HARDHEAD MONITORING REPORT

2010

Spring Gap-Stanislaus Project

(FERC Project No. 2130)

Final

Prepared By:

Pacific Gas and Electric Company™

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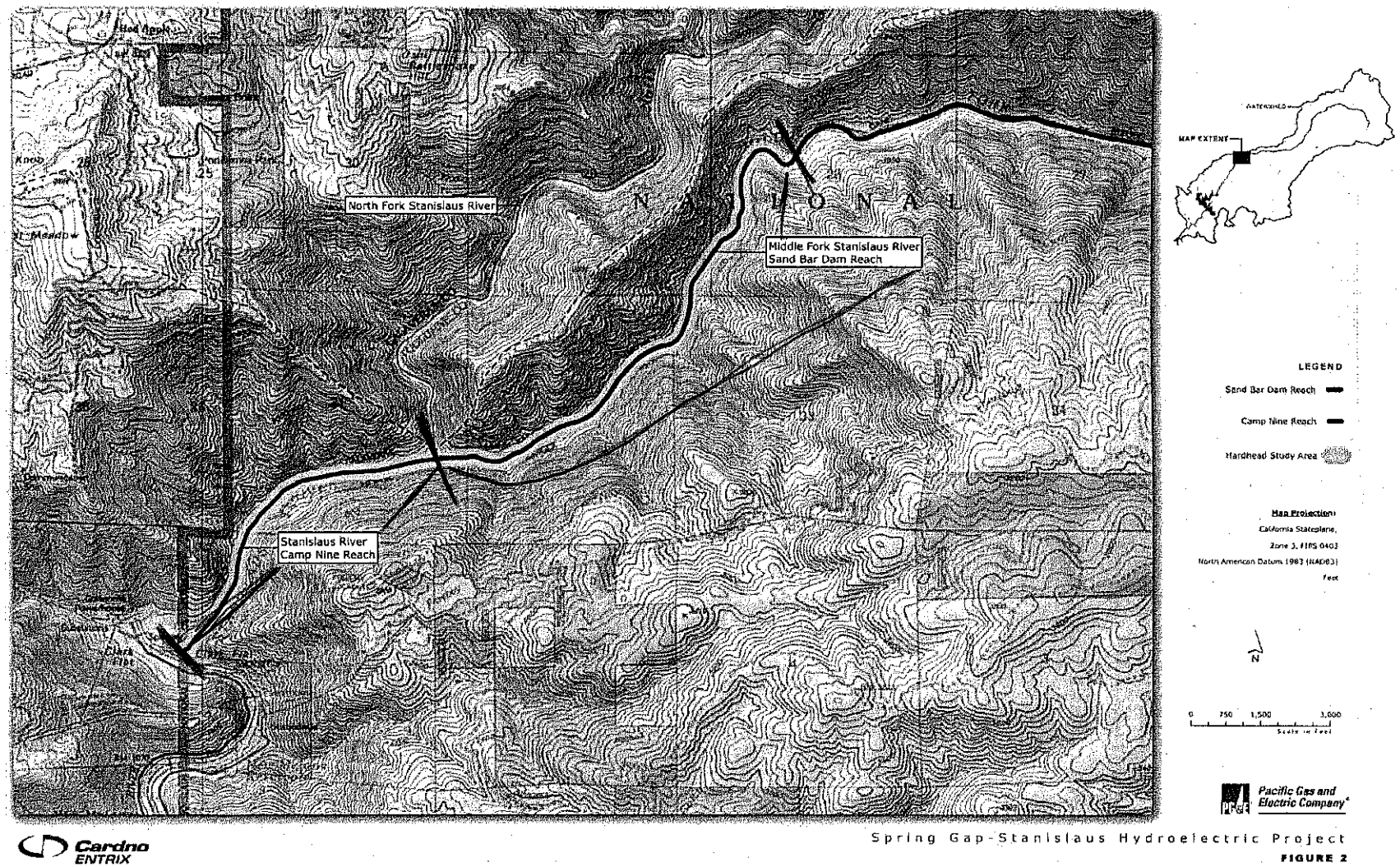


Figure 2. Hardhead Study Area in the Stanislaus and Middle Fork Stanislaus Rivers.

3.4 SNORKEL SURVEYS

3.4.1 Overview

Five species were observed in the 2010 snorkel survey: rainbow trout, brown trout, Sacramento sucker, Sacramento pikeminnow, and hardhead. Schools of young cyprinids less than three inches in length that were largely young of the year or yearling Sacramento pikeminnow and hardhead were difficult to identify while snorkeling. These were denoted as unidentified cyprinids. Large numbers of unidentified cyprinids were observed at all survey sites, and 1,345 fish or 62.5 percent of the 2,153 total fish observed were unidentified cyprinids (Table 5). Hardhead were the most abundant identifiable species with 316 individuals observed, comprising 14.7 percent of the total fish observations with unidentified cyprinids included. Of the 316 hardhead identified, 70 percent had lengths between six and nine inches and 21 percent had lengths between nine and twelve inches. Species composition and abundance varied between reach and survey sites, which were representative of their respective reaches (Figure 11).

3.4.2 Upper Sand Bar Site

The Upper Sand Bar Site was established at the upstream extent of the Lower Sand Bar Dam Reach. GPS positions and photos detailing the survey location were recorded (Appendix E). A total of 177 fish were observed at the Upper Sand Bar Site (Table 5). Five identifiable species and unidentified cyprinids were observed. Unidentified cyprinids were the most abundant group and made up 35 percent of the total with 62 individuals (Figure 12). Hardhead were the most abundant identified species and made up 44 percent of observations with 52 individuals (Figure 13). Fifty four percent of all hardhead observed were between six and nine inches, 33 percent were between nine and twelve inches (Figure 11). Rainbow trout were the second most abundant positively identified species and made up 43 percent of the positively identified observations with 49 individuals (Table 5). Figure 14 presents the overall length-frequency distribution for rainbow trout. Visibility during the survey was measured at nine feet and water temperature was 14.8°C, and dissolved oxygen was 9.54 mg/l (Table 6). The study site was comprised of 472 feet of deep pool and 221 feet of associated fastwater (Table 2). Average channel width was 76

Table 5. Spring Gap Stanislaus Snorkeling Data, 2010.

Site	Unit Type	Species	Size Ranges (inches)					Species Totals
			0-3	3-6	6-9	9-12	12+	
Camp Nine Site	Pool	rainbow trout				1		1
		Sacramento sucker	15			200		215
		Sacramento pikeminnow		35	40	11	3	89
		hardhead		20	194	50		264
		unidentified cyprinids	1021					1021
	Fastwater	rainbow trout	4	20	19	6	2	51
		brown trout				1		1
		Sacramento sucker	8					8
		unidentified cyprinids	145					145
Lower Sand Bar Site	Pool	rainbow trout		6	17	5	1	29
		brown trout			2		1	3
		Sacramento sucker	13					13
		Sacramento pikeminnow	12					12
		unidentified cyprinids	60					60
	Fastwater	Sacramento sucker	7					7
		unidentified cyprinids	57					57
Upper Sand Bar Site	Pool	rainbow trout		4	1	4	2	11
		Sacramento sucker				1	1	2
		Sacramento pikeminnow			2	3	4	9
		hardhead		2	28	17	5	52
		unidentified cyprinids	62					62
	Fastwater	rainbow trout		13	8	8	9	38
		brown trout	1				2	3

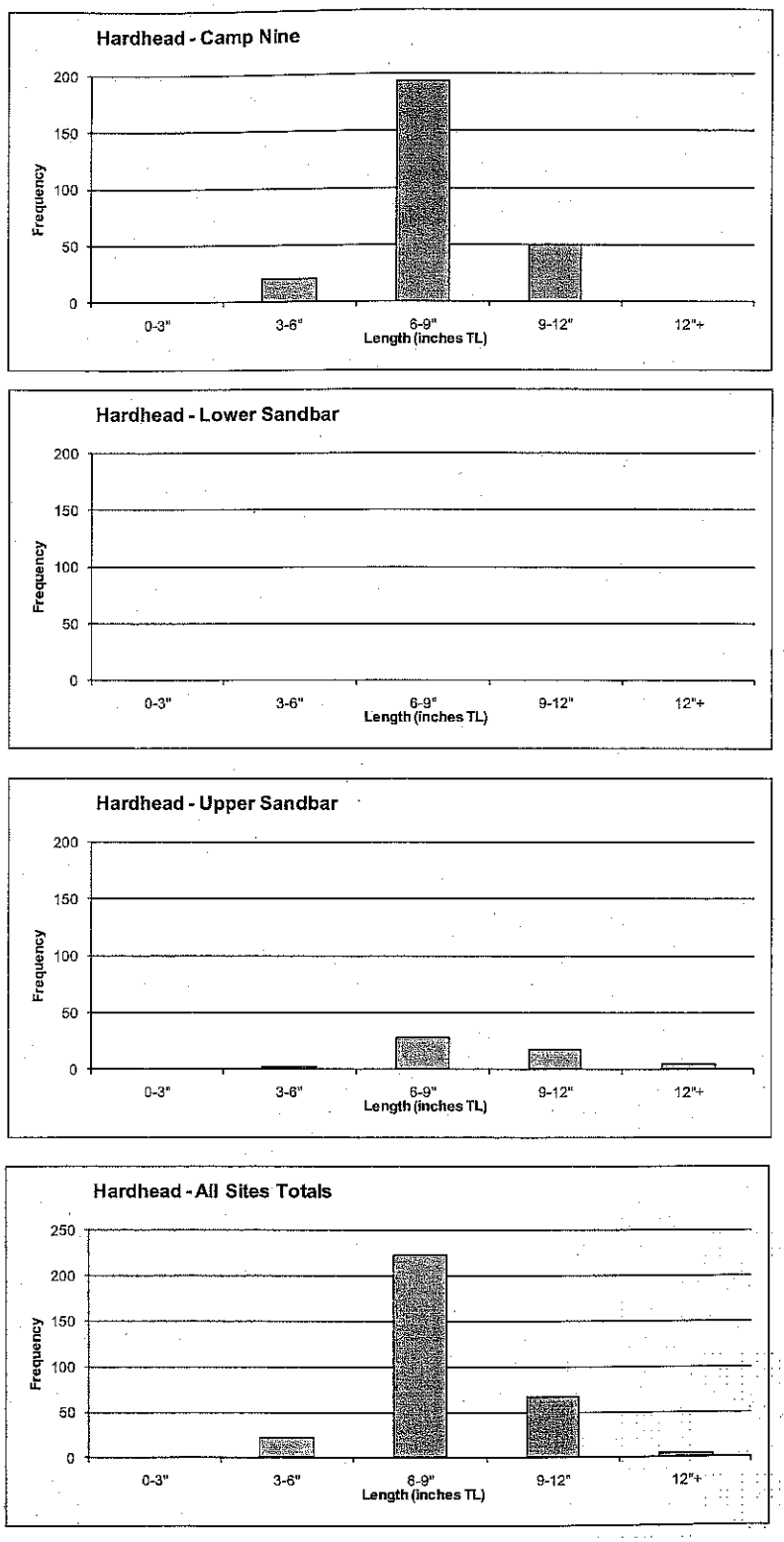
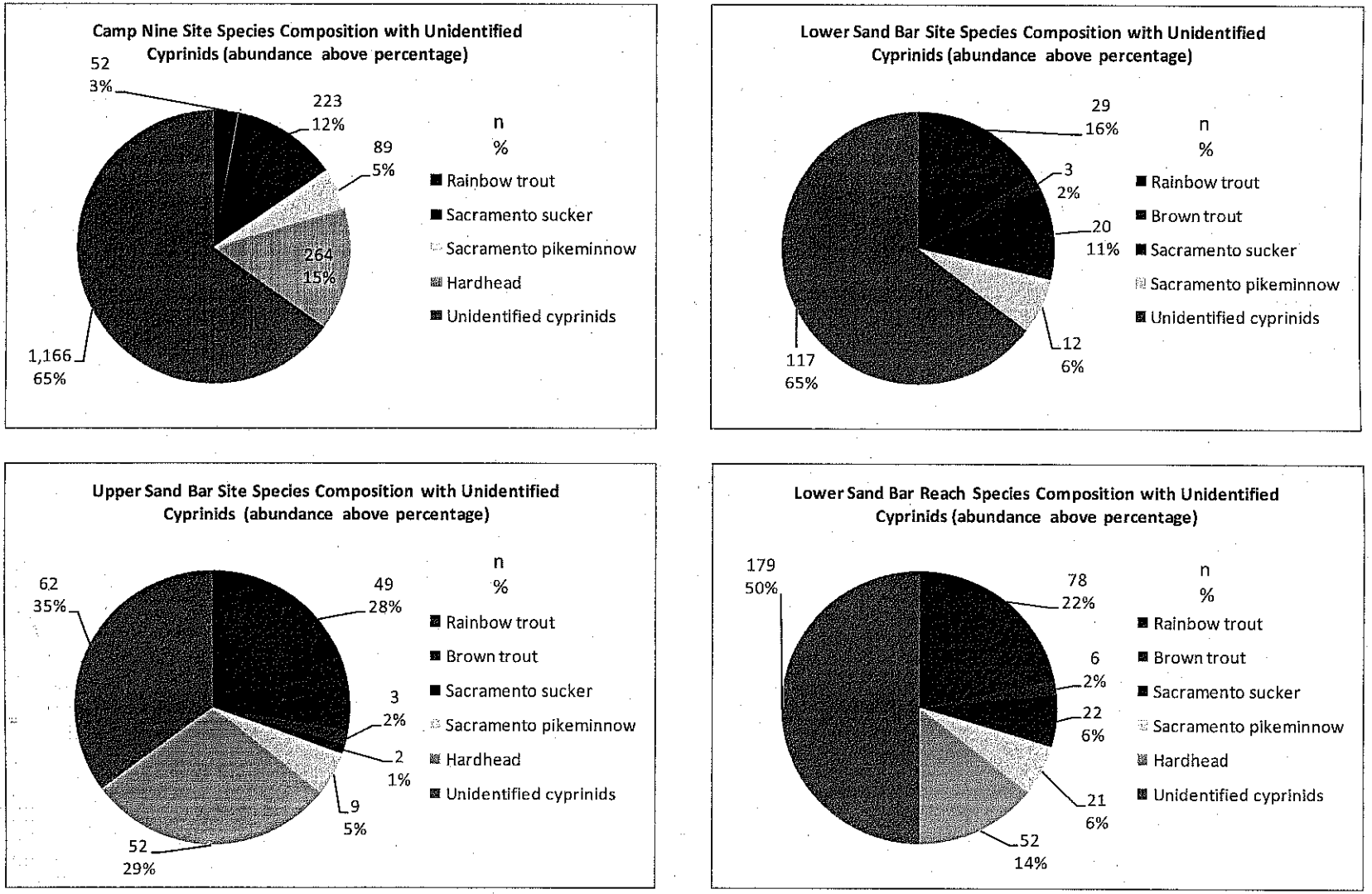


Figure 11. Hardhead Length-Frequencies by Site and for all Sites, 2010.



Note: n = number % = percent of total

Figure 12. Species Composition with Unidentified Cyprinids by Site and Reach, 2010.

feet. Substrate data collected shows this site to be boulder dominant and cobble subdominant with an average depth of 4.7 feet and a maximum depth of 14.5 feet (Table 2).

3.4.3 Lower Sand Bar Site

The Lower Sand Bar Site was established at the downstream extent of the Lower Sand Bar Dam Reach. GPS points and photos detailing the survey location are presented in (Appendix E). A total of 117 fish were observed at the Lower Sand Bar Site (Table 5). Four species were identified along with unidentifiable cyprinids. Unidentified cyprinids were the most abundant and made up 64 percent of the total with 117 individuals (Figure 12). Rainbow trout were the most abundant identified species and made up 45 percent of the positively identified observations with 29 individuals (Figure 13). No hardhead was identified. Most rainbow trout were between six and nine inches in length (Table 5), the overall length frequency for rainbow trout is presented in Figure 14. Visibility during the survey was measured at nine feet and water temperature was 15.7°C, and dissolved oxygen was 9.14 mg/l (Table 6). The study site was comprised of 230 feet of deep pool and 191 feet of associated fastwater (Table 2). Average channel width was 48 feet. Substrate data collected shows this site to be largely boulder dominant but with some cobble and bedrock also present. The study site was measured to have an average depth of 3.4 feet and a maximum depth of eight feet (Table 2).

3.4.4 Camp Nine Reach

The Camp Nine Reach had one survey site established at the upstream extent of the reach just downstream of the North Fork and Middle Fork Stanislaus River confluence. GPS points and photos detailing the survey location are presented in (Appendix E). Five fish species were positively identified at the Camp Nine Site. A total of 1,795 individual fish were observed (Table 5). Schools of unidentified cyprinids were part of this total and made up 65 percent of all fish observed at the site (Figure 12). Of the 690 fish that were positively identified, hardhead was the most abundant species; comprising 43 percent of all conclusive observations with 264 individuals present (Figure 13). Seventy four percent of all hardhead observed were between six

and nine inches, 19 percent were between nine and twelve inches (Figure 11). Sacramento sucker were the second most abundant identifiable species making up 35 percent of all positive identifications (Figure 13). Visibility during the survey was measured at 12 feet; water temperature was 14.4°C, and dissolved oxygen was 9.87 mg/l (Table 6). The study site in this reach was 834 feet in length with 588 feet deep pool and 246 feet associated fastwater habitat (Table 2). Average channel width at the site was 87 feet. Substrate data collected shows this reach to be boulder dominant and sand and bedrock sub dominant. Average depth for the site was 4 feet and maximum depth was 11.3 feet (Table 2).

3.5 ALGAL MONITORING

Algal abundance transects established at all three sites provide a baseline for the condition and density of algae available to hardhead in the Camp Nine and Lower Sand Bar Reaches. Transect GPS locations width and unit type are presented in Table 7. Condition refers to the state that the present algae is in and ranges from zero, being the poorest condition to 5, being the healthiest condition. Density refers to the surficial cover of substrate by algae regardless of its condition and has a similar scale ranging from zero, or none detected to five, substrate completely obscured. In addition to condition and density determinations, algal filament height was measured. Algal abundance data is summarized in Table 8 and an overall description of each site follows below.

The Upper Sand Bar Site algal condition ranged from level 1, detritus with a few recognizable elements, to level 3, discolored green, yellow, or rusty with epiphyte or silt loads, with the average condition of level 2, pale, weak, senescent in appearance. Algal density at the Upper Sand Bar Site ranged from level 1, a few filaments or small isolated patches, to level 4, greater than 25 percent cover, with the average density being level 3, 10-25 percent cover. Algal filament heights were generally 1 cm but one quadrat had filaments averaging 10 cm. Average filament heights were 1.7 cm at the Upper Sand Bar Site.

The Lower Sand Bar Site algal condition ranged from level 1, detritus with a few recognizable elements, to level 3, discolored green, yellow, or rusty with epiphyte or silt loads, with the

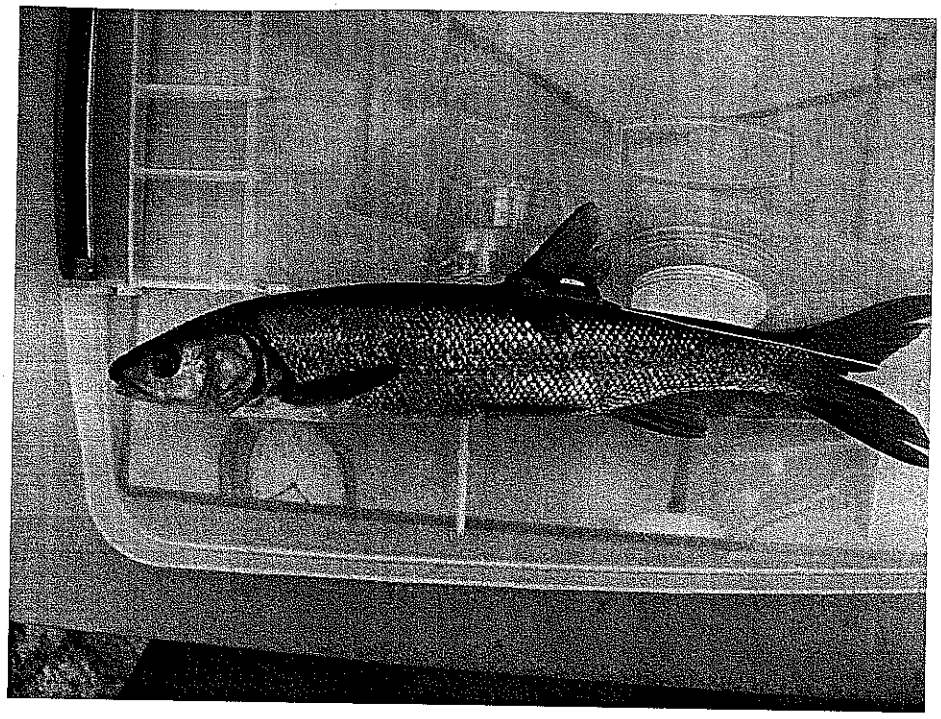


Photo 15. Adult hardhead with radiotag.

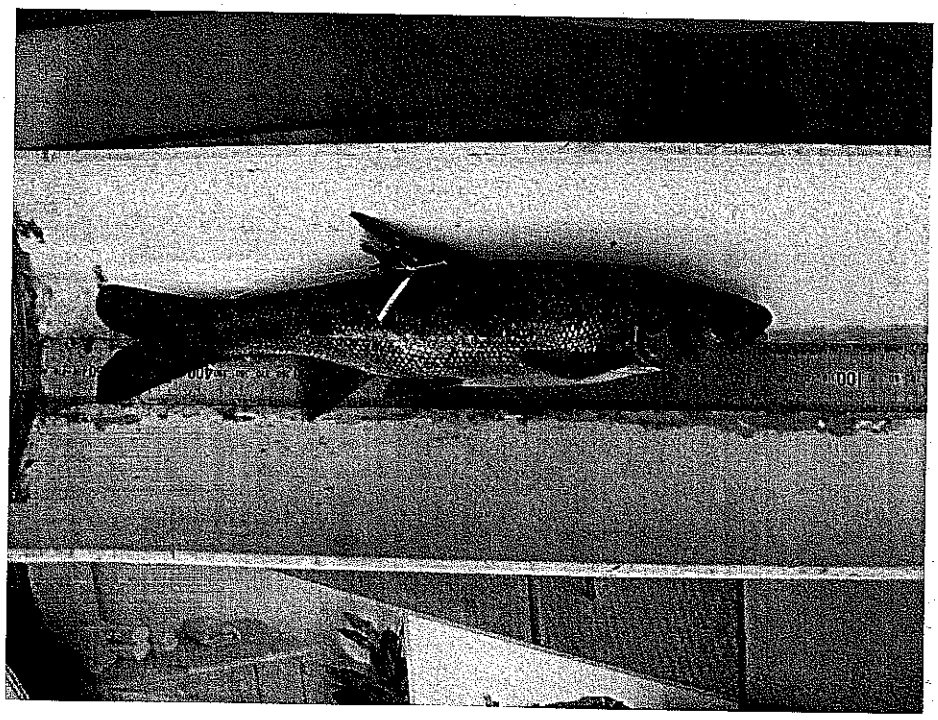


Photo 16. Adult Hardhead with radiotag attachment and floy tag.