

Role of Restored Floodplains in Conservation of the Endangered Rio Grande Silvery Minnow

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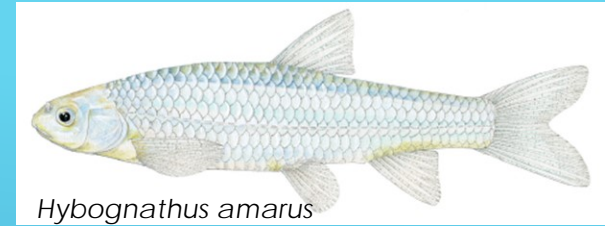
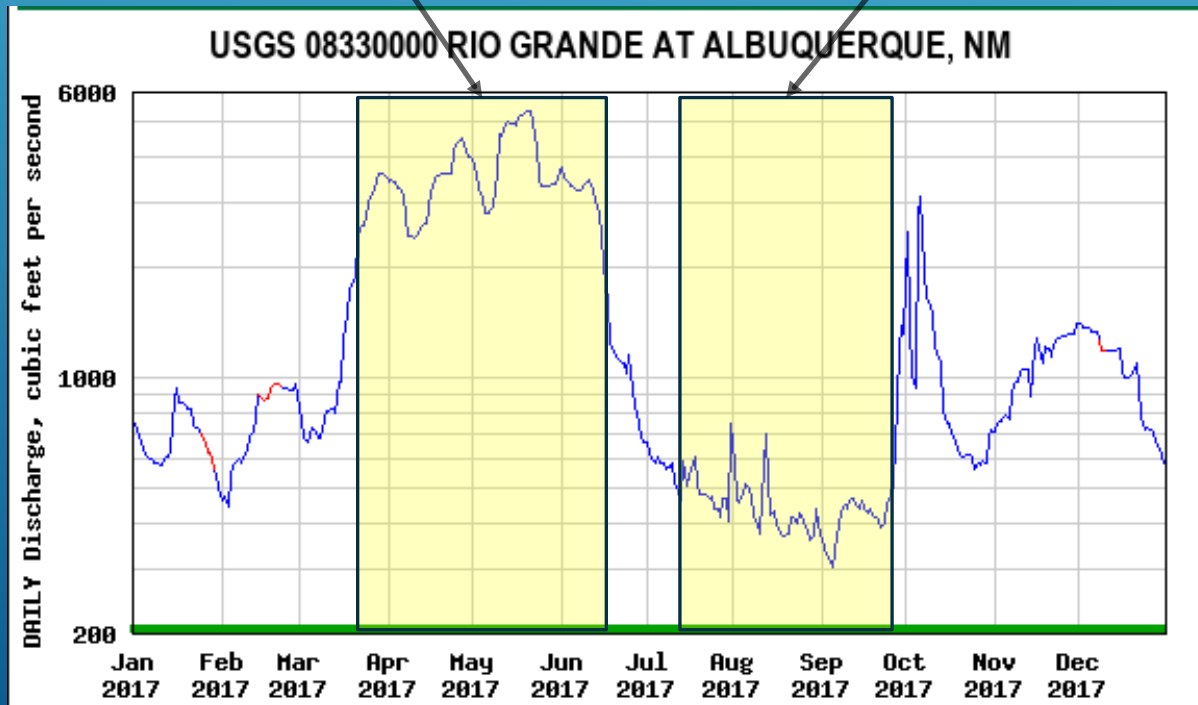


2016 Biological Opinion

► Hydrobiological Objectives (HBOs)

Production
Strategy

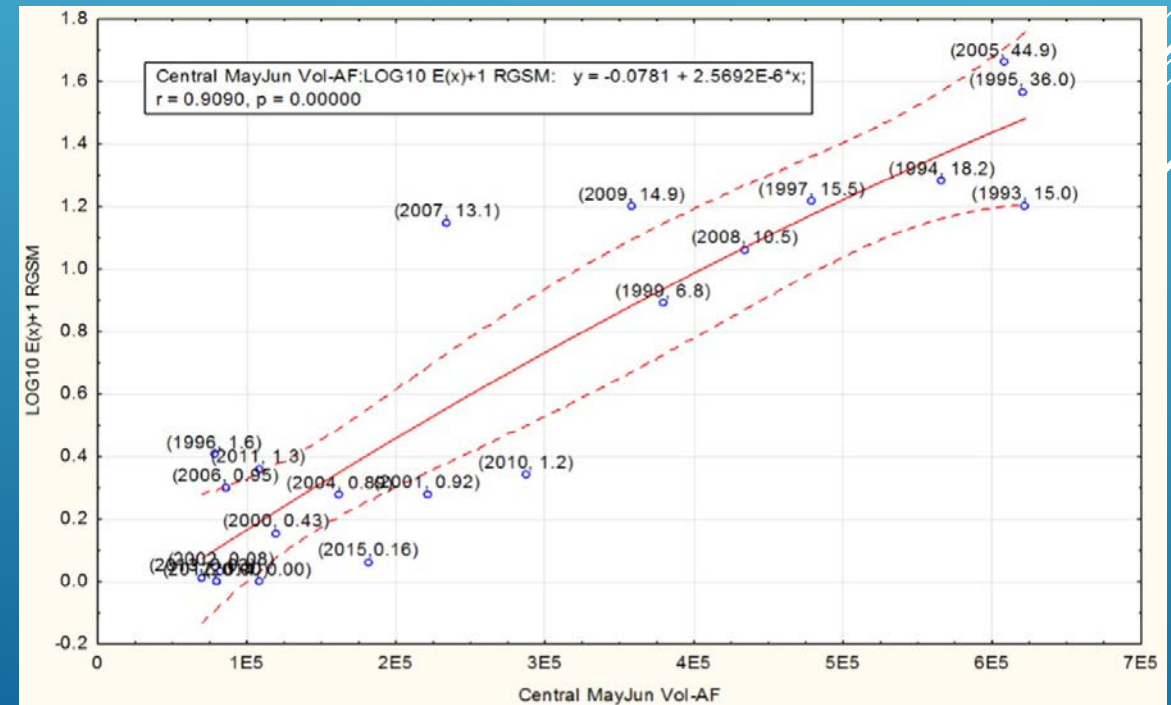
Survival
Strategy



Hybognathus amarus

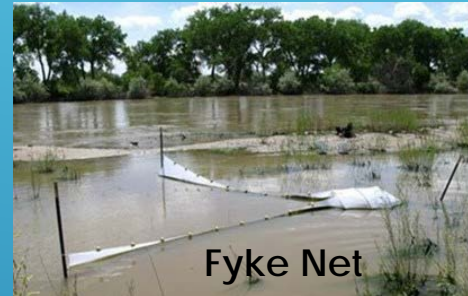
Hypothesis:

Positive relationship between high spring flow and RGSM density is related to floodplain inundation and survival of larvae

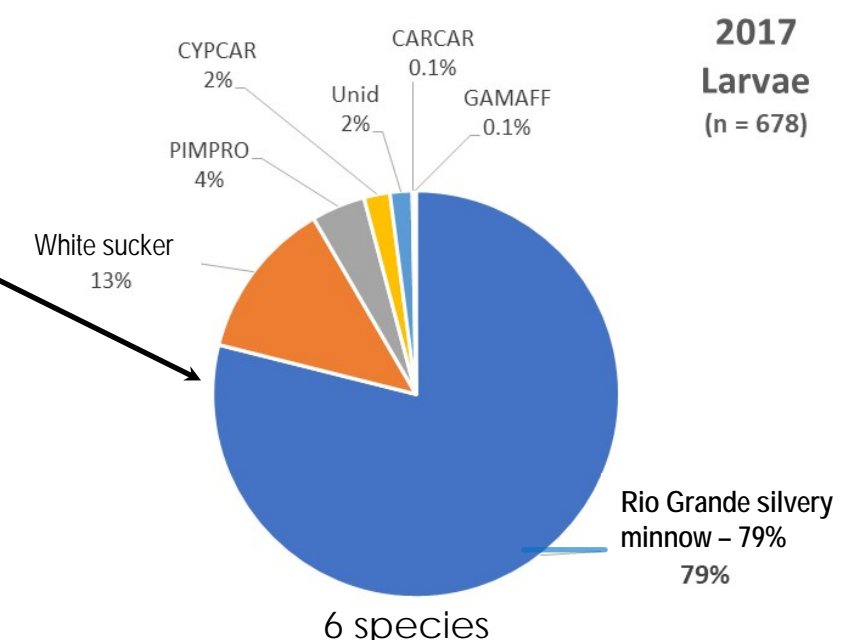
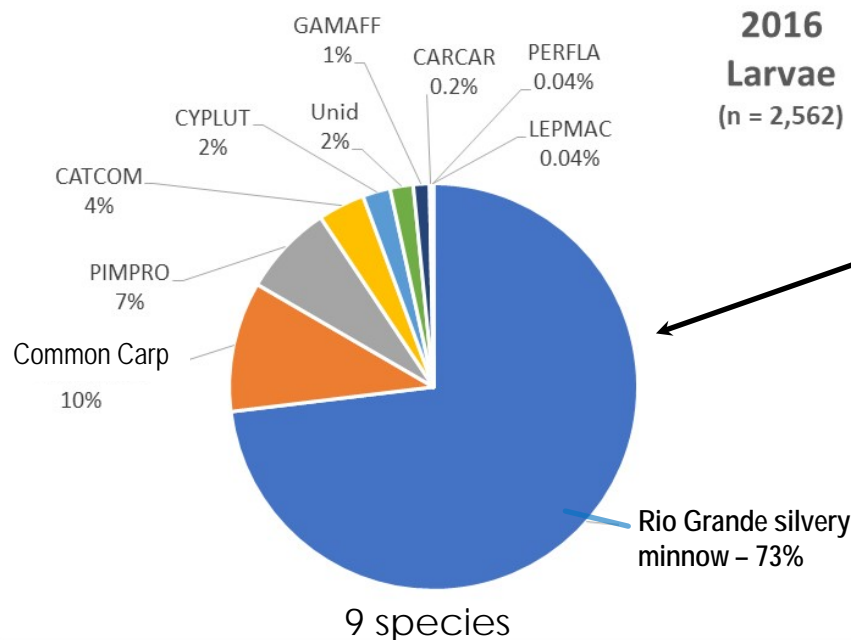
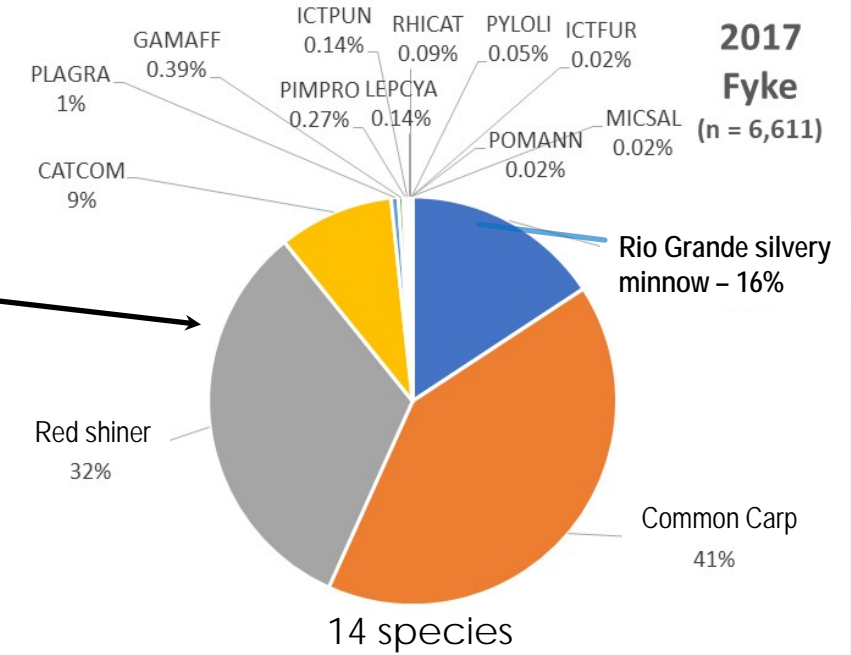
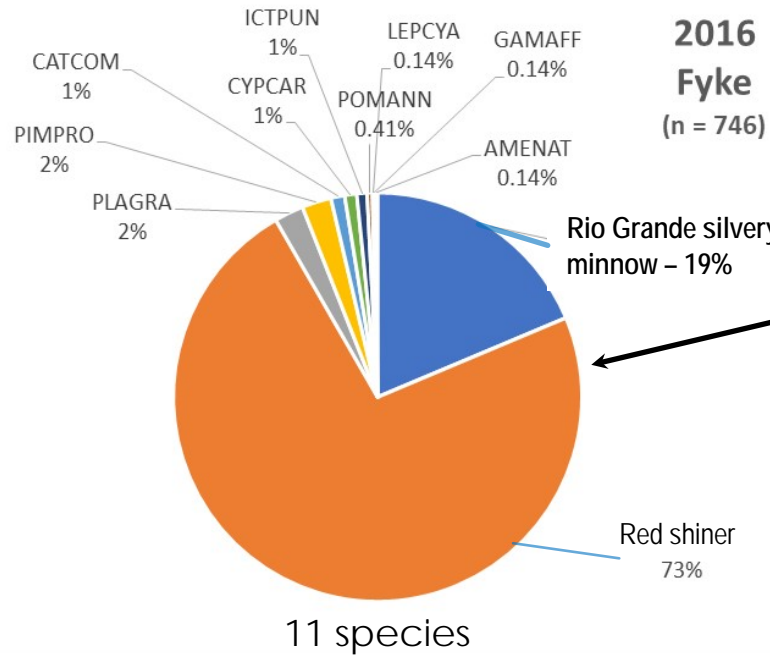


Fish Species Composition in Floodplains (2016, 2017)

RGSM was second most abundant large-bodied species (19% & 16%)

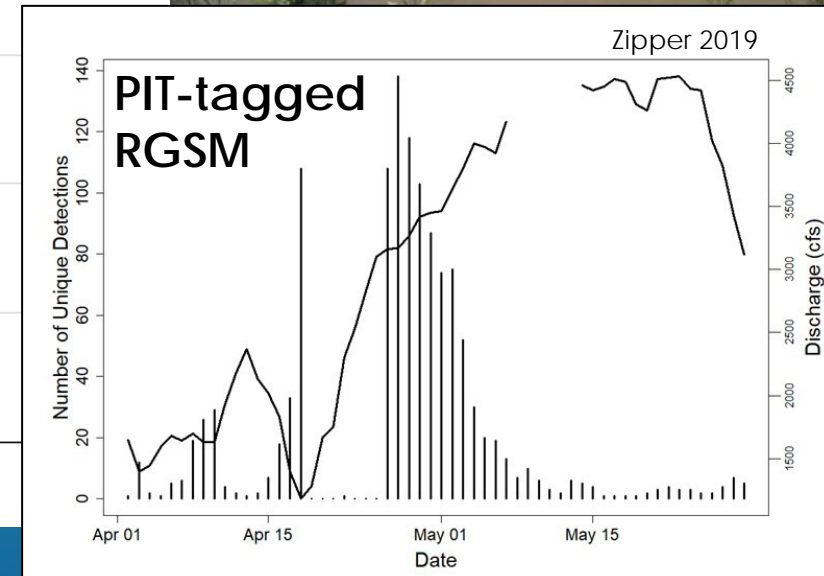
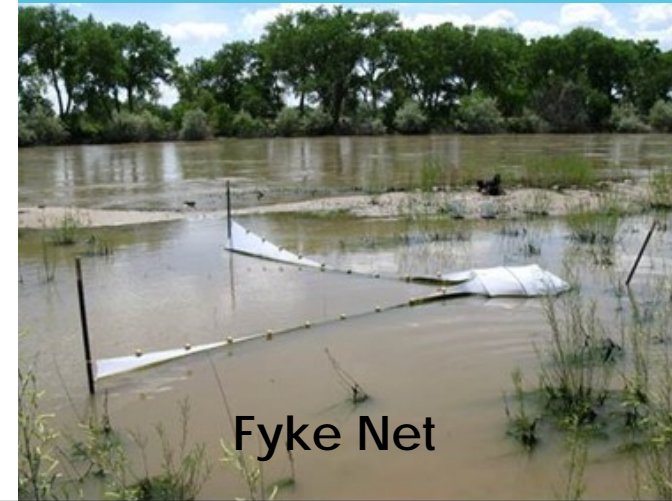
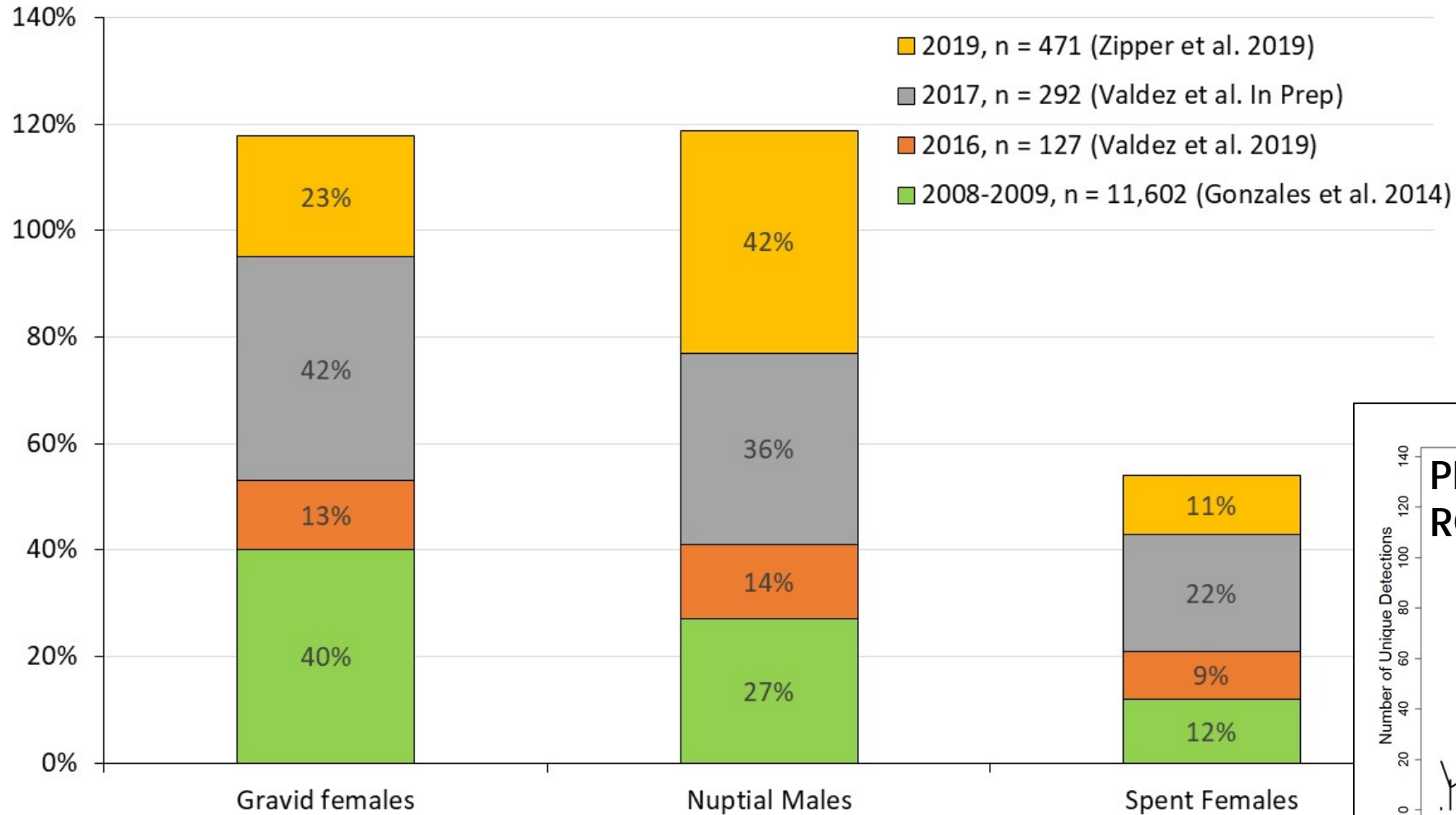


RGSM dominated larval fish (73% & 79%)



RGSM Adults In Floodplains (SWCA Studies)

Large numbers of adults indicate spawning in floodplains



Fish Species Composition in Mainstem and Floodplains of the Middle Rio Grande

			Mainstem (Seines)—Dudley et al.		Floodplains (Fyke Nets)—SWCA	
			2016	2017	2016	2017
	Code	Number of Specimens	2,723	4,924	746	6,611
		Number of Species	13	16	11	14
1	HYBAMA	Rio Grande silvery minnow	✓ 53%	47%	19%	16%
2	CYPLUT	Red shiner	✓ 16%	26%	73%	32%
3	RHICAT	Longnose dace	✓ 10%	2%	--	0.09%
4	PLAGRA	Flathead chub	✓ 9%	9%	2%	1%
5	ICTPUN	Channel catfish	✓ 3%	1%	1%	0.14%
6	CYPCAR	Common carp	✓ 3%	8%	1%	41%
7	PIMPRO	Fathead minnow	✓ 3%	1%	2%	0.27%
8	CARCAR	River carpsucker	✓ 2%	0.18%	--	--
9	CATCOM	White sucker	✓ 1%	3%	1%	9%
10	GAMAFF	Western mosquitofish	✓ 1%	2%	0.14%	0.39%
11	AMENAT	Yellow bullhead	0.04%	0.02%	0.14%	--
12	ICTFUR	Blue catfish	0.04%	1%	--	0.02%
13	LEPMAC	Bluegill	✓ 0.04%	--	--	--
14	DORPET	Threadfin shad	--	0.08%	--	--
15	DORCEP	Gizzard shad	--	0.04%	--	--
16	MORCHR	White bass	--	0.02%	--	--
17	POMANN	White crappie	--	0.02%	0.41%	0.02%
18	LEPCYA	Green sunfish	✓ --	--	0.14%	0.14%
19	PYLOLI	Flathead catfish	--	--	--	0.05%
20	MICSAL	Largemouth bass	--	--	--	0.02%

✓ 13 species have been found as larvae or young in floodplains (2016-2017)

Use Of Constructed Sites By RGSM (NMISC And SWCA)



Adults



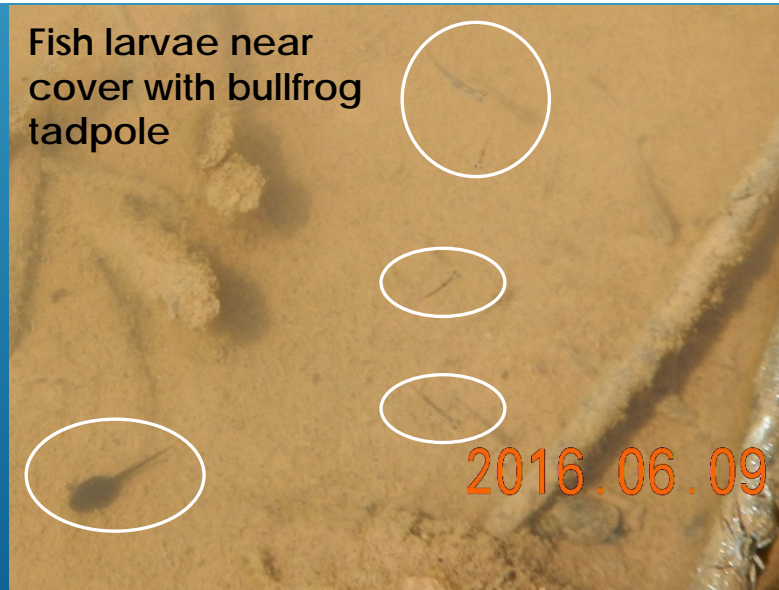
Eggs



Larvae



Terrace
inundation at
3,250 cfs



Fish larvae near
cover with bullfrog
tadpole



Dip Net

Summary: Use Of Middle Rio Grande Floodplains by Rio Grande Silvery Minnow

- ▶ **Porter and Massong (2004)**: Restored sites entrain and retain RGSM eggs as natural sites.
- ▶ **Pease et al. (2006)**: RGSM larvae abundant in distinct habitats of low-lying areas.
- ▶ **Hatch and Gonzales (2008)**: Predominance of RGSM of all ages in spring floodplains.
- ▶ **Magaña (2012)**: Availability of nursery habitat linked to flow and inundation.
- ▶ **Gonzales et al. (2012, 2014)**: Evidence of spawning in floodplains and shorelines.
- ▶ **Hutson et al. (2018)**: Lateral movement of adults to simulated floodplain.
- ▶ **Valdez et al. (2019)**: Predominance of RGSM larvae in floodplains.
- ▶ **Valdez et al. (2020)**: Larval residence in floodplains through late mesolarval phase.

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