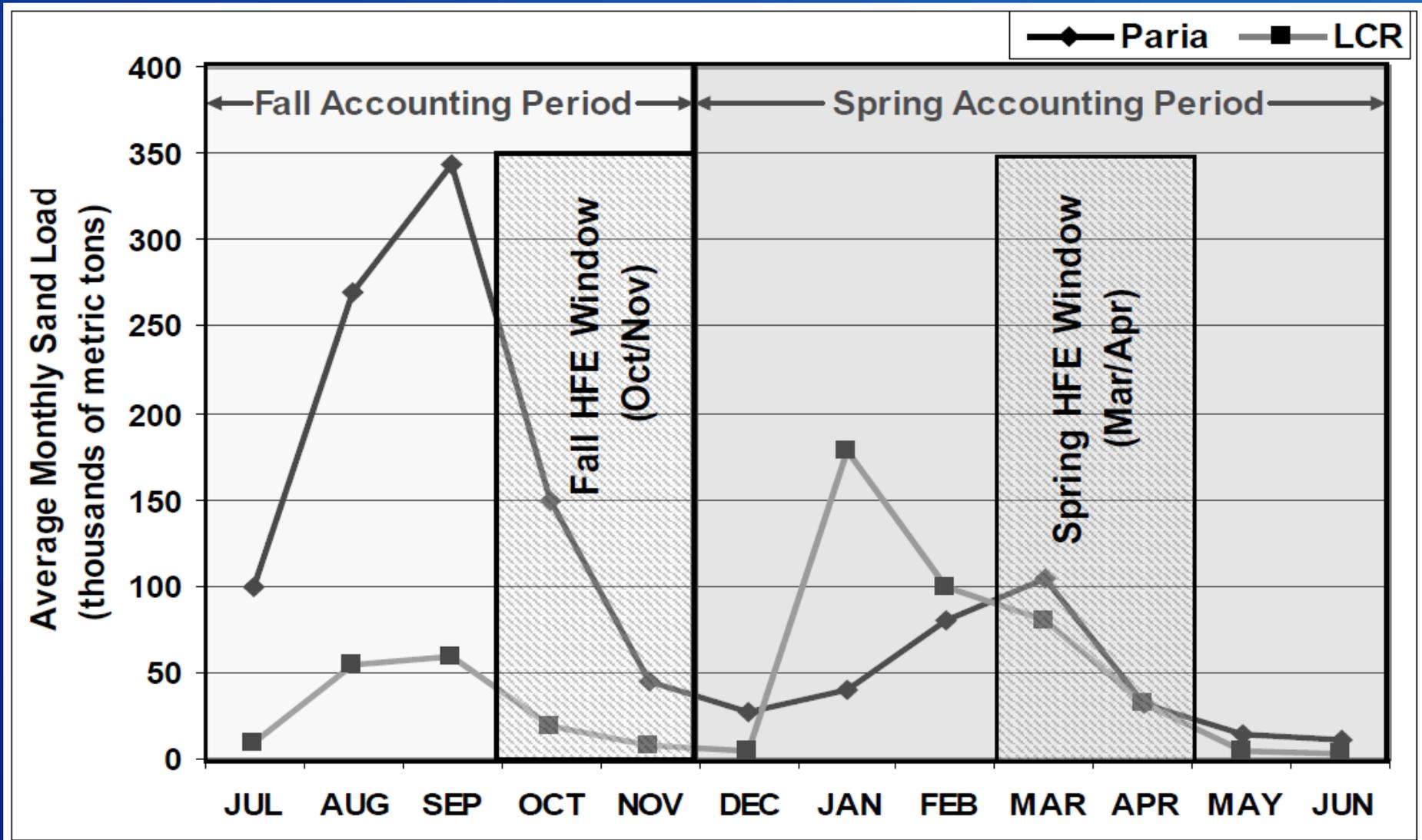
- Annual resource status assessment
  - Annual Agency Reporting
  - GCDAMP Budget and Work Plan Process

## 2. Modeling Component

## 3. Decision and Implementation Component

- Review Modeling Component
- Review Status of Resources
- Consultation with agencies and tribes, AMWG input
- Staff Recommendation/DOI GCD Leadership Team Recommendation

# Modeling Component



# HFE Protocol Parameters

## Possible Timing

- March-April and October-November through 2020
- Spring HFEs were considered starting in 2015

## Duration range

- 1 hr – 96 hrs (at full magnitude)
- 1 ½ days – 6 ½ days (including ramping)

## Magnitude range

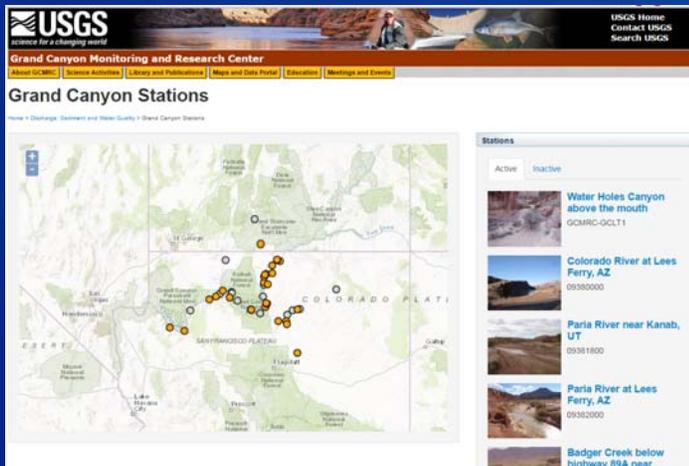
- 31,500 cfs – 45,000 cfs (depends on maintenance)

## Ramping rates

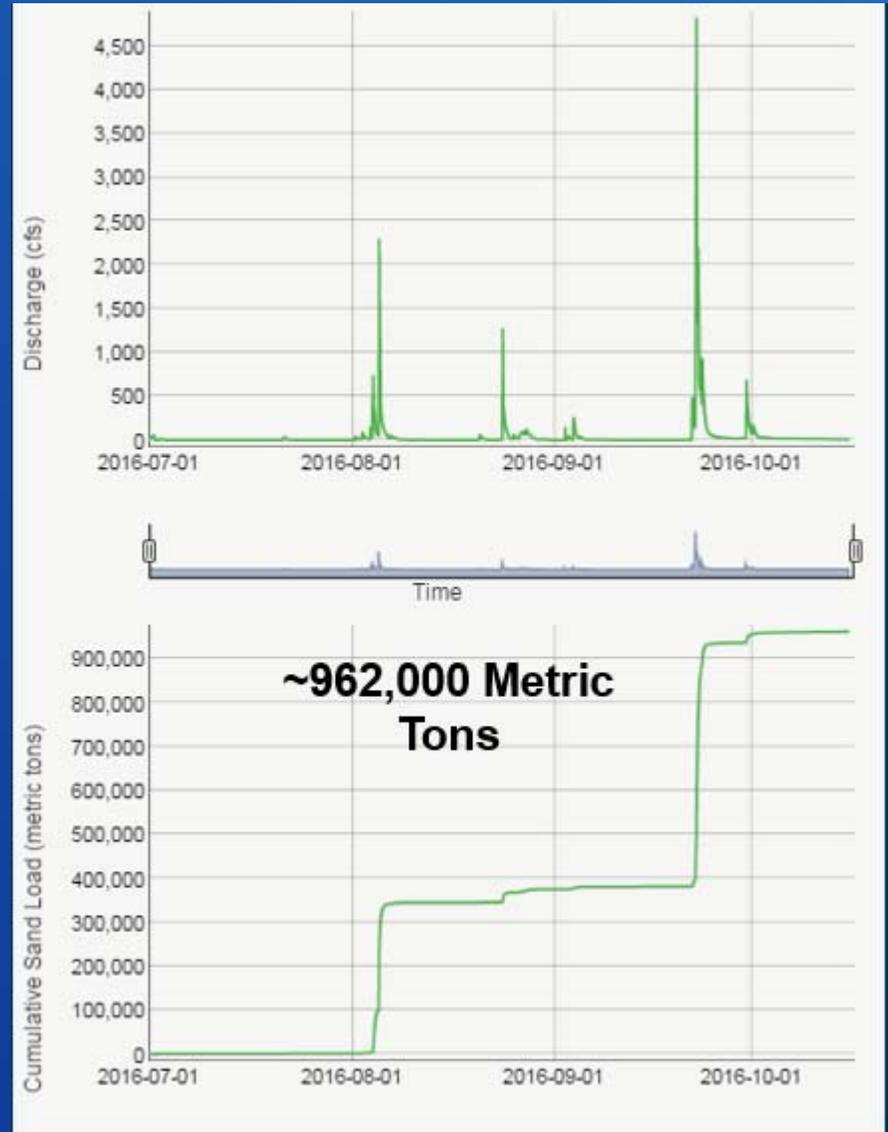
- Ramping rates are defined by 1996 ROD and 1997 Glen Canyon Dam Operating Criteria (62 FR 9447, 4,000 cfs up and 1,500 cfs down)

# Current conditions

from the GCMRC  
web page as of  
Oct 16, 2016



[http://cida.usgs.gov/gcmrc/  
discharge\\_qw\\_sediment/stations/GCDAMP](http://cida.usgs.gov/gcmrc/discharge_qw_sediment/stations/GCDAMP)

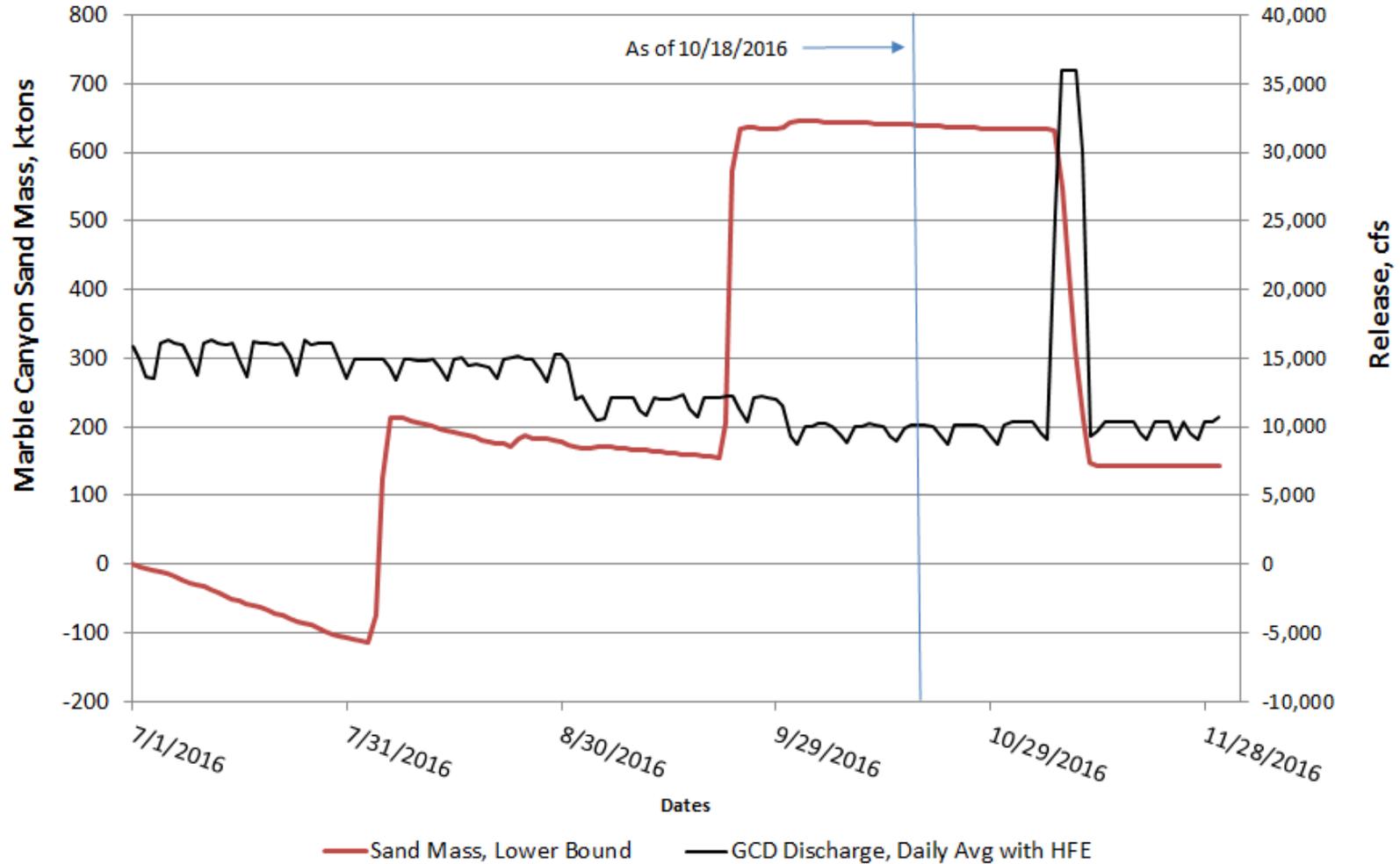


Preliminary Data – Do not cite or distribute

Actual flow as of 10/17/2016 23:00  
Actual Sediment data as of 10/17/2016 23:00  
Graph updated 10/18/2016 10:45

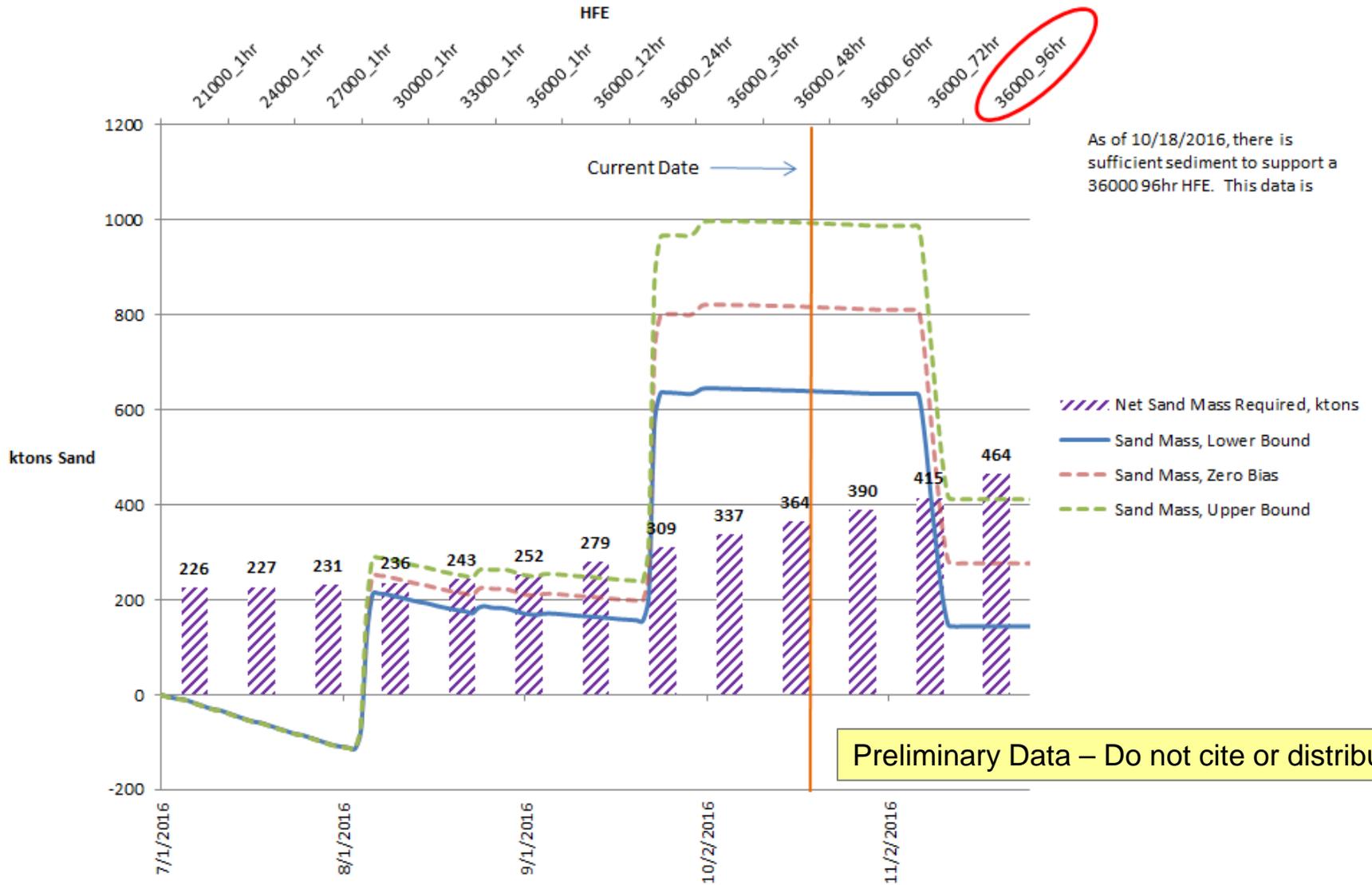
### Sand Budget Model Results, Jul 2016- Nov 2016 Release and Calculated Sediment Load in Colorado River

There is sufficient sediment to support a 96hr 36000cfs HFE this accounting period. This data is provisional and subject to change.



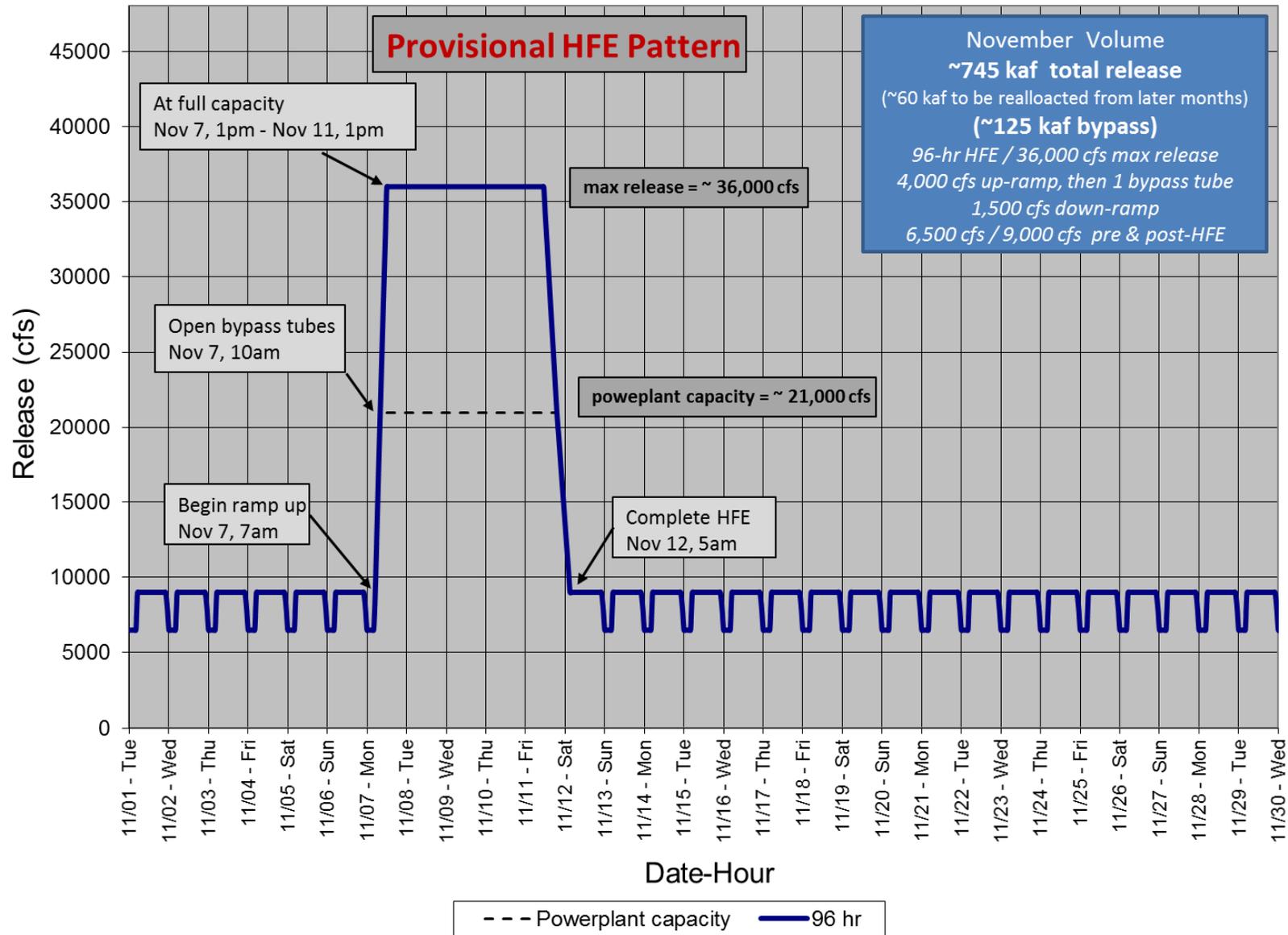
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## Sand Mass at Marble Canyon vs. 36,000 cfs HFE Load requirements



Updated 10/18/2016

# Glen Canyon Dam Possible HFE Release Pattern



# Resource Status Assessment

## Sediment Resources

In-channel sediment storage

Sandbar campable area

High-elevation sand deposits

## Cultural Resources

Archaeological site condition and stability

Access to archaeological sites by tribes

## Hydropower and water delivery

Water quality

Water delivery

Dam maintenance

Hydropower production and marketable capacity

## Biological Resources

Aquatic food base

Lees Ferry trout population

Lees Ferry fishery recreation experience quality

Endangered humpback chub and other fish abundance

Riparian vegetation

# Hydropower/Socioeconomic Impacts

- HFEs impact hydropower production:
  - Water released during an HFE counts against the annual release and is not available to be programmed in peaking releases during high demand months (HFE windows of Mar/Apr and Oct/Nov are low-demand shoulder months).
  - 30-40% of HFE releases bypass the power plant.
  - Lake Powell is lowered, reducing hydrologic head.
  - 2014 HFE cost: \$2.1 M



Western Area Power Administration estimates the annual hydropower impacts of approximately \$1.4 M

# Cultural Resources

- HFE-caused erosion and deposit is a consideration, some sites already mitigated.
- GCMRC monitoring shows that recent HFEs have eroded terraces that contain archaeological sites in Glen Canyon NRA and can resupply aeolian dunefields which contain archaeological sites (though it may not outpace erosion of the dunefields) No impacts to sites were identified from the 2012 HFE, no reports of issues with access to sites



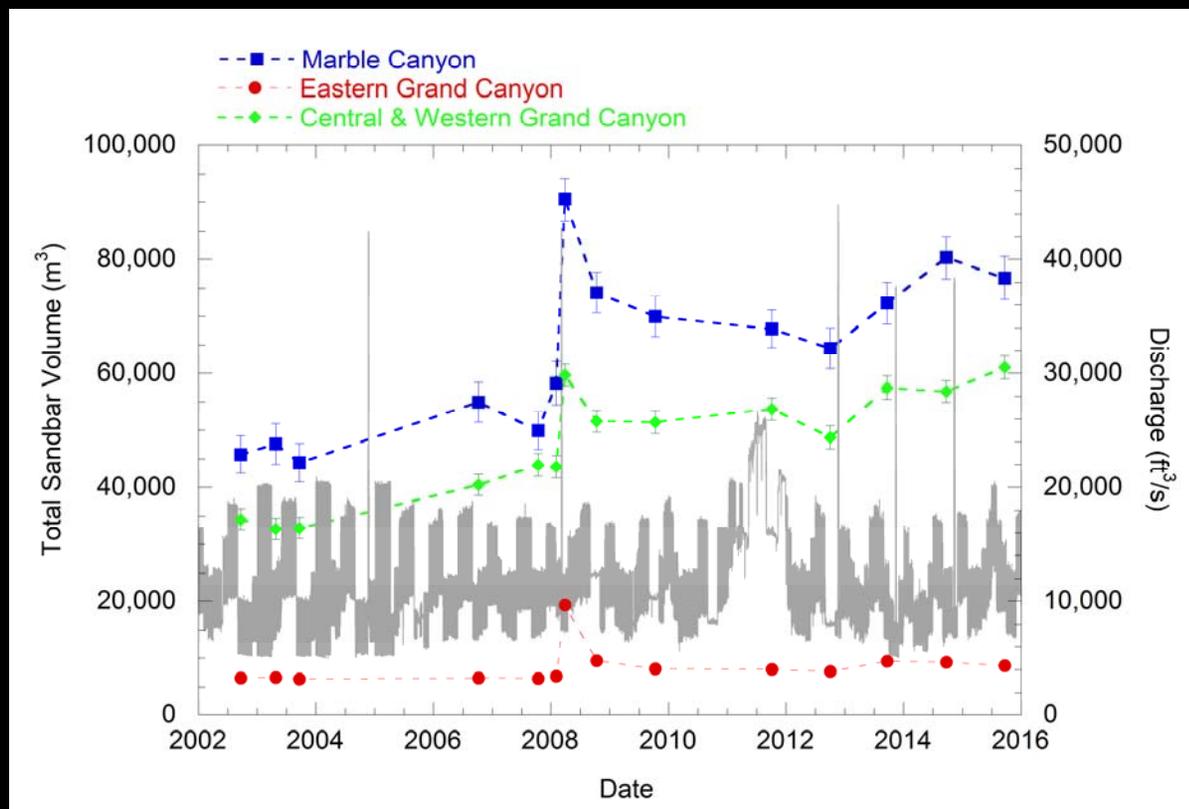
- The MOA for the HFE Protocol requires notification to all the consulting parties at least 30 days in advance of a HFE and will consult with tribes to resolve any issues
- A 30-day notification letter notifying MOA signatories of a possible HFE in November will be sent soon
- The HFE MOA requires reporting and consultation after HFEs

# Sandbars and Campsites: 2012-2015

- HFEs in 2012, 2013, and 2014 built sandbars
  - Bars eroded between HFEs
  - Greater erosion in years of higher release volumes
  - Bars larger now than at start of HFE protocol and periods with no HFEs, but no evidence for “progressive” increases in sandbar size
- High-elevation Campsite area (above 25,000 cfs stage)
  - No net change in non-critical reaches
  - Increase from 2012 to 2014 in critical reaches
- First three years of HFE protocol were a period of low annual release volumes and good tributary sand supply
  - Bar deposition without depleting sand from storage
  - Sand accumulated in Marble Canyon, replenishing sand evacuated during 2011 equalization



# Sandbars: 2008-present



Marble Canyon:  
slightly larger than  
Oct. 2008

Grand Canyon  
(below RM 87): large  
relative to Oct. 2008

Grand Canyon  
(RM 60-87): same  
relative to Oct. 2008

- 50 individual sandbars with data 2008-present
  - 25 in Marble Canyon
  - 7 in Grand Canyon (RM 60-87)
  - 18 in Grand Canyon (below RM 87)
- With October 2008 as reference (8-month post-HFE)
  - Increase in Marble Canyon and Grand Canyon (below RM 87)
  - No change in Grand Canyon (RM60-87)

# 2011 USFWS Biological Opinion Non-native Fish Control Trigger

- Adult humpback chub <7000 fish? **No**

- OR



- ALL THREE? **No**

- 3 of 5 years 150-199 mm humpback chub in the LCR drops below 910?

\*Fell below threshold in 2016

**No\***

- Temperature <12° C for 2 consecutive years at LCR?

**No**

- Annual survival of 40-99 mm humpback chub in JCM drops 25% from preceding year?

**No**

# 2011 USFWS Biological Opinion Non-native Fish Control Trigger

- AND

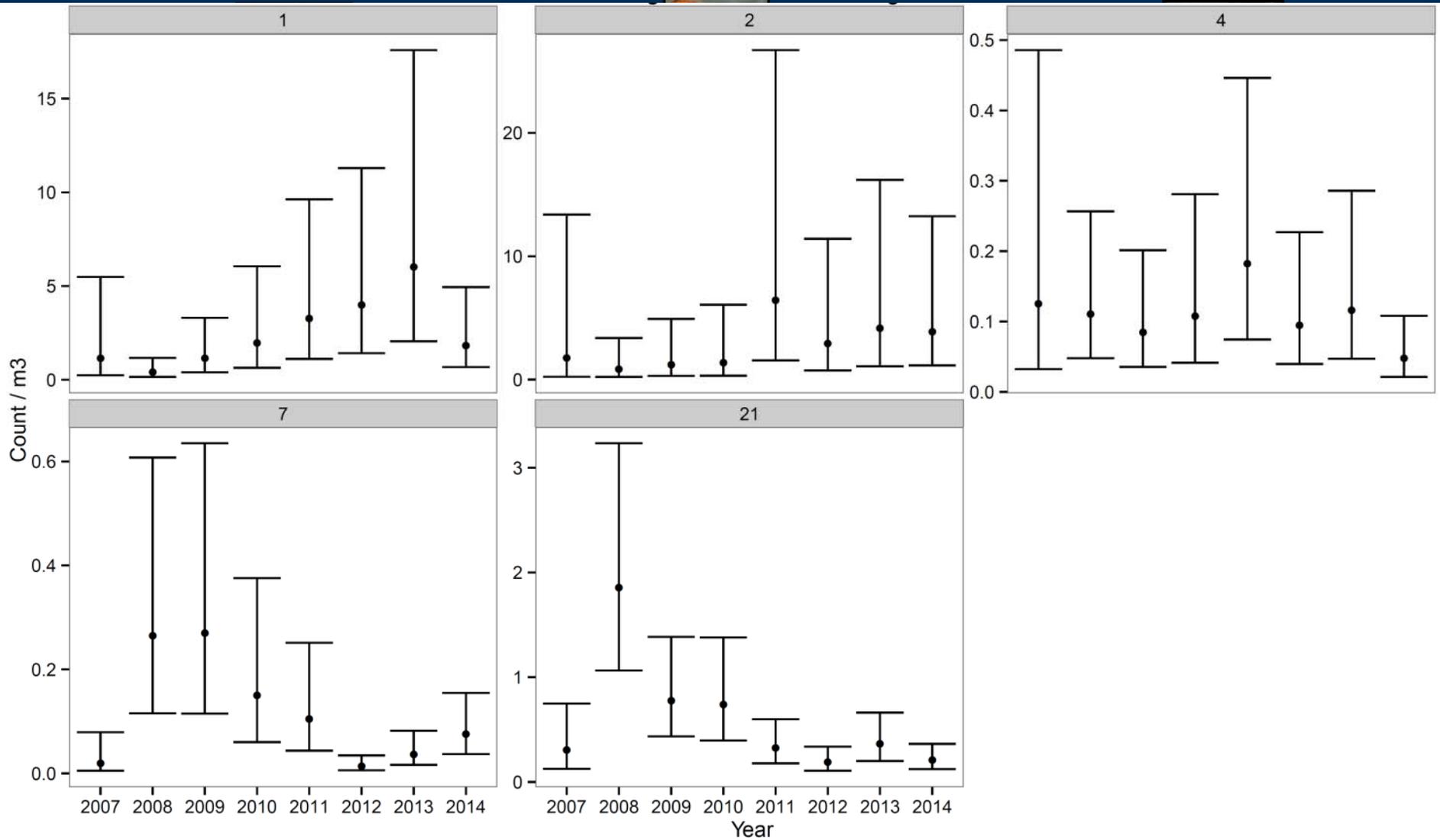
- Rainbow trout abundance over 760? **No**

- AND

- Brown trout abundance over 50? **Unknown**

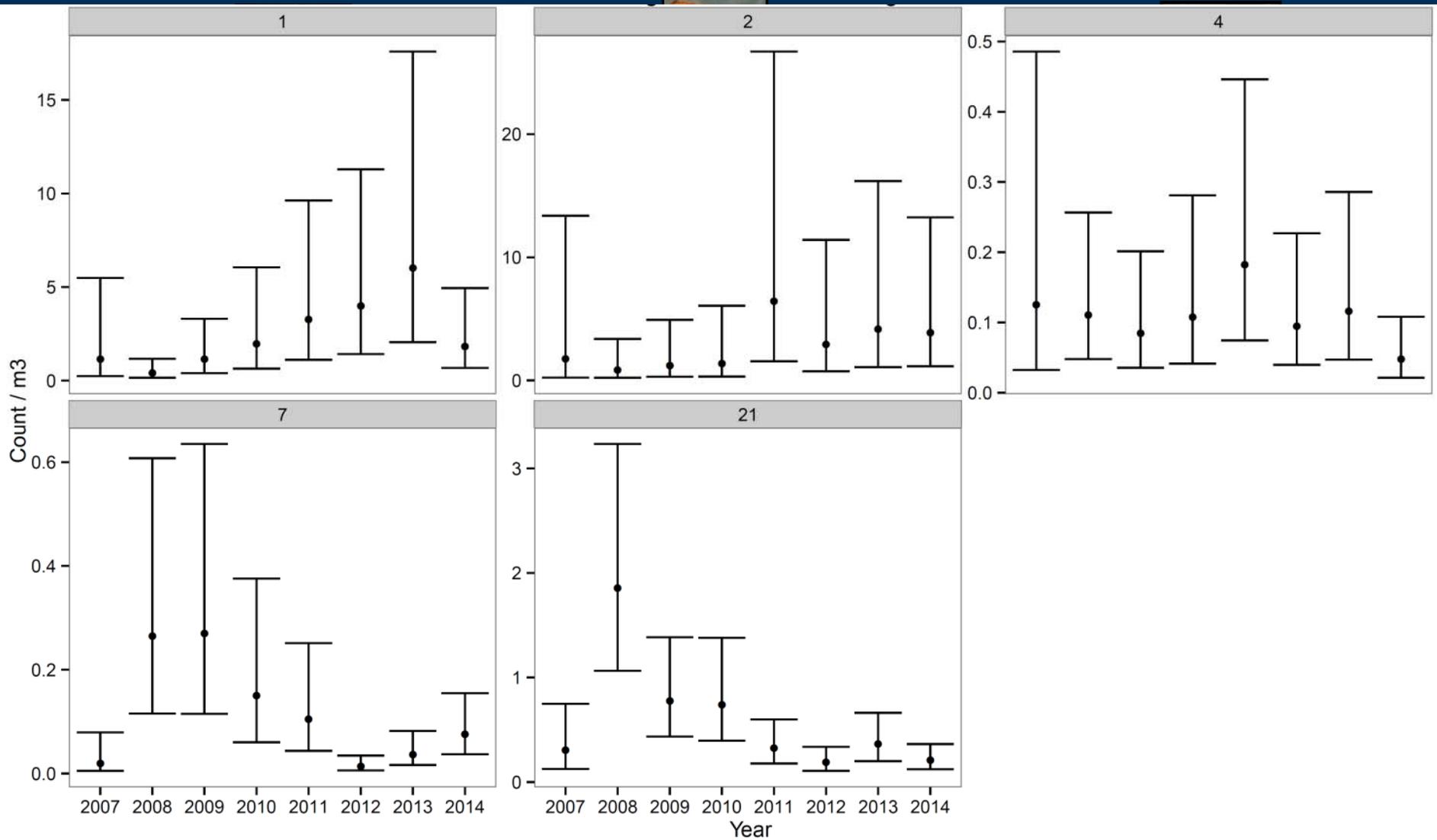
2016 catches remain low; 3 caught in Jan, 0 in April and July – catches too low to generate abundance estimate (Yard and Korman, preliminary data)

# Aquatic Insect Drift: Long Term Trends



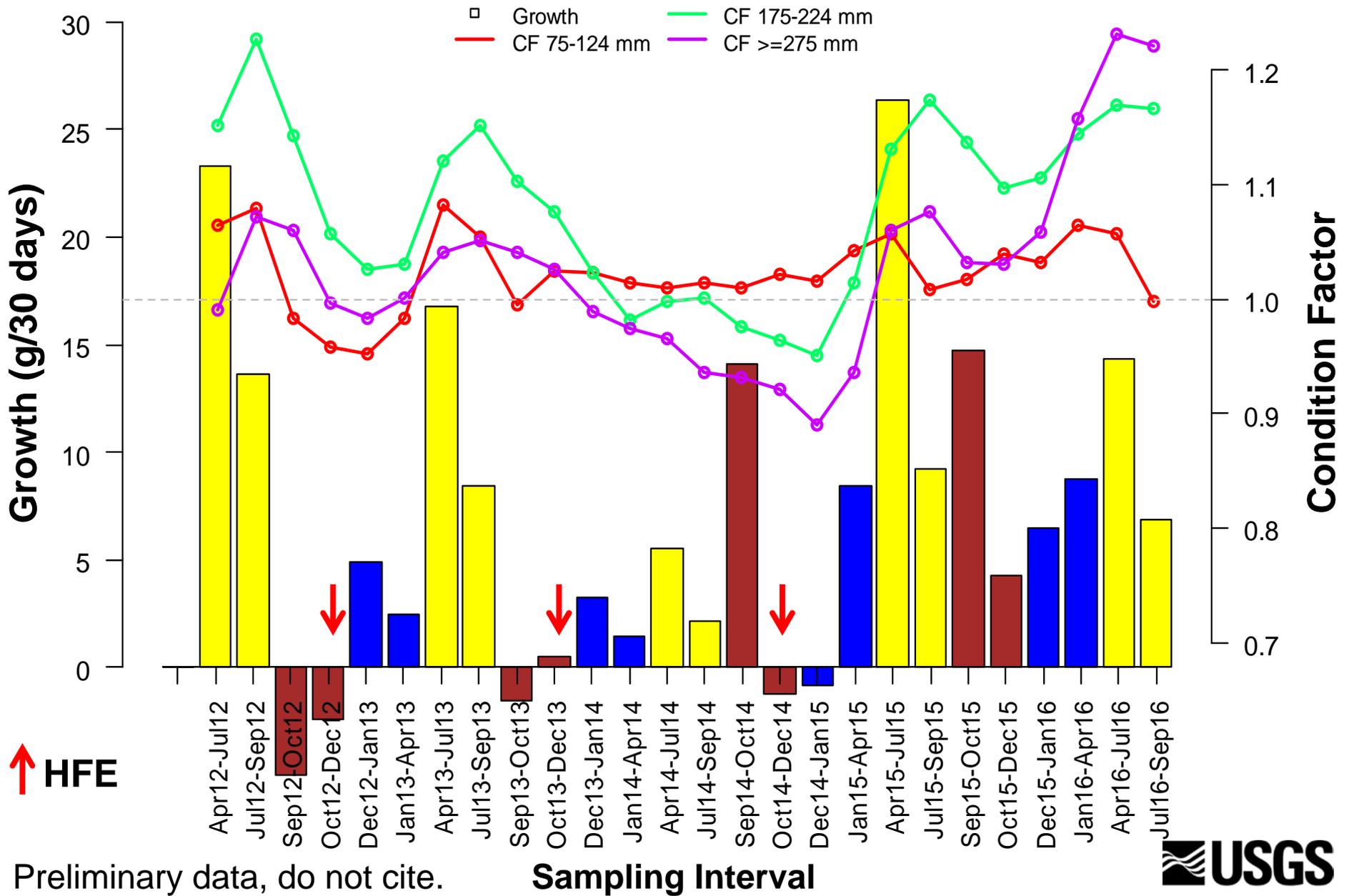
Controlled flood

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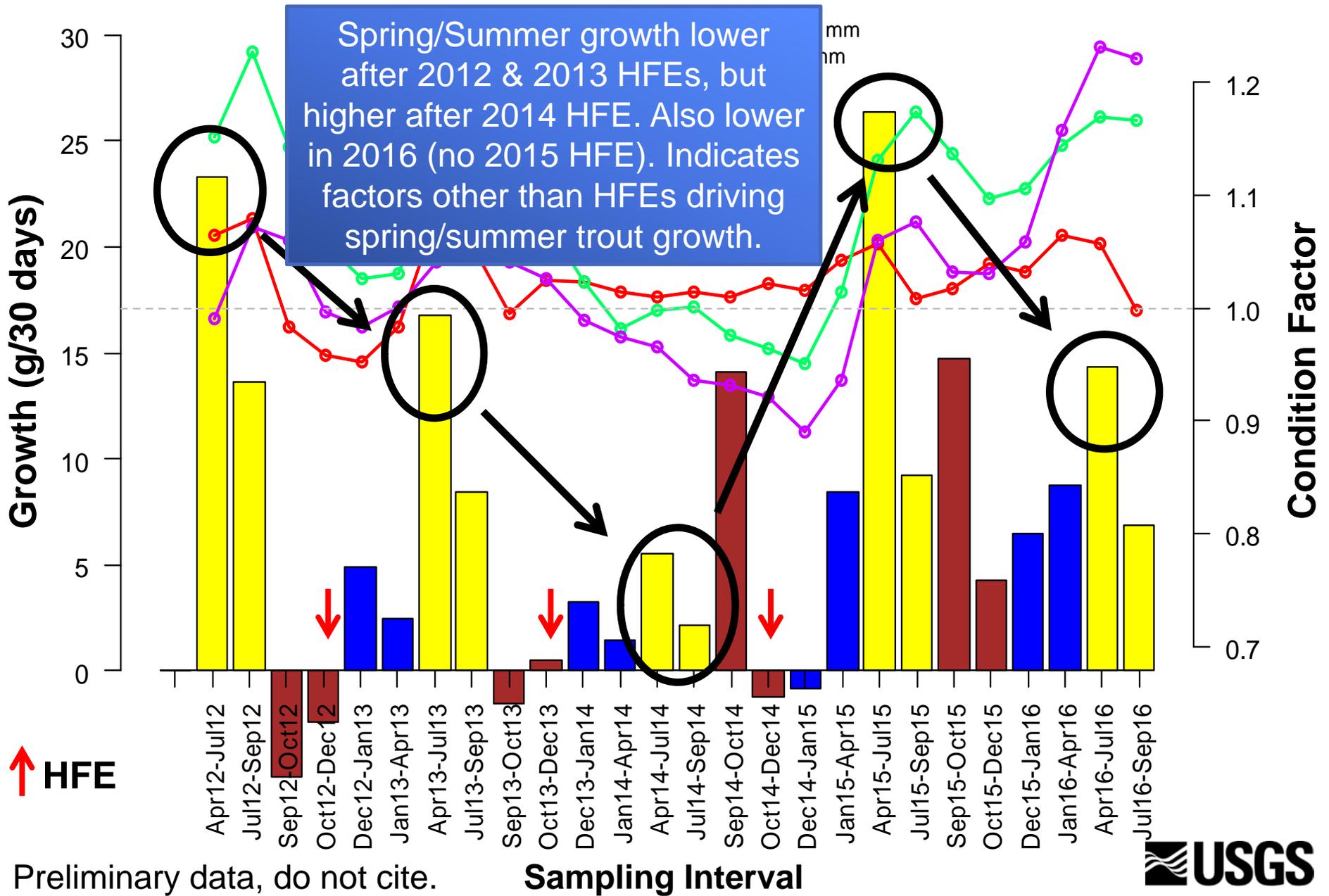
Controlled flood

# Rainbow Trout in Glen Canyon

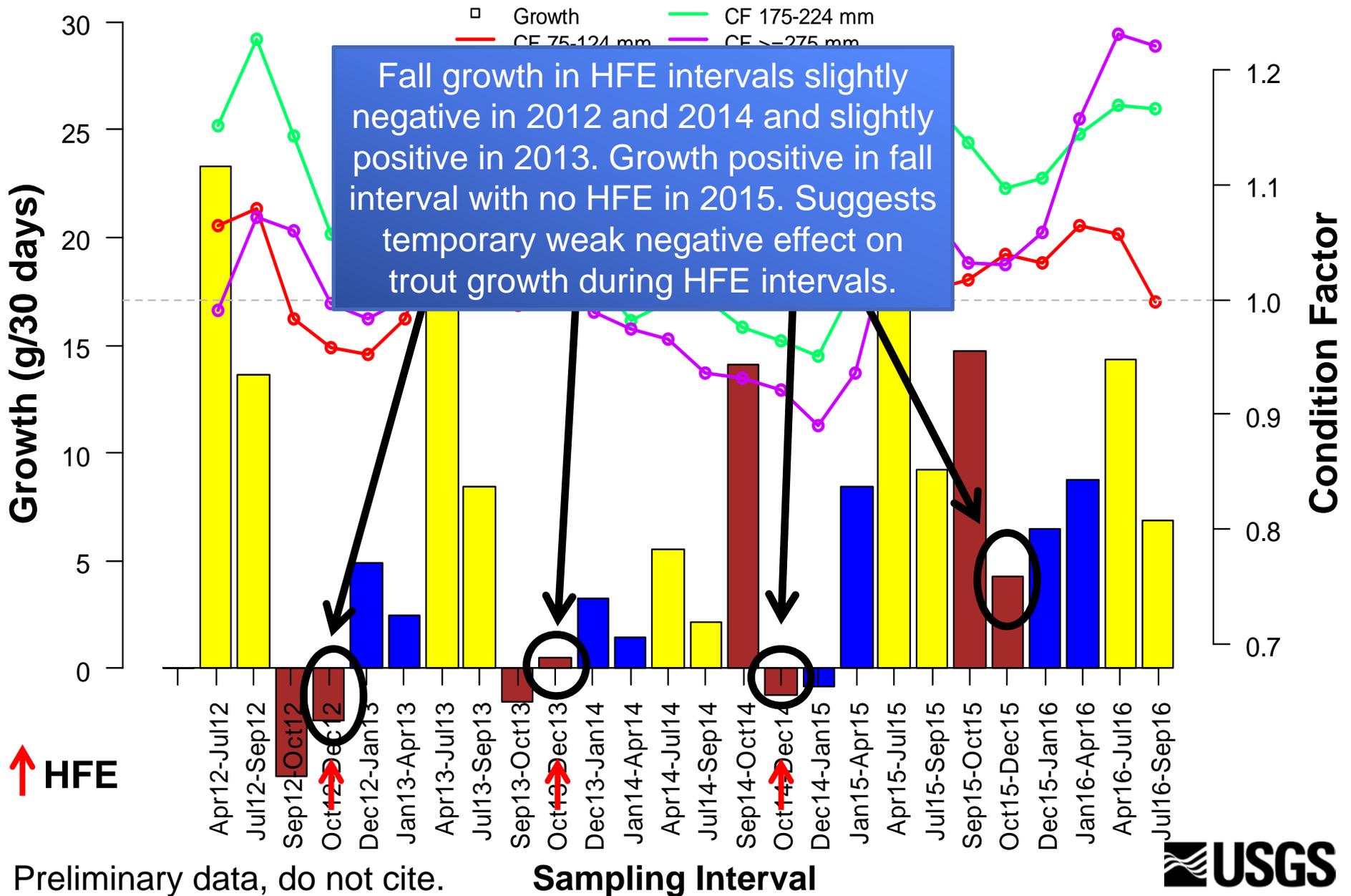


Preliminary data, do not cite.

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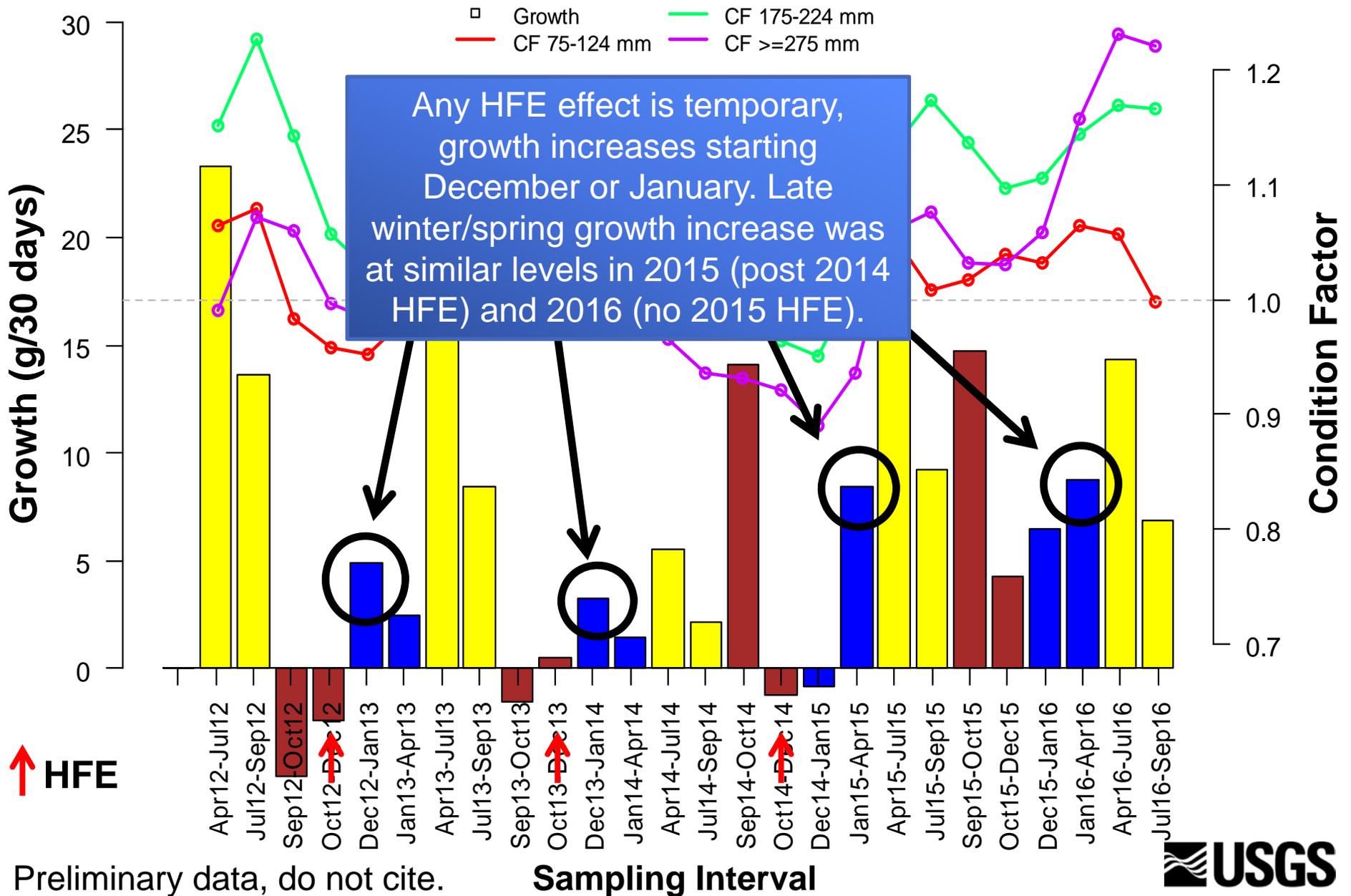
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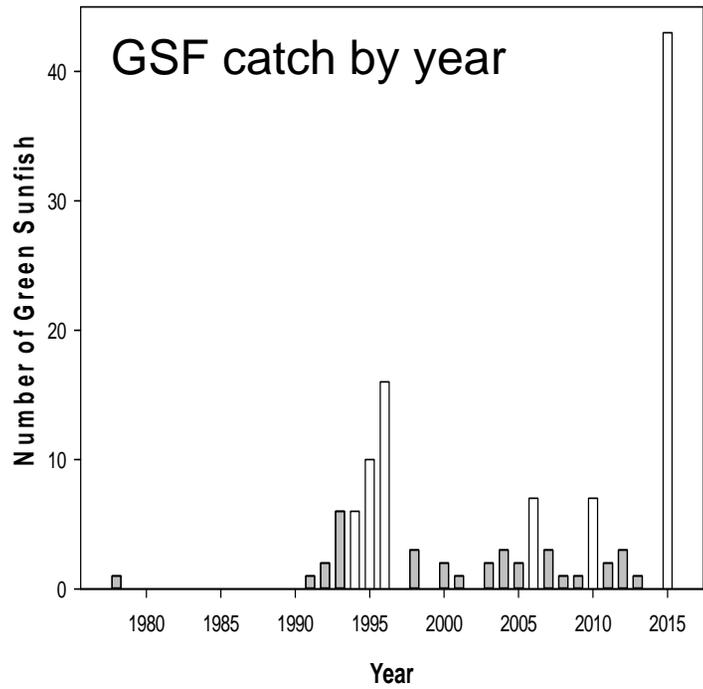


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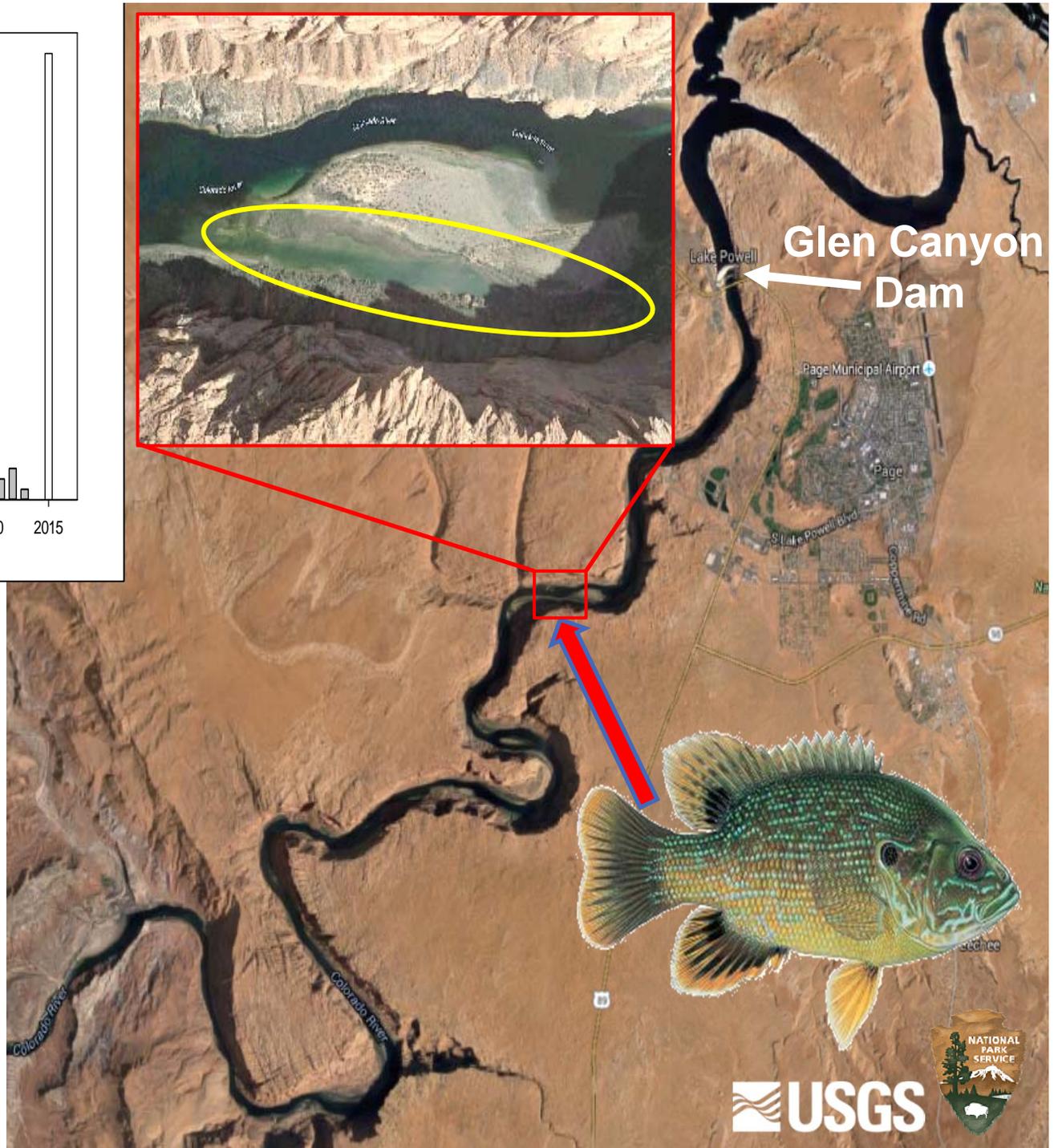


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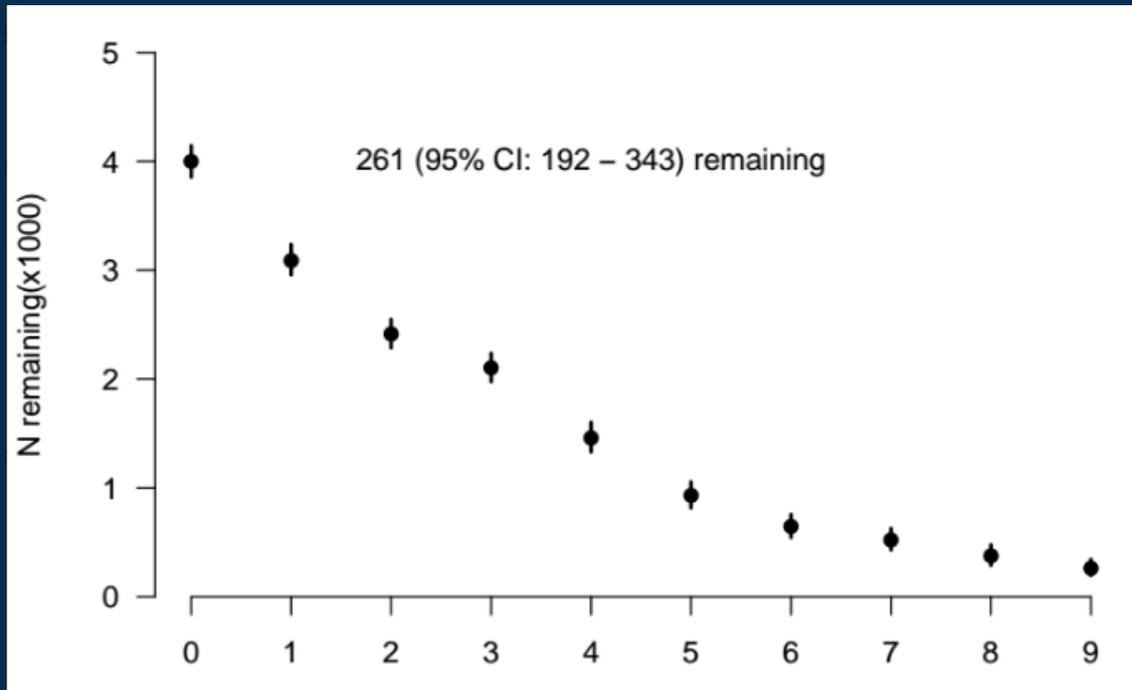


GSF catch by river mile



# 2016 Green Sunfish Rapid Response

- Two detection trips in July 2016 = no GSF
- August 2016 – GSF detected
- 10 removal trips from August – October captured and removed over 4600 GSF
  - Trips conducted by GCMRC, AGFD, and NPS



# 2016 Green Sunfish Rapid Response

- GSF numbers reduced by mechanical removal but cannot be eliminated
  - GSF removed by mechanical means will be provided to the Tribes for beneficial use
- NPS applied for a permit from ADEQ to apply ammonia as an experimental piscicide



# Current Status

- **Application for proposed ammonia treatment submitted to ADEQ on October 3**
  - Approval received October 13
  - Treatment date is October 20
- **All other permitting and compliance complete as of October 17**
- **HFE proposed for November 7**
  - Decision will be made by October 20 by HFE leadership team after review of all resource conditions including status of GSF.

# Treatment Plan

- GCMRC and NPS staff will conduct the ammonia treatment on October 20<sup>th</sup>
- Water quality sampling will occur before and after treatment
- 15 to 20 gallons of ammonia will be dispersed into upper slough
- Electrofishing surveys Friday Oct. 21<sup>st</sup> and the following week to confirm treatment success
- The slough area will be administratively closed from treatment to proposed HFE date

# HFE Protocol Reporting

1. GCDAMP Annual Reporting meeting every January.
2. Updates at TWG and AMWG GCDAMP meetings
3. Meet with the HFE MOA consulting parties and consult with tribes as needed.
4. The HFE Technical Team report to the Secretary's Glen Canyon Leadership Team for their consideration in HFE decisions.
5. US Fish and Wildlife Service report each January on the effects of prior HFEs and conservation measures of the 2011 FWS biological opinion.

RECLAMATION

# 2016 HFE Summary and Next Steps

1. Sediment conditions support a 96-hr 2016 Fall HFE
  - 36,000 cfs for 96-hrs, possible start Nov 7
2. 30-day HFE MOA letter has gone out
3. Other resource considerations: green sunfish;
  - planned treatment Oct 20<sup>th</sup>.
4. TWG presentation: Oct 18<sup>th</sup>
5. The HFE Technical Team recommendation to the Secretary's Glen Canyon Leadership Team: Oct 19<sup>th</sup>
6. Leadership Team decision on whether to proceed with fall HFE: Oct 20<sup>th</sup>
7. BO report- by December
8. Follow up at future AMP meetings