

Stormwater Pollution Prevention Plan for Industrial Outfalls

for:

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SECTION 1: FACILITY DESCRIPTION

1.1 Facility Narrative

Fort Leonard Wood (FLW) is located at north 37° 45', west 92° 1' and is predominately located in Pulaski County, population 45,000, in the south-central Missouri Ozarks and covers more than 61,410 acres. FLW is bound to the north by the towns of Waynesville and St. Robert, with a combined population of approximately 6,700. FLW is bound on the east, south, and west by the Houston-Rolla Unit of the Mark Twain National Forest, on the east by the Big Piney River, and on the west by Roubidoux Creek. FLW has established a cantonment area in the north-central part of the installation that contains most of the buildings and structures within the facility. Areas outside of the cantonment area are operational ranges for small arms training, vehicle maneuvers, heavy equipment training, aerial strafing, and bombardment training.

Surface water drainage within FLW is predominately through small ephemeral streams whose flow directions are influenced by a topographic ridge dividing the eastern and western sections of the installation. Ephemeral streams exist only for a few days following a precipitation event and are located above the groundwater table year-round. Drainage systems on the eastern section of FLW discharge to the Big Piney River, a perennial stream. Drainage systems on the western section of FLW discharge to Roubidoux Creek, a known losing stream. The Big Piney River and Roubidoux Creek each flow northward and converge with the Gasconade River.

The purpose of this Stormwater Pollution Prevention Plan (SWPPP) is to identify the industrial outfalls, control measures, Best Management Practices (BMPs), sampling procedures, and stormwater management personnel and practices that primarily serve the training areas and ranges of FLW. Other stormwater features and assets found on FLW, primarily in the cantonment area, are covered under Fort Leonard Wood's Phase II Small Municipal Separate Storm Sewer System (MS4) permit (MO-040088) and are not detailed within this SWPPP. According to the Missouri State Operating Permit (MSOP) #MO0117251, "This operating permit authorizes only stormwater, discharges under the Law and the National Pollutant Discharge Elimination System. This operating permit does not apply to other regulated areas." A copy of the MSOP is included as Appendix A.

1.1.1 Facility Information

Name of Facility: Fort Leonard Wood

Street: 1334 1st Street, Building 2222

City: Fort Leonard Wood

State: MO

ZIP Code: 65473

County or Similar Subdivision: Pulaski County

Permit Tracking Number: **MO0117251**

Is the facility located in Indian Country? No

If yes, name of Reservation, or if not part of a Reservation, indicate "not applicable."
Not Applicable

Is this facility considered a Federal Facility? Yes

Estimated area of industrial activity at site exposed to stormwater: 61,410 acres

1.1.2 Discharge Information

Twenty stormwater outfalls have been identified at Fort Leonard Wood, seven of which are no longer active. The following table (Table 1:FLW Outfalls) shows each outfall identification number, location, receiving water body, first classified water body, USGS basin & sub-watershed number, actual flow, design flow, and multiple sector notes. Note that where actual flow is not listed, actual flow is dependent on rainfall.

Of the 20 outfalls servicing the FLW stormwater system, 13 are included in the 2010 Missouri State Operating Permit: 001, 004, 006, 007, 012, 013, 014, 015, 016, 017, 018, 019, and 020. Figure 1: FLW Outfalls, shows pictures and descriptions for all active FLW outfalls.

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Table 1: FLW Outfalls

Outfall ID Number	Outfall Location UTM Coordinates	Receiving Water Body	Classified Water Body	USGS Watershed Number	Design Flow*	Actual Flow**
001	X = 0572802 Y = 4175719	Smith Branch (U)	Roubidoux Creek (C) (01513)	10290201-060005	181 MGD	
002	Eliminated prior to October 1, 1999					
003	Eliminated prior to October 1, 1999					
004	X = 0580979 Y = 4179387	Unnamed tributary to Big Piney River (U)	Big Piney River (P) (01566)	10290202-040002	0.026 MGD	
005	Eliminated prior to October 1, 1999					
006	X = 0573502 Y = 4182791	Roubidoux Creek (C)	Roubidoux Creek (C) (01513)	10290201-060005	14.5 MGD	
007	X = 0581578 Y = 4174875	Unnamed tributary to Big Piney River (U)	Big Piney River (P) (01566)	10290202-040002	6.5 MGD	
008	Eliminated upon renewal of 2005 permit					
009	Eliminated prior to October 1, 1999					
010	Eliminated prior to October 1, 1999					
011	Eliminated prior to October 1, 1999					
012	X = 0569357 Y = 4171184	Unnamed tributary to Hurd Hollow (U)	Roubidoux Creek (C) (01513)	10290201-060005	107 MGD	
013	X = 0578944 Y = 4172541	Unnamed tributary to McCourtney Hollow (U)	Big Piney River (P) (01566)	10290202-040002	2.12 MGD	
014	X = 0568599 Y = 4166468	Unnamed tributary to Roubidoux Creek (U)	Roubidoux Creek (C) (01513)	10290201-060005	147 MGD	

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Outfall ID Number	Outfall Location UTM Coordinates	Receiving Water Body	Classified Water Body	USGS Watershed Number	Design Flow*	Actual Flow**
015	X = 0573502 Y = 4182791	Roubidoux Creek (C)	Roubidoux Creek (C) (01513)	10290201-060005	449 MGD	
016	X = 0568365 Y = 4173043	Hurd Hollow (U)	Roubidoux Creek (C) (01513)	10290201-060005	485 MGD	
017	X = 0578248 Y = 4183137	Unnamed tributary to Dry Creek (U)	Big Piney River (P) (01566)	10290202-040002	44 MGD	
018	X = 0584045 Y = 4177339	Unnamed tributary to Big Piney (U)	Big Piney River (P) (01566)	10290202-040002	0.001 MGD	
019	X = 0573890 Y = 4174918	Unnamed tributary to Smith Branch (U)	Roubidoux Creek (C) (01513)	10290201-060005	0.125 MGD	
020	X = 0573328 Y = 4172141	Unnamed tributary to Smith Branch (U)	Roubidoux Creek (C) (01513)	10290201-060005	0.001 MGD	

* Flow measured in millions of gallons per day (MGD)

** Note that where actual flow is not listed, actual flow is dependent on rainfall.

(P) = Protected

(U) = Unclassified streams

(C) = Classified streams

Figure 1: FLW Outfalls



Outfall 001: Low water crossing below Training Area 244.



Outfall 004: Box culvert on FLW 25 east of intersection with East Gate Road.



Outfall 006: Oil-water separator discharge pipe.



Outfall 007: Sediment pond overflow.



Outfall 012: Box culvert on FLW TT.



Outfall 013: Low water crossing located on FLW Route R.

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Outfall 014: Above box culvert located on Cannon Range.



Outfall 015: Low water bridge across Roubidoux Creek on FLW 8.



Outfall 016: Approximately 1 mile downstream from box culvert located on FLW TT.



Outfall 017: Low water crossing on Dry Creek. Located on unnamed road running parallel north of Plant Road.



Outfall 018: Overspill from Training Area 250.



Outfall 019: Oil-water separator below clean vehicle wash rack located at Joint Engineer Operators Course Training Area 244 - Normandy Training Area.



Outfall 020: Low level water vehicle crossing and Wheeled Obstacle Course water hazard with oil-water separator at Training Area 236.

1.2 SWPPP Contacts

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1.2.1 24-Hour Emergency Contact

Fire Station Headquarters
Building #580, N. Dakota Ave.
Fort Leonard Wood, Missouri 65473
Emergency: 911

Phone: 573-596-0883
 Fax: 573-596-0885

Fire Station #2
 Building #5001, Forney Airfield
 Fort Leonard Wood, Missouri 65473
 Emergency: 911
 Phone: 573-596-0884

1.3 Stormwater Pollution Prevention Team

Table 2: Stormwater Staff and Responsibilities

Staff Name	Title	Responsibilities
Patrick S Kelly IMCOM FLW	Physical Scientist	Clean Water Act (Stormwater) Program Manager
Jeff Lamb Colorado State University	Environmental Compliance Stormwater Specialist	Land Disturbance Permit Manager
Joe Guggenberger Colorado State University	Environmental Compliance Stormwater Specialist	Fort Leonard Wood Site-specific Industrial Stormwater Permit Manager
Heather Williams ICI Services Corporation	Sr. Environmental Scientist	MS4 Permit Manager
Jill Holliwell ICI Services Corporation	Jr. Environmental Scientist	MS4 Permit Manager

1.4 Activities and Stormwater Outfalls at Fort Leonard Wood

The FLW Primary SIC Code is #9711 = National Security (Military Installation – Army). FLW is a premier Maneuver Support Center of Excellence (MSCoE) that trains upwards of 90,000 military personnel and civilians each year. Industrial activities at FLW are inherently tied to the mission of FLW:

“The Maneuver Support Center of Excellence develops Leaders and Warriors; advances Engineer, Military Police, Chemical, Biological, Radiological, and Nuclear (CBRN), and Maneuver Support capabilities to ensure success in the current and future operational environments; sets conditions for training, readiness, deployment, reconstitution, and sustainment of all tenant forces.” (Fort Leonard Wood Mission Statement)

Various training and industrial activities occur at FLW in support of the mission. There are several stormwater outfalls affected by these activities. The locations of each outfall and its associated industrial activities are shown in outfall-specific maps detailed in Attachment B. The following table also shows each industrial stormwater outfall identified in the MSOP (2010) and the activities that feed into that outfall.

Table 3: FLW Outfalls and Related Industrial Activities

Outfall Number	Activities
001	TA 244 Joint Engineer Operators Course
	Training Range – Explosives Detonation Area
	Forney Army Air Field
	TA 244 (Smoke Training – Discontinued)
004	Defense Reutilization and Marketing Office (DRMO)
	Bulk Fuel Storage
	Pesticide Storage
	Salt Storage
006	TA 256 Asphalt Training Facility
007	Rock Quarry
012	Range 27A
013	Training Range Area (Small Arms Range Complex)
014	Training Range – Cannon Range
	TA 403 (Smoke Training – Discontinued)
015	TA 400 (Smoke Training – Discontinued)
	TA 248 (Bivouac)
	TA 609 (Rappel Site)
016	Numerous Training Activities
	TA 240N (Bivouac)
	TA 240S (Bivouac)
	TA 241M (Military Operation in Urban Terrain (MOUT))
	TA 255 (Forward Operating Base (FOB))
	TA 241F (FOB)
	TA 241 (Bivouac)
	TA 225 (Bivouac)
	TA 235 (Humanitarian Demining)
	TA 237 (Bivouac)
	TA 337 (Bivouac)
	TA 233 (Bivouac)
	TA 401C (Smoke Training – Discontinued)
	TA 401 (Smoke Training – Discontinued)
	TA 401F (FOB)
	TA 401H (Sensitive Site Exploitation)
	TA 401M (MOUT)
	TA 275 (Bivouac) NE corner of the training area
017	Waste water treatment plant drying beds (use discontinued)
018	TA 250 Float bridge Fox Training
019	TA 244 Joint Engineer Operators Course Clean vehicle wash rack

Outfall Number	Activities
020	TA 236 Motor Transport Operators Course (MTOC)/5 TON Low level vehicle crossing

1.5 General Location Map

A general location map is included with this SWPPP as Attachment A – General Location Map.

1.6 Site Maps

Site maps, including all MSOP (2010) outfalls and industrial activities at FLW, are included in the SWPPP as Attachment B – Outfall Locations and Industrial Use Areas.

SECTION 2: POTENTIAL POLLUTANT SOURCES

A summary of industrial activities and associated materials at FLW, with a description of associated potential pollutant sources, is included in this section of the FLW SWPPP. This section identifies potential stormwater pollution sources associated with industrial activities for each stormwater outfall. Control measures addressing the activities and potential pollutants, and inspections are discussed in SWPPP Sections 3, 4, and 5.

Activities at FLW that present potential impacts to stormwater outfalls, according to the Missouri State Operating Permit #M00117251 (2010), include the following:

- Fueling
- Loading and unloading materials
- Vehicle and equipment maintenance
- Vehicle, aircraft, and equipment washing
- Locations used for the treatment and storage of wastes
- Fuel storage tanks
- Heavy machinery
- Rock quarry
- Training Area – training exercises
- Training Ranges – live-fire ranges
- Waste water treatment plant drying beds
- Pesticide storage
- Salt storage

2.1 Industrial Activity and Associated Pollutants

Outfall #001

The following table shows the industrial activities that feed stormwater outfall #001 and the materials associated with those activities with potential exposure to stormwater.

Activity	Associated Materials with the Potential for Exposure to Stormwater
Heavy Machinery: TA 244 Joint Engineer Operators Course	Lubricating oil and grease, fuel, heavy metals
Training Area Exercises: TA 244 Joint Engineer Operators Course	Sediment
Training Range Exercises: Explosives Detonation Area	Munitions constituents
Vehicle, aircraft, and equipment maintenance: Forney Army Airfield	Lubricating oil and grease, fuel, sediment, paint, transmission and hydraulic fluids, anti-freeze, parts-cleaning solvent, battery acid
Vehicle, aircraft, and equipment washing: Forney Army Airfield	Lubricating oil and grease, fuel, anti-freeze, detergents, sediment, de-icing constituents
Training Area Exercises: TA 244 Smoke Training (discontinued)	Residual smoke products

Outfall #004

The following table shows the industrial activities that feed stormwater outfall #004 and the materials associated with those activities with potential exposure to stormwater.

Activity	Associated Materials with the Potential for Exposure to Stormwater
Vehicle and equipment maintenance: Defense Reutilization and Marketing Office (DRMO)	Lubricating oil and grease, fuel, sediment, paint, transmission and hydraulic fluids, anti-freeze, parts-cleaning solvent, battery acid
Fuel Storage Tanks: Bulk Fuel Storage (Buildings 4053, 4054, 4056, 4057)	Diesel fuel, gasoline
Pesticide Storage Building 2273	Pesticides
Salt Storage Building 2269	Salt

Outfall #006

The following table shows the industrial activities that feed stormwater outfall #006 and the materials associated with those activities with potential exposure to stormwater.

Activity	Associated Materials with the Potential for Exposure to Stormwater
Training Area Exercises: Training Area 256 – Quarryman Asphalt Course	Sediment
Heavy Machinery: Training Area 256 – Quarryman Asphalt Course	Lubricating oil and grease, fuel, heavy metals

Outfall #007

The following table shows the industrial activities that feed stormwater outfall #007 and the materials associated with those activities with potential exposure to stormwater.

Activity	Associated Materials with the Potential for Exposure to Stormwater
Rock Quarry	Sediment, sediment pond overflow (fine)
Heavy Machinery: Rock Quarry	Lubricating oil and grease, fuel, heavy metals

Outfall #012

The following table shows the industrial activities that feed stormwater outfall #012 and the materials associated with those activities with potential exposure to stormwater.

Activity	Associated Materials with the Potential for Exposure to Stormwater
Range 27A	Iron scrap from Legacy monitoring.

Outfall #013

The following table shows the industrial activities that feed stormwater outfall #013 and the materials associated with those activities with potential exposure to stormwater.

Activity	Associated Materials with the Potential for Exposure to Stormwater
Training Area Exercises: Range Complex – Small Arms Firing Ranges	Munitions constituents
Training Area Exercises: Impact Area – Range 19	Munitions constituents

Outfall #014

The following table shows the industrial activities that feed stormwater outfall #014 and the materials associated with those activities with potential exposure to stormwater.

Activity	Associated Materials with the Potential for Exposure to Stormwater
Training Range Exercises: Cannon Range – Air National Guard Bombing Range	Munitions constituents
Training Range Exercises: Impact Area – Cannon Range	Munitions constituents

Outfall #015

The following table shows the industrial activities that feed stormwater outfall #015 and the materials associated with those activities with potential exposure to stormwater.

Activity	Associated Materials with the Potential for Exposure to Stormwater
Training Area Exercises: TA 400 Smoke Training (discontinued)	Residual smoke products

Outfall #016

The following table shows the industrial activities that feed stormwater outfall #016 and the materials associated with those activities with potential exposure to stormwater.

Activity	Associated Materials with the Potential for Exposure to Stormwater
Training Area Exercises: TA 401 Smoke Training (discontinued)	Residual smoke products

Outfall #017

The following table shows the industrial activities that feed stormwater outfall #017 and the materials associated with those activities with potential exposure to stormwater.

Activity	Associated Materials with the Potential for Exposure to Stormwater
Waste Water Treatment Drying Beds (discontinued)	Effluent from drying beds

Outfall #018

The following table shows the industrial activities that feed stormwater outfall #018 and the materials associated with those activities with potential exposure to stormwater.

Activity	Associated Materials with the Potential for Exposure to Stormwater
Training Area Exercises: TA 250 Float Bridge Fox Training	Sediment
Heavy Machinery: TA 250 Float Bridge Fox Training	Lubricating oil and grease, fuel, heavy metals

Outfall #019

The following table shows the industrial activities that feed stormwater outfall #019 and the materials associated with those activities with potential exposure to stormwater.

Activity	Associated Materials with the Potential for Exposure to Stormwater
Training Area Exercises: TA 244 Joint Engineer Operators Course	Sediment
Heavy Machinery: TA 244 Joint Engineer Operators Course	Lubricating oil and grease, fuel, heavy metals
Vehicle Washing: TA 244 Clean Vehicle Wash Rack	Sediment, lubricating oil and grease, fuel

Outfall #020

The following table shows the industrial activities that feed stormwater outfall #020 and the materials associated with those activities with potential exposure to stormwater.

Activity	Associated Materials with the Potential for Exposure to Stormwater
Training Area Exercises: TA 236 Motor Transport Operators Course (MTOC)/5 Ton	Sediment
Heavy Machinery: TA 236 Motor Transport Operators Course (MTOC)/5 Ton	Lubricating oil and grease, fuel, heavy metals
Low Level Vehicle Crossing: TA 236 Wheeled Obstacle Course Water Hazard	Sediment, lubricating oil and grease, fuel, heavy metals

2.2 Spills and Leaks

If not properly controlled and promptly addressed, spills and leaks are potential, significant sources of stormwater pollution at FLW. This SWPPP documents all significant spills and leaks of oil or toxic or hazardous pollutants that have occurred

at exposed areas, or drained to a stormwater conveyance, during the three years prior to the date of SWPPP preparation or amendment.

Additionally, the SWPPP identifies the locations where potential spills and leaks may occur. Locations where spills and leaks are more likely to occur are the following: fuel transfer areas, airfields, vehicle/equipment maintenance storage yards, vehicle parking/staging areas, and roads.

To mitigate the potential for spills and leaks base-wide, FLW has a spill prevention and response program that requires spills and leaks to be immediately reported upon discovery, personnel trained in spill prevention and response for applicable facilities, and preventative maintenance measures for all applicable facilities.

Potential spills or leaks associated with stormwater outfalls are most likely to occur in areas where heavy machinery is being used in training areas. Typical causes of spills and leaks are broken lines and hoses or other mechanical failures associated with heavy equipment, most commonly, broken hydraulic lines. Strict preventative maintenance schedules for heavy machinery help mitigate the potential for spills or leaks.

Table 4: Potential Spills or Leaks

Location of Potential Spill or Leak	Associated Outfall	Associated Potential Pollutants
TA 244 Joint Engineer Operators Course	001	Lubricating oil and grease, fuel, heavy metals
Bulk Fuel Storage (Buildings 4053, 4054, 4056, 4057)	004	Diesel fuel, gasoline
Pesticide Storage Building 2273	004	Pesticides
Training Area 256 – Quarryman Asphalt Course	006	Lubricating oil and grease, fuel, heavy metals
Rock Quarry	007	Lubricating oil and grease, fuel, heavy metals
TA 250 Float Bridge Fox Training	018	Lubricating oil and grease, fuel, heavy metals
TA 244 Joint Engineer Operators Course	019	Lubricating oil and grease, fuel, heavy metals
TA 236 Motor Transport Operators Course (MTOC)/5 TON	020	Lubricating oil and grease, fuel, heavy metals

See Appendix B for all spills reported from April 2010 – April 2013.

2.3 Salt Storage

Salt storage occurs at the DPW Compound, Building 2269.

2.4 Sampling Data Summary

Sampling data summary for 2012 is contained in Appendix C.

SECTION 3: STORMWATER CONTROL MEASURES

FLW has implemented a wide range of stormwater control measures, also known as Best Management Practices (BMPs), to reduce the likelihood of contaminating stormwater runoff. Stormwater management BMPs address specific industrial activities on FLW and reinforce operating requirements found in state, federal, and Army regulations.

Basic BMPs are implemented at all industrial facilities at FLW and include the following categories, which are discussed in more detail where applicable:

- Minimize exposure
- Good housekeeping
- Preventative maintenance
- Spill prevention and response
- Erosion and sediment controls
- Management of runoff
- Salt storage piles
- Employee training
- Waste, garbage, and floatable debris

3.1 Minimize Exposure

The following basic BMPs minimize the exposure of contaminants to the stormwater system and are implemented at all industrial facilities on FLW where applicable:

- Material loading/unloading should occur inside.
- Materials with potential sources of contamination will be stored indoors when practical, and covered and contained if stored outdoors.
- All liquid waste must be stored over secondary containment with sufficient volume to hold 110% of the largest liquid waste container.
- All liquid storage containers sized 55 gallons or larger are required to be stored over secondary containment. Smaller containers of hazardous material should also be stored over secondary containment.
- Liquid containers should not be opened prior to arriving at the area of use.

- All batteries that are damaged must be separated and stored in a protective container.
- Drip pans shall be properly placed under all heavy equipment and tactical vehicles when parked.
- Drip pans shall be properly emptied and replaced as necessary.
- Hazardous materials that are stored outdoors must be protected from the elements and located in a contained area.

3.2 Good Housekeeping

The following basic BMPs for good housekeeping are implemented at all industrial facilities on FLW where applicable:

- All materials shall be properly categorized (hazardous material, hazardous waste, universal waste, industrial waste, recycled materials).
- All materials shall be labeled, stored, and disposed of properly.
- Trash dumpsters shall be labeled, accessible, and maintained with the lids down.
- Industrial facilities shall be maintained in a clean and orderly fashion.
- Spill kits shall be available in all industrial facilities, placed in a conspicuous area, and clearly labeled.
- Warning signs for hazardous and flammable materials must be appropriately placed and displayed.
- Maintenance records for vehicles and equipment shall be kept by facility personnel.
- Vehicles should be parked on an impermeable surface whenever possible.
- A petroleum, oil, and lubricants (POLs) and hazardous material inventory should be kept by facility personnel.
- Facilities shall have security measures to ensure there are no unauthorized uses of materials or equipment.
- All storm drains shall be clearly labeled.

3.3 Preventative Maintenance

Preventative maintenance of industrial equipment helps reduce the potential for leaks and spills. FLW follows a regular schedule for inspecting, testing, maintaining, and repairing all industrial equipment. Following a regular maintenance schedule reduces the chance of equipment failure or breakdown that could result in a discharge of pollutants to the stormwater system.

The following basic BMPs for preventative maintenance of industrial equipment and systems are implemented at all industrial facilities on FLW where applicable:

- Quarterly inspections of all aboveground storage tanks (ASTs) and monthly inspection of all regulated underground storage tanks (USTs) and leak detection systems.
- Oil-water separators (OWSs) are serviced based on usage, semi-annually or annually.

3.4 Spill Prevention and Response

Spills and leaks are one of the largest industrial sources of stormwater pollutants. The Spill Prevention Control and Countermeasures (SPCC) Plan for FLW identifies locations and activities where the potential exists for harmful discharges, establishes a general and facility specific spill prevention program, and outlines spill response procedures for FLW personnel.

3.5 Erosion and Sediment Controls

Sediment ponds are established within TA 244 to mitigate sediment runoff from training activities on the Engineers Operators Course. (See Attachment C – Training Area 244 Erosion and Sediment Controls.)

Maps of sediment ponds/settling basins are identified per industrial outfall in Attachment B – Outfall Locations and Industrial Use Areas.

3.6 Management of Runoff

Control measures for management of runoff are either inherent to the industrial outfall (OWSs at outfalls 006, 019, and 020) or non-existent due to the location of the industrial outfall.

3.7 Salt Storage Piles or Piles Containing Salt

DPW Compound, Building 2269 is used for salt storage and is not exposed to stormwater. Salt is mixed with cinders on an as-needed basis, limiting exposure at any given time.

3.8 Employee Training

Training is required for all personnel working in industrial areas where materials or activities have the potential to be exposed to stormwater. Environmental Compliance Officers (ECO) at FLW are required to attend quarterly training presented by DPW Environmental Division. Training schedules include:

- Hazardous material and waste storage and handling
- Used oil management
- Oil-water separator maintenance and usage guidelines

- Good housekeeping procedures
- Facility inspections
- Spill prevention and response
- Solid waste disposal
- Stormwater pollution prevention

After being trained, the ECOs are responsible for monthly inspections of their facilities and compliance with BMPs identified in the SWPPP. ECOs also provide training and guidance to personnel in their unit or facility.

Quarterly training is documented and maintained by the FLW DPW Environmental Division.

3.9 Waste, Garbage, and Floatable Debris

The following basic BMPs are implemented at all industrial facilities on FLW, where applicable, to ensure that waste, garbage, and debris do not enter receiving waters:

- Provide dedicated and clearly marked dumpsters or containers for waste disposal.
- Keep dumpsters and containers protected from weather.
- Empty containers and dumpsters on a regular schedule.
- Place dumpsters and containers in convenient locations.
- Inspect grounds and remove all loose garbage and dispose of properly.
- Inspect and clean areas where snow has been stockpiled.
- Regularly inspect parking lots and remove all loose garbage and dispose of properly.

SECTION 4: SCHEDULES AND PROCEDURES FOR MONITORING

4.1 Sample Procedures

Outfall Water Quality Sampling

Stormwater quality samples will be collected using the grab method as directed by the permit at the following outfalls: 001, 004, 006, 007, 012, 013, 014, 015, 016, 017, 018, 019, and 020. Storm samples will be collected and analyzed annually at all outfalls, and storm samples will be collected and analyzed for total recoverable lead and total hardness at outfalls 001, 013, and 014 quarterly. Starting in FY 2011, sampling began at outfall 021 and will continue in FY2013, following the same sampling frequency and parameters analyzed for as outfalls 001, 013, and 014. These samples will be collected within 12 hours of a storm event sufficient in magnitude to create runoff and subsequent discharge to each outfall. Collection

attempts following the above types of storm events will continue until the appropriate number of samples has been collected at each outfall. Samples will be collected on the upstream side of bridges and low-water crossings to avoid potential contaminants concentrated at the crossing or draining from roadways. If no discharge is observed for up to 12 hours after the storm event, then the outfall will be documented as having "no discharge". If no discharge is observed throughout the year at an outfall, then no sample will be collected at that outfall. Samples will be collected and processed in accordance with standards set forth in the USGS National Field Manual for the Collection of Water-Quality Data. When and where safety of USGS personnel is not endangered and where practical (i.e., an outfall is wide enough to make a discharge measurement), a discharge measurement from the outfall will be made in accordance with USGS publications, Techniques and Methods Chapter 8 of Book 3, Section A (Discharge Measurements at Gaging Stations) and Techniques and Methods Chapter 22 of Book 3, Section A (Measuring Discharge with Acoustic Doppler Current Profilers from a Moving Boat) at the time the sample is collected. Where a discharge measurement is impractical or unsafe (i.e., at periods of high flow or at outfalls 006, 018, 019, or 020), a reasonable estimate of flow is acceptable. Copies of field sheets and discharge measurement printouts (if discharge measurement is made) shall accompany the end-of-year report. The stream flow at the time of the sample collection will be measured or determined from an existing stream gage operated at the site.

4.2 Sampling Schedules

Describe procedures for conducting all applicable types of monitoring: benchmark, effluent limitations, state or tribal-specific, impaired waters, other per EPA: Monitoring approach is as above (4.1); benchmarks were set by the Missouri Department of Natural Resources using 'best engineering judgment'; effluent limitations set by state; n/a; no impaired waters.

4.3 Sampling Locations

Describe sampling locations:
CONTAINED IN PERMIT

4.4 Pollutant Parameters

List the pollutant parameters sampled at each location and frequency:
CONTAINED IN PERMIT

4.5 Monitoring Schedules

Include monitoring schedules including alternate periods if applicable for climates with irregular stormwater runoff:
CONTAINED IN PERMIT

4.6 Pollutant Parameters Subject to Numeric Limits

List any pollutant parameters subject to numeric limits (effluent limitations guidelines) and which outfalls are subject to such limits:
CONTAINED IN PERMIT

4.7 Sampling Procedures

Describe procedures for collecting samples, including responsible staff, logistics, lab to be used, etc.:

See 4.1 and 4.2 of this document for procedures.

USGS collects samples and handles logistics. Lab work is performed by Test America.

4.8 Inactive and Unstaffed Outfalls

Provide information regarding inactive and unstaffed sites for which the exception is being invoked, including information to support this claim.

Inactive sites are identified in permit; unstaffed sites are not applicable due to the type of outfalls (perpetually unstaffed).

SECTION 5: INSPECTIONS

The MSOP (2010) requires that bi-monthly visual inspections occur for all industrial outfalls identified in the permit.

5.1 Industrial Outfall Inspections

Personnel from FLW DPW Environmental Division conduct bi-monthly industrial outfall inspections. The industrial stormwater outfall inspection report is included in this SWPPP as Attachment D – Industrial Stormwater Outfall Inspection Form.

**SECTION 6: DOCUMENTATION TO SUPPORT ELIGIBILITY
 CONSIDERATIONS UNDER OTHER FEDERAL LAWS**

6.1 Documentation Regarding Endangered Species

Threatened and endangered species (T&E) on Fort Leonard Wood are managed by the Fort Leonard Wood Natural Resources Branch (573-596-2814). There is no evidence to suggest that stormwater discharges from the industrial outfalls at FLW would have the potential to cause adverse effects to T&E species downstream from the industrial outfalls. The industrial outfalls are consistent with Endangered Species Act (ESA) whereas, “No federally-listed threatened or endangered species or their designated critical habitat are likely to occur in the action area.” For detailed information on T&E species and species of special concern at FLW, please contact the Fort Leonard Wood Natural Resources Branch at 573-569-2814. A summary table of T&E species and species of special concern and their locations can be found below.

Table 5: Summary of T&E Species and Species of Special Concern

Taxonomic Group	Common Name	Scientific Name	Status	Documented Presence
Naiades				

Taxonomic Group	Common Name	Scientific Name	Status	Documented Presence
	Spectaclecase	<i>Cumberlandia monodonta</i>	FE	Roubidoux Creek and Big Piney River
	Black Sandshell	<i>Ligumia recta</i>	SCC	Big Piney River
	Elktoe	<i>Alasmidonta marginata</i>	SCC	Roubidoux Creek and Big Piney River
	Northern Brokenray	<i>Lampsilis brittsi</i>	SCC	Roubidoux Creek and Big Piney River
Fish				
	Blacknose Shiner	<i>Notropis heterolepis</i>	SCC	Roubidoux Creek
	Plains Topminnow	<i>Fundulus sciadicus</i>	SCC	Big Piney River and Falls Hollow Creek
	Bluestripe Darter	<i>Percina cymatotaenia</i>	SCC	Roubidoux Creek and Big Piney River
Amphibian				
	Eastern Hellbender	<i>Cryptobranchus alleganiensis</i>	SE	Multiple sites on Big Piney River
	Grotto Salamander	<i>Eurycea spelaea</i>	SCC	Several caves on FLW
	Ringed Salamander	<i>Ambystoma annulatum</i>	SCC	Multiple sites on FLW
	Common Mudpuppy	<i>Necturus maculosus</i>	SCC	Multiple sites on Big Piney River
	Eastern Tiger Salamander	<i>Ambystoma tigrinum</i>	SCC	1 record
Reptile				
	Northern Scarlet Snake	<i>Cemophora coccinea copei</i>	SCC	1 record
Bird				
	Bald Eagle	<i>Haliaeetus leucocephalus</i>	EPA	One Nest on Big Piney River - B
	Cerulean Warbler	<i>Setophaga cerulea</i>	SCC	Riparian Zones on Roubidoux Creek and Big Piney River - B
	Brown Creeper	<i>Certhia americana</i>	SCC	Riparian Zones on Roubidoux Creek and Big Piney River - B
	Sharp-shinned Hawk	<i>Accipiter striatus</i>	SCC	Several locations on FLW - B

Taxonomic Group	Common Name	Scientific Name	Status	Documented Presence
	Swainson's Hawk	<i>Buteo swainsoni</i>	SCC	Multiple records – M
	Osprey	<i>Pandion haliaetus</i>	SCC	Multiple records – M
	Northern Harrier	<i>Circus cyaneus</i>	SCC	Multiple records – M
	Black Vulture	<i>Coragyps atratus</i>	SCC	Multiple records – M
	Sora Rail	<i>Porzana carolina</i>	SCC	1 record – M
	Virginia Rail	<i>Rallus limicola</i>	SCC	1 record – M
	Great Egret	<i>Ardea alba</i>	SCC	1 record – M
	Little Blue Heron	<i>Egretta caerulea</i>	SCC	1 record – M
	Snowy Egret	<i>Egretta thula</i>	SE	1 record – M
	Black-crowned Night-heron	<i>Nycticorax nycticorax</i>	SCC	1 record – M/PB
	Long-eared Owl	<i>Asio otus</i>	SCC	Multiple records – M
	Ruffed Grouse	<i>Bonasa umbellus</i>	SCC	Mid 80s release on adjacent USFS land. No recent sightings.
	American Bittern	<i>Botaurus lentiginosus</i>	SCC	1 record – M
	Marsh Wren	<i>Cistothorus palustris</i>	SCC	1 record – M
	Bachmans Sparrow	<i>Peucaea aestivalis</i>	SE	1 record – M/PB
	Least Flycatcher	<i>Empidonax minimus</i>	SCC	Multiple records – M/PB
	Greater Roadrunner	<i>Geococcyx californianus</i>	SCC	Multiple records – M/PB
	Sandhill Crane	<i>Grus canadensis</i>	SCC	1 record – M
	Loggerhead Shrike	<i>Lanius ludovicianus</i>	SCC	1 record – M/PB
	Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	SCC	Multiple records – M/PB
	Black-throated Green Warbler	<i>Setophaga virens</i>	SCC	Multiple records – M
Mammal				

Taxonomic Group	Common Name	Scientific Name	Status	Documented Presence
	Indiana Bat	<i>Myotis sodalis</i>	FE, SE	Hibernacula caves. Spring, summer, and fall resident all areas of FLW
	Gray bat	<i>Myotis grisescens</i>	FE, SE	Maternity and transient caves on FLW. Spring, summer and fall resident on FLW
	Northern long-eared Bat	<i>Myotis septentrionalis</i>	PLFE	Hibernacula caves. Spring, summer and fall resident all areas of FLW
	Eastern Small-footed Bat	<i>Myotis leibii</i>	PLFE	Spring, summer and fall resident all areas of FLW
	Silver-haired Bat	<i>Lasiurus noctivagans</i>	SCC	Spring, summer and fall resident all areas of FLW
	Seminole bat	<i>Lasiurus seminolus</i>	SCC	1 record
	Golden Mouse	<i>Ochrotomys nuttalli</i>	SCC	Several locations on FLW
	Long-tailed Weasel	<i>Mustela frenata</i>	SCC	Several locations on FLW

Notes:

Sources: Missouri Department of Conservation – Missouri Species and Communities of Conservation Concern, 2013
FLW Natural Resource Branch Species Occurrence Lists

EPA = The Bald and Golden Eagle Protection Act protects eagles on FLW.

FE = Federally Endangered

PLFE = Petitioned for Listing as Federally Endangered

SCC = Species of Conservation Concern on FLW

SE = State Endangered

ST = State Threatened

B = Confirmed Breeder

M = Migrant Spring/Fall

M/PB = Migrant/Possible Breeder

6.2 Documentation Regarding Historic Sites

Cultural Resources are managed by Fort Leonard Wood’s Environmental Division Natural Resources Branch (573-596-2814).

Historic Districts eligible for inclusion on the National Register of Historic Places include:

1. World War II Temporary Building Historic District

2. Rolling Pin Barracks Historic District
3. Prisoners of War (POW) Stonework Linear Historic District

All of these districts are located within the cantonment area. Additional National Register eligible buildings, structures, and landscapes are listed in Attachment E – NRHP Eligible Buildings, Structures, and Landscapes.

The Fort Leonard Wood Integrated Cultural Resources Management Plan (ICRMP) provides guidance and procedures to enable the installation to meet its legal responsibilities for the identification, evaluation, and protection of cultural resources contained within its lands. The ICRMP integrates legal requirements for cultural resources preservation into the day-to-day operations of the Maneuver Support Center of Excellence (MSCoE) and Fort Leonard Wood Garrison military mission and support activities. The ICRMP can be viewed by contacting the Fort Leonard Wood Natural Resources Branch.

The MSCoE military mission is to “...develop Leaders and Warriors; advance Engineer, Military Police, Chemical, Biological, Radiological, and Nuclear (CBRN) and Maneuver Support capabilities to ensure success in the current and future operational environments; and set conditions for training, readiness, deployment, reconstitution, and sustainment of all tenant forces.” The Fort Leonard Wood Garrison mission is to provide quality base operation services, facilities, and infrastructure to enable all units to accomplish their missions and to enhance the well-being of the Fort Leonard Wood community.

6.3 Documentation Regarding NEPA Review (if applicable)

Not Applicable

SECTION 7: SWPPP CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Name: _____ Title: _____

Signature: _____ Date: _____

SECTION 8: SWPPP MODIFICATIONS

Instructions

- Your SWPPP is a “living” document and is required to be modified and updated, as necessary, in response to corrective actions.
 - If you need to modify the SWPPP in response to a corrective, then the certification statement in Section 7 of this SWPPP template must be re-signed For any other SWPPP modification, you should keep a log with a description of the modification, the name of the person making it, and the date and signature of that person.

List of Acronyms and Abbreviations

(C)	Classified Streams
(U)	Unclassified Streams
ASTs	Aboveground Storage Tanks
BMPs	Best Management Practices
CBRN	Chemical, Biological, Radiological, and Nuclear
DPW	Directorate of Public Works
DRMO	Defense Reutilization and Marketing Office
ECO	Environmental Compliance Officers
ESA	Endangered Species Act
ESC	Erosion and Sediment Controls
FLW	Fort Leonard Wood
FOB	Forward Operating Base
FY	Fiscal Year
ICRMP	Integrated Cultural Resources Management Plan
ID	identification
MGD	Millions of Gallons per Day
MOUT	Military Operation in Urban Terrain
MSCoE	Maneuver Support Center of Excellence
MSOP	Missouri State Operating Permit
MTOC	Motor Transport Operators Course
NEPA	National Environmental Policy Act
NRHP	National Register of Historic Places
OWSs	Oil-Water Separators
POLs	Petroleum, Oil, and Lubricants
POW	Prisoners of War
SIC	Standard Industrial Classification
SPCC	Spill Prevention, Control, and Countermeasures

SWPPP	Stormwater Pollution Prevention Plan
T&E	Threatened and Endangered
TA	Training Area
USGS	United States Geological Service
USTs	Underground Storage Tanks
UTM	Universal Transverse Mercator

Appendix A – Missouri State Operating Permit (2010)

Appendix B – FLW 2010 – 2013 Spill Reporting

Appendix C – Fiscal Year 2012 MO-0117251 Monitoring Data

Attachment A – General Location Map

Attachment B – Locations of Outfalls and Industrial Use Areas

Attachment C – Training Area 244 Erosion and Sediment Controls

Attachment D – Industrial Stormwater Outfall Inspection Form

Attachment E – NRHP Eligible Buildings, Structures, and Landscapes