

Rapid Response Technical Team Report 2023



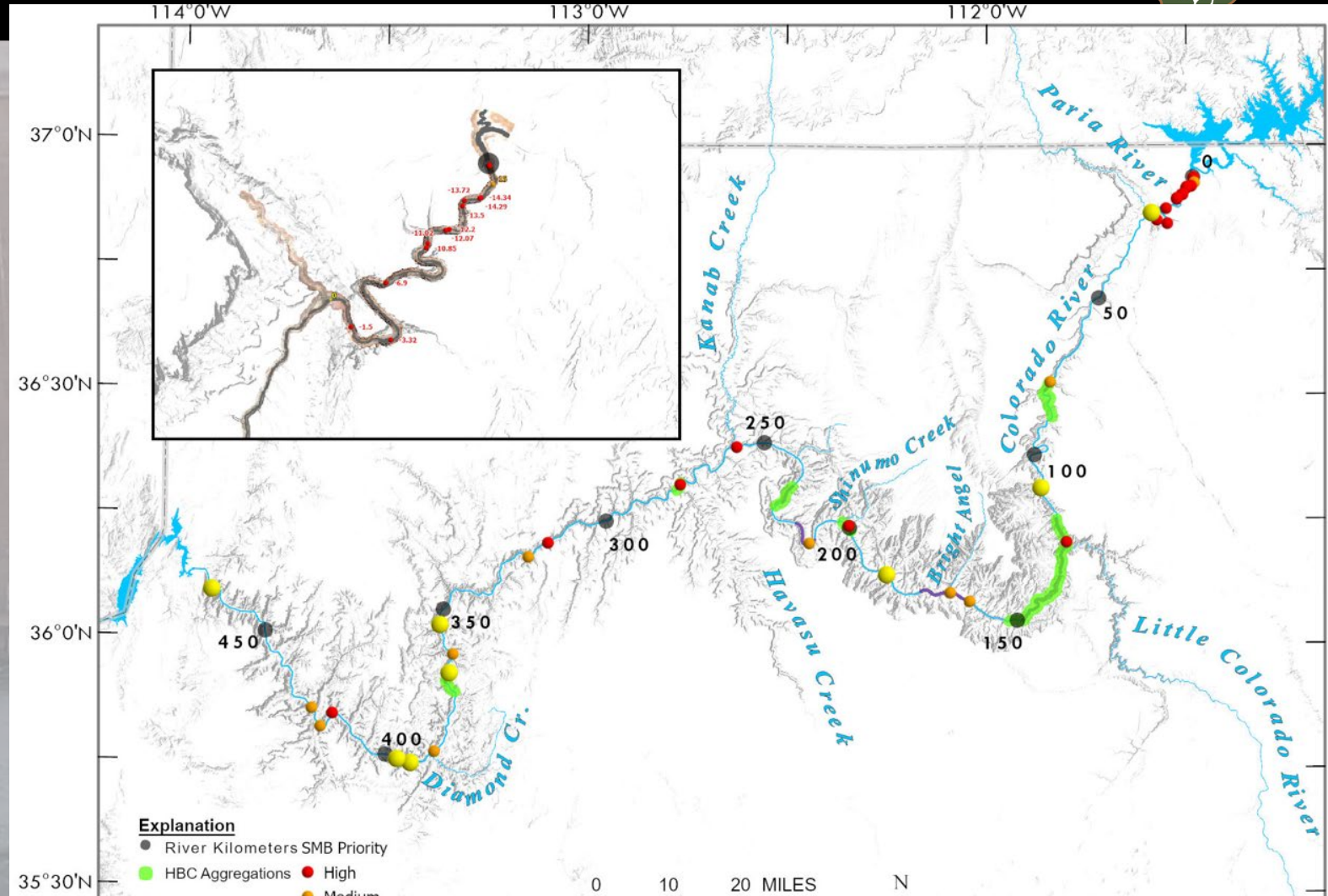
HISTORY

- **2022:** The Secretary's Designee to the GCDAMP, directed Reclamation, USGS, Grand Canyon Monitoring and Research Center (GCMRC), and the Technical Work Group (TWG) to draft **the Strategic Plan**.
- **2022: Slough Treatment and 6 Rapid Response Trips to remove SMB**
- **2023:** At the February 2023 GCDAMP Adaptive Management Working Group (AMWG), a motion passed to recommend to the Secretary of the Interior adoption of the **Strategic Plan**.
- **2023:** To implement the Strategic Plan, a **DOI Charter** was developed. The purpose of this agreement is to ensure a unified Department of Interior response to the threat of Smallmouth Bass (SMB) and other high-risk invasive fish establishment downstream of Glen Canyon Dam.
- **2023: The Charter** established a Rapid Response Leader Team, and a Rapid Response Tech Team composed of representatives from the Fisheries Management agencies (DOI agencies, and the state wildlife management agency (AGFD))
- **response actions**

Early Detection - Hot Spots for Invasion



Fisheries staff from multiple agencies collaborated in rapid response meetings in fall of 2022 and developed a map of 'hotspots' along the river that would be likely breeding locations for SMB, with the intention of increasing early detection in these locations in 2023 and 2024





Fish Monitoring Collaboration



Private group



Not following



28 members

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+ New ▾



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Analytics

Published 11/28/2023



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2023 Trips

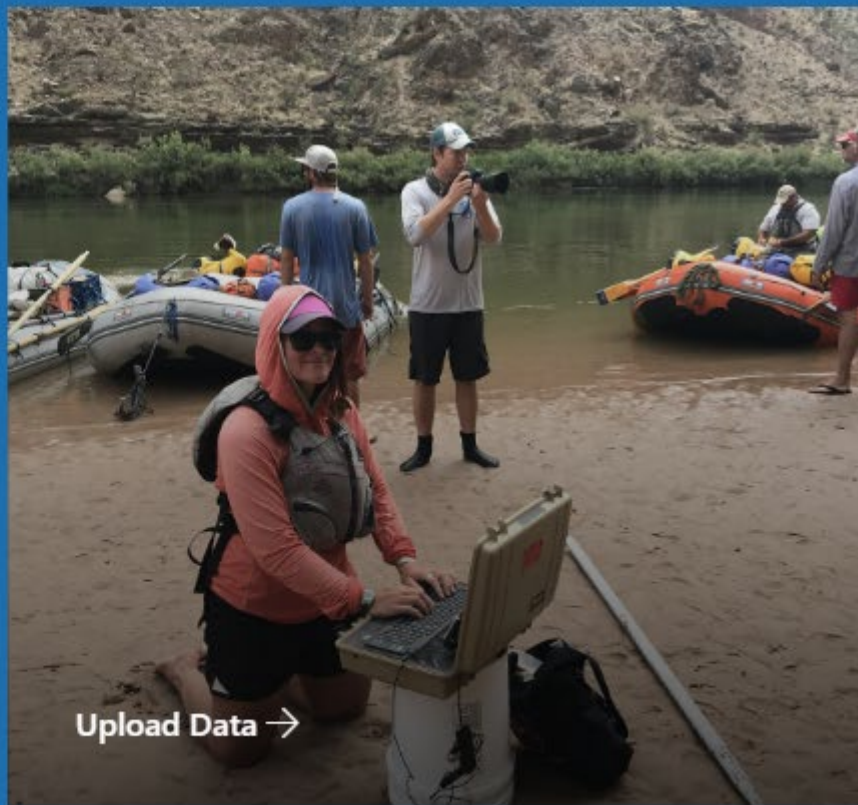
Documents

Notebook

Recycle bin

Edit

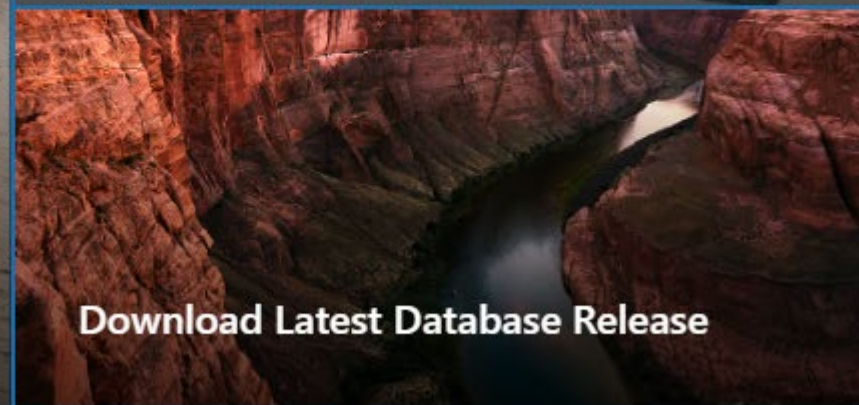
Data Access



Upload Data →

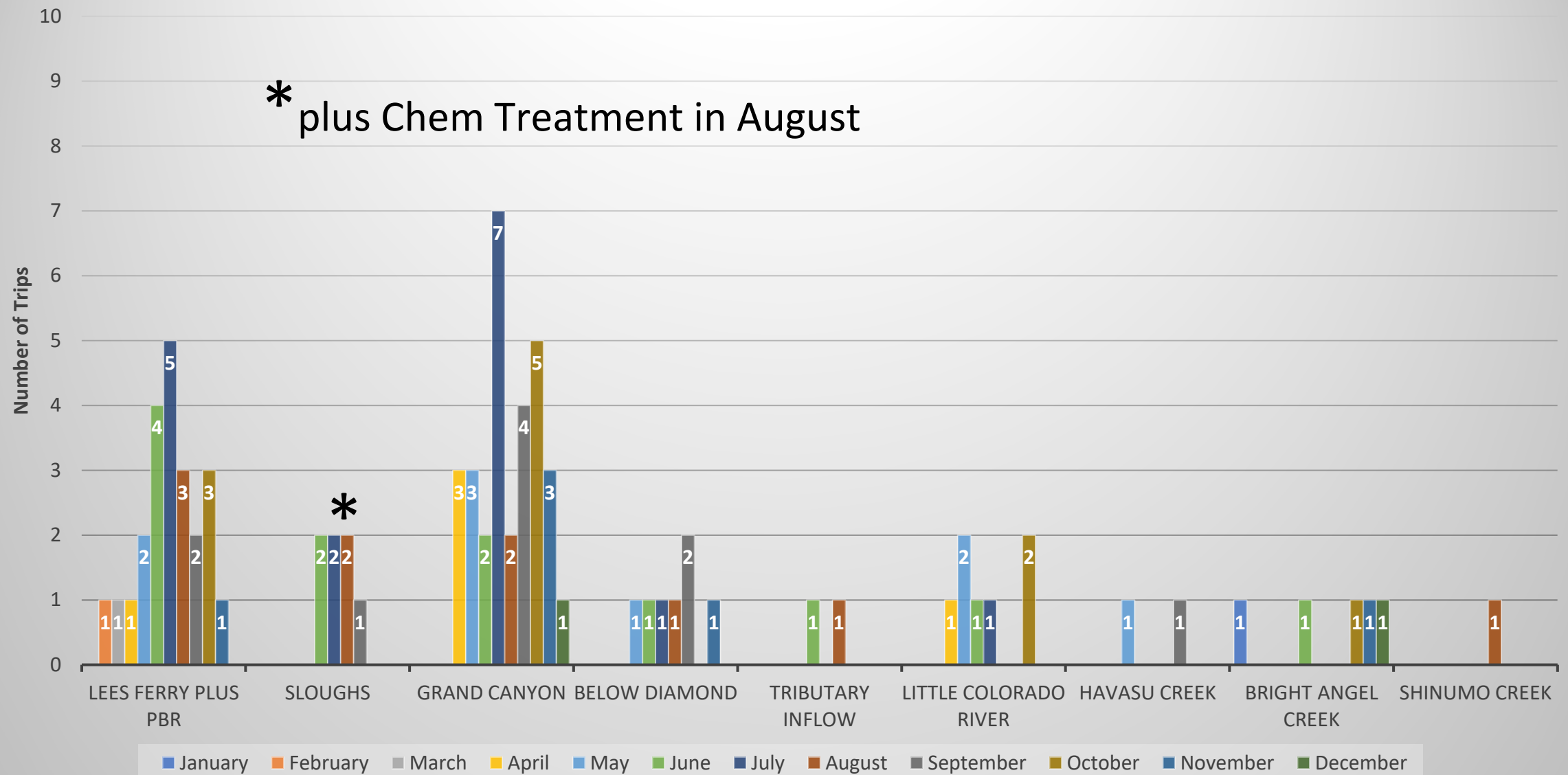


Report Non-Native Fish Captures



Download Latest Database Release

2023 Surveillance and Rapid Response



2023 NPS NNF Monitoring and Removal

- Preserve NNF for Beneficial Use
 - Human Consumption
 - Aviary
 - Science
- Lees Ferry- Boat Electrofishing 2 weeks/month May-Nov
- Sloughs
 - Netting 2 weeks/month June-Sept
 - Chem Treatment August
- Paria River to Badger Rapid Reach (PBR)- Monitor 1 week/month June-Nov
 - Boat Electrofishing (night)
 - Backpack Electrofishing (day)
 - Seining (day)
- GCNP
 - River miles 1-226: mix of hoop-netting, BP electrofishing, seining (1 trip)
 - River miles 1-66: mix of seining, BP electrofishing, boat electrofishing, eDNA (3 trips)
 - Trib sampling, including at inflows
 - Trib sampling



SMB Captures by Agency

Agency	Monitoring/ removal	Trips	RX
GCNRA	1014	14	148
GCMRC - TRGD	68	4	
AGFD	30	3	
GCNP	12 (in GRCA)	16	
FWS	1 (in GRCA)	2	
Total	1125		148

Earliest and most downstream captures of YOY SMB in Glen Canyon and Grand Canyon, 2021-2024

Year	Earliest YOY SMB detected	Farthest downstream capture of SMB	Total caught and removed	Number of RR trips	Slough treatment
2021	None	RM 272.07	1	x	N
2022	6/30/22 (in slough)	RM -0.67 (12/8/22)	368	6 (Oct – Dec)	Y
2023	7/7/22 (in slough)	RM 16.38 (11/04/2023)	1260* 13	14-GLCA 16-GRCA	Y
2024 – one trip	NA- too early		7	[TRGD]	?

Back calculated spawning date in early June
(Dr. Kevin Bestgen, pers. comm.)

* 435 in Main Channel, 825 in the Sloughs

Glen Canyon: Chemical Treatment of the Sloughs in 2023

Species	Lower Slough	Upper Slough
BGS	4	40
BNT	4	2
CRP*	2855	292
GSF*	821	652
FMS	12	0
RBT*	114	0
SMB*	114	34

*Two buckets of fish collected late in the process were not counted for lack of time.

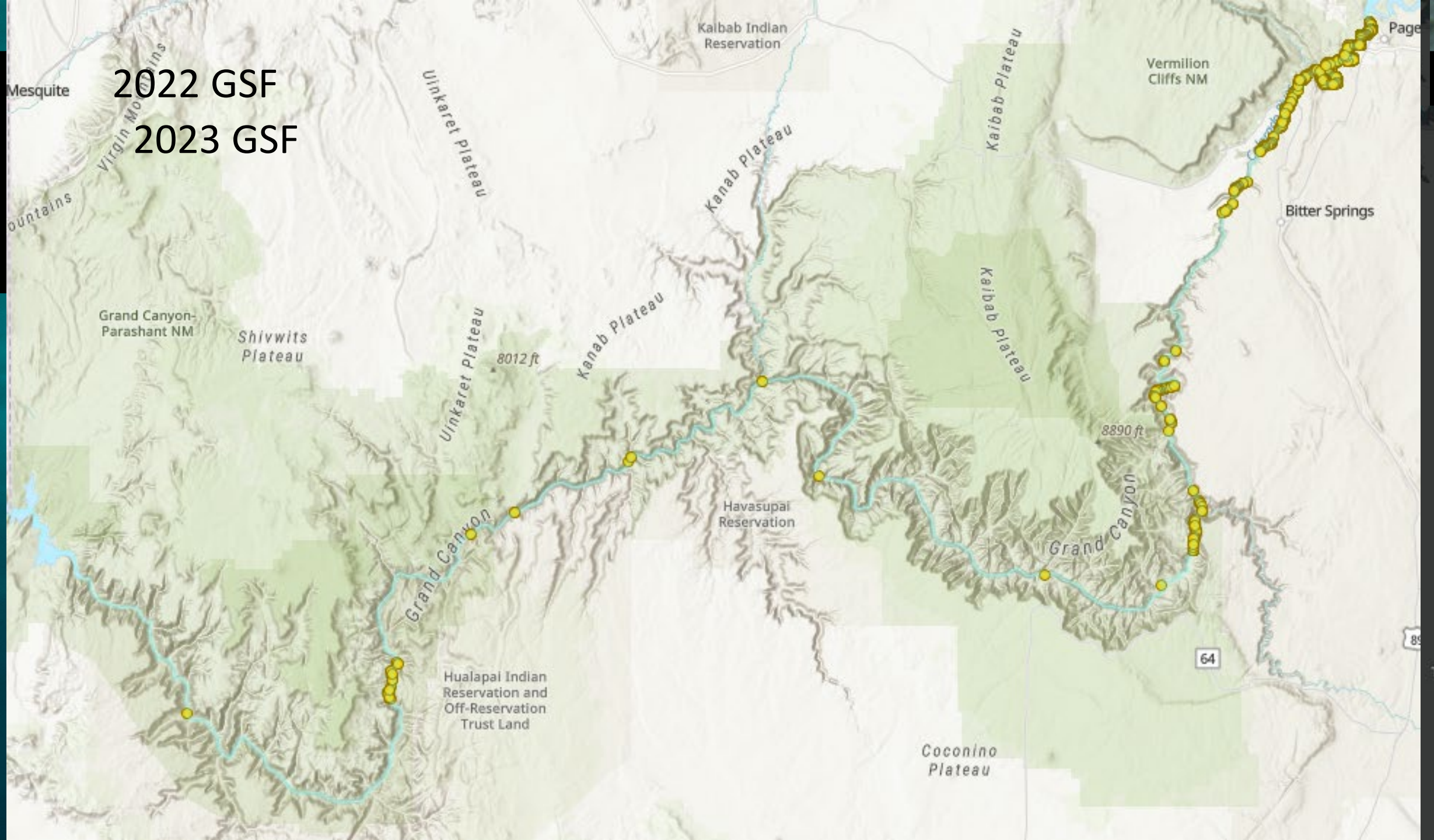
Cooperative Fisheries NNF database

- Many nonnative species
- Table in order of total captures in GC and LF
 - 20 NN fish species and hybrids
 - Crayfish (rare in Lees Ferry)
- Primary High-Risk Species
 - Green Sunfish
 - Smallmouth bass
 - Walleye
 - Brown trout



Species	2021	2022	2023	Note
GSF	41	5928	16485	Mostly from Slough
CRP			11458	Mostly from Slough
FHM			5944	Mostly in GCNP
SMB	1	368	1273	Mostly in Slough
BGS		478	521	
MOS			941	Mostly in GCNP
PKF			713	Mostly in GCNP
BNT			602	not all captured
CCF	6	256	38	Mostly in GCNP
RBT			235	not all captured
RSH			172	
FMS			155	in Lees Ferry
STB	5	70	53	
WAL	9	15	60	
BKC		51	15	
BBH		29	9	
GZD		4	31	
YBH	23	8	1	
TFS		10	11	
LMB		2	3	
CHUB (BT)			2	in Lees Ferry
CRAyfish			2	in Lees Ferry
GSFX			1	
Grand Total	85	7308	38746	

2022 GSF
2023 GSF



Green Sunfish (GSF)

- Hotspots below Dam, and in Sloughs.
- Continuing to Spread downstream.

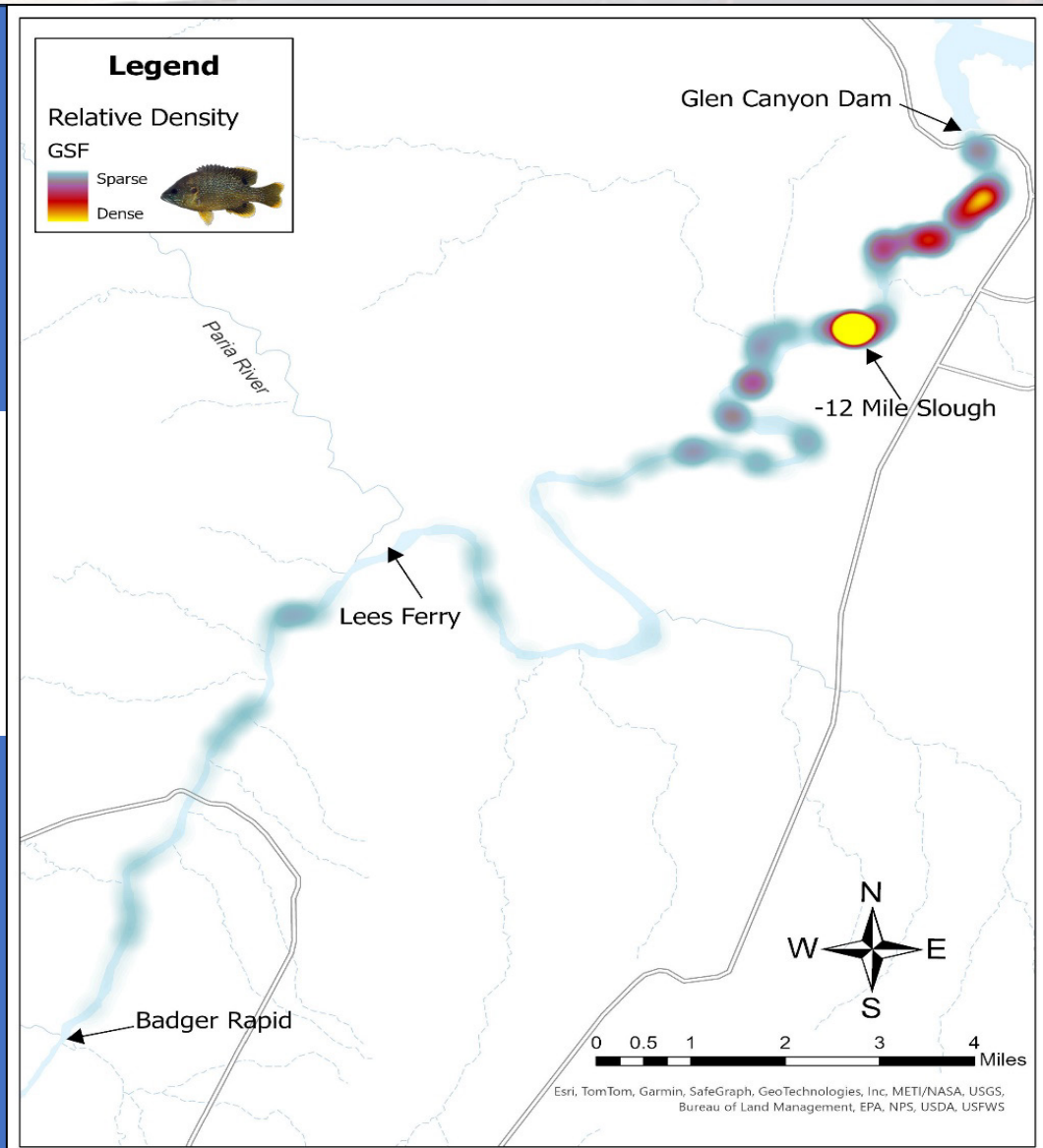
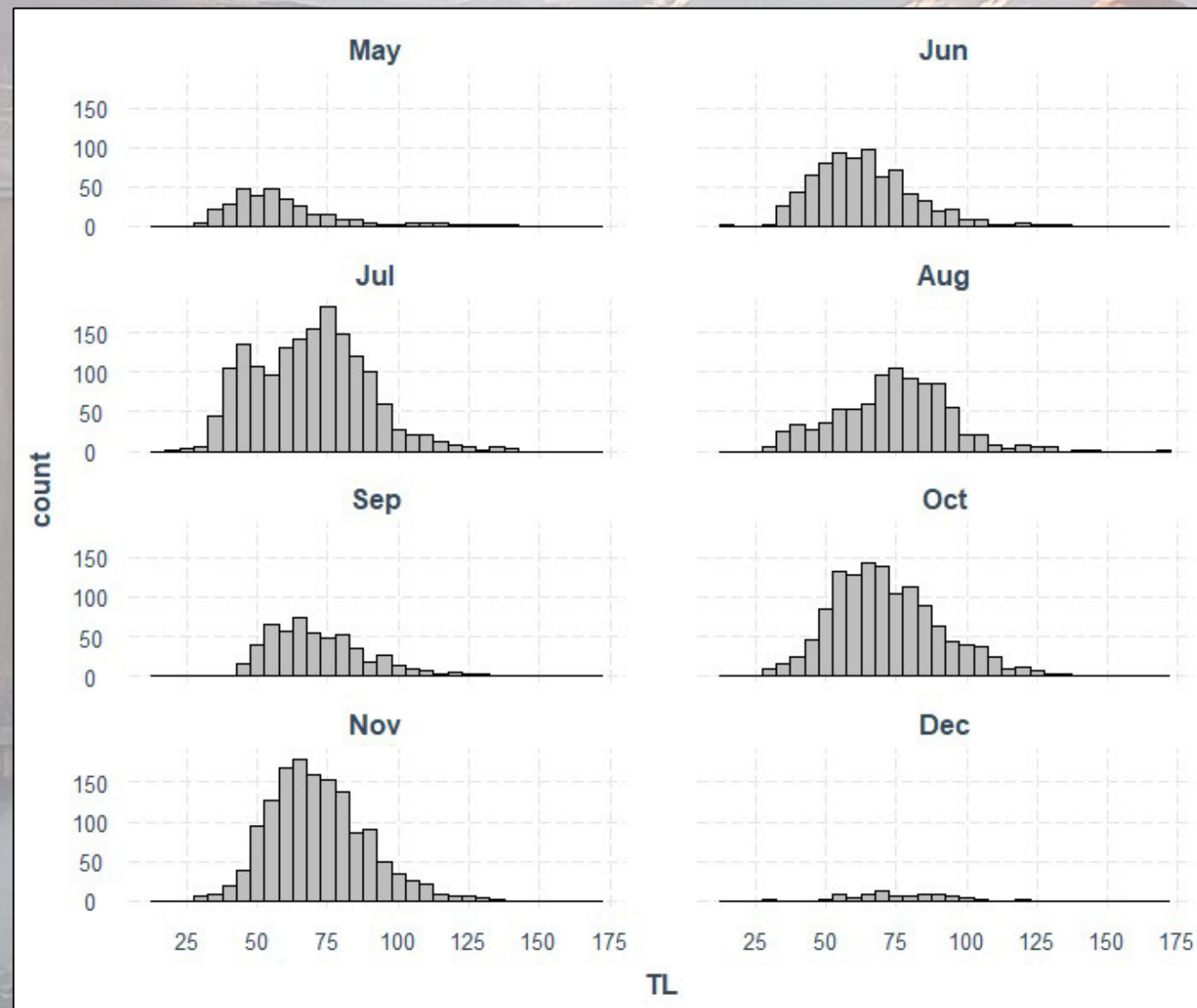
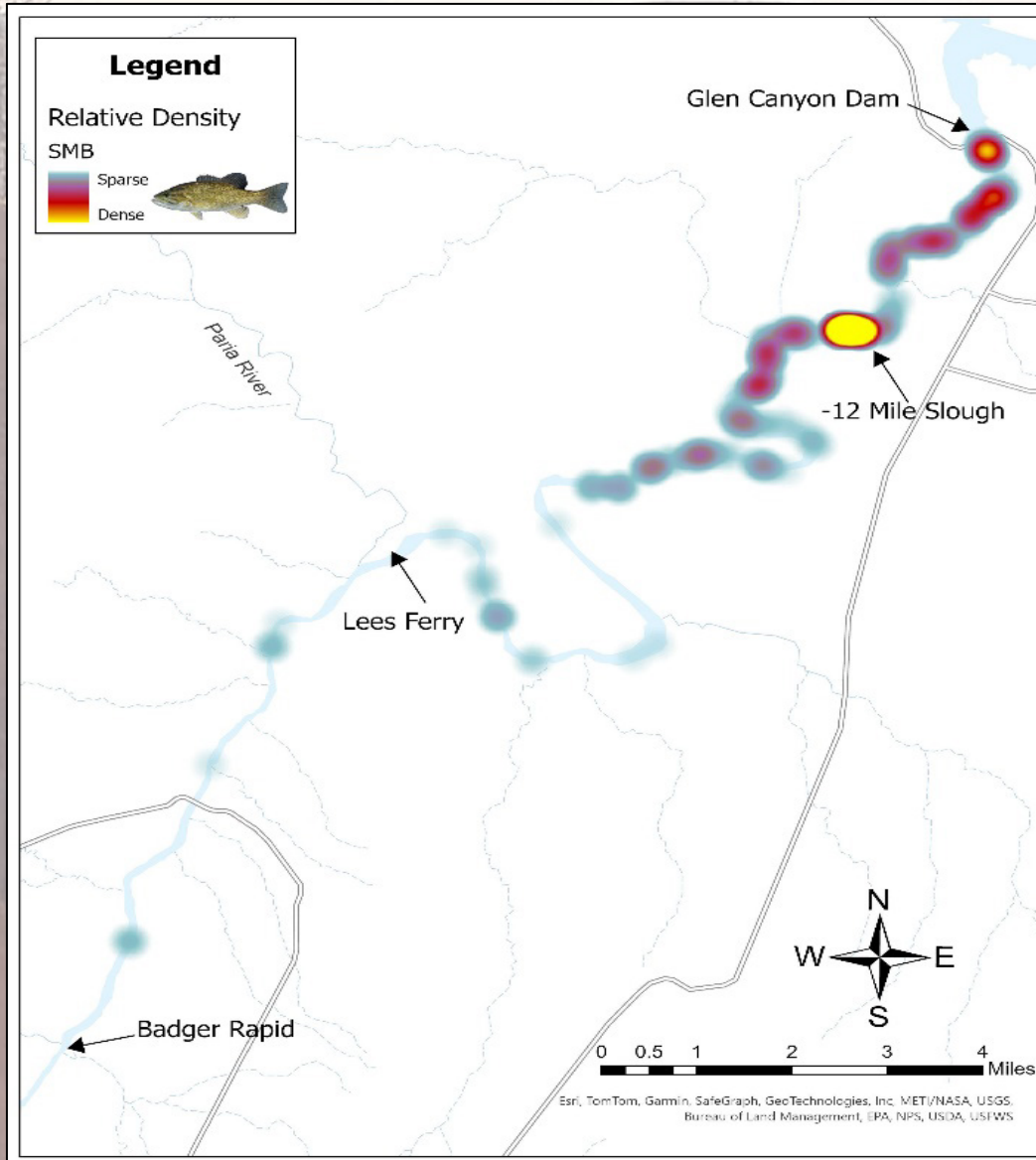


Figure 3. [from NPS draft 2023 annual report to BOR] Relative density heat map for green sunfish captured in GRCA and GLCA between Glen Canyon Dam and Badger Rapid. (Scale of density is independent for each species))

Length-frequency histogram for Green Sunfish captured from all gear types and reaches in Glen Canyon and Grand Canyon in 2023.

- All year classes present
- Most YOY from the Sloughs
 - May-Aug
- Reproduction in main channel
- Entrainment likely





Smallmouth Bass (SMB)

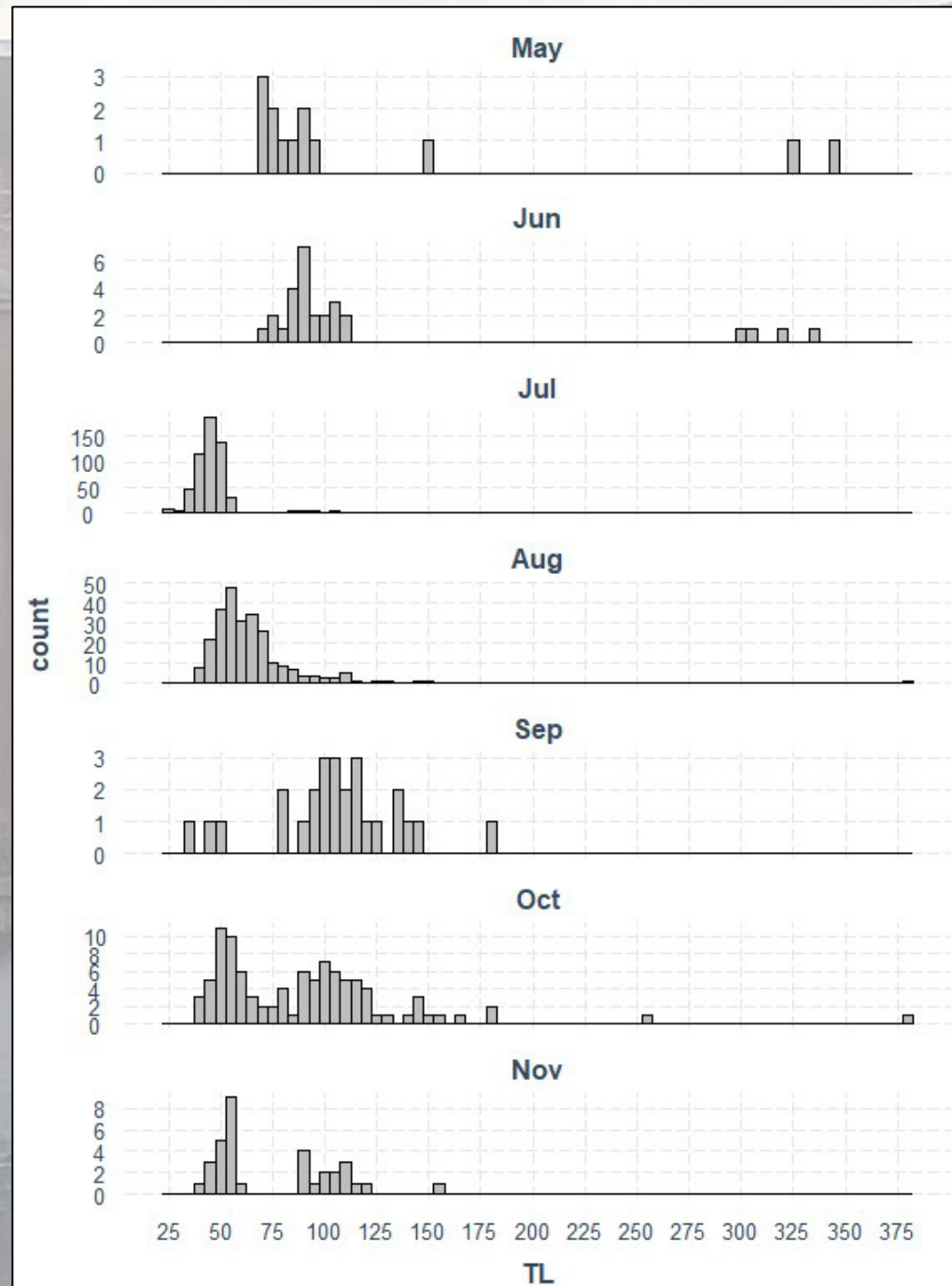
- Hotspots below Dam
- Between Dam and Slough
- Sloughs
- Continuing to spread downstream

Figure 3. [from NPS draft 2023 annual report to BOR] Relative density heat map for smallmouth bass captured in GRCA and GLCA between Glen Canyon Dam and Badger Rapid. (Scale of density is independent for each species)]

Length-frequency histogram for Smallmouth Bass captured from all gear types and reaches in Glen Canyon and Grand Canyon in 2023.

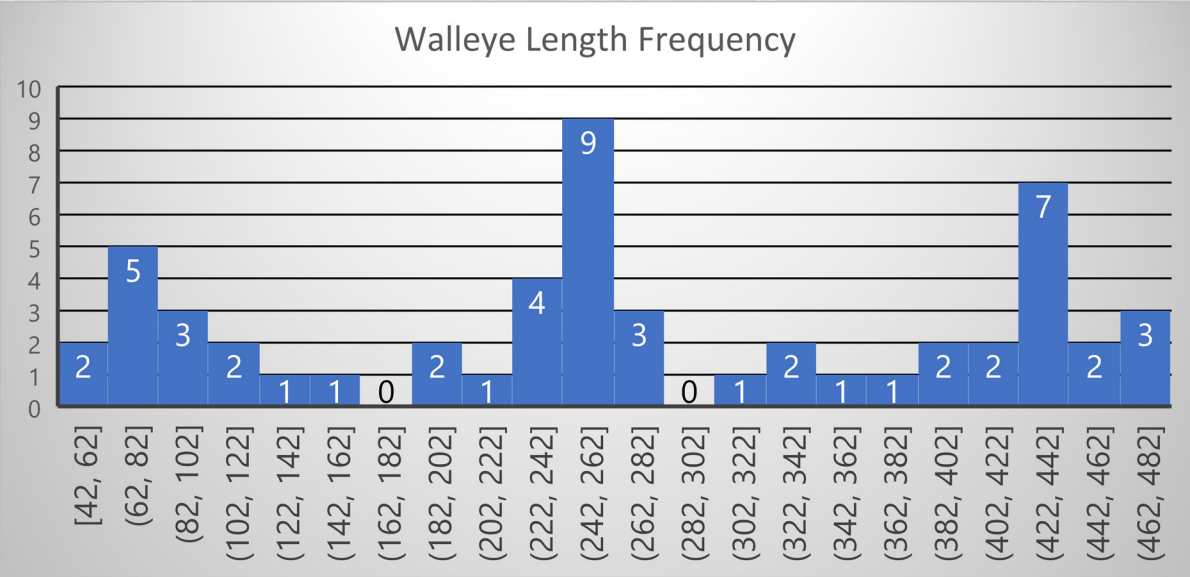
(Note different Y-axes)

- Few Adults
- Most YOY from the Sloughs
 - July-Aug Reproduction
- Late reproduction in main channel

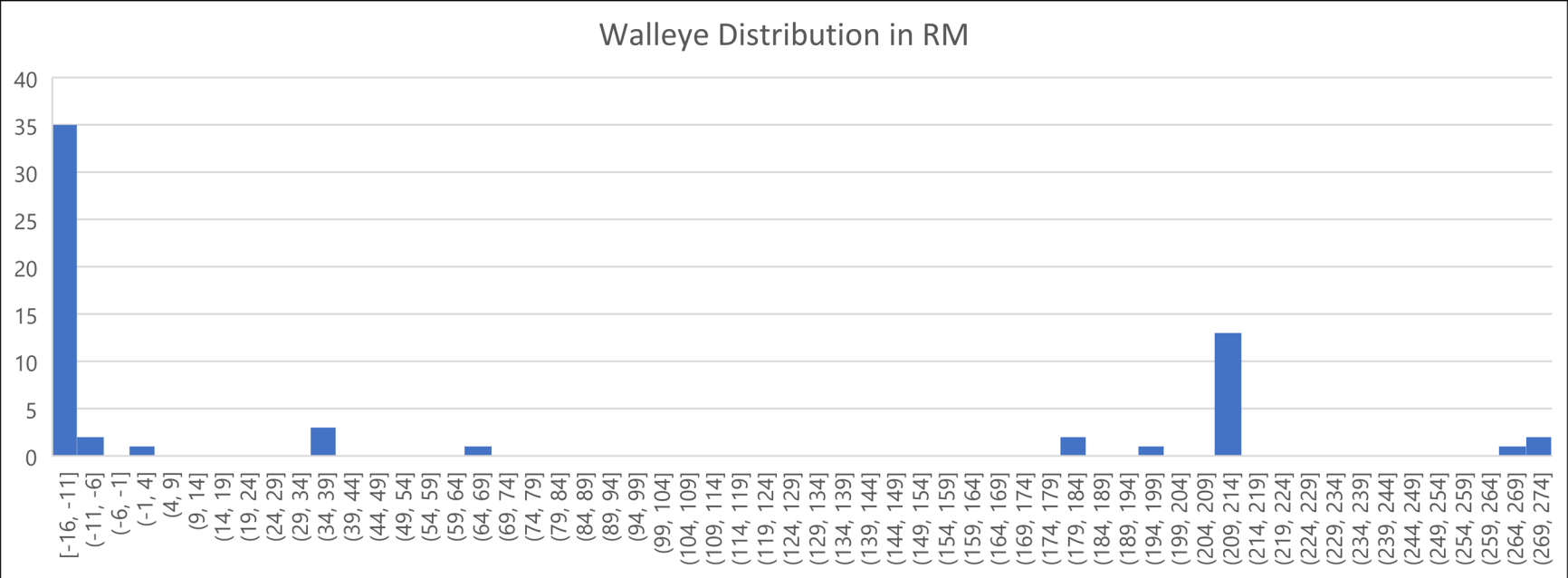




Female Walleye with eggs
Captured during January
2024 TRGD trip



Dam



Pearce
Ferry

Annual catch of Smallmouth Bass, Green Sunfish and Walleye from 2021-2023



GSF
Max length
10 inches



SMB
Max length
27 inches



WAL
Max length
40 inches



HBC max
18 in

Rapid Response - Time is Still Critical



Rapid Response

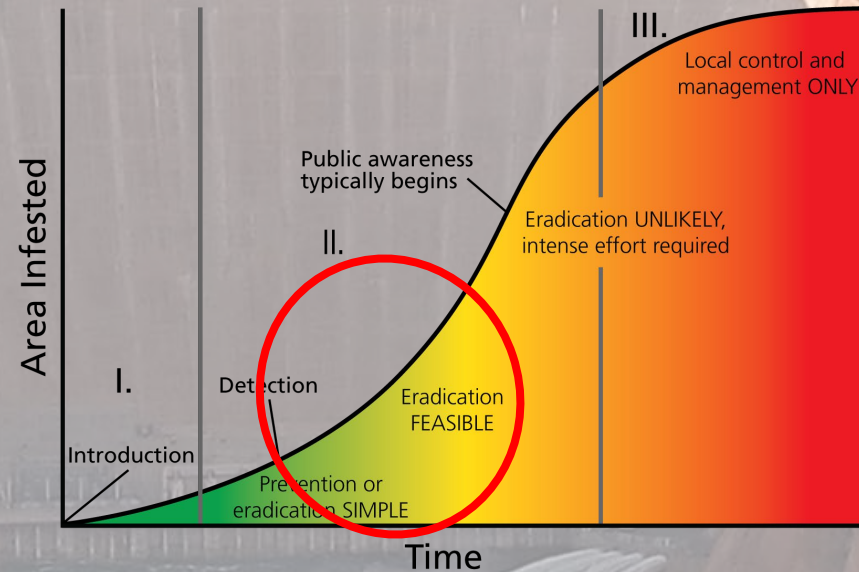


Staff intensive
Limits to effectiveness
If this is the only action

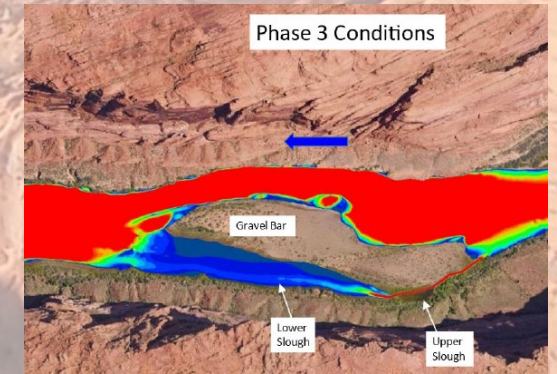
- We have a limited time to act while it is efficient and less expensive
- If we wait, then the numbers of **warmwater invasives will increase exponentially.**
- We can still prevent establishment of SMB if we use multiple actions now

Invasion Curve

Modified from Southwest Montana Science Partnership



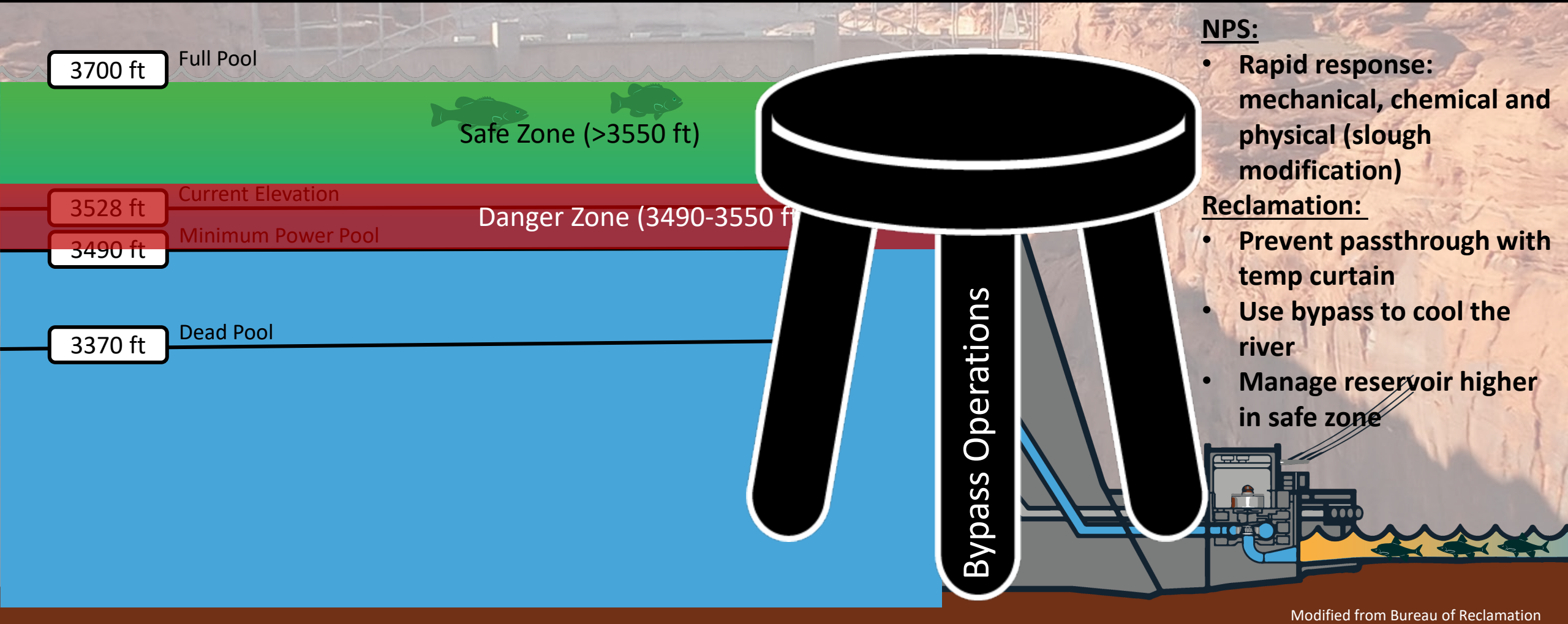
Slough Modification



Dam Operations



Integrated Response Strategy



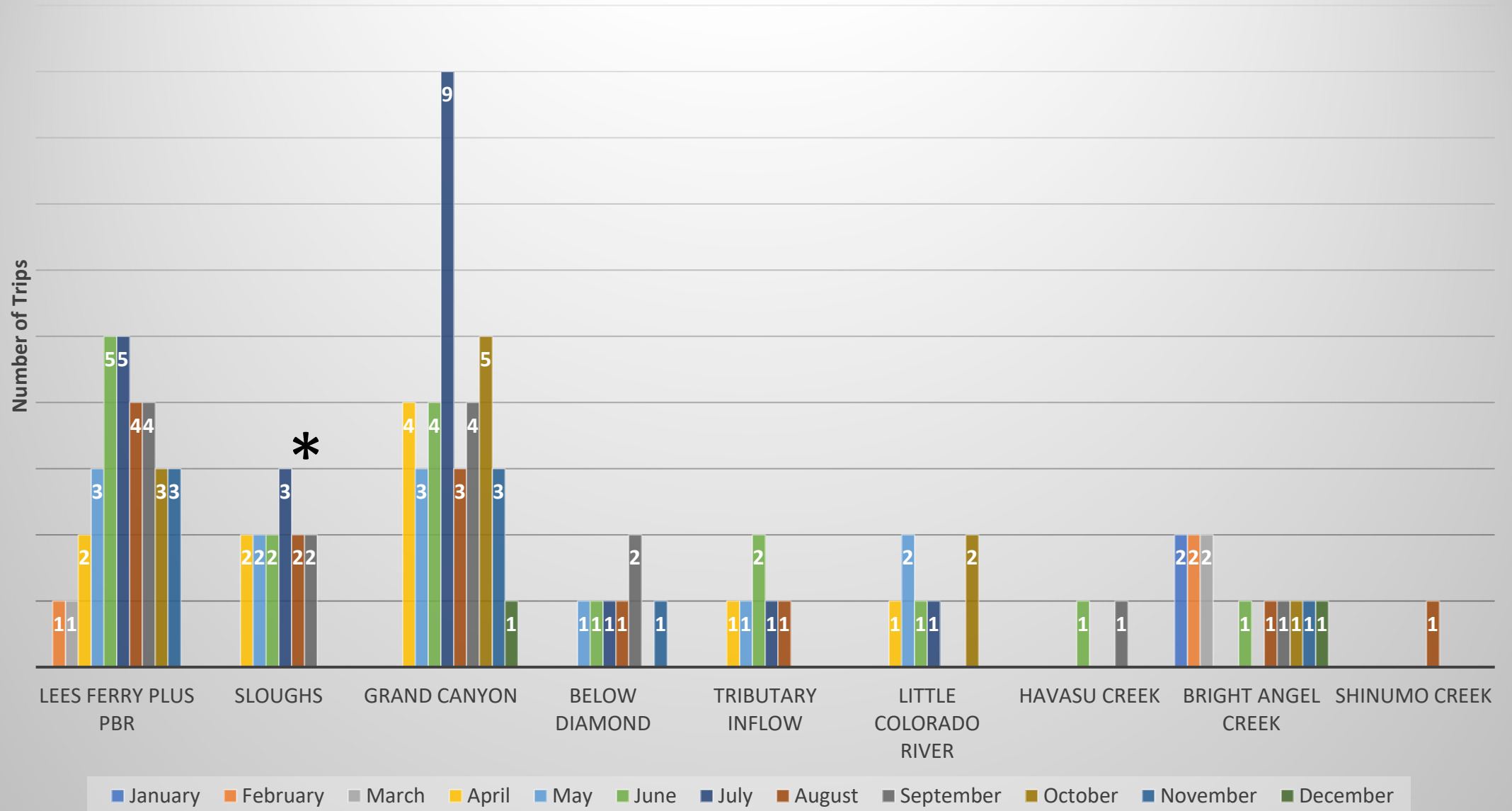
NPS:

- **Rapid response:** mechanical, chemical and physical (slough modification)

Reclamation:

- Prevent passthrough with temp curtain
- Use bypass to cool the river
- Manage reservoir higher in safe zone

2024 Surveillance and Rapid Response



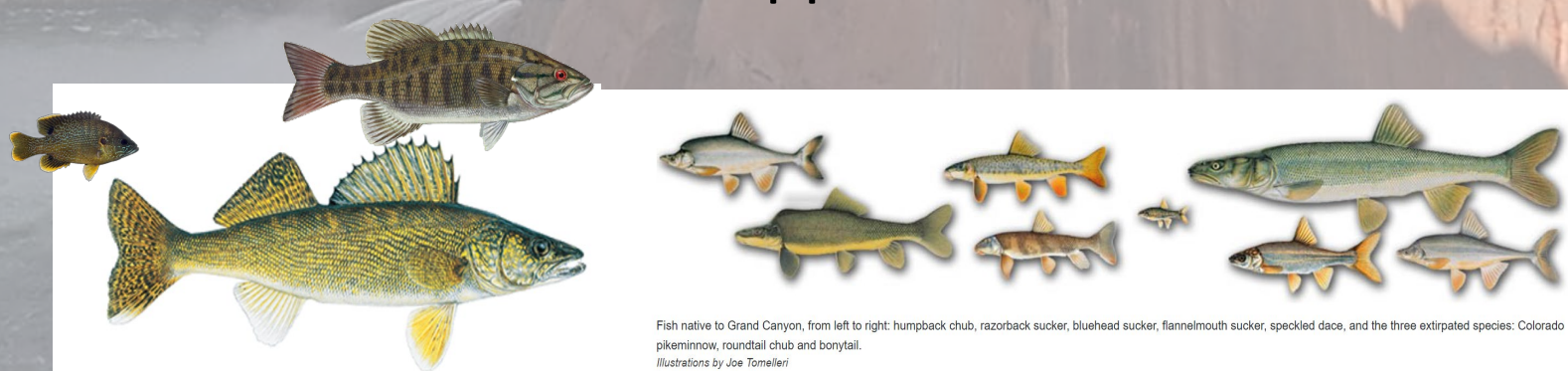
* plus potential Chem Treatment in August

2024 NPS NNF Monitoring and Removal

- All Trips Preserve NNF for Beneficial Use
 - Human Consumption
 - Aviary
 - Science
- GCNRA – 7-8 new staff, new EF and sample boats
 - Lees Ferry
 - 2 EF trips per month, April – October, 1 in March, 1 in Nov: synoptic and hotspots
 - Snorkeling surveys for nests June-Aug
 - Temperature loggers
 - Sloughs
 - Netting - 2 trips per month April – Sept
 - Temperature Loggers
 - Snorkel surveys for nests June-Aug
 - Potential Chem Treatment for vegetation
 - Potential Chem Treatment for fish in August
- Paria River to Badger Rapid Reach (PBR)
 - Boat Electrofishing every 3 weeks April-December
 - Seining, Backpack Electrofishing, Snorkeling 1-2 days/ month (April-December)
- GCNP
 - River miles 1-226: hoop-netting, BP electrofishing, seining (June)
 - River miles 1-66: seining, BP electrofishing (September)
 - River miles 1-66: Boat electrofishing (October)
 - Trib sampling, including at inflows
 - Trib sampling

Summary

- Rapid Response Tech Team meetings are effective
 - Cooperative Fisheries Database updated after each trip
 - New capture locations and species reported – trip focus and schedules were adjusted
 - Resource sharing enabled
 - Real Time maps
- SMB, GSF, WAL and other undesirable WW fishes continue to increase
- We are still in the Rapid Response phase
 - Speed and magnitude of response
 - As long as it takes to achieve eradication or suppression
 - Compliance
 - Funding



Fish native to Grand Canyon, from left to right: humpback chub, razorback sucker, bluehead sucker, flannelmouth sucker, speckled dace, and the three extirpated species: Colorado pikeminnow, roundtail chub and bonytail.
Illustrations by Joe Tomelleri

Thank You Rapid Response Tech Team!

Mark Anderson, Jeff Arnold, Rob Billerbeck, Kim Dibble, Dave Rogowski, Drew Eppehimer, Bud Fazio, Nicki Gibney, Jeremy Hammen, Lindsay Hansen, Shaula Hedwall, Brian Hines, Julie Carter, Jess Newton, Matt O'Neill, Emily Omana, Kerri Pedersen, Taryn Preston, Pilar Rinker, Ryan Mann, Andrew Schultz, Sky Hedden, Kurt Schollenberger, Scott Rogers, Bill Stewart, Laura Tennant, Melissa Trammell, Katherine Tucker, David Ward, Charles Yackulic

