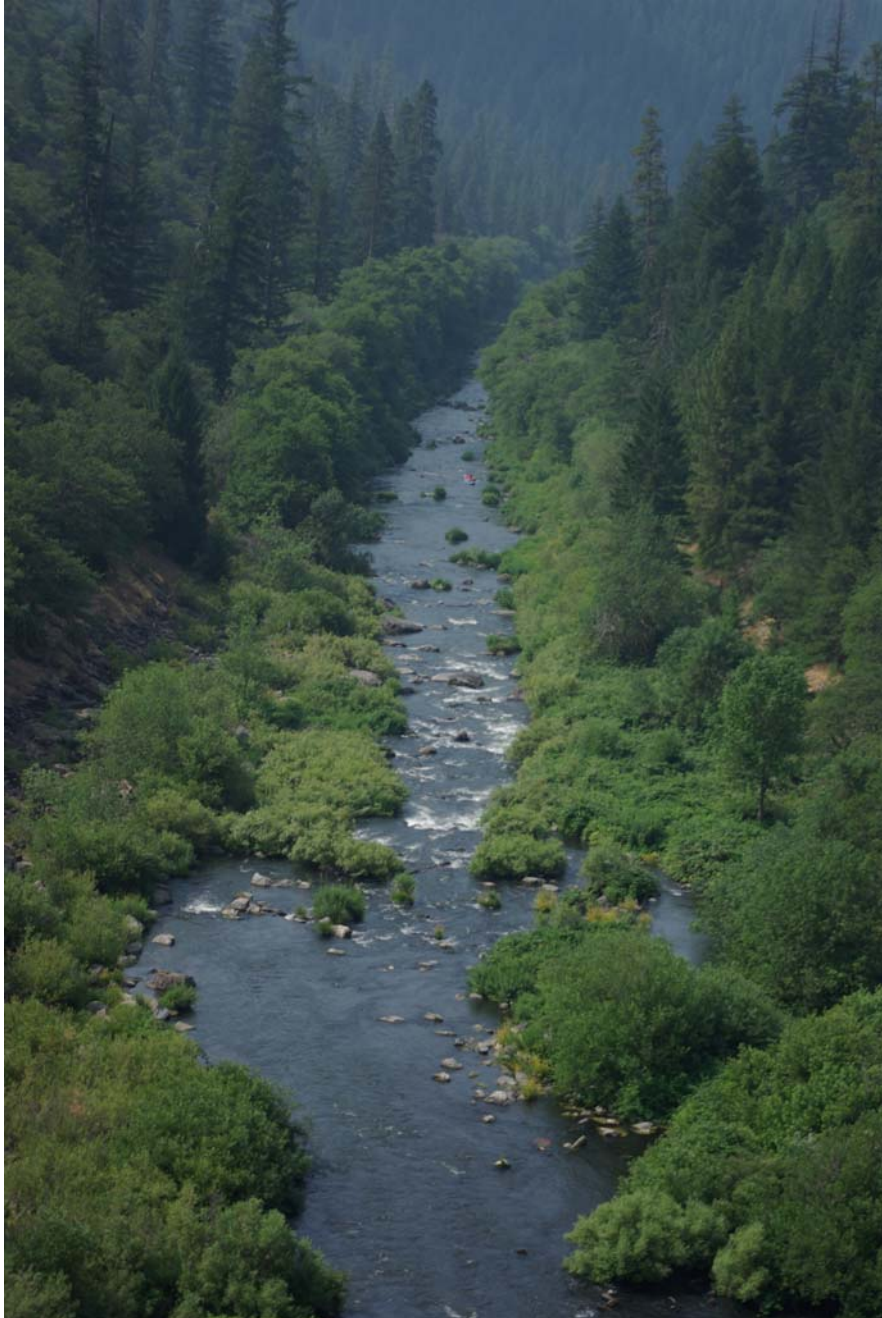


Pit River Summary Report 2008

July 14th-17th, 2008

Heritage and Wild Trout Program
California Department of Fish and Game



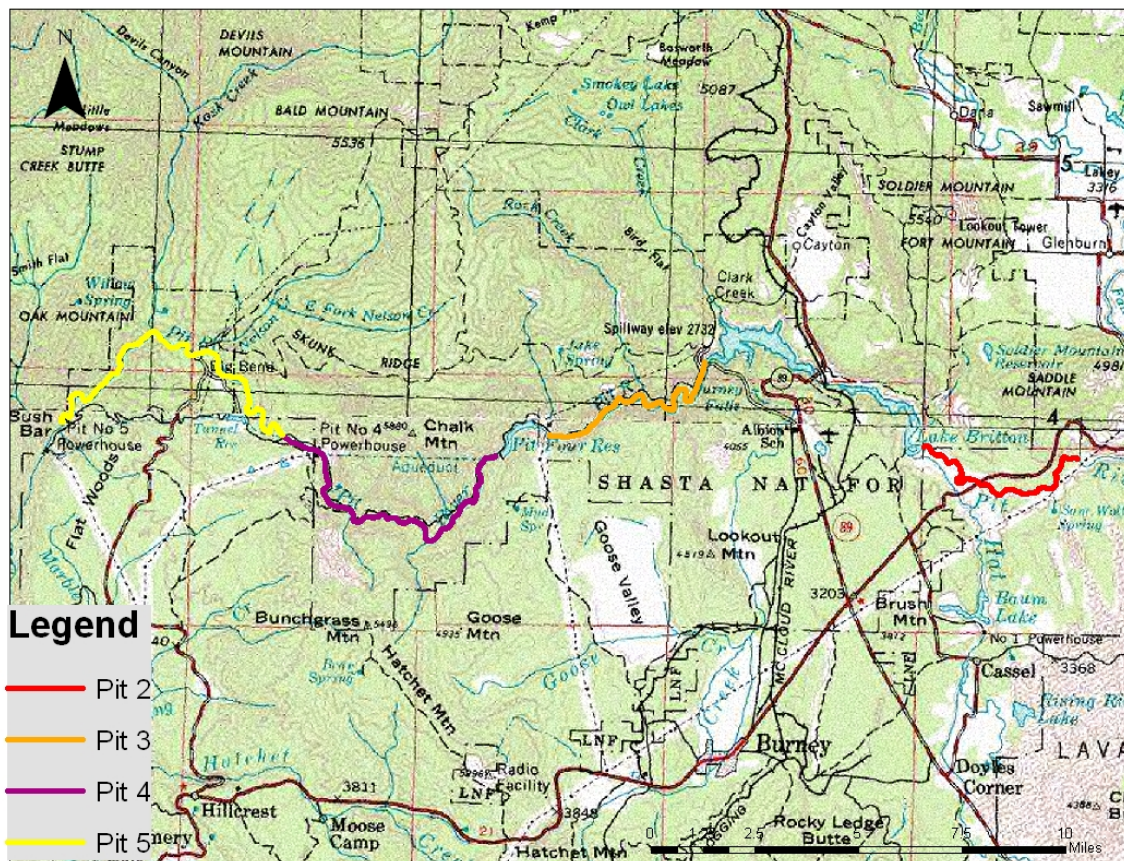
Prepared by Jeff Weaver and Stephanie Mehalick

Introduction:

The Pit River drains the Modoc Plateau in northeastern California and is one of the longest rivers in northern California, flowing for approximately 315 miles from its headwaters near Alturas to the Sacramento River at Shasta Lake. The native fish fauna of the Pit River is similar to that of the Sacramento River and includes rainbow trout (*Oncorhynchus mykiss* sp.), sculpin (*Cottus* spp.), hardhead (*Mylopharodon conocephalus*), Sacramento sucker (*Catostomus occidentalis*), speckled dace (*Rhinichthys osculus*), and Sacramento pikeminnow (*Ptychocheilus grandis*) (Moyle 2002). The ancestral origins of the rainbow trout native to the Pit River are unclear (see Discussion). For the purposes of this report, we refer to them as rainbow trout (*Oncorhynchus mykiss* sp.)

The California Department of Fish and Game's (DFG) Heritage and Wild Trout Program (HWTP) is evaluating a portion of the Pit River as a candidate Heritage Trout Water. In 2008, the HWTP conducted Phase 1 (initial resource assessment) fishery and habitat surveys on the Pit River in Shasta County to gather information on species composition, fish size class structure, habitat types, and catch rates. In addition, angler access locations and potential sites for additional Angler Survey Box (ASB) installations were evaluated.

Figure 1. Topographic map of Pit River 2008 sections



Methods:

Field Surveys

Surveys were conducted on the Pit River from the Pit Powerhouse #1 downstream to the Pit River Powerhouse #5 from July 14 through 17, 2008 (Figure 1). This 32-mile stretch of river is divided into four discrete sections based on the presence of powerhouses and dams; we used the common nomenclature that anglers use when referring to specific areas of the river. Pit 2 is the area downstream of Pit Powerhouse #1 and upstream of Lake Britton; Pit 3 is downstream of Lake Britton Dam and upstream of Pit Powerhouse #3; Pit 4 is downstream of Pit Powerhouse #3 and upstream of Pit Powerhouse #4; and Pit 5 is downstream of Pit Powerhouse #4 and upstream of Pit Powerhouse #5 (Figure 1).

HWTP staff performed hook-and-line surveys to assess catch per unit effort (CPUE) and to compare fish size(s) captured across the four study sections, collected habitat data, and documented angler access points and suitable ASB installation locations.

Survey crew members were paired for safety (due to difficult wading, remote access, and other safety considerations). Three teams of two anglers were spread out to the greatest extent possible, given access limitations, within a single section each day for Pit 3, 4, and 5 (i.e., Pit 3 was surveyed by all participants on the same day). This approach was chosen to provide a comprehensive spatial look at each section's fishery potential. In addition, spreading anglers out within each section provided a safety back-up for the kayakers conducting habitat assessments (see below). The angling teams were comprised of the same six individuals on each of the three survey days to allow comparisons of catch rates across the three sections for each angler. The angling teams surveyed Pit 3 on July 14, Pit 4 on July 15, and Pit 5 on July 16, 2008. In addition, the habitat team conducted a brief hook-and-line survey in both Pit 3 and 4 (approximately one hour each). These data were assimilated into the results.

Each angler recorded the start and end time of their effort and included a written description of the area fished. Survey length was approximated based on a visual estimate. Weather conditions were noted and water temperatures were measured. All landed fish were identified to species and their total lengths were measured to the nearest inch using a calibrated landing net.

On July 17, 2008, five HWTP staff accessed Pit 2 with kayaks and performed hook-and-line surveys in several locations along the way. The primary focus of this Pit 2 survey was a whitewater boating training exercise for the HWTP statewide crew; however, some catch data were collected in the process and incorporated into the results. Simultaneously, a team of two conducted a habitat assessment of Pit 2 utilizing the same habitat-typing methods as performed on Pit 3 and 4 (see below).

Two individuals assessed habitat within Pit 2, 3, and 4 on the same dates of the angling surveys. Due to safety concerns and the presence of Class V rapids in Pit 5, this section was not included in the habitat typing survey. The habitat team utilized inflatable kayaks and habitat-typed while paddling the length of each section. Due to equipment malfunction, coordinates from Pit 3 habitat units were lost and this section was resurveyed on July 16, 2008.

The habitat team identified habitat types as either flatwater (which included runs and glides) or pocketwater and collected GPS coordinates at the boundaries of each distinct habitat unit encountered in Pit 2, 3, and 4. A distinct habitat unit was defined as having a length greater than or equal to one channel width. Coordinates were collected with a handheld GPS unit and the corresponding habitat type was recorded.

One survey crew member was assigned to drive the length of each section and identify public access points and potential locations for additional ASB installations. This individual served as a point of radio contact and backup for the boating and angling teams, in the event of an emergency. This crew member also performed limited hook-and-line assessments and the data collected were assimilated into the results.

Analysis

For each angler, catch per unit effort (CPUE) was calculated per section by dividing the total number of fish landed by the amount of time fished (number of fish per hour). Mean daily discharge was gathered for each section. Pit 2 flow data were obtained from the United States Geological Survey (Pit River below Pit #1 Powerhouse near Fall River Mills stream gage (PP1); www.cdec.water.ca.gov). Flow data for Pit 3, 4, and 5 were obtained from Spring Rivers Ecological Sciences, LLC in coordination with Pacific Gas and Electric.

The coordinates for each habitat unit were imported into ArcGIS to quantify the total length of each habitat type in each section. A digital stream layer of the Pit River was created at a scale of 1:3000 and, based on the coordinates of each habitat type, the stream polyline was split into distinct habitat segments (Figures 5, 7, 9, and 11). The total length of each habitat unit was calculated in ArcMap and was totaled for each habitat type across each section.

Although Pit 5 was not habitat-typed in the field, a habitat layer was digitized for this section based on aerial photography. While conducting the GIS analyses on previous sections, it was noted that pocketwater was lighter and mottled in color on the aerial photography while flatwater was dark and solid in color (Figures 2 and 3). Using these visual distinctions, we differentiated habitat types in Pit 5 and their corresponding lengths to the extent possible using satellite imagery interpretation in GIS.

Figure 2. Photographs of aerial photography from GIS (1:3000) comparing flatwater versus pocketwater habitat. Left photograph is without alteration and right photograph includes overlay of digitized stream layer based on field survey coordinates.

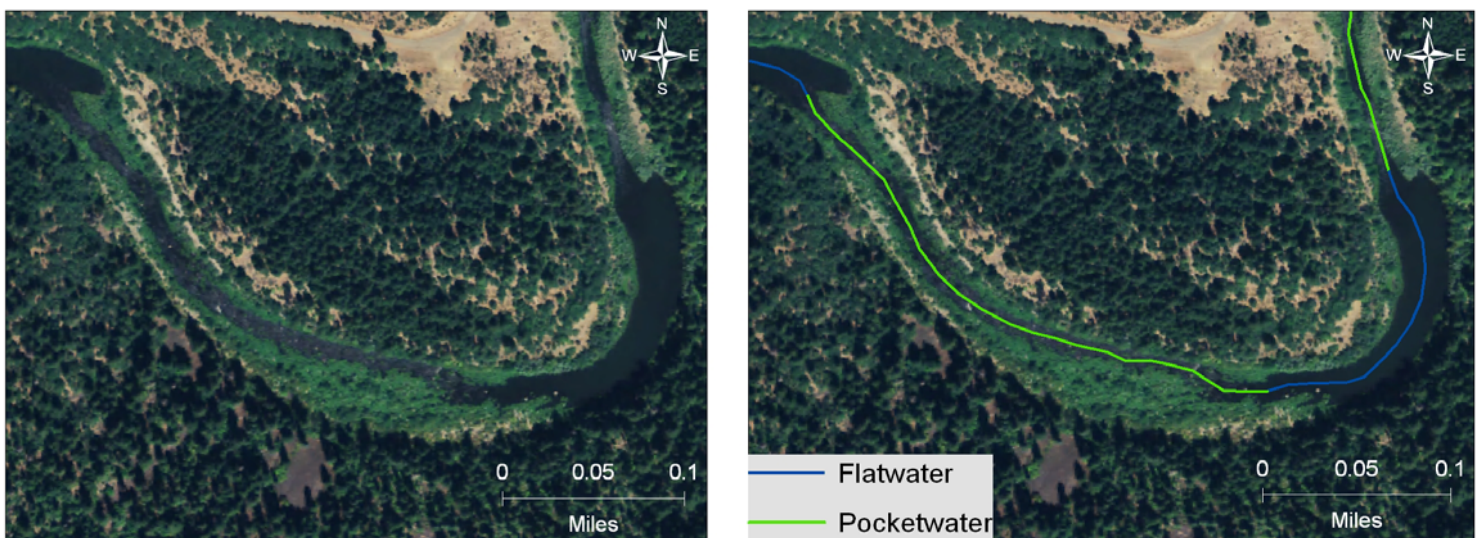


Figure 3. Photographs of flatwater habitat (left), pocketwater habitat (middle), and HWTP staff conducting habitat analysis in inflatable kayak (right).



Results:

Pit 2

Pit 2 was 5.49 miles in length and consisted of 64% flatwater and 36% pocketwater (Figures 4 and 5; Table 8). The weather was sunny and clear during the survey on July 17, 2008 and the water temperature was 21° Celsius (C) in the afternoon. Flow was approximately 1334 cubic feet per second (cfs). Five anglers captured a total of eight fish in 6.25 hours of effort which yielded an overall catch rate of 1.3 fish per hour (Table 1). Individual catch rates ranged from zero to four fish per hour and anglers landed rainbow trout and hardhead (Table 7). Rainbow trout ranged in size from small to extra-large, with the majority falling in the large size class (Table 6).

According to local fishing guides, this section receives less angling pressure than Pit 3 through 5. However, it appears to provide a quality rainbow trout fishery. Large fish may seasonally move upstream from Lake Britton which, at times, may provide a trophy fishery especially in the lower portion of the section. Public access in this area of the river is limited, with private property surrounding the majority of the section on both the north and south sides of the river (Figure 6). Anglers may access the upper end of Pit 2 via the road to the Clearwater Lodge (and the Bureau of Land Management Pit River Campground adjacent to the river at the end of the same access road) and the lower end of the section at the Highway 299 bridge crossing. HWTP staff recommends installing new ASB boxes at both of these locations to better assess angler use, catch rates and angler satisfaction in this area (Figure 6).

Table 1. Summary of 2008 Pit 2 angling data

Section Number	Date	Angler	Number Fish Landed	Effort (hours)	Catch per Hour
2	07/17/08	Buckmaster	2	1.67	1.2
2	07/17/08	Hennes	2	0.83	2.4
2	07/17/08	Notch	0	0.75	0.0
2	07/17/08	Zuber	4	2	2.0
2	07/17/08	Weaver	0	1	0.0
Pit 2 Totals			8	6.25	1.3

Figure 4. Topographic map of Pit 2 (red line)

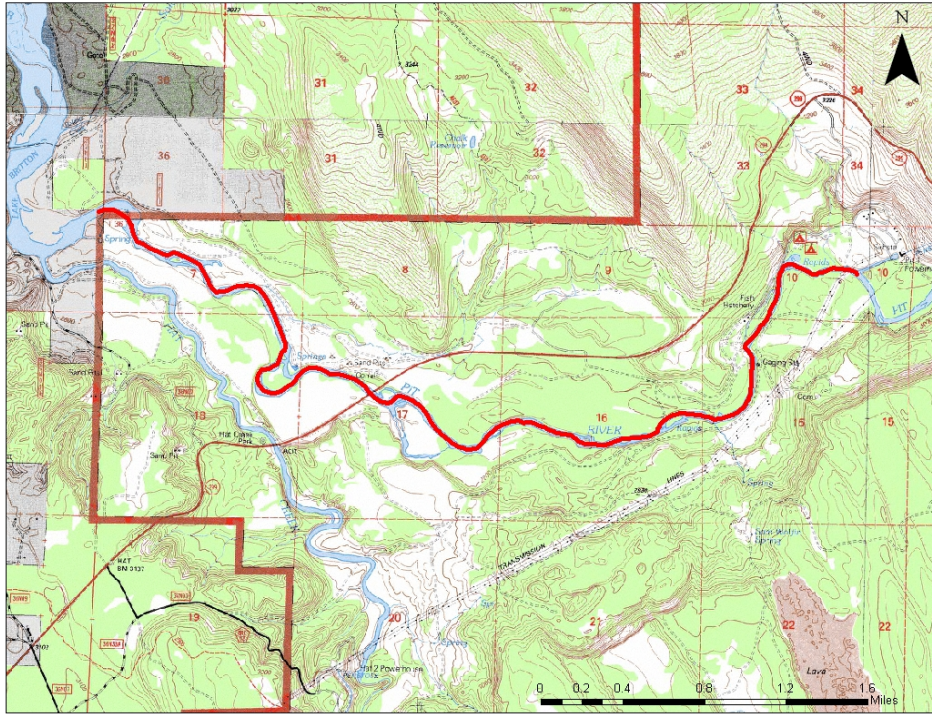


Figure 5. Map of Pit 2 habitat delineation from GIS

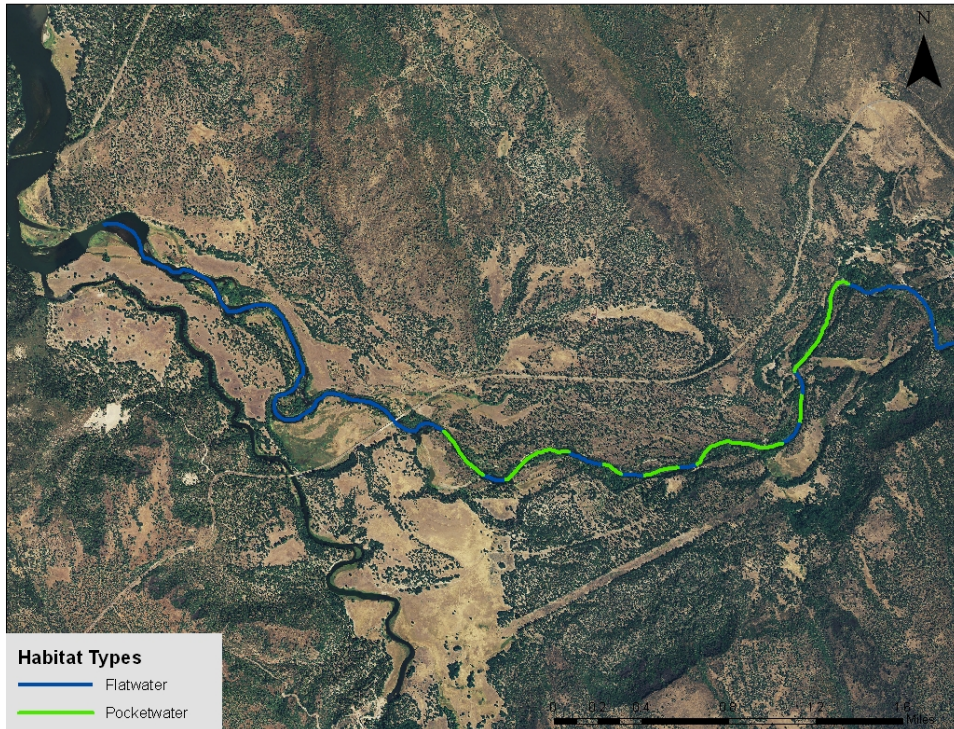
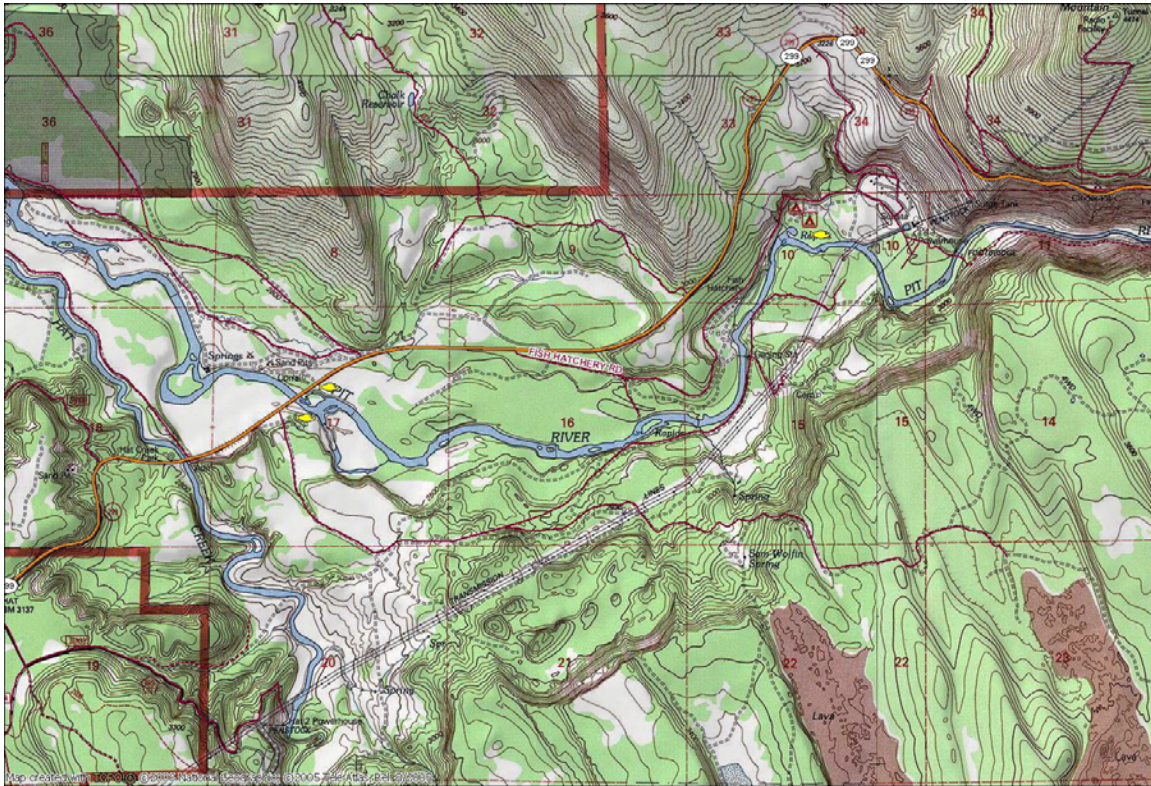


Figure 6. Map of suggested locations for new ASB installations on Pit 2 (yellow fish symbols)



Pit 3

Pit 3 was 5.99 miles in length and consisted of 35% flatwater and 65% pocketwater (Figures 7 and 8; Table 8). The weather was partly cloudy in the morning and sunny with a slight breeze in the afternoon on July 14, 2008. Water temperature was approximately 17° C in the morning. There are no flow gages on Pit 3; however, according to Pacific Gas and Electric, flows were at a minimum of 150 cfs (only minimum discharge information was available). Nine anglers captured 68 fish in 37.08 hours of effort with an overall catch rate of 1.8 fish per hour (Table 2). Individual catch rates ranged from 0.2 to nine fish per hour. Except for three hardhead, all of the fish landed were rainbow trout. The latter ranged in size from small to large (Tables 6 and 7). Ninety-five percent of the trout landed fell into the medium and large size classes; small fish represented only five percent of the total landed. Anglers accessed the river at Powder Spur, Pit #3 Powerhouse, and Rock Creek.

This portion of the river receives a considerable amount of angling pressure, with the Pit Canyon Road (Forest Route 50) paralleling the river the entire length of the section (Figure 9). Direct access to the river, however, is difficult in many areas with the roadbed high above the river's level. Steep topography and few trails further limit access. The easiest Pit 3 access locations are: Lake Britton Dam; several well-known pull outs with user-created trails between Lake Britton and Rock Creek; the confluence of the Pit River with Rock Creek (several pullouts and parking areas with multiple user-created trails to the river); the Camp Nine Flat area (multiple access points and dispersed camping areas); and a limited number of pullouts between Camp Nine Flat and the Pit 3 Powerhouse.

Existing ASB locations include Lake Britton Dam (along the access trail heading downstream from the dam) and Rock Creek (Figure 9). Additional ASBs could be installed at the most popular access points between Lake Britton and the confluence with Rock Creek (in the vicinity of Delucci Ridge and Powder Spur). Another box could be installed in the Camp Nine Flat area.

Table 2. Summary of 2008 Pit 3 angling data

Section Number	Date	Angler	Number Fish Landed	Effort (hours)	Catch per Hour
3	07/14/08	Buckmaster	8	4.5	1.8
3	07/14/08	Hennes	5	5	1.0
3	07/14/08	Notch	25	6.5	3.8
3	07/14/08	Zuber	1	5.33	0.2
3	07/14/08	Kirsch	9	6.25	1.4
3	07/16/08	Mehalick	1	1	1.0
3	07/16/08	Bloom	9	1	9.0
3	07/14/08	Weaver	1	1	1.0
3	07/16/08	Weaver	6	1.5	4.0
3	07/14/08	Plemons	3	5	0.6
Pit 3 Totals			68	37.08	1.8

Figure 7. Topographic map of Pit 3 (orange line)

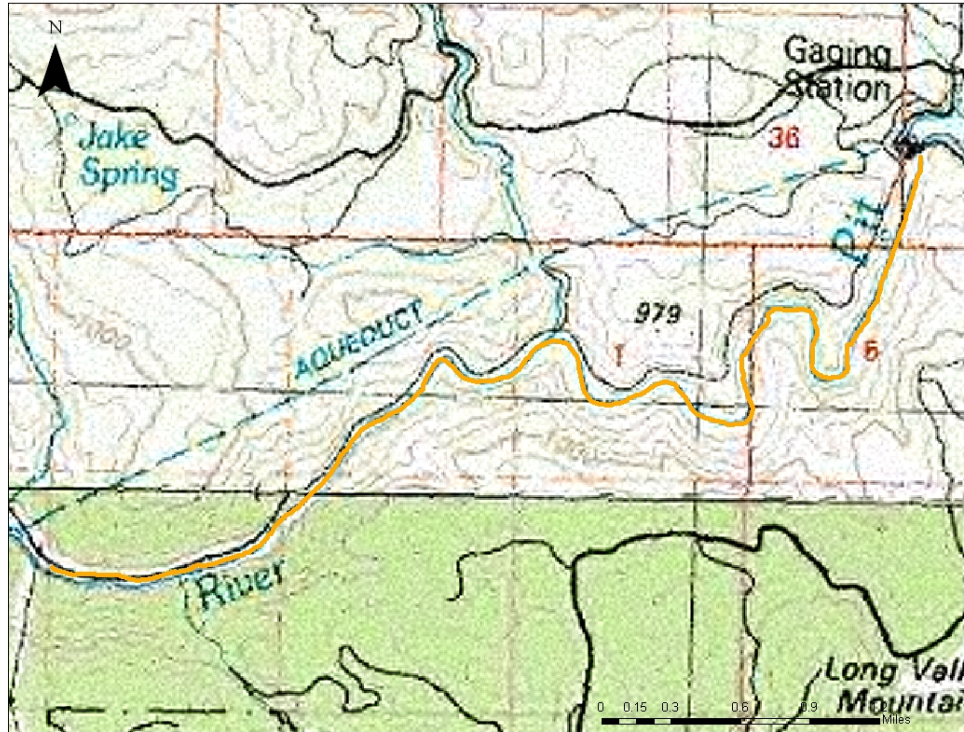


Figure 8. Map of Pit 3 habitat delineation from GIS

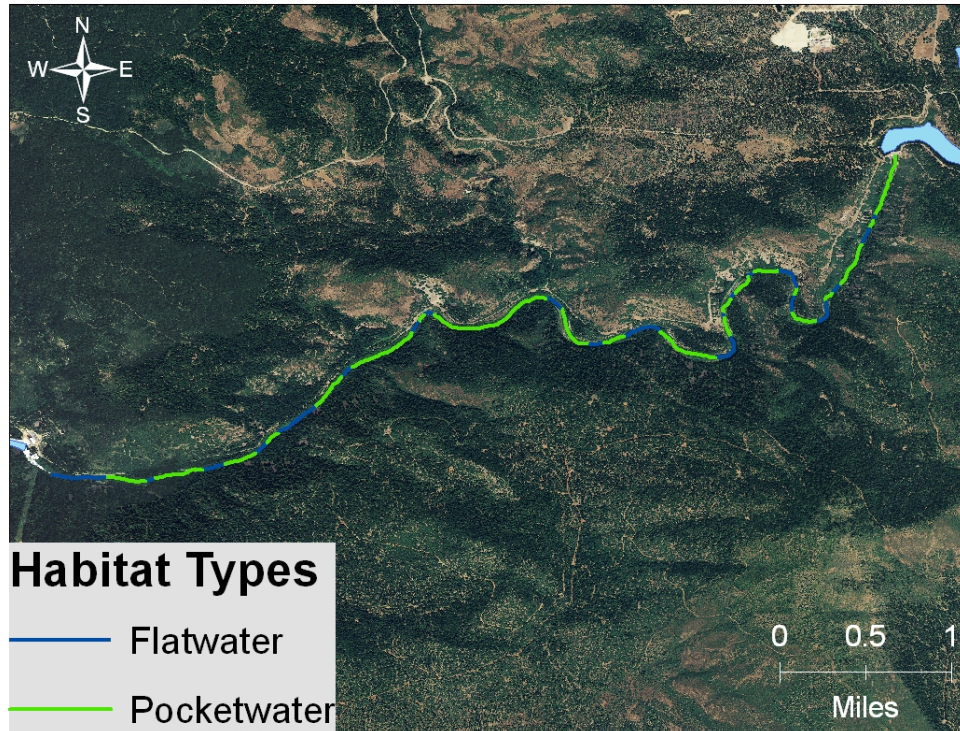
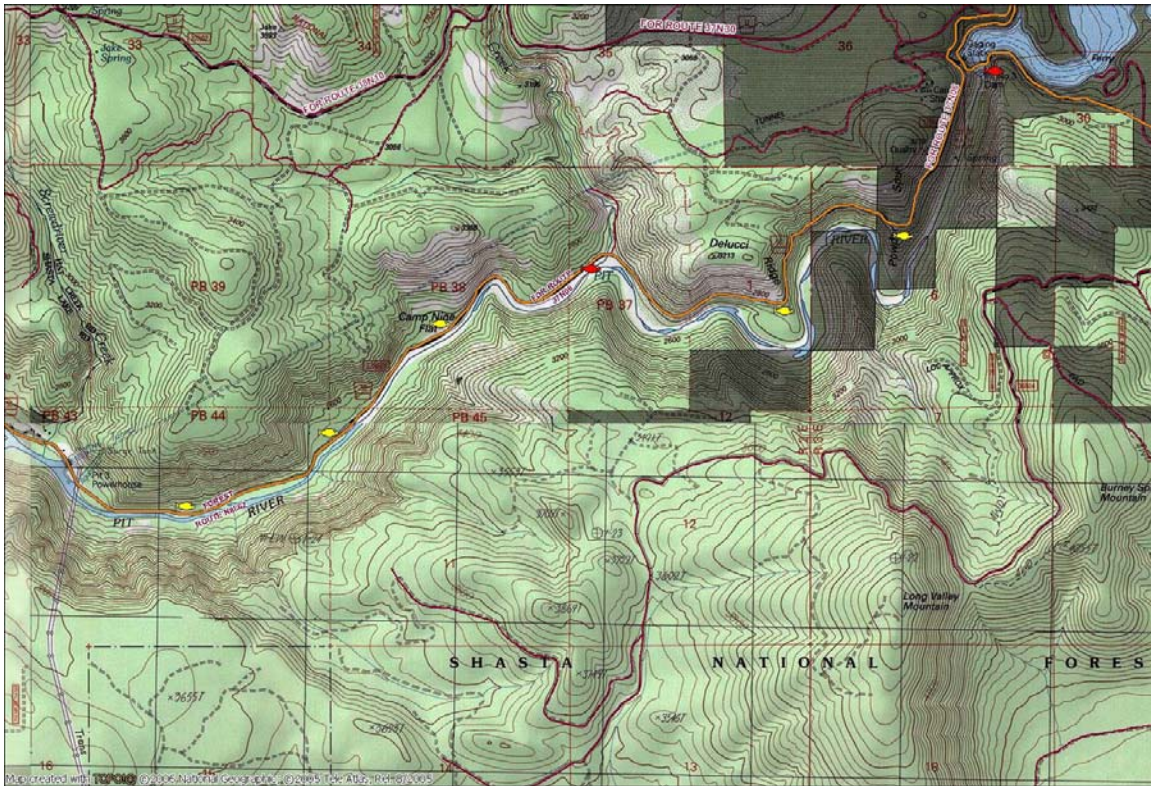


Figure 9. Map of existing ASB locations (red fish symbols) and suggested locations for new ASB installations on Pit 3 (yellow fish symbols)



Pit 4

Pit 4 was 8.69 miles in length and consisted of 48% flatwater and 52% pocketwater (Figures 10 and 11; Table 8). On July 15, 2008, the weather was clear and calm in the morning with a slight breeze in the afternoon. Water temperatures ranged between 19° and 21° C and flow was approximately 188 cfs. Eight anglers captured a total of 74 fish in 33.5 hours of combined effort, with an overall catch rate of 2.2 fish per hour (Table 3). Individual catch rates ranged between zero and 5.4 fish per hour. Anglers landed rainbow trout, Sacramento pikeminnow, a Sacramento sucker, and hardhead (Table 7). The majority of fish captured were medium-sized rainbow trout; rainbow trout observed in Pit 4 ranged from small to large (Table 6). Anglers accessed the river at the Deer Creek Campground and the Pit 4 stream gage station.

Access to this portion of the river becomes increasingly difficult, with the Pit Canyon Road running high along the ridge on the north rim of the canyon and well above the river for long distances (Figure 12). Nearly one-half of the section is inaccessible from the road and only the most determined anglers (or those with boats and whitewater paddling skills) can fish these areas. Access is best at the upper end of the section near the outflow of Pit 4 Reservoir. A large flat on the north side of the river in this vicinity provides one of the only dispersed camping areas along Pit 4 (with the exception of Deer Creek Campground, located at the end of a long and rough dirt road on the south side of the river approximately three miles upriver from the Pit 4 Powerhouse). No ASB are currently installed along Pit 4. HWTP staff recommends installation of ASBs at one or

more locations in the large, dispersed camping flat downstream of the Pit 4 Reservoir and at Deer Creek Campground (Figure 12).

Table 3. Summary of 2008 Pit 4 angling data

Section Number	Date	Angler	Number Fish Landed	Effort (hours)	Catch per Hour
4	07/15/08	Buckmaster	18	5.75	3.1
4	07/15/08	Hennes	9	7.08	1.3
4	07/15/08	Notch	28	5.17	5.4
4	07/15/08	Zuber	5	4.75	1.1
4	07/15/08	Kirsch	8	4.75	1.7
4	07/15/08	Mehalick	3	1	3.0
4	07/15/08	Weaver	0	0.5	0.0
4	07/15/08	Plemons	3	4.5	0.7
Pit 4 Totals			74	33.5	2.2

Figure 10. Topographic map of Pit 4 (purple line)

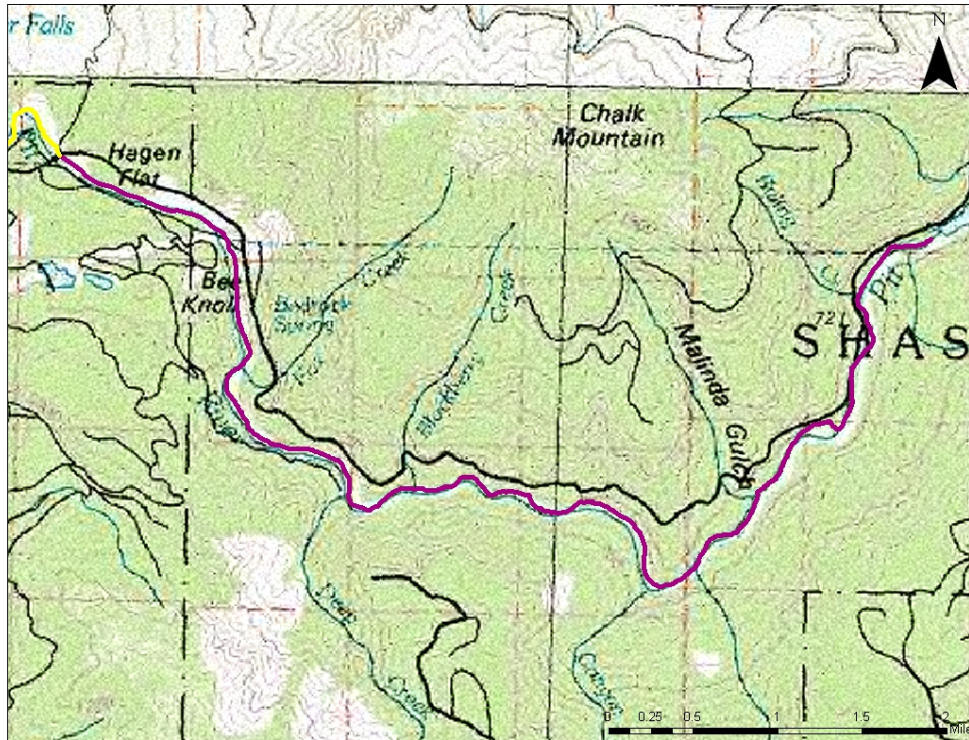


Figure 11. Map of Pit 4 habitat delineation from GIS

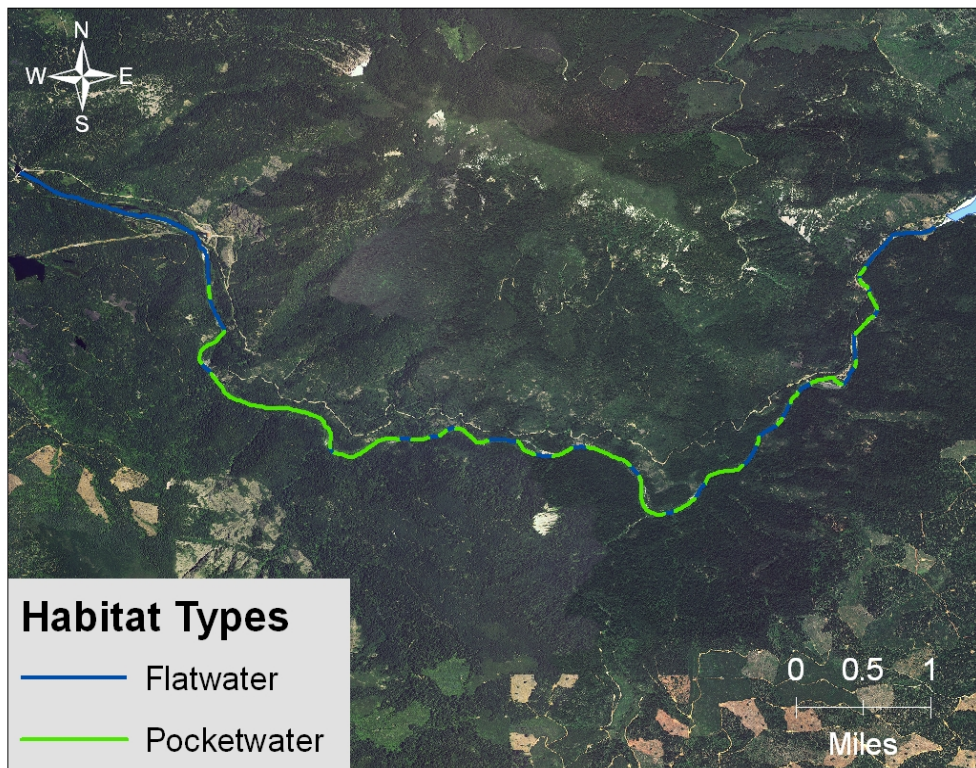
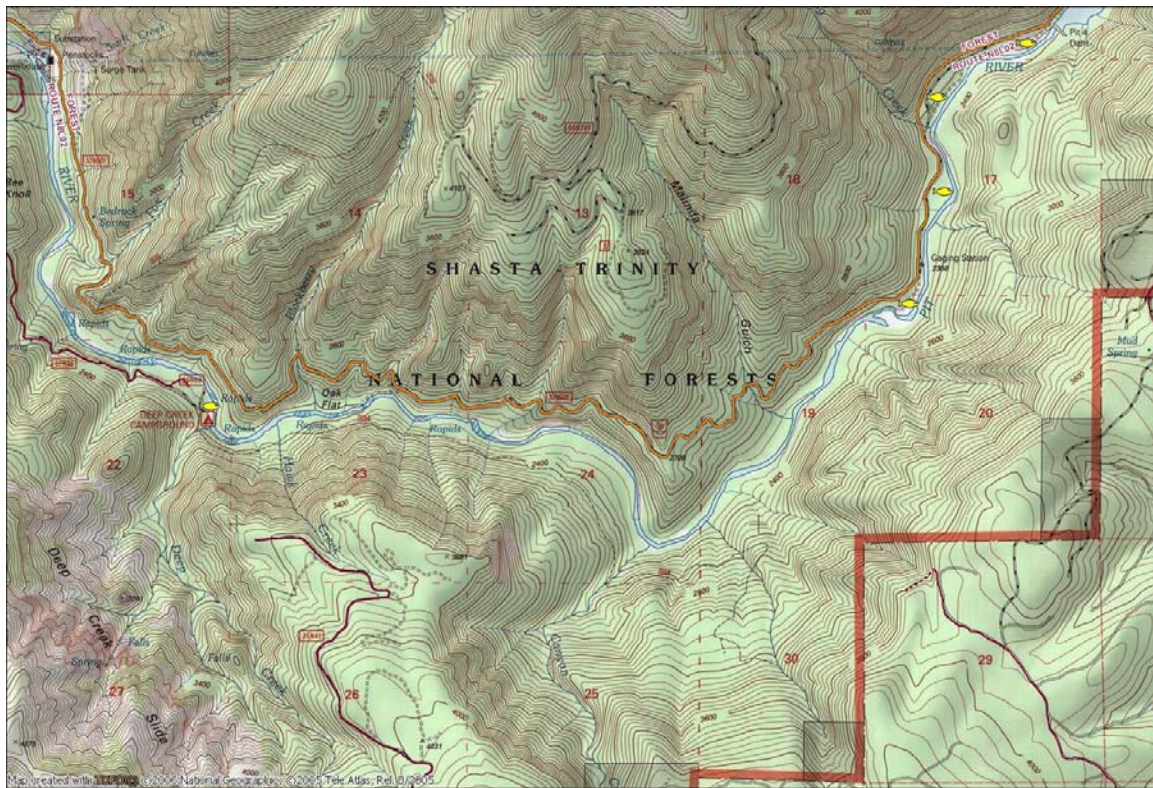


Figure 12. Map of suggested locations for new ASB installations on Pit 4 (yellow fish symbols)



Pit 5

Pit 5 was 15.16 miles in length and, according to GIS analysis, was comprised of approximately 53% flatwater and 47% pocketwater (Figures 13 and 14; Table 8). This analysis was based on satellite imagery from 2006. Locating the boundaries between flatwater and pocketwater habitat types by interpreting satellite imagery appeared to correspond well to our in-field habitat typing of Pit 2, 3, and 4 (Figure 2). Although this method is presumably less accurate than habitat typing in the field, remote GIS analysis allowed an approximation of the habitat percentages of both flatwater and pocketwater.

The weather was sunny and calm on July 16, 2008 and the water temperature was between 20° and 23° C. Flow was approximately 190 cfs. Seven anglers captured a total of 76 fish in 29.3 hours of effort with an overall average catch rate of 2.6 fish per hour (Table 4). Fish captured included rainbow trout, Sacramento pikeminnow, one Sacramento sucker, and hardhead (Table 7). Rainbow trout ranged in size from small to large; the majority of rainbow trout landed were medium-sized (Table 6). Individual catch rates ranged from one to 6.6 fish per hour. Anglers accessed the river near Big Bend, Pit #5 Dam, and via a four-wheel drive road from the Pit #5 Powerhouse.

Like Pit 4, access to much of Pit 5 is limited. Private property surrounds the majority of the section, especially near the community of Big Bend (Figure 15). The best access (and angling) appears to be at the upper end of the section, from the vicinity of Tunnel Reservoir upstream to Pit 5 Dam. Anglers can hike downstream from Pit 5 Dam (though the wading and hiking is difficult). Dispersed roads near a set of power lines adjacent to

Tunnel Reservoir allow access to the Pit River canyon rim; however, hiking (scrambling) down to the river itself is strenuous. This area is private property, so legal access may be an issue (although no signs indicating no trespassing were noted during this survey). Access in and around Big Bend is almost non-existent with private property surrounding the river. Several access points exist on the north side of the river near Big Bend, where Summit Lake Road crosses the river. From the confluence with Kosk Creek downstream to Bush Bar, the river runs through a remote canyon with no road access. The only apparent access to this area is via the Nelson Flat Trail, on the north side of the river. This trail was not investigated during these surveys due to time constraints.

One crew member accessed the lowest portions of the section near the Pit 5 Powerhouse via Pit 5 Road, near Bush Bar. Water temperatures were high (70°F) and no trout were captured or observed. This area is downstream of several hot springs which may contribute to higher water temperatures, reducing suitable habitat for trout in the lower end of Pit 5.

There are currently no ASBs located on Pit 5. HWTP staff suggests installation of a box at the Pit 5 Dam (just downstream, along a user-created trail) and possibly at one or more dispersed road accesses near the Summit Lake Road crossing of the Pit River, just north of Big Bend (Figure 15).

Table 4. Summary of 2008 Pit 5 angling data

Section Number	Date	Angler	Number Fish Landed	Effort (hours)	Catch per Hour
5	07/16/08	Buckmaster	7	2.5	2.8
5	07/16/08	Hennes	4	2.5	1.6
5	07/16/08	Notch	44	6.67	6.6
5	07/16/08	Zuber	4	4.5	0.9
5	07/16/08	Kirsch	7	5.92	1.2
5	07/15/08	Weaver	5	2	2.5
5	07/14/08	Plemons	5	5.25	1.0
Pit 5 Totals			76	29.34	2.6

Figure 13. Topographic map of Pit 5 (yellow line)

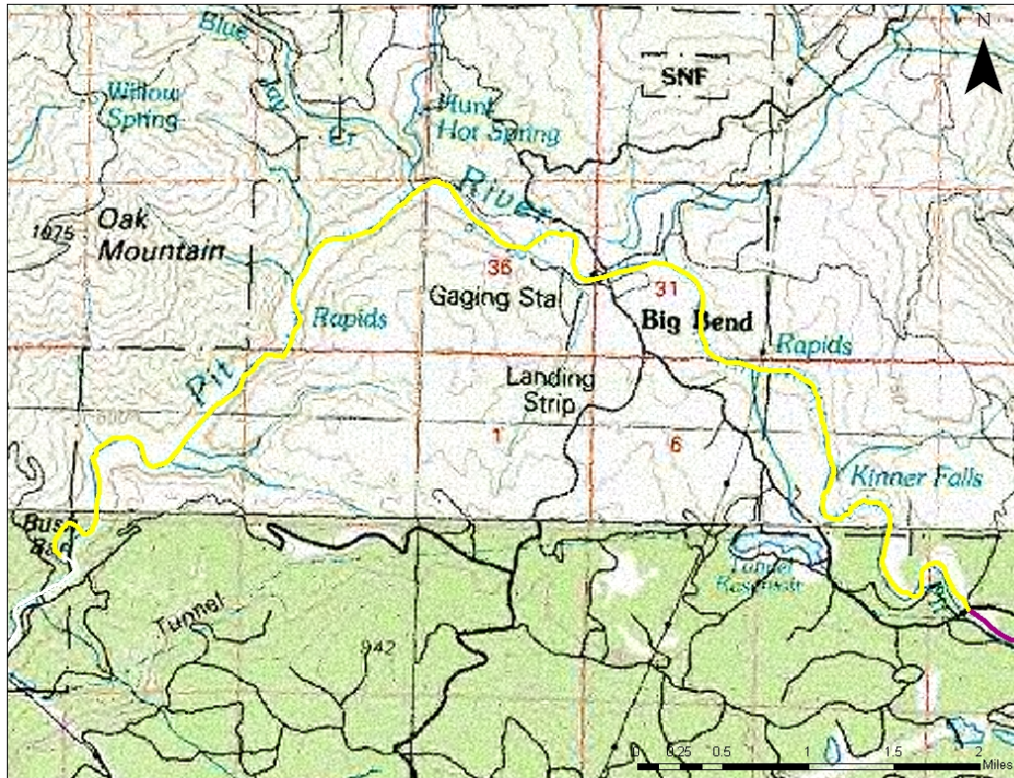


Figure 14. Map of Pit 5 habitat delineation from GIS

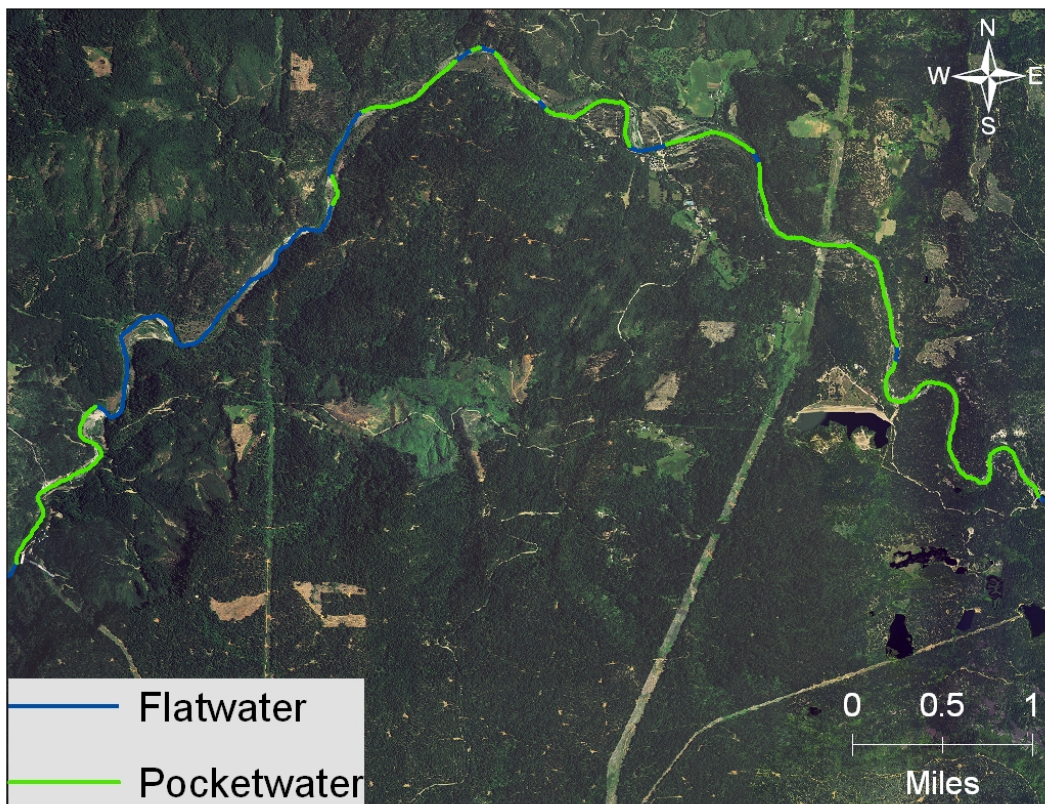
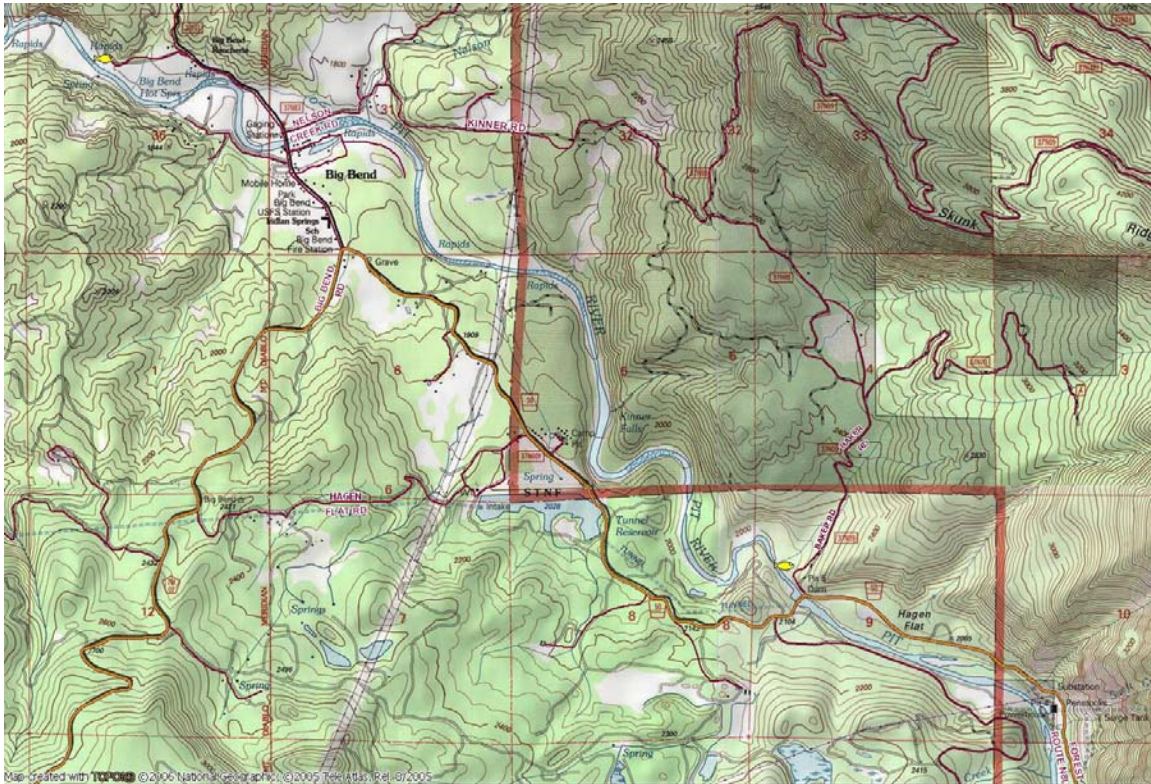


Figure 15. Map of suggested locations for new ASB installations on Pit 5 (yellow fish symbols)



A comparison of individual catch rates between sections yielded varying results (Table 5). In general, the overall catch rate was high at 2.1 fish per hour (as averaged across all anglers and all sections) and indicates that all sections surveyed have the potential of offering fast-action fisheries (Table 5). No apparent trend exists to indicate that one section had higher catch rates than other sections (Table 5). Of the rainbow trout landed, medium-sized fish made up a large proportion of the size class structure across all sections (Table 6). Pit 3 had relatively high numbers of large-sized rainbow trout. Pit 2 was the only section in which an extra-large rainbow trout was landed. According to field notes, anglers focused on fishing the pocket-water habitat during these surveys, although some anglers did fish in the flatwater (run or glide) areas. One angler used spinning gear (all others were fly fishing) and was able to more effectively fish the deeper flatwater areas, though no trend was noted as a result.

Table 5. Comparison of 2008 angler catch rates by section on the Pit River

Angler	Catch per Hour			
	Pit 2	Pit 3	Pit 4	Pit 5
Bloom	n/a	9	n/a	n/a
Buckmaster	1.2	1.8	3.1	2.8
Hennes	2.4	1	1.3	1.6
Kirsch	n/a	1.4	1.7	1.2
Plemons	n/a	0.6	0.7	1
Mehalick	n/a	1	3	n/a
Notch	0	3.8	5.4	6.6
Weaver	0	2.8	0	2.5
Zuber	2	0.2	1.1	0.9
Average	1.1	2.4	2.0	2.4

Table 6. Number of rainbow trout landed by size class and section on the Pit River in 2008

Section number	Number of rainbow trout landed					Total
	YOY	Small	Medium	Large	XLarge	
		0-5.9"	6"- 11.9"	12"-17.9"	>18"	
2	0	0	1	4	1	6
3	0	3	29	33	0	65
4	0	5	45	9	0	59
5	0	3	46	18	0	67

Table 7. Number of fish landed by species and section on the Pit River in 2008

Section number	Number of fish landed					Total
	Total effort (hrs)	Rainbow trout	Sacramento pikeminnow	Sacramento suckers	Hardhead	
2	6.25	6	0	0	2	8
3	37.08	65	0	3	0	68
4	33.5	59	10	1	4	74
5	28.34	67	6	1	2	76

Table 8. Comparison of total lengths of each section and percentages of habitat types on the Pit River, 2008

	Pit 2	Pit 3	Pit 4	Pit 5
Total Length (mi.)	5.49	5.98	8.68	15.16
Total Flatwater (mi.)	3.50	2.09	4.19	8.09
Total Pocketwater (mi.)	1.99	3.89	4.49	7.07
% Flatwater	64	35	48	53
% Pocketwater	36	65	52	47

Discussion:

HWTP Phase 1 (basic resource assessment) surveys are performed to determine whether or not a trout fishery meets the minimum criteria for designation as Wild or Heritage Trout Water. These criteria include: waters supporting self-sustaining trout populations must be open to the public; waters should be environmentally productive and aesthetically pleasing; the fishery must be able to support, with appropriate angling regulations, wild trout populations of sufficient magnitude to provide satisfactory trout catches in terms of number or size of fish; and, domestic strains of catchable-size trout shall not be planted but suitable hatchery-produced wild or semi-wild strains may be planted in designated waters, only if necessary to supplement natural reproduction (Bloom 2008).

There are no stocking allotments on the Pit River in the study area (Pit 2-5) and, based on our hook-and-line surveys, multiple size classes were present throughout the system. The Pit River provides a quality wild trout fishery in many locations, with relatively high catch rates and public access throughout the study area (though limited in some sections, as noted). The river is aesthetically pleasing and is rich with aquatic macroinvertebrates, riparian vegetation, and other habitat attributes that support a very popular and productive rainbow trout fishery. Anglers have the opportunity to catch wild trout throughout the study area. An examination of voluntary angler-provided ASB forms for the last ten years (1999-2008) show an average catch rate of 1.93 fish per hour. These data includes a total of 539 angling days with 3528 fish caught in 1830.75 hours of effort. Of the fish caught, 33% of the brown trout and two percent of the rainbow trout were greater than or equal to 18 inches in length.

As noted in the Introduction, the ancestral origins of the rainbow trout in the Pit River remain unclear. These phenotypically unique trout are often referred to by the angling public as “Pit River rainbows,” implying a different strain than coastal rainbow trout. Our surveys confirmed that many of the rainbow trout observed exhibited bright coloration along the lateral line and on the opercula (pink to purplish band, some with faint parr marks retained into adulthood), yellowish ventral coloration and orange markings (cutthroat slashes) under the lower jaw. These phenotypic expressions are generally associated with redband trout. Given the Pit River’s historical and/or present hydrological connection to both the Goose Lake Basin (and, therefore, potential downstream movement of Goose Lake redbands) and the Sacramento River (and therefore, coastal rainbow trout invasions from the lower end of the system), it is possible the trout observed in the system today represent some intermediate between one or more forms of redband trout and coastal rainbow trout. However, no definitive genetic studies have been performed to clarify this issue. Further genetic sampling and analyses of the rainbow trout present throughout the Pit River system is recommended to elucidate the phylogenetic relationship(s) of rainbow trout in the Pit River to other trout forms in the greater Sacramento Fish Province.

Pit 2 falls within the Sierra District General fishing regulations and is open from the last Saturday in April through November 15 with a bag limit of five per day and ten in possession. Downstream of Lake Britton Dam, fishing regulations allow for year-round angling on the Pit River. Pit 3 has a two fish bag limit (18-inch total length minimum size limit) from the last Saturday in April until November 15 and a zero fish bag limit from

November 16 to the Friday preceding the last Saturday in April. Only artificial lures (including flies) with barbless hooks may be used. There is a five fish bag limit (no size restrictions) on Pit 4 and 5 from the last Saturday in April until November 15th and a zero fish bag limit from November 16th to the Friday preceding the last Saturday in April. Only artificial lures (including flies) with barbless hooks may be used.

There are numerous roadside access points throughout the four portions of the river we surveyed although, in some areas, access is limited as the Pit flows through deep canyon areas. The Pit River is notoriously difficult to wade due to large unstable boulders and dense riparian vegetation. This fact both reduces overall angling pressure and, to a degree, adds to the allure of the Pit River as a destination for “die-hard” anglers looking for a challenge. Wading was difficult at flow levels observed during the 2008 survey effort. There are proposed changes to the flow regime on the Pit River, possibly including pulse flows. These changes may or may not have an influence on angler access and/or the ability of anglers to wade in certain areas of the Pit River.

Based on our 2008 initial resource assessment of Pit 2, 3, 4, and 5, HWTP staff recommends moving from a Phase 1 to Phase 2 (candidate water) assessment. Advancing to a Phase 2 evaluation on a given water denotes that the wild trout fishery has met multiple Phase 1 criteria and is deemed a candidate for designation as either a Wild or Heritage Trout Water. Phase 2 assessments include population and biomass estimates, habitat evaluations, and creel census/angler survey boxes. Phase 2 evaluations are generally conducted over a multi-year period (Bloom 2008).

Performing the requisite biological surveys (fish population estimates and habitat assessments), however, may prove problematic on the Pit River. With limited road access in some areas and treacherous wading conditions (due to the large algae covered volcanic boulders that make up the riverbed), traditional survey methods such as electrofishing would be difficult and potentially dangerous to perform. Direct observation (snorkel survey) methods may be effective during certain times of year, but frequent turbidity in the Pit River is an ongoing challenge to this method. Headquarter and regional DFG staff will work together to develop an appropriate Phase 2 sampling strategy for the Pit River. Future analyses should compare species composition, abundance, angler use and success in different habitat types and at varying flow levels. Based on these data, a reassessment of current fishing regulations should occur to determine whether or not they are best-suited for the management of this wild trout fishery. In addition, surveys should include tributaries to the Pit River which may serve as spawning grounds and play an important role in the fish population dynamics in the Pit River.

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