

# River Corridor Closure Contract

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## Identification and Protection of a Bat Colony in the 183-F Clearwell: Mitigation of Bat Habitat on the Hanford Site

January 2009

**Washington Closure Hanford**

Prepared for the U.S. Department of Energy, Richland Operations Office  
Office of Assistant Manager for River Corridor



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# **Identification and Protection of a Bat Colony in the 183-F Clearwell: Mitigation of Bat Habitat on the Hanford Site**

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Authors:

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## EXECUTIVE SUMMARY

Maternity bat roosts, where adult females congregate to rear their young, are listed by the state of Washington on the Priority Species/Habitat List. At the Hanford Site, mitigation work for maternity colonies began in 1999, when bats were encountered at the 190-DR Process Water Tunnels (100-D Area) during preparation for the Interim Safe Storage (ISS) project being conducted as part of Hanford's overall cleanup mission. In 2003, mitigation work continued when another maternity colony was found at the 105-F Reactor during the ISS project there. In 2006, a large colony of bats was discovered at the 183-F (west) Clearwell facility (100-F Area) which was planned for demolition as part of cleanup activities. The size of this colony was estimated at approximately 2,000 bats—making it the largest known colony in eastern Washington. Further observation indicated it also was a maternity colony.

An ecological study was begun at the 183-F Clearwells (west intact; east demolished in the 1980s; and collectively identified as the 126-F-2 waste site) to identify strategies that would be necessary to eliminate or mitigate impacts to this colony caused by demolition. Many alternatives were considered for the outcome of this facility. The preferred alternative selected as a result of the study is to leave the structure intact and add perimeter fencing and signage to deter human entry. This alternative causes the least disturbance to the bats while eliminating unauthorized access to the facility.

Beginning in June 2007, and continuing through September 2008, bats at the 183-F Clearwell, along with the roost site at the 190-DR process water tunnels for comparison, were studied to identify the species present, their relative abundances, and how the 183-F Clearwell structure is being utilized by the bats. The methods used involved a combination of roost entries, acoustic analysis, video analysis, morphometric measurements, and DNA analysis.

The study showed that the bats present at 183-F Clearwell are Yuma myotis (*Myotis yumanensis*) and that they use many portions of the complex facility at different times of the year. The preferred roosting locations appear to be in the west one-third of the clearwell along the tops of the pillar supports and two of the closed steel hatches. The concrete roof and the steel hatches collect and store solar heat and provide warmth needed by the bats for a maternity roost. The large size of the clearwell and the unlimited options for the bats to find optimum roosting conditions make this an ideal roost site for such a large colony. This colony is

likely a “source” population, providing other smaller “sink” populations in the region with immigrants (mostly males), facilitating the in-flow of new genetic material into those colonies.

The results of acoustic monitoring showed a dramatic decrease in activity in mid-October 2007 and a dramatic increase in mid-March 2008, but bat activity continued throughout the winter at a much reduced level. The number of bats active during these times cannot be determined by an acoustic detector because one bat can trigger several recordings. However, the fact that bats were detected during the winter months could indicate that some are using parts of the facility that are inaccessible to people.

Demolition of the 183-F Clearwell would undoubtedly affect the success of this large colony of bats. The size of the clearwell affords numerous roosting options that have made this such an attractive roost site. The filter back-wash flume that is attached to the north side of the clearwell does not have an internal connection, but is open to the surface at the east end. This flume is also used as a roost at certain times of the year, but does not appear to be a significant maternity roost site.

The ecological significance of the 183-F Clearwell, the viability of the maternal roosts contained therein, and the biological contribution these colonies make to the regional bat populations all require that the decision to demolish 183-F be re-evaluated. The 183-F Clearwells (collectively identified as the 126-F-2 waste site) were upstream of sodium dichromate additions to cooling water. The demolished 183-F (*east*) Clearwell was recently remediated and the Remaining Sites Verification Package (RSVP) supporting Waste Site Reclassification Form 2006-017 stated that the waste removal action achieved compliance with the remedial action objectives. The RSVP was approved by the U.S. Environmental Protection Agency, and the site was interim closed out. Therefore, demolition of the 183-F (*west*) Clearwell and flumes is not driven by the CERCLA cleanup. Consequently, the recommendation from this study is to leave the Clearwell and flumes intact and protect them from disturbance with fencing and signage.

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## ACRONYMS

CERCLA	<i>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</i>
ISS	Interim Safe Storage projects
NEPA	National Environmental Policy Act
PHS	Priority Habitats and Species
RSVP	Remaining Sites Verification Package
SOC	Species of Concern
WCH	Washington Closure Hanford
WDFW	Washington State Department of Fish and Wildlife



## 1.0 INTRODUCTION

The 183-F Clearwell, in the 100-F Area of the Hanford Site, along with other clearwells (former underground water storage facilities) at retired Hanford reactors, will be demolished as part of the overall cleanup mission. In the summer of 2006, a colony of bats was discovered in the 183-F Clearwell and subsequently determined (via visual survey with infrared video camera) to consist of more than 2,000 bats—making it the largest known colony in eastern Washington. Because very little was known about this colony, an ecological investigation, discussed in this report, was conducted to identify the species and determine the characteristics of the clearwell that make it attractive as habitat, as well as the impact resulting from a loss of the habitat. Of particular importance is the use of the facility as a maternity roost (i.e., where the female bats rear their young).

The study conducted at the 183-F Clearwell was similar to earlier mitigation projects at other Hanford reactor sites (105-D/DR and 105-F Areas) for roosting habitat lost as a result of Interim Safe Storage (ISS) projects. The purpose of the ISS projects was to remove all ancillary structures from the reactor buildings, install new steel roofs, and seal all penetrations to prevent the spread of contamination. Ecological investigations, conducted before these ISS projects began, identified the presence of multiple bat species using the reactors as maternity roosts. At least two species of little brown bats (*Myotis ciliolabrum* and *M. yumanensis*) were found at both areas and pallid bats (*Antrozous pallidus*) at the 105-F Reactor (Johnson and Gano 2006).

The mitigation project at 100-D Area was initiated when a maternity roost was discovered in one of the process water tunnels connected to the 105-DR Reactor. The ISS Project Plan included isolating the tunnels from the reactor, effectively eliminating the bats' access to the tunnels. Approval and concurrence from the U.S. Department of Energy, Richland Operations Office (DOE-RL) on July 28, 1998, provided direction to maintain bat access and mitigate for roosting habitat that would be lost as a result of ISS. In 1998 and 1999, at both tunnel systems that entered the 105-DR valve pit, "bat gates" were installed on access hatches (Figure 1). Monitoring, which began in July 1999, shows the number of roosting bats has ranged from 97 to 170 (Johnson and Gano 2006). The mitigation project was successful in maintaining the maternity roost; however, no studies had been conducted to verify the species present, their relative abundance, or how the bats are utilizing these structures in the spring and summer, or winter.

In the spring of 2003, during the ISS project at the 105-F Reactor, a maternity colony of approximately 30 to 50 pallid bats (*Antrozous pallidus*) was observed in the upper areas of the reactor building. The 105-F Reactor had served as both a communal roost and a breeding area for the bats; therefore, a mitigation effort was initiated to provide an alternate roosting habitat. Commercially built artificial roost boxes were installed on the outside of the reactor. As the building was sealed, the bats were safely removed from inside using a standard eviction process that allowed them to leave but not return. The colony immediately took up residence in the bat houses installed on the exterior of the building (Figure 2). Subsequent monitoring has shown that the colony continues to use the boxes and appears to have increased in size (Gano and Lindsey 2007).

Figure 1. 100-D Area Bat Gate Locations.

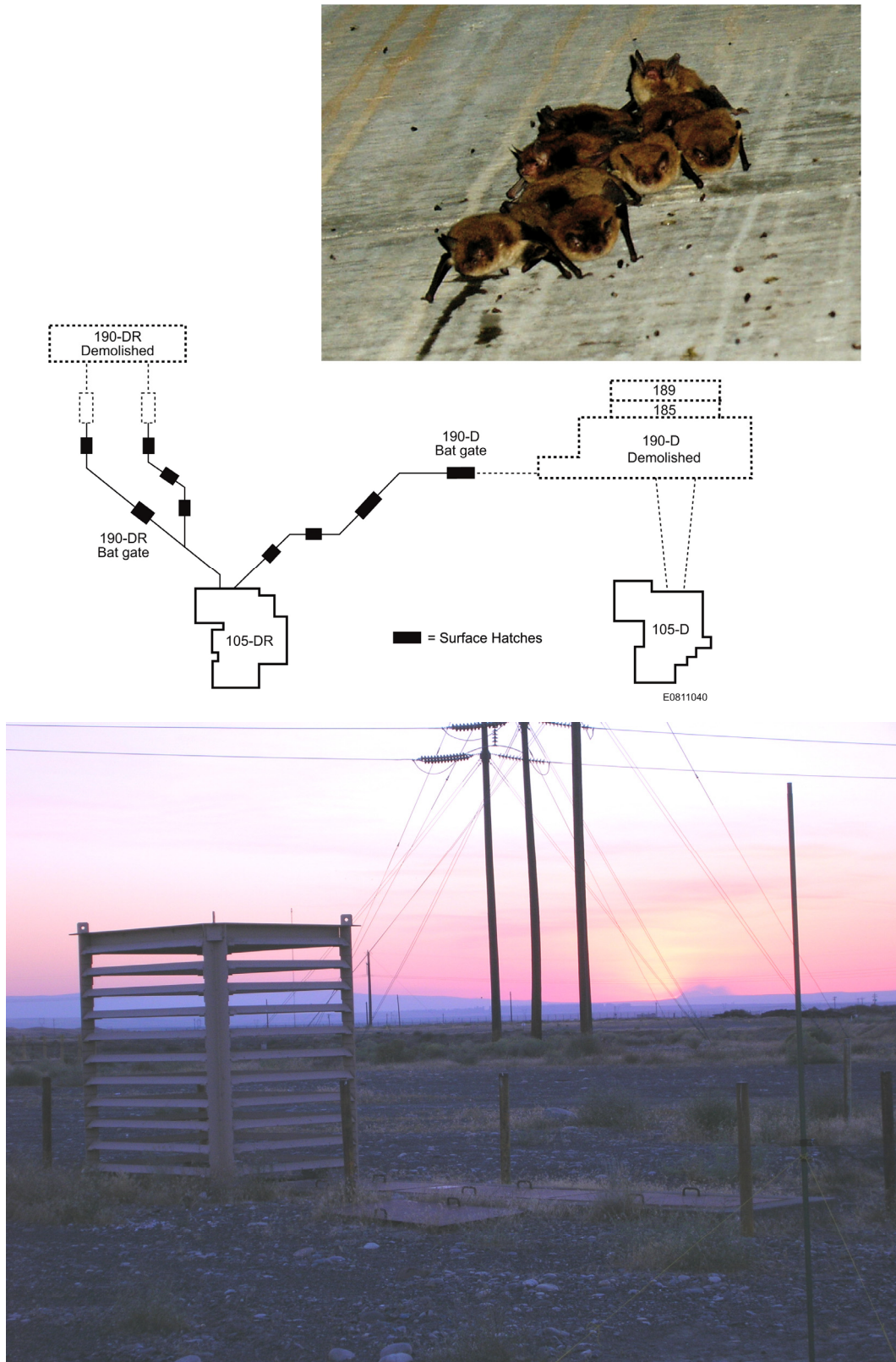
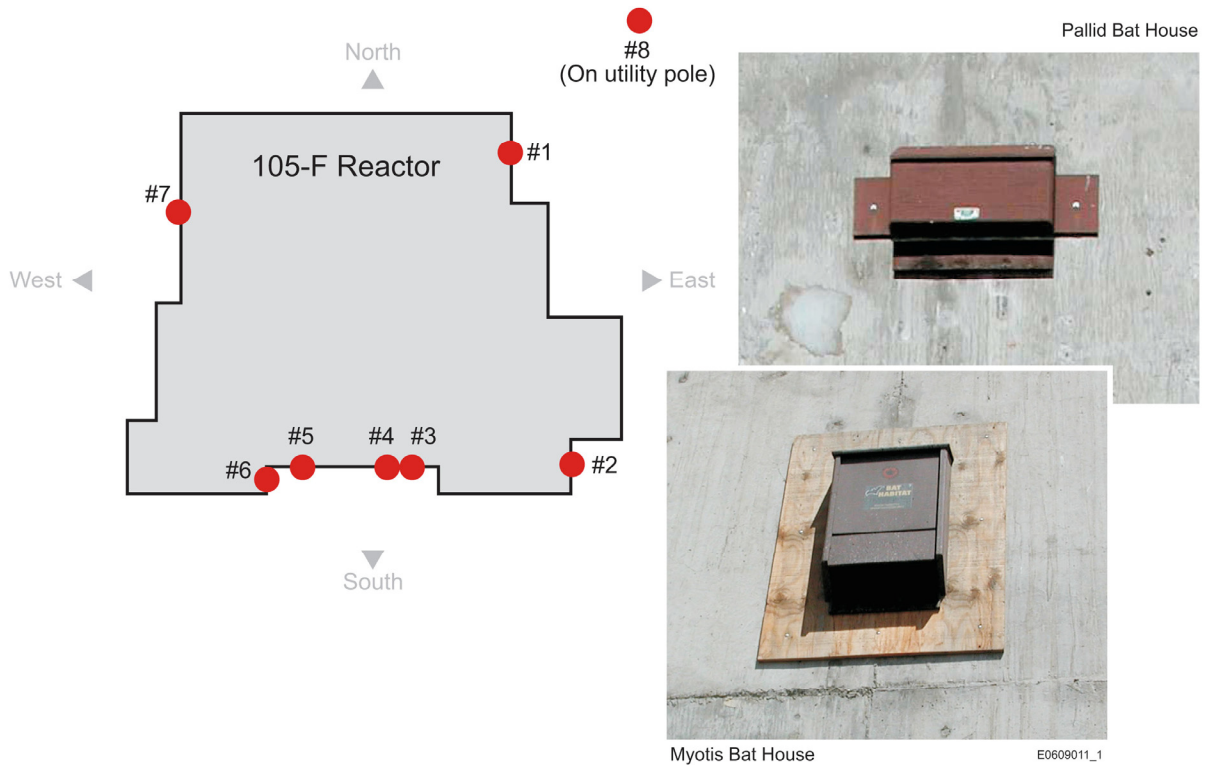


Figure 2. 105-F Pallid Bat Mitigation.



At the 183-F Clearwell, the large size of the colony observed there, as well as the probable species (one of the genus *Myotis* that had been seen at other reactor sites, including the 105-D/DR bat mitigation project), made it of significant interest. There is only one other colony of *Myotis* this size known in the state of Washington (in Olympia). Letters were sent to the DOE-RL by cognizant groups urging that an investigation of this roost site be conducted and a mitigation strategy developed to protect the colony. The following organizations submitted letters to DOE-RL: Oregon Department of Energy; Washington Department of Ecology; Washington Department of Fish and Wildlife; Washington Department of Natural Resources; Confederated Tribes of the Umatilla Indian Reservation; Western Bat Working Group; U.S. Fish and Wildlife Service; Oregon Chapter of The Wildlife Society; and Cascadia Research Collective (studying the colony in Olympia). See Appendix A for copies of these letters.

The study at the 183-F Clearwell, which began in June 2007, provided information on how the colony was using the facility, the impact that demolition of the clearwell might have on the colony, and the need for a successful mitigation project to protect the colony. This report includes the results of DNA testing, observations made during facility/roost entries, and the ecological significance of this colony.

## **2.0 REGULATORY BASIS FOR MITIGATING THE LOSS OF BAT HABITAT**

Before impacting any biological resource during a remediation or demolition project, it is necessary to understand the implications of the planned actions. The species must be identified to determine if it is a sensitive species listed on state or federal protection lists. If so, alternatives must be developed to mitigate the impacts. This process is required as part of the implementation of the National Environmental Policy Act (NEPA) while conducting remediation projects under the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA). The "Hanford Site Biological Resources Management Plan" (DOE/RL 96-32) provides guidance for determining which biological resources require mitigation on the Hanford Site. The document also provides guidance on the various levels of mitigation in order to protect species of concern and protect loss of critical habitat.

The Washington State Department of Fish and Wildlife (WDFW) has two different listings for protecting plant and animal species; the Species of Concern (SOC) list and the Priority Habitats and Species (PHS) program. Species of Concern are also considered Priority Species under the PHS program. Many of the bat species known to occur on the Hanford Site are included on the Washington State Priority Species list.

The SOC (<http://wdfw.wa.gov/wlm/diversty/soc/concern.htm>) list includes all state endangered, threatened, sensitive, and candidate species; and facilitates management and development of species recovery plans. Bats that are included on the SOC list in Washington are shown in Table 1.

**Table 1. Species of Concern List for Bats.**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Federal Status</b>	<b>State Status</b>
<b>Keen's Myotis</b>	<i>Myotis keenii</i>	None	Candidate
<b>Small-Footed Myotis</b>	<i>Myotis ciliolabrum</i>	Concern	Monitor
<b>Townsend's Big-eared Bat</b>	<i>Corynorhinus townsendii</i>	Concern	Candidate
<b>Long-eared Myotis</b>	<i>Myotis evotis</i>	Concern	Monitor
<b>Fringed Myotis</b>	<i>Myotis thysanodes</i>	Concern	Monitor
<b>Long-Legged Myotis</b>	<i>Myotis volans</i>	Concern	Monitor
<b>Yuma Myotis</b>	<i>Myotis yumanensis</i>	Concern	None

The following text is a description of the PHS program (<http://wdfw.wa.gov/hab/phslist.htm>):

“The PHS List is a catalog of habitats and species considered to be priorities for conservation and management. Priority species require protective measures for their perpetuation due to their population status, sensitivity to habitat alteration, and/or recreational, commercial, or tribal importance. Priority species include State Endangered, Threatened, Sensitive, and Candidate species; animal aggregations considered vulnerable; and those species of recreational, commercial, or tribal importance that are vulnerable.”

The bat species listed in the PHS program are shown in Table 2 ([http://wdfw.wa.gov/hab/phs/phs\\_list\\_2008.pdf](http://wdfw.wa.gov/hab/phs/phs_list_2008.pdf)).

**Table 2. Priority Bat Species.**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Priority Area</b>
<b>Keen's myotis</b>	<i>Myotis keeni</i>	Any occurrence
Roosting concentrations of: <b>Big brown bat</b>	<i>Eptesicus fuscus</i>	Regular large concentrations in naturally occurring breeding areas and other communal roosts
Roosting concentrations of: <b>Myotis bats</b>	<i>Myotis spp.</i>	Regular large concentrations in naturally occurring breeding areas and other communal roosts
Roosting concentrations of: <b>Pallid bat</b>	<i>Antrozous pallidus</i>	Regular large concentrations in naturally occurring breeding areas and other communal roosts
<b>Townsend's big-eared bat</b>	<i>Corynorhinus townsendii</i>	Any occurrence

NOTE: Common names in bold are bats that occur or potentially occur on the Hanford Site.

### 3.0 STUDY DESCRIPTION AND RESULTS

The 183-F Clearwells were used as underground water storage facilities that were part of the water treatment plant for the 105-F Reactor. These facilities were common to all the retired reactors except 100-N and were used to store filtered river-water prior to being used as cooling water in the reactor. There were two clearwells at each reactor. At 100-F Area (Figure 3), the *east* clearwell, demolished in the 1980s, was backfilled in 2007; however, the *west* clearwell remains intact. Figure 4 shows the location of the 183-F Clearwells. The intact *west* clearwell is 114 m (375 ft) long by 41 m (134 ft) wide and approximately 5 m (16 ft) deep and covered with a 15 cm (6 in.) reinforced concrete slab roof that is supported by 98 concrete pillars. The roof has six access hatches that are approximately 81 cm (32 in.) by 107 cm (42 in.) each. One hatch cover on this clearwell was removed in the past, which provides easy access for bats to fly in and out. On the north side of this clearwell, as well as at the former *east* clearwell, side-by-side underground concrete flumes facilitated movement of water into and out of the clearwells during operation. These flumes remain intact.

The comprehensive study discussed here was initiated in June 2007 to develop a better understanding of the bat colony observed in the 183-F (*west*) Clearwell and thus gain further insight on various strategies protecting the viability of the roost site. The results of this study can also be used to provide needed information for mitigation at other reactor sites.

Figure 3. 100-F Area Location on the Hanford Site.

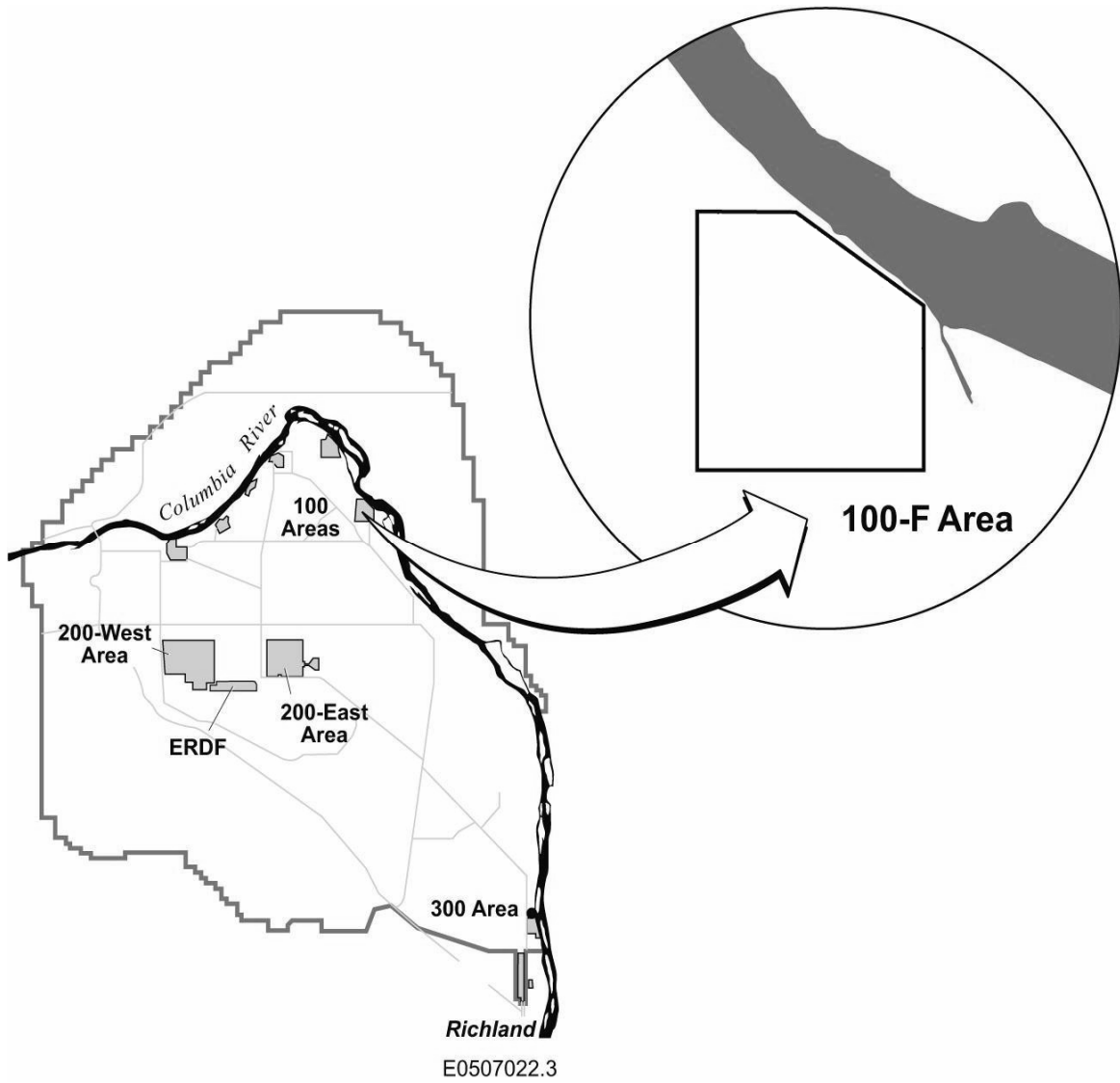


Figure 4. Location and Diagram of 183-F Clearwells.

Overview of 100-F Area

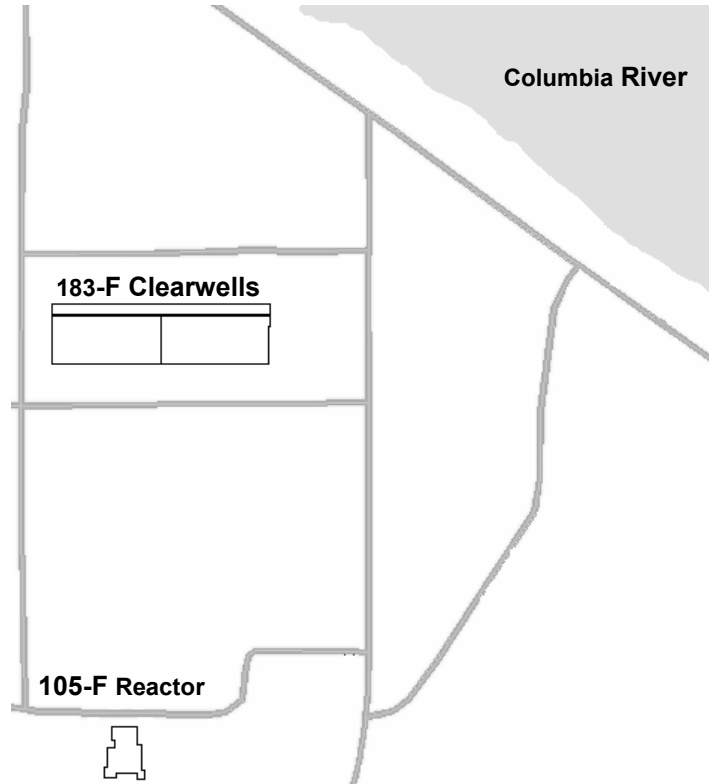
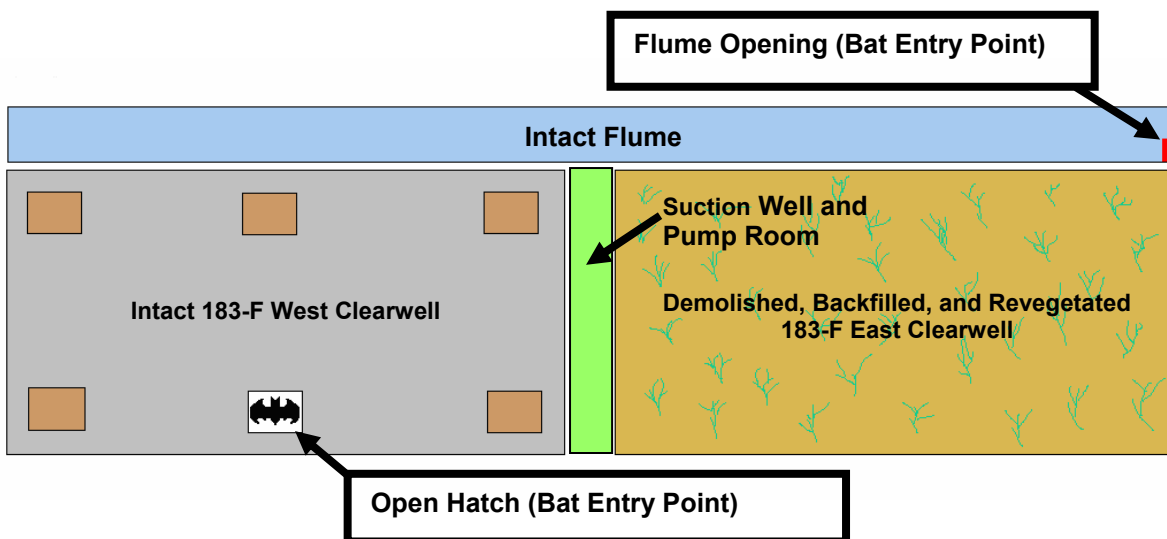


Diagram of 183-F Clearwells





### 3.1 STUDY METHODS

Data for this study were collected at the 183-F Clearwell and the 190-DR Process Water Tunnels to facilitate making recommendations on how the bats at 183-F Clearwell should be managed. The roost site at the 190-DR Process Water Tunnels was included in this study to provide a comparison with maternal genetic lines in a different, but close proximity, site. The 190-DR site is located 13.0 km (8.1 mi) upstream of the 100-F reactor site, and is approximately 1 km (0.6 mi) from the Columbia River. If the two maternity colonies (183-F and 190-DR) are genetically different and unique, then individuals from one colony may not mingle with or be accepted by the other colony. Kerth et al. (2000), Weyandt et al. (2005), and Wilmer et al. (1994) found that some bat species exhibited this pattern of exclusiveness due to natal site fidelity (loyalty to their birthplace). The implications of this would be that if either roost were destroyed, it may not be correct to assume they could or would be incorporated into another colony.

To address the study objectives, bats were captured in mist nets set at night near the identified roosting sites at each of the two study sites. The data collected from captured bats included:

- Age (adult or sub-adult)
- Forearm length
- Sex
- Reproductive status
- Species
- Weight
- Wing membrane tissue punch collected for DNA analysis.

These data were collected per protocols established by the Western Bat Working Group (Bat Grid Protocol; <http://www.wbwg.org/>). Methods described in Zinck et al. (2004) were used for species identification. Relative abundance was determined by filming emergences at the study sites and then counting the number of bats leaving the roost. Haplotype (maternal lineage) differences between sites were determined according to methods described in Kerth et al. (2000), Weyandt et al. (2005), and Wilmer et al. (1994).

Several entries were made into the 183-F Clearwell and flumes to determine which parts of the facility were being used by bats as roosts sites and to determine the structural integrity of the facility.

### 3.2 RESULTS

#### Mist Netting and Acoustic Monitoring

Mist-netting was conducted on eight different nights from August 2007 to September 2008 at the 190-DR and the 183-F study areas. A total of 22 bats from the 190-DR site and 135 from 183-F were captured and released. Measurement data were collected from all captured bats. At 190-DR, 19 of the 22 bats captured were females and at 183-F, 131 of the 135 bats captured were females. Because the majority of bats in these colonies were female and many were observed to be reproductively active, both populations are assumed to be maternity colonies. Eighty-five wing membrane punch samples (190-DR [22 samples], 183-F [63 samples]) were sent to Portland State University for genetic analysis on July 31, 2008. The results indicated that all samples were identified as Yuma myotis (*Myotis yumanensis*). Ten maternal lines (haplotypes) were identified from mitochondrial DNA analysis. Six of the 10 maternal lines seen

at 183-F appeared in the 190-DR population, indicating that the two maternity colonies belong to a common breeding population within the region. More maternal lines could be present, but this would require larger sample sizes from both colonies. While it does not appear that the two colonies are genetically distinct, we cannot assume that the bats intermingle between roosts because of the tendency for individuals to express natal site fidelity (loyalty to their birthplace) as noted by other researchers (Kerth et al. [2000], Weyandt et al. [2005], and Wilmer et al. [1994]).

Acoustic monitoring, using an Anabat SD-1 detector, began in October 2007 at the 183-F filter back-wash flume entrance to determine when the bats utilizing the 183-F structure during the spring/summer would leave for the winter. The monitoring showed a dramatic decrease in the number of calls in mid-October. Unexpectedly, a small number of bat calls were recorded throughout the winter. Call frequency reduced in number about the first week in December to less than 12 calls over approximately every 5 to 6 days despite temperatures dropping to  $-8^{\circ}\text{C}$  ( $18^{\circ}\text{F}$ ) at one point in January. The detector was moved to just outside the 183-F Clearwell hatch in mid-February to determine if the bat calls would be recorded there as well (Figure 5). Calls were recorded with similar frequency at this location. Call frequency increased significantly during the middle of March 2008, indicating a return to spring/summer maternity colony activity. Monitoring continued at this location until the end of June 2008.

### 183-F Structure Entries

On October 3, 2007, an inspection of the current structural condition of the 183-F Clearwell and the associated filter back-wash flume (construction drawings W-69676, W-69679 and W-71536) was conducted by a structural engineer, environmental staff, and an Industrial Health specialist. The clearwell was found to be structurally sound with only some minor spalling in the ceiling in two locations near the east wall. The structural engineer advised that no personnel should stand under the first 2.4 m (8 ft) of roofing along the east wall due to the potential for some of the spalled concrete to fall. There is a flume that runs along the east wall, the top of which is 1.2 m (4 ft) above the general floor level. As long as personnel do not stand on top of the flume, they will be maintaining a safe distance from the spalled concrete. There were no other restrictions for access. The Industrial Health specialist continuously monitored air quality ( $\text{O}_2$  and explosive gases) and found no portion of the facility to have limiting conditions. Upon exiting the facility, all staff were surveyed for radiological contamination and none was found.

Only a small number of bats (less than 20) were observed in the clearwell at this time. The weather had cooled significantly during the prior week, and the temperature on the ceiling of the clearwell was  $15.5^{\circ}\text{C}$  ( $60^{\circ}\text{F}$ ).

The filter back-wash flume, which runs the entire length of both the west and east clearwells, functioned as the drainage system for filter back-wash water from the filter beds in the 183-F Water Filtration building. It measures 1.3 m (4 ft) wide by 2 m (6.6 ft) high and 228.7 m (750.5 ft) long. This flume is open on the east end; at the northeast corner of the east clearwell site. The flume was inspected and found to be safe for access. At approximately 100 m (328 ft) in, a timber that had fallen through a 61-cm (24-in.) pipe/drain opening in the ceiling and supported rubble above. The structural engineer advised that personnel not proceed past this point to ensure that no one would contact the timber and cause rubble to fall through the opening. The engineer judged the flume to otherwise be structurally sound.

During this entry into the filter back-wash flume, an estimated 200 to 300 bats (*Myotis sp.*) were encountered roosting in clusters along the walls of this 1.2-m (4-ft)-wide flume. The temperature inside the flume was warmer than the clearwell at  $22.8^{\circ}\text{C}$  ( $73^{\circ}\text{F}$ ). The warmth of

the flume was attributed to stored heat in the massive concrete structure from solar heating on the exterior of the southern wall during the summer. Before the demolished 183-F east Clearwell was backfilled on October 18, 2007, the southern wall of the flume was exposed to the sun.

**Figure 5. 183-F East Clearwell Open Hatch.**



On February 7, 2008, the 183-F Clearwell and associated flume structures were entered to evaluate the use of the structures as a winter roost. Again, the inspection team consisted of a structural engineer (different individual than during October 2007 visit), environmental staff, and an Industrial Health specialist. Again, no limiting conditions were found by the Industrial Health specialist, and the structural engineer determined that the clearwell and the flumes were structurally sound.

Acoustic monitoring had been ongoing at the filter back-wash flume entrance since October, in order to determine when the bats were going to leave for the winter. The acoustic monitoring indicated that bats (unknown number and most likely *Myotis yumanensis*) had been present at the structure since the monitoring began. While in the filter back-wash flume, extreme care was taken not to touch the fallen timber discovered on the previous entry. No bats were observed in the entire length of the flume, and no apparent physical connection to the main clearwells was seen. The conclusion was that this flume is apparently used only during the spring to fall by the bats, and not used as a winter roost because it appears to be too warm for hibernation.

No winter roosting bats were observed in the 183-F Clearwell during the February inspection. On the north side of the clearwell is a baffle wall and the inlet flume where water came into the clearwell from the filter building. These areas were explored for the presence of bats, but none were observed. Fecal matter (guano) was seen on the floor throughout the inlet flume, indicating that the bats used this area at some time of the year.

On March 13, 2008, entry was made into the suction well, which is a flume on the east side of the 183-F Clearwell where the water was pumped from the facility to the reactor. The suction well is a flume located between the intact west clearwell and the demolished pump room to the east (construction drawings W-69665, W-69677, and W-71388). This area was noted during the February 7 entry as a potential area for winter roosting bats that should be further investigated. The suction well is approximately 40.8 m (134 ft) long by 2 m (6.6 ft) wide by 7.3 m (24 ft) high. The floor of the suction well is approximately 1.5 m (5 ft) below the floor level of the clearwell, and was accessed via a ladder through a 1.2-m (4-ft) -wide opening in the east side of the clearwell. This area was visually inspected for roosting bats and presence of guano, but neither was observed. It did not appear that the suction well had been used as a summer or winter roost site for bats.

On June 6, 2008, entry was made into the 183-F Clearwell and filter back-wash flume structures (reference drawings W-69676, W-69679, and W-69838) to film the active maternity colony in the clearwell and to inspect the flume for roosting bats. The maternity colony was found to be utilizing the west end of the clearwell and was seen roosting along the tops of several pillar supports where they contact the roof. The population of the colony was estimated at between 1,800 and 2,000 individuals after analyzing the video. This number was consistent with previous exit counts of bats emerging in the evening. Guano and urine stains indicate bats utilize all portions of the clearwell throughout the summer. The full length of the filter back-wash flume was inspected, but no bats were observed at this time.

The clearwell was entered again on September 22, 2008, to recover temperature data loggers and to inspect the roost for usage. The external temperature had recently dropped to the mid-70s (°F) during the day and high 40s and low 50s (°F) at night. The majority of the colony was observed to be located in one of the closed hatches in the west end of the clearwell. Other small groups of 5 to 20 bats were observed scattered throughout the western end and roosting on the underside of the roof, in cracks and small penetrations into the concrete. Approximately 30 bats were observed roosting as individuals throughout the clearwell. Because adult male bats do not typically roost with a maternity colony, these individuals were likely males. The total population in the clearwell at this time was estimated to be approximately 300 to 500 bats.

The filter back-wash flume was entered on September 30, 2008, to recover a temperature data logger that was installed October 3, 2007. The temperature near the ceiling measured by the data logger (approximately 72 m from the entrance) was 21 °C (70 °F). The temperature increased toward the west end of the flume; temperatures measured by portable thermometer were 26.7 °C (80 °F) at approximately 140 m (459 ft) from the east entrance and 28.7 °C (84 °F) at the west end of the flume. Approximately 200 bats were observed in the flume.

### 3.3 CONCLUSIONS

This investigation of bats at the 183-F Clearwell and associated flume structures indicates a wide usage of this facility, both temporally and spatially. The bats appear to use all portions of the intact clearwell, its associated inlet flume, and the filter back-wash flume at certain times throughout the summer roosting season. The suction well associated with the pump room

(located on the east end of the clearwell) was the only location where guano was not found. The preferred roosting locations appear to be in the western one-third of the clearwell along the tops of the pillar supports and two of the closed steel hatches. The concrete roof and the steel hatches collect and store solar heat and provide warmth needed by the bats for a maternity roost. It is likely that the bats use the hatches during times when outside temperatures are moderate in the spring and fall because the steel covers heat up quickly and provide a small recessed area in the roof, which traps heat. The majority of the population was seen in one of these hatches in September 2008. During hotter periods, the bats were observed roosting on the pillar supports where they attach to the roof. The pillars themselves provide vertical surfaces that allow the bats to move up or down to find their optimum temperature. The large size of the clearwell and the unlimited options for the bats to find optimum roosting conditions make this an ideal roost site for such a large colony.

Numerous individual roosting bats were observed during the September 2008 inspection. These bats are likely males that have entered the roost site preparing to breed. Bats typically breed in the fall prior to leaving the summer roost. The females store the sperm and do not complete fertilization until spring when they emerge from hibernating in their winter roosts.

Acoustic monitoring outside the roost was conducted from October 2007 to late-March 2008 to determine when the bats left the roost for the winter and came back in the spring. The results of that monitoring showed a dramatic decrease in mid-October and a dramatic increase in mid-March, but bat activity continued throughout the winter at some level. The number of bats actually active during these times cannot be determined by an acoustic detector because one bat can be active near the detector, thus triggering several recordings. However, the fact that bats were detected during the winter months could indicate that some are using parts of the facility that were inaccessible to people.

This colony is the largest known maternity colony of *Myotis yumanensis* in eastern Washington. It is likely a "source" population (Meffe et al. 2002), providing other smaller "sink" populations in the region with immigrants (mostly males), facilitating the in-flow of new genetic material into those colonies. Without this flow, those "sink" populations could be genetically at risk. Further study would be required to determine the role this colony plays in the region.

#### **4.0 RECOMMENDED MITIGATION ACTIONS AT THE 183-F CLEARWELL/FLUME BAT ROOST**

The 183-F Water Treatment Plant operated the same as a municipal water treatment plant, filtering river water to be used as cooling water for the 105-F Reactor. It is upstream of reactor effluents, and there is no operational history of this facility becoming radiologically contaminated. An investigation of the 183-B Clearwells, which are identical to the 183-F Clearwells, determined that water treatment chemicals such as sodium dichromate were added at the 190-F facility, which was between the clearwells and the reactors. The Remaining Sites Verification Package (RSVP) supporting the Waste Site Reclassification Form 2007-004 (for the 183-B, 126-B-2 Clearwells) stated that there is no evidence to suggest that the water stored in the clearwells ever contained sufficient quantities of radionuclide or nonradionuclide hazardous chemicals to present a human health risk (WCH 2007). The demolished 183-F east clearwell was remediated and the RSVP supporting Waste Site Reclassification Form 2006-017 for the 183-F, 126-F-2 Clearwells stated that the waste removal action achieved compliance with the remedial action objectives (WCH 2006). The RSVP was approved by the

U.S. Environmental Protection Agency, and the site was interim closed out. Therefore, demolition of the 183-F west Clearwell and flumes is not driven by the CERCLA cleanup.

The complexity and size of the 183-F Clearwell facility are obviously important features that have contributed to the size of this colony of bats. Because this is a maternity colony, and is listed by the state of Washington as a Priority Species, mitigation is required according to the Hanford Site Biological Resources Management Plan (DOE/RL-96-32) to maintain the viability of this colony. The extremely large size of this colony makes it a very important resource to the regional bat population. Demolition of the clearwell without replacement of the habitat would result in total loss of the colony. Because demolition of the 183-F Clearwell is not required as a CERCLA action, the recommendation from this study is that the structure be left intact and protected with a perimeter fence and signage to exclude all but authorized entry. Also, this site should be added to the mitigation monitoring program which estimates the populations of the bat roosts at the 105-F Reactor and 190-DR Process Water Tunnel mitigation sites. The results of this mitigation monitoring is reported annually in the *River Corridor Closure Contractor Revegetation and Mitigation Monitoring Report*.

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**APPENDIX A**  
**LETTERS OF INTEREST TO DOE-RL**



## APPENDIX A

### LETTERS OF INTEREST TO DOE-RL



**Oregon**

Theodore R. Kulongoski, Governor



**OREGON DEPARTMENT  
OF ENERGY**

625 Marion St. NE  
Salem, OR 97301-3737  
Phone: (503) 378-4040  
Toll Free: 1-800-221-8035  
FAX: (503) 373-7806  
[www.oregon.gov/energy](http://www.oregon.gov/energy)

January 25, 2008

Mr. Joe Franco  
Assistant Manager for the River Corridor  
U.S. Department of Energy  
Richland Operations Office  
P.O. Box 550, MSIN A3-04  
Richland, WA 99352

Dear Mr. Franco:

As a natural resource trustee for the Hanford Site, Oregon wants to express concern about the planned demolition of the 183-F clearwell at the Hanford F Area.

At the October 2007 meeting of the Hanford Natural Resource Trustee Council we were told by Ken Gano, a natural resource specialist with Washington Closure Hanford, that the 183-F clearwell has become home to a very large colony of bats, tentatively identified as *Yuma myotis*. The colony is one of the largest in the State of Washington, with over 2,000 females using the site as a maternity and nursery site. Although the site is not natural habitat for the bats, conditions in the clearwell are apparently well-suited for bats which are thriving in this facility. Monitoring of the site is continuing to fully characterize the extent and duration of use in what has become an important regional habitat.

In a subsequent discussion with Mr. Gano, we were also told that the site is not contaminated, nor is its demolition necessary to facilitate cleanup of nearby contaminated facilities, pipelines, or soils at the 100-F area. The clearwell is structurally sound, so there is no urgency for its demolition. There seems to be no compelling rationale for demolition except that the clearwell is included on a list of remaining facilities at 100-F and as such has been targeted for demolition. By fencing the site, DOE can protect this habitat while spending far less than the cost of demolition. Moreover, in the event that demolition does proceed, there would be a need to provide mitigation for loss of habitat. Washington Closure is evaluating the potential to modify the structure and/or soil cover of a nearby flume, but it is unclear whether the flume can provide suitable replacement habitat.

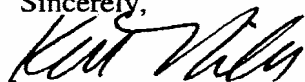
As we understand it, the clearwell is scheduled for demolition during FY 2009. We urge you to indefinitely suspend or cancel this action for several reasons. First, it preserves scarce, heavily used habitat and prevents disruption and possible loss of this colony. It also obviates the need to spend resources on a mitigation project that might or might not be successful. Finally, in a time of tight budgets, it allows scarce funds that would have been used for demolition to be reallocated to other priorities.

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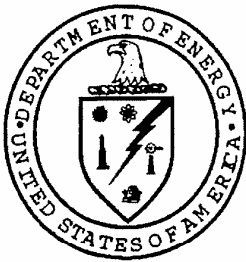


Thank you for your interest in this matter. Oregon remains interested in learning the results on continuing monitoring of the clearwell, and on DOE's plans for the future of this facility. Should you have questions or wish to discuss this matter further, please contact Paul Shaffer of my staff at 503-378-4456.

Sincerely,



Ken Niles  
Assistant Director



Document: NA (ODOE)  
Document Date: 01/25/2008  
Author: NILES K  
Addressee: FRANCO J

Actionee: **D. Chris Smith**  
Due Date: ACTION

Title: Expressing Concern About the Planned Demolition of the 183-F Clearwell at the Hanford F Area

<u>DIR</u>	<u>DIV</u>	<u>NAME</u>	<u>DIR</u>	<u>DIV</u>	<u>NAME</u>
MGR			AMSE		
DEP		Hawkins, Al		OOD	
AMRC		Smith, D. Chris (Actionee)		SED	
		Bowers, Liz		SES	
		Charboneau, Stacy	KBC		
		Franco, Joe	PPRI	PIC	
		Hathaway, Boyd		CMG	
		Ward, Dana		RPI	
		Zeisloft, Jaime	ORP		
AMCP			PNSO		
OEC		French, Colleen	RLCI		
OCC		Smith, Connie			
		Wilcox, Deb			
		Williamson, Barbara			
AMA					
	BOP				
	FMD				
	HRM				
	PRO				

Comments:

Records Schedule Information:

ENV-1.k1

TBD (to be determined)

Scan?: Yes Sensitive?: No

Sensitive Attachments?:

IDMS Folder: RL General Corr

Date RL CC Rec'd: 01/30/2008



**DEPARTMENT OF ECOLOGY**

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**DEPARTMENT OF FISH AND WILDLIFE**

600 Capitol Way North • Olympia, WA 98501-1091  
(360) 902-2200 • TDD (360) 902-2207

November 15, 2007

Mr. Dave Brockman, Manager  
U.S. Department of Energy  
Richland Operations Office  
P.O. Box 550  
Richland, WA 99352

Re: 183-F Clearwell Demolition

As Hanford natural resource trustees, the Washington State Department of Ecology and Department of Fish and Wildlife are concerned about the demolition of the 183-F clearwell.


At the October 2007 meeting of the Natural Resource Trustee Council, we learned that more than 2,000 female Yuma myotis bats use this facility as a roost and nursery. According to Washington Closure Hanford natural resource specialist Ken Gano, this may be the second largest colony of Yuma myotis in Washington State.

We also learned the facility is not contaminated and is structurally sound. Assuming this is the case, would it make better sense, from a budget and a natural resources viewpoint, to spend the money to fence this facility rather than to demolish it? In doing so, the risk of losing the colony altogether could be prevented, and the bats would continue to thrive in this important roosting habitat.

Though this clearwell is not considered natural habitat for the bats, it provides optimal habitat conditions. Protection of this site is our priority, as well as an added value to Washington's natural resources. As such, we would be open to banking this site to offset other Hanford mitigation needs associated with arid land impacts.

We are also concerned with disturbances to the colony. Maternal bat roosting colonies are very sensitive to disturbances, especially during pup rearing. If disturbed, they may abandon their young, and mortality can occur. We would like to learn more about the monitoring activities taking place in the clearwell and would be happy to meet with your staff to discuss the monitoring and alternatives to demolition. Please contact Larry Goldstein for Ecology at 360/407-6573 or Charlene Andrade for Washington Fish and Wildlife at 360/902-2546.

Sincerely,

  
Jane Hedges, Manager  
Nuclear Waste Program

  
Curt Leigh, Manager  
Major Projects Section

cc: Joe Franco, USDOE  
Nick Ceto, EPA  
Rod Lobos, EPA  
John Price, Ecology  
Hanford Natural Resource Trustee Council

January 4, 2007

Dana Ward  
Department of Energy  
P.O. Box 550  
MSIN A3-04  
Richland, WA 99352

Dear Mr. Ward:

I am writing to you regarding bat use of the 105-F reactor clearwell at the Hanford site. I recently learned of the possible significance of this site to bats and encourage you to support research on its use.

I am a zoologist for the Washington Natural Heritage Program within the Department of Natural Resources. As part of my job, I maintain a list of animals known from the state and information on their status. Washington hosts 15 species of bats. Twelve of these species make significant use of spaces such as this clearwell. Seven species of bats are rare or declining in the state. All but one of these seven have been found on the Hanford site or within 20 miles of it.

I have conducted research on bats at about 25 locations across Washington. Much of my work has been on the east side of the Cascades and has focused on shrubsteppe habitat similar to that of the Hanford site. At many of these sites bat populations appear to be limited by absence of water or absence of appropriate roost sites. At the Hanford site, the Columbia River provides sufficient water, and large concrete structures provide a range of roost possibilities. For these reasons, Hanford has been recognized as important to bats for at least 25 years. While numbers of bats have been found at several locations across the site, this is by far the largest number of bats known from a single roost. Indeed, it is one of the largest roost sites known in the state. If the number of bats seen in 2006 is verified, this roost probably has importance to state-wide and regional populations of bats.

Cleanup of the Hanford Site is a necessary process, the end result of which will be an improvement of environmental conditions in the area. Before the clearwell or other similar structures are removed, however, it would be highly beneficial to survey them for use by bats.

Importance of the clearwell or other structures in the area can not be determined without research. Surveys of bat use, including collection of data on species diversity, numbers, and timing and distribution of use is important to measuring significance. This information would be useful in guiding decisions about removal or other management of these structures. Given the apparent size of these roosts, information useful in their management would also be useful in managing other bat populations in the region and across the country.

Mr. Dana Ward  
January 4, 2007  
Page 2 of 2

If you have questions about this information, please contact me.

Sincerely,

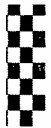
John Fleckenstein, zoologist  
Natural Heritage Program  
Department of Natural Resources  
(360) 902-1674  
[John.Fleckenstein@dnr.wa.gov](mailto:John.Fleckenstein@dnr.wa.gov)

cc: Ken Gano

09/25/07 TUE 1:34 FAX 509 376 1466

DOE OTR

SEP 25 '07 03:42PM 001



CONFEDERATED TRIBES  
of the  
*Umatilla Indian Reservation*

DEPARTMENT OF SCIENCE AND ENGINEERING

P.O. Box 638  
73239 Confederated Way  
PENDLETON, OREGON 97801  
Phone: (541) 966-2400  
Fax: (541) 278-5380

September 10, 2007

Mr. Dave Brockman, Site Manager  
Richland Operations Office  
US Department of Energy  
P.O. Box 550, MSIN: A7-50  
Richland, WA 99352

Post-it® Fax Note	7671	Date	9/25/07	# of pages	1
To	Ken Gano	From	Dana Ward		
Co./Dept.		Co.			
Phone #		Phone #			
Fax #	372-9481	Fax #			

SUBJECT: Protection of bat, eagle, and heron habitat

Dear Mr. Brockman

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Department of Science and Engineering (DOSE) urge DOE at this time to leave the clearwells in place wherever possible as they are homes to multitudes of bats of several species. Since the clearwells are not contaminated and are providing a valuable environmental service we would like them to remain in place. As DOE's focus should be clean up of contamination these could be left alone for now and resources reprioritized. If there are additional clearwells that could be opened, it may also be valuable to leave them for now.

The DOSE would also like DOE and USFWS to consider replanting the old cottonwood and black locust trees used by herons and eagles that are eroding, senescing, and/or burned along the Hanford Reach. Even though those particular trees are anthropogenic, they enhance the overall habitat and value of the Hanford Reach. The CTUIR have always managed habitat to benefit wildlife. Our natural resource goals are generally phrased in term of restoring, protecting, and enhancing, and preserving habitat. This seems like an example of a beneficial result from a very light management touch.

Sincerely,

Stuart G. Harris  
Director CTUIR DOSE

Cc: Dana Ward, DOE  
Greg Hughes, USFWS

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SEP 14 2007

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TREATY JUNE 9, 1855 © CAYUSE, UMATILLA AND WALLA WALLA TRIBES



Western Bat Working Group  
P.O. Box 2153  
Rapid City, SD 57709  
www.wbwg.org

December 27, 2006

Dana Ward  
Department of Energy  
P.O. Box 550  
MSIN A3-04  
Richland, Washington 99352  
Dana\_C\_Ward@rl.gov

Dear Dana Ward,

I'm writing this letter on behalf of the Western Bat Working Group to express our interest about the known and potential bat maternity roosts associated with the Hanford Facility in Richmond, Washington. Based on results of the 105-F reactor clearwell bat surveys conducted in May of 2006, this maternity site is one of the largest documented in the Pacific Northwest. Approximately 2000 bats were documented emerging from the main clearwell portal. Since June or July are more likely to be when I'd expect peak numbers of females to be present, and August to be when pups would be present, the actual number of bats using this one site could be significantly higher. Additionally, maternity colonies typically use a number of roost structures, so it is also plausible that additional bats were in the area and using other roost structures at the time of the surveys, but went undetected. I would not be surprised if this facility is home to several thousand bats during the maternity season. If this is the case, I know of no other maternity site in Washington that supports that high number of bats and only those sites in southwestern Oregon that are specific to *Tadarida brasiliensis*, a species renowned for forming large colonies, would approach this number.

I understand that there are plans to conduct research on the bats at Hanford and I want to applaud your agency for investing in the scientific exploration of this invaluable site. The Department of Energy's financial investment in this work is critical to successfully conducting the proposed research. Data collected from this site concerning species, numbers, how the bats use which structures, distribution patterns, and maternity behavior, is valuable not only in the management of Hanford, but to the management of similar sites worldwide. While unfortunately our organization is not equipped to provide



financial support for research of this site, we are prepared to assist with the Hanford site research by providing professional and technical advice and support. Please do not hesitate to ask if there is anything we can do to support this important work.

In my other parallel life, I work fulltime as the Bat Specialist for the U. S. Forest Service and Bureau of Land Management for Oregon and Washington. In that capacity, I have agreed to lend my expertise to the Hanford bat project. I estimate that this will entail 3 weeks of in-kind contribution of my time and 3 days of travel, an estimated value of \$5,000. I'm providing this information to demonstrate the importance of this site to and the willingness of other federal agencies to partner in collecting data on this site.

Again, if I can be of further assistance to you in supporting the study of the bats using the Hanford Facility, please feel free to contact me.

Sincerely,

Patricia (Pat) Ormsbee, President  
Western Bat Working Group  
[pormsbee@fs.fed.us](mailto:pormsbee@fs.fed.us)  
541-225-6442

cc Ken Gano

---

**Gano, Kenneth A (Ken)**

---

**From:** Ward, Dana C [Dana\_C\_Ward@RL.gov]  
**Sent:** Tuesday, January 23, 2007 9:16 AM  
**To:** Franco, Jose R (Joe)  
**Cc:** Zeisloft, Jamie; Gano, Ken A; Smith, Douglas C (Chris); Westover, Kent R; Bazzell, Kevin D  
**Subject:** FW: Hanford bat inventory

FYI

-----Original Message-----

From: Paula\_Call@fws.gov [mailto:Paula\_Call@fws.gov]  
Sent: Tuesday, January 23, 2007 9:01 AM  
To: Wisness, Steven H; Ward, Dana C  
Cc: Michael\_Ritter@fws.gov; David\_Linehan@fws.gov; Greg\_M\_Hughes@fws.gov;  
Heidi\_Newsome@fws.gov; Howard\_Browsers@fws.gov; Kevin\_Goldie@fws.gov  
Subject: Hanford bat inventory

Steve and Dana,

Recently we have become aware of the significant bat habitat provided by the 183-F Clearwell. In light of your continuing clean-up and remediation activities on the Hanford site, we strongly encourage you to take steps immediately to initiate a year-long bat inventory of all Hanford site structures which are scheduled for demolition. The inventory should determine presence and/or absence of bats related to season, species, roost type (e.g. maternity, hibernaculum, fall swarming), and roost characteristics (e.g. temperature, relative humidity, etc). There are many peer reviewed and tested procedures for conducting such an inventory in a manner with minimal impacts to bats. The study should be peer reviewed and should be conducted with the guidance of experienced bat researchers. Once completed, the study results can be used to guide demolition and mitigation actions.

We look forward to seeing a detailed proposal for such a study, and will support the inventory efforts with to the extent available; through review of study proposal package and draft reports, and potentially through limited assistance with inventory efforts and equipment.

Paula

Dana Ward  
Department of Energy  
P.O. Box 550  
MSIN A3-04  
Richland, Washington 99352

3 January 2007


Dear Dana Ward,

The purpose of this letter is to encourage research on the bat maternity roosts at the Hanford Facility in Richland, Washington. The Oregon Chapter of The Wildlife Society (ORTWS) is a non-profit scientific and educational association dedicated to wildlife stewardship through science and education. Its goal is to enhance the ability of wildlife professionals to conserve biological diversity, sustain productivity, and ensure responsible use of wildlife resources for the benefit of society. Our membership includes a diverse group of nearly 400 professional field and research biologists, educators, students, administrators, and conservation enforcement officers.

Although the Hanford site is not within the borders of Oregon, it is well understood that wildlife populations do not honor administrative boundaries. We recognize that species as mobile as bats are of interstate importance and represent a valuable wildlife resource shared by both states. It is our understanding that surveys conducted at the 105-F reactor in 2006 documented a significant maternity site for bats. With more than 2000 bats, this represents one of the largest known maternity sites in Washington and Oregon. The bats counted during the May 2006 survey likely represent only a portion of the total bat population using this site.

ORTWS is supportive of carrying out research on this site prior to demolition of the clearwell associated with the 105-F reactor. We encourage you to fund this study to the level necessary to ensure its successful completion. Although it sounds as though the loss of this man-made habitat is inevitable, it is important to learn as much as possible about the site while it still exists. Such knowledge could be applied elsewhere to mitigate effects to bats. ORTWS' membership includes individuals with specific expertise that could be beneficial to the proposed research. We have a Conservation Affairs Committee that could coordinate a technical review of study plans and contribute in whatever way possible to facilitate a defensible study. Please contact us if we can be of service regarding this study.

Sincerely,

  
Mark Penninger, President  
Oregon Chapter of The Wildlife Society  
mpenninger@wildlife.org  
541-962-8519

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a non-profit research organization

Phone: (360) 943-7325  
FAX: (360) 943-7026  
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Dana Ward  
Department of Energy  
P.O. Box 550  
MSIN A3-04  
Richland, Washington 99352

Hello Dana,

Through my bat colleagues I've heard of the colony of bats that have formed maternity colony in a clearwell associated with the old 105-F Reactor at the Hanford reservation. I study bats on the west side of Washington state, and one of the colonies I monitor is near Olympia that is just about the same size as reported for the 105-F colony. According to WDF&W records this the largest "known" bat colony in the state, and is a mixed species group of Little brown and Yuma Myotis bats (*Myotis lucifugus* & *M. yumanensis*). These two species are the only ones known to form such large colonies in the Pacific NW and are typically associated with areas that have open water available for foraging. Most of the bats in this large colony travel nightly to Capitol Lake 8 miles from the roost site. This indicates to me that these large roosts serve as regional nurseries, and after several months, after the young are weaned, they will disperse and relocate throughout a large area.

Based upon the number of bats in the clearwell it is most certainly a group of reproductive females who will bear and raise their pups at this location, most likely either Little brown or Yuma Myotis, or both species mixed. Because both of these species form large groups rather than scattering more widely and will commute long distances to foraging areas they appear to be rather specific in their selection of maternity roost structures. It is believed that suitable roost structures are a limiting factor in their distribution, especially for the Yuma Myotis. Prey and foraging studies have shown Little brown bats to be diverse in their foraging strategies, but the large colonies and long commutes to foraging areas support the "roost limited" hypothesis.

Efforts to provide alternative roosting structures for a roosts scheduled for removal are often unsuccessful. I believe this is because of the limited time between the placement of the new structure and the failure to fully consider the features of the original roost that the bats selected for, and our poor understanding of bat biology compared to so many other families of mammals. Several years to examine the characteristics and use patterns for the existing roost and experimenting with alternative designs would be a reasonable *minimum* effort. Some projects to relocate bats have been quite successful, such as with Western State Hospital in Steilacoom, Washington and some have been huge disappointments that consumed a lot of time and money but were never occupied by bats. It seems the only rule for success is creativity and the quality of the effort, as every colony seems to have its own preferences.

I would recommend and support proposals that would include adequate time to study this clearwell colony, learn a bit about its life history strategies, including foraging areas and roost preferences, and finally accommodating the colony by conserving their roost structure or by providing solid alternative habitat. Please feel free to contact me regarding this bat project, or any others.

Best regards,  
Greg Falxa

Direct: 360-754-8290 Office: 360-943-7235

---

Waterstreet Building 218½ West Fourth Ave. Olympia, Washington 98501

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## DISTRIBUTION

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J. R. Franco	A3-04
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A. R. Hawkins	A5-14
D. C. Ward (20)	A5-15
S. R. Weil	A5-15
J. Zeisloft	A3-04

### River Corridor Closure Contract

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