



UPPER MISSOURI RIVER DRAINAGE

PHYSICAL DESCRIPTION

The Upper Missouri River drainage includes the Missouri River and tributaries from the confluence of the Jefferson, Madison and Gallatin rivers (near the town of Three Forks), downstream 110 river miles to Holter Dam. The upper river reach extends from the headwaters 43 river miles to the upper end of Canyon Ferry Reservoir. Toston Dam, located 23 miles upstream from Canyon Ferry, is a barrier to upstream fish movement. The dam creates a small, run-of-the-river irrigation storage reservoir that has been retrofitted for hydro-power generation.

Riparian vegetation is limited to a narrow band along the river, except for the lower 10 miles above Canyon Ferry Reservoir where the river channel is braided and the bottomland is extensively vegetated with willows and cottonwoods. Width of the channel varies from 300 to 1,200 feet, the average gradient is 5.6 feet per mile, and the sinuosity is 1.6. Bottom substrate varies from sand-silt to cobble, but the majority is gravel-cobble. Tributaries originate mainly from the east and most are totally diverted during late summer for irrigation. Major tributaries of the Missouri River between Three Forks and Canyon Ferry Reservoir include Sixteenmile, Deep, Dry, Crow, Sixmile, Indian, Greyson and Warm Springs creeks. Many of these tributaries are chronically dewatered during late summer for irrigation. Water to irrigate about 555,400 acres is diverted above this reach. Thus, flow can be severely depleted during the summer irrigation season. Flows in this reach are partially regulated by a number of upstream reservoirs.

The remainder of the mainstem of this drainage is dominated by a reservoir complex that includes three reservoirs: Canyon Ferry, Hauser, and Holter. Canyon Ferry Reservoir is the first major storage impoundment on the Missouri River. Hauser and Holter reservoirs lie about 3 and 30 miles downstream from Canyon Ferry, respectively. Canyon Ferry Dam and Reservoir is operated by the BOR for power production, flood control, irrigation, recreation, and as a municipal water source. At full pool, Canyon Ferry has a surface area of 35,200 acres and a volume of nearly 2 million acre-feet and provides virtually all the storage available in the reservoir complex. Rapid filling of the reservoir begins in early May with peak storage occurring in late June to early July. Major tributaries to the reservoir include Duck Creek, Confederate Gulch, Hellgate Creek, Avalanche Creek, Magpie Creek, and Beaver Creek. The two reservoirs below Canyon Ferry are Hauser and Holter and are operated by PPL Montana. They differ significantly from Canyon Ferry Reservoir in that they are "run-of-the-river" facilities. Hauser Reservoir has a surface area of about 3,800 acres and stores approximately 98,000 acre-feet of water at full pool. The reservoir is about 15.5 miles in length and is relatively narrow, ranging from about 0.1 to 1.1 miles in width. Important tributaries to Hauser Reservoir include Prickly Pear, Silver, Trout, Spokane and McGuire creeks. A biologically important feature of Hauser is Lake Helena, which is a large (surface area of 2,100 acres), shallow water body connected to the Causeway Arm by a narrow channel which was created when Hauser Dam inundated the lower reach of Prickly Pear Creek.

A 4.6-mile reach of the Missouri River is located between Hauser Dam and Holter Reservoir. This unique segment of river flows through a narrow, high-walled gorge for most of its length prior to entering upper Holter Reservoir. Productivity in this river segment is affected by the two

upstream reservoirs, which creates tailrace conditions where water temperatures are moderated and the water is enriched with nutrients.

Holter Reservoir has a surface area of about 4,800 acres, stores 243,000 acre-feet of water at full pool and is 25 miles long with widths ranging from 0.1 to 1.1 miles. The 4.6 mile segment of free flowing river located upstream of Holter Reservoir provides very important spawning habitat to migrant salmonids. Beaver Creek, a tributary to this river segment, is the principal spawning stream for reservoir fish, especially in the spring. Cottonwood and Willow creeks are also important tributaries that empty directly into Holter Reservoir.

FISHERIES MANAGEMENT

The Missouri River drainage contains fish species common to southwestern Montana. The native species found here include westslope cutthroat trout, mountain whitefish, mountain sucker, longnose dace, longnose sucker, Rocky Mountain sculpin, stonecat and white sucker. Non-native species are the rainbow trout, brown trout, brook trout, northern pike, yellow perch, walleye and common carp. Hybrids of rainbow trout and westslope cutthroat trout are also found in the drainage.

The Missouri River drainage upstream of Canyon Ferry Reservoir is managed as a wild trout fishery, emphasizing natural reproduction. The basin is also suitable for westslope trout recovery efforts in many locations. Upstream from Toston Dam, the fisheries resources are sparse, due to the poor quality of the river system in terms of temperature and physical habitat. Downstream from Toston Dam was considered a “Blue Ribbon Trout Fishery” into the 1990s. This seasonal fishery was characterized by spawning runs of large rainbow and brown trout from Canyon Ferry Reservoir; however, resident brown trout fishing was also an attraction during this time period. In the 1990s, the expansion of walleye into Canyon Ferry Reservoir modified the composition of the fish community in Canyon Ferry Reservoir, resulting in a significant reduction of spawning trout in the Missouri River downstream from Toston Reservoir. As a result, angling use of this 21-mile stretch of the Missouri River for trout angling has declined substantially.

Over the past decade, angler use of the Missouri River reach downstream from Toston Dam has varied from 2,594 angler days in 2005 to 8,939 angler days in 2009. Upstream from Toston Dam to the Confluence of the Madison and Jefferson rivers, angling pressure over the past decade has varied from 1,564 angler days in 2007 to 3,837 angler days in 2001. The Central Fishing District Standard regulations govern the Missouri River upstream from Canyon Ferry Reservoir. Exceptions include restricted harvest opportunities for brown trout, no limit on northern pike, and size and number exceptions for walleye downstream from Toston Dam.

Common to many southwest Montana rivers, fish stocking records for the Missouri River were documented beginning in the 1920s, and lasting through the early 1970s, when wild trout management philosophies were instituted. Beginning in the late 1920s, rainbow trout, brook trout, brown trout, kokanee salmon, chinook salmon, coho salmon and arctic grayling were stocked. Fish stocking for the purpose of augmenting fisheries ended in the 1950s and 1960s. New sport-fish introductions (salmon species) occurred in early 1970s and conservation stocking projects were initiated in the 1990s and early 2000s to reintroduce brown trout and Arctic grayling, respectively.

Combined, the upper Missouri River reservoir system accounted for 7.7% of the fishing pressure in Montana in 2007. Fishing pressure on these reservoirs is high relative to other bodies of water in Montana. These reservoirs traditionally are in the top 5 most heavily fished waters in Montana, with Canyon Ferry averaging 92,527 angler days (1989-2007), Hauser averaging 58,487 angler days (1989-2007) and Holter averaging 60,657 angler days (1989-2007). This level of pressure equates to an average 15.4 angler days per acre on Hauser, 12.6 days per acre on Holter, and 2.6 angler days per acre on Canyon Ferry. In 2007, Canyon Ferry was the third most heavily fished water in the state, and was the number one flatwater fishery in Montana. Hauser Reservoir was the most heavily fished body of water in the state in 1991. Since 1999 total angler pressure in the reservoir system has declined 31.5%, with Canyon Ferry pressure declining 30.5% and Holter declining 46% between 1999 and 2007. Angler use in Hauser declined through the early 2000's; however, pressure has increased 2.5% from 1999 to 2007. Statewide angling pressure also declined 25.4% over that same time period.

A variety of important fish species are present within the reservoir system. Rainbow trout, kokanee salmon, yellow perch, brown trout, burbot (ling), and walleye are among the species of greatest interest to the public. Downstream movement of hatchery rainbow trout from Canyon Ferry to Hauser and Holter reservoirs has been documented during periods of high surface water releases, and flushing of walleye out of Canyon Ferry has heavily influenced species composition in the downstream reservoirs.

HABITAT

Toston Dam, located 23 miles above Canyon Ferry Reservoir and 6 miles southeast of Toston, is owned and operated by DNRC. It is a small, run-of-the-river irrigation storage reservoir that stores 3,000 acre-feet at full pool and was retrofitted with a 10 megawatt hydro-power generating plant in the 1980's. It has little influence on flows in the Missouri River downstream, but does function as a barrier to upstream migrating fish.

Canyon Ferry Reservoir has a significant impact on the flows of the Missouri downstream to Fort Peck Reservoir. Its typical operation provides benefits to a tailwater trout fishery downstream of Holter Dam, but presents challenges to development and stability of some reservoir fisheries due to fluctuating water levels. Rapid filling of the reservoir begins in early May, with peak storage occurring in late June to early July, followed by a steady decrease of about 2 feet per month during the summer period of high irrigation use (July-September). A decrease in reservoir volume continues throughout the fall and winter in preparation for storage of spring run-off. The retention time of water in the reservoir averages 135 days, but ranges from 50-200 days depending on reservoir elevation and inflow-outflow regimes. The annual water level fluctuation (drawdown) averages about 12 feet. Canyon Ferry Reservoir is typically drawn down to its minimum level in March, and then is refilled during the March to June period. A reservoir operations steering committee comprised of FWP, PPL Montana, BOR, irrigators, and sportsmen, has developed operational guidelines for Canyon Ferry Reservoir to balance recreational values and minimize impacts to fish and wildlife. This committee meets annually to review operational issues.

Discharge from Canyon Ferry Dam occurs at various outlets: the radial gates near the top of the spillway (30 feet deep); power penstocks (94 feet); the irrigation outlet (110 feet); and the river outlet (147 feet). The power penstocks are usually the main release point, except in spring and

summer when additional releases are made from the spillway, irrigation, and river outlets. Releases from the radial gates typically occur during June and July following peak river run-off. Radial gate spills occur in roughly two out of every three years, with an average duration of 30-45 days. Temperature and oxygen content of the release water can vary depending on what outlets are used and the time of year.

Hauser Dam is a straight concrete gravity structure, 700 feet long and 80 feet above the riverbed. The structure consists of an overflow spillway, a non-overflow section, a forebay intake section and two abutment sections. The spillway is 493 feet long with slide gates and removable flashboards for flow control. Hauser Dam has the lowest powerhouse capacity of the three dams (19 megawatts) in the reservoir complex and consequently, spills the most water. Turbine water enters a 32-foot-deep intake channel on the east side of the dam. The six-penstock intakes draw from this channel with the openings from 16 to 30 feet below full pool. Water is spilled from five hydraulic gates and 17 manually operated gates. Water that is spilled is drawn from 0-14 feet below full pool. In a dry year, water may spill as much as 4-5 months of the year, while in a wet water year, water is spilled every day of the year. Water elevations of the reservoir are to fluctuate within a 1 foot elevation, so flows from tributaries and discharge from Canyon Ferry are passed through the facility, and it is operated as a run-of-the-river plant.

Holter Dam is also a straight concrete gravity structure, which is 1,364 feet long and 124 feet above the riverbed. The structure consists of an overflow spillway section, a powerhouse/intake section, a left non-overflow section and a right non-overflow section. It has a usable storage of approximately 81,920 acre-feet. Penstocks are between 24-32 feet below full pool. In addition, an “exciter” unit is always operating, which has a penstock opening from 25-29 feet below full pool. Water is spilled from a depth of 6-16 feet. In very high water conditions, a “cap” can be removed from the spill gates allowing the top six feet of water to be spilled. In a dry year, water may be spilled only one day, while in wet water years, spilling may occur throughout most of the year. Operation of Holter Dam has a significant impact on the fishery, wildlife and recreational resources of the reservoir and downstream as was experienced in 1986 when flows shut down. As part of the FERC re-licensing process, operational guidelines were developed for Holter Reservoir to be operated as a run-of-the-river project with pool elevations maintained within one foot between 3,543 and 3,564 feet msl. Prior to the implementation of the operating guidelines, a steering committee composed of FWP, Montana Power Company, BOR, USFS, irrigators, and sportsmen formulated operational guidelines for Holter Dam to optimize recreational values and to minimize impacts to fish and wildlife. The steering committee recommendations for the operation of Holter Dam include: 1) provide a stable reservoir level, 2) have no large spills (10,000 cfs, total turbine and spill) in August or September; and 3) accomplish facility maintenance drawdowns in March or during September (after Labor Day) through October 15. Adherence to these recommendations and the operating guidelines still serve to protect fisheries habitat today in both the reservoir and the trout fishery immediately downstream.

FISHING ACCESS

The reach on the Missouri River above Canyon Ferry Reservoir has good access for recreationists, and access points are well placed for floaters. These points include the Toston, York’s Island and Townsend access sites. In addition, ample opportunities for walk-in access exist within the Canyon Ferry Wildlife Management area.

The reservoir complex has good access for recreationists and access points are well placed for boaters and campers. The BOR, Broadwater County, and private marinas provide access to Canyon Ferry Reservoir throughout its length. The BOR manages recreational areas, including campgrounds, boat ramps, and day-use areas around the reservoir. FWP administers six FASs on Hauser and Lake Helena. The BLM also has two recreation areas that provide access to Hauser and Lake Helena, and three recreation areas that provide access to Holter Lake. **SPECIAL**

MANAGEMENT ISSUES

Unauthorized introductions of predatory species have significantly changed the characteristics of the fishery throughout this drainage. The Upper Missouri River Reservoirs Fisheries Management Plan 2010-2019 guides management within the plan area, which extends from Toston Dam through the reservoir complex down to Holter Dam, including short sections of the Missouri River between Canyon Ferry Reservoir and Toston Dam. In 2012, FWP initiated an environmental assessment to remove northern pike from the entire basin upstream from Holter Dam.

The Upper Missouri River drainage is also home to several conservation populations of westslope cutthroat trout, providing opportunities to conserve this native species in the drainage. The goal of cutthroat conservation work is to secure populations in habitat that is free from the threats of introduced species, and much of this work will be done upstream of natural and man-made fish barriers. A cutthroat trout population is considered secure when it has a minimum population size of 2,500 fish, occupies at least 5-6 miles of stream and is free from the threats of competition and hybridization from non-native species. The long-term goal of cutthroat conservation in the Missouri is to have 20% of the historically occupied habitat restored to cutthroat trout.

MANAGEMENT DIRECTION FOR UPPER MISSOURI RIVER DRAINAGE

Water	Miles/acres	Species	Origin	Management Type	Management Direction
Missouri River - Confluence of the Madison and Jefferson Rivers to Toston Dam	22 miles	Rainbow trout, Brown trout, Mountain whitefish	Wild	General	Maintain present numbers and sizes. Consider increasing angler harvest to reduce numbers if necessary to maintain fish growth.
		Northern pike	Wild	Suppression/ Special Regulations	Continue to allow unlimited harvest to minimize impacts on other sport fishes.
Habitat needs and activities: Continue to improve instream flow, by looking for opportunities to lease water or improve efficiency in irrigational infrastructure and methods.					
Sixteenmile Creek	69 miles	Rainbow trout, Brown trout	Wild	General	Manage as a recreational fishery with larger sized fish available to the angler.
		Brook trout	Wild	General	Manage as a recreational fishery with consumptive harvest.
Habitat needs and activities: Explore potential opportunities to restore habitat on some reaches.					
Missouri River – Toston Dam to Canyon Ferry Reservoir - See Upper Missouri River Reservoir Fisheries Management Plan	21 miles	Rainbow trout	Hatchery	General	Evaluate possible methods to restore migratory fishery in the river.
		Brown trout	Wild	Quality	Manage as a recreational fishery with little harvest.
		Mountain whitefish, Stonecat	Wild	General	Maintain numbers within historic range.
		Northern pike	Wild	Suppression / Special Regulations	Maximize harvest to minimize impacts on other wild & reservoir sport fishes.
		Walleye	Wild	Special Regulations	Adjust regulations as needed to minimize predation.
Habitat needs and activities: Maintain Instream Flows at 2,500 cfs to maintain side channel habitat. Look for opportunities to lease water or improve efficiency in irrigational infrastructure and methods.					

Water	Miles/acres	Species	Origin	Management Type	Management Direction
Crow Creek	25.9 miles	Rainbow trout Brown trout, Brook trout	Wild	General	Manage as a recreational fishery with consumptive harvest.
		Mountain whitefish	Wild	General	Manage to maintain a population.
Habitat needs and activities: Maintain habitat and instream flows of 11 cfs. Explore opportunities to improve chronic dewatering.					
Dry Creek	16.6 miles	Rainbow trout, Rb x WCT hybrids, Brook trout	Wild	General	Manage as a recreational fishery with consumptive harvest.
Habitat needs and activities: Maintain habitat and instream flows of 1.8 cfs. Explore opportunities to improve chronic dewatering.					
Deep Creek	30.3 miles	Rainbow trout, Brown trout	Wild	General	Manage as a recreational fishery and spawning stream for fluvial/adfluvial populations.
		Brook trout	Wild	General	Manage as a recreational fishery with consumptive harvest.
Habitat needs and activities: Maintain habitat and instream flows of 9 cfs. Explore opportunities to improve chronic dewatering and habitat restoration.					
Canyon Ferry Lake	35,200 acres	Rainbow trout	Hatchery	Put-Grow-Take	Manage as a high-quality, cost-effective, multi-species fishery with high levels of angler satisfaction. See Upper Missouri River Reservoir Fisheries Management Plan for each species goals, strategies, and targets.
		Brown trout	Wild	Quality/ Special Regulations	
		Walleye	Wild	Special Regulations	
		Yellow Perch	Wild	Special Regulations	
		Burbot	Wild	General	
		Northern Pike	Wild	Suppression/ Special Regulations	
Habitat needs and activities: Explore opportunities for enhancement of forage fish spawning habitat.					
Continue on next page.					

Water	Miles/acres	Species	Origin	Management Type	Management Direction
Duck Creek, Confederate Gulch, Beaver Creek	15.0 miles 17.1 miles 15.5 miles	Rainbow trout, Brown trout Brook trout	Wild Wild	General General	Manage as a recreational fishery and spawning stream for fluvial/adfluvial populations. Manage as a recreational fishery with consumptive harvest.
Magpie Creek	13.6 miles	Rainbow trout Brook trout	Wild Wild	General General	Manage as a recreational fishery and spawning stream for fluvial/adfluvial populations. Manage as a recreational fishery with consumptive harvest.
Hauser Lake/ Lake Helena	3,800 acres	Rainbow trout Brown trout Walleye Yellow perch Burbot Northern pike	Hatchery Wild Wild Wild Wild Wild	Put-Grow-Take Quality/Special Regulations Special Regulations Special Regulations General Suppression	Manage as a high-quality, cost-effective, multi-species fishery with high levels of angler satisfaction. See Upper Missouri River Reservoir Fisheries Management Plan for each species goals, strategies, and targets.
Helena Valley Regulating Reservoir	553 acres	Kokanee salmon Yellow perch Burbot	Wild Wild Wild	Put-Grow-Take/ Special Regulations General General	Maintain recreational fishery for consumptive harvest by continued stocking. Maintain recreational fishery for consumptive harvest. Maintain population numbers with some consumptive harvest.
Spokane Creek	2.8 miles	Rainbow trout, Brown trout	Wild	General	Manage as a recreational fishery and spawning stream for fluvial/adfluvial populations.
Habitat needs and activities: Maintain habitat and instream flows of 4 cfs from May 1-Nov 30 and 3 cfs from Dec 1-April 30. Explore opportunities for habitat restoration on public land.					
Trout Creek Continue on next page.	9.0 miles	Rainbow trout, Brown trout	Wild	General	Manage as a recreational fishery and spawning stream for adfluvial populations.

Water	Miles/acres	Species	Origin	Management Type	Management Direction
		Mountain whitefish	Wild	General	Maintain population numbers.
Habitat needs and activities: Maintain habitat and instream flows of 15 cfs. Maintain access to stream for migrations of adfluvial fish and minimize habitat perturbations caused by road construction and riparian impact from housing development.					
Prickly Pear Creek	43.6 miles	Rainbow trout, Brown trout	Wild	General	Manage as a recreational fishery and spawning stream for adfluvial populations.
		Brook trout	Wild	General	Manage as a recreational fishery with consumptive harvest.
Habitat needs and activities: Maintain habitat and instream flows of 30 cfs below East Helena and 22 cfs above East Helena. Work to maintain agreements that have resulted in wetting chronically dewatered reaches. Maintain access to stream for migrations of adfluvial fish. Continue to cooperate in reducing pollution delivery and mining damage to the waterway above East Helena. Explore opportunities to increase public access and conserve riparian habitat.					
Silver Creek	23.5 miles	Rainbow trout, Brown trout	Wild	General	Maintain spawning and rearing for adfluvial populations.
		Brook trout	Wild	General	Maintain a recreational fishery with little harvest.
Habitat needs and activities: Maintain habitat and instream flows of 13 cfs from May 1 to Nov 30 and 5.4 cfs from Dec 1 to April 30.					
Tenmile Creek	29.4 miles	Rainbow trout, Brown trout	Wild	General	Maintain a recreational fishery and spawning for adfluvial populations.
		Brook trout	Wild	General	Maintain a recreational fishery with some harvest.
Habitat needs and activities: Maintain habitat and instream flow of 12 cfs. Explore opportunities to reduce chronic dewatering in the lower reaches.					
Missouri River – Hauser Dam to Holter Reservoir	4.6 miles	Rainbow trout	Hatchery/Wild	Put-Grow-Take/General	Manage as a high-quality, cost-effective, multi-species fishery with high levels of angler satisfaction. See Upper Missouri River Reservoir Fisheries Management Plan for each species goals, strategies, and targets.
		Brown trout	Wild	Quality/ Special Regulations	
		Kokanee salmon	Wild	General	
		Walleye	Wild	Special Regulations	
Continued on next page					

Water	Miles/acres	Species	Origin	Management Type	Management Direction
		Yellow perch	Wild	General	
		Burbot	Wild	General	
		Northern pike	Wild	Suppression/Special Regulations	
Beaver Creek	18.6 miles	Rainbow trout	Wild	General	Maintain a recreational fishery and spawning for fluvial/adfluvial fish.
		Brown trout, Brook trout	Wild	General	Maintain a recreational fishery with some harvest.
Habitat needs and activities: Maintain habitat and instream flows of 10 cfs. Explore opportunities for habitat restoration.					
Holter Lake	4,800 acres	Rainbow trout	Hatchery/Wild	Put-Grow-Take	Manage as a high-quality, cost-effective, multi-species fishery with high levels of angler satisfaction. See Upper Missouri River Reservoir Fisheries Management Plan for each species goals, strategies, and targets.
		Kokanee salmon	Hatchery	Put-Grow-Take	
		Walleye	Wild	Special Regulations	
		Yellow perch	Wild	Special Regulations	
		Burbot	Wild	General	
		Northern Pike	Wild	Suppression/Special regulations	
Willow Creek	9.8 miles	Rainbow trout, Brook trout	Wild	General	Maintain population numbers within historic levels for a recreational fishery with consumptive harvest.
Habitat needs and activities: Maintain habitat and instream flows of 3.5 cfs. Evaluate possible barrier sites that would allow establishing a WCT population in the upper reaches.					
Continued on next page					

Water	Miles/acres	Species	Origin	Management Type	Management Direction
Elkhorn Creek-Lower Reach	5.1 miles	Rainbow trout, Brook trout, Rb x WCT hybrids	Wild	General	Maintain population numbers within historic levels for a recreational fishery with consumptive harvest.
Habitat needs and activities: Maintain habitat and instream flow of 3.5 cfs.					
Elkhorn Creek – Upper Reach	5.3 miles	Westslope cutthroat trout	Wild/Transfer	Conservation	Maintain population and expand distribution to occupy all habitat above barrier with genetically unaltered WCT.
Habitat needs and activities: Maintain habitat and instream flow of 3.5 cfs. Complete barrier and remove most hybridized fish above barrier.					
Cottonwood Creek	8 miles	Westslope Cutthroat trout	Wild/Transfer	Conservation	Maintain population and expand densities to occupy all habitat above barrier.
Habitat needs and activities: Install riparian fencing in headwater area on private land to improve riparian vegetation condition. Maintain habitat and instream flow of 1.0 cfs.					
Westslope Cutthroat Trout Genetically Unaltered Conservation Population Streams (Isolated Single Species populations)	56.9 miles	Westslope cutthroat trout	Wild /Transfer	Conservation	Maintain or enhance populations to reduce extinction risk. When biologically feasible, in robust populations, provide for limited consumptive.
Habitat needs and activities: Maintain or improve habitat and explore suitable sites for barriers to protect populations and opportunities to reduce fragmentation of WCT occupied habitat.					
Westslope Cutthroat Trout Genetically Altered Conservation Population or Mixed Streams	36.1 Miles	Westslope Cutthroat trout & hybrids	Wild/Transfer	Conservation	Maintain or enhance populations. Allow harvest in robust populations.
Brook Trout Streams	624 Miles	Brook trout	Wild	General	Maintain or enhance populations for a recreational fishery for consumptive harvest.

