

Hanford Site Ground Squirrel Monitoring Report for Calendar Year 2013



Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management
Contractor for the U.S. Department of Energy
under Contract DE-AC06-09RL14728



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Richland, Washington 99352

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1.0 Introduction

The U.S. Department of Energy, Richland Operations Office (DOE-RL) conducts ecological monitoring on the Hanford Site to collect and track data needed to ensure compliance with an array of environmental laws, regulations, and policies governing DOE activities. Ecological monitoring data provide baseline information about the plants, animals, and habitat under DOE-RL stewardship at the Hanford Site required for accurate ecological impact assessment decision-making under the *National Environmental Policy Act* (NEPA) and *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA). In addition, ecological monitoring helps ensure that DOE-RL, its contractors and other entities conducting activities on the Hanford Site are in compliance with the *Hanford Site Comprehensive Land Use Plan* ([DOE/EIS-0222-F](#)). DOE-RL places priority on monitoring those plant and animal species or habitats with specific regulatory protections or requirements; or that are rare and/or declining (federal or state listed endangered, threatened, or sensitive species); or of significant interest to federal, state, or tribal governments or the public.

The Washington Department of Fish and Wildlife (WDFW) lists the Townsend's ground squirrel (*Urocitellus townsendii*) as a "State Candidate" ([WDFW 2012](#)). Monitoring of Townsend's ground squirrel colonies, and surveys to identify new colonies, are necessary to collect the baseline data needed to manage and prevent impacts to this sensitive species. The identification of ground squirrel colony locations and other related data are used to generate the maps and information in the *Hanford Site Biological Resources Management Plan* ([DOE/RL-96-32, Rev. 1](#)), which is the guide for the conservation of natural resources on the Hanford Site. These animals are important to the shrub-steppe ecosystem for many reasons. They serve as a food source for many mammals such as badgers and coyotes and fall prey to predatory birds such as hawks, falcons, and owls. The ground squirrel diet consists of a variety of foods including seeds, which contributes to native plant seed dispersal. The process of digging burrows helps aerate the soil and provides burrows for other species including Burrowing Owls ([Sato 2012](#)). Their decline is due to the loss of suitable habitat and isolation of their communities through fragmentation. Townsend's ground squirrels can be difficult to monitor due to their concealed underground lifestyle and short seasons of activity.

Ground squirrels are underground for much of the year for hibernation and estivation, making it crucial to monitor during the correct time window. The ground squirrels' lifecycle consists of several seasonal components. During mid- to late-January squirrels emerge from their burrows after hibernation. They spend the next month breeding, followed by gestation and rearing of young. The young become active outside the burrow by mid-April. They become dormant again starting in late-May to late-June, entering a type of torpor called estivation that is used to avoid the hot and dry portion of the year ([WDFW 2012](#)). After estivation, the ground squirrels may spend late September and October foraging in preparation for hibernation.

The crucial window to observe and monitor these ground squirrels is between late January, after hibernation, and before late-May when estivation begins. This is the longest active period for ground squirrels and thus the best time for monitoring. Ground squirrels breed and rear young during this time, and age determination is easier at this time of year because juvenile ground squirrels are smaller. Protective maternal alarm calls are also used at this time, maximizing the likelihood of detecting colonies.

Ground squirrels on the Hanford Site are known to consume mostly Sandberg's bluegrass (*Poa secunda*), followed by a variety of forbs including western tansymustard (*Descurainia pinnata*), lupine (*Lupinus spp.*), and long-leaf phlox (*Phlox longifolia*) (Rogers and Gano 1980). Two subspecies of Townsend's ground squirrels are known to occur in Washington, *U. townsendii townsendii* and *U. townsendii nancyae*. The subspecies *nancyae* is expected to occur on the Hanford Site ([Sato 2012](#)).

At the onset of the 2013 monitoring season, eight Townsend's ground squirrel colonies were known on the Hanford Site (Figure 1). Two of these sites were known prior to 2012 (Public Safety and Resource Protection Database), while the other six were documented during the 2012 monitoring season ([HNF-53075](#)). The goal of this study was to document the status of previously known colonies and to survey for new colonies across the central portion of the Hanford Site. The central Hanford Site, the portion managed by the Department of Energy, encompasses approximately 315 mi² (815.8 km²) and presents a large geographical area to search for these elusive creatures.

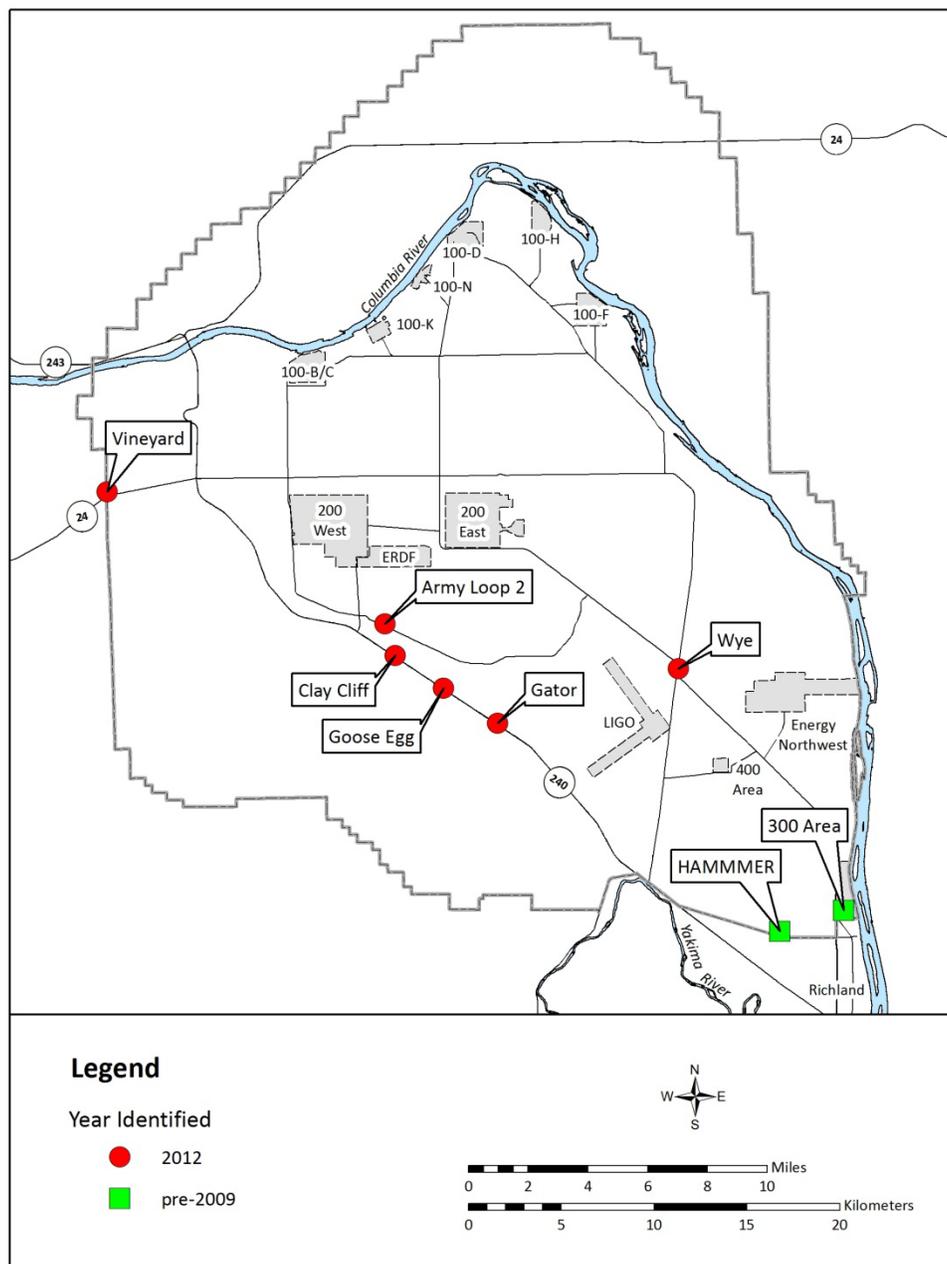


Figure 1. Townsend's Ground Squirrel Colonies Known on the DOE-RL Managed Portion of Hanford Site Prior to 2013

2.0 Methods

Surveyors used a Global Positioning System (GPS), capable of sub-meter accuracy, to navigate to the previously identified Townsend's ground squirrel colony locations. Active ground squirrel burrows were identified as holes approximately 7 cm (2.8 in) in diameter, absent of vegetation, lacking spider webs at the opening, and with tracks and/or signs of herbivory near the opening (Figure 2). Surveyors also

documented visible individuals and audible distress calls. Each colony was determined inactive or active based on these criteria. Any burrows identified outside of the previously defined polygons, generated by connecting the coordinates of the outermost burrows in the colony, were flagged and the polygons were extended to include those new burrows.



Figure 2. Example of Active Townsend's Ground Squirrel Burrows

In addition to documenting the status of previously identified ground squirrel colonies, transect surveys were conducted to identify new colonies across the central portion of the Hanford Site. These transects are the same methods performed by Mission Support Alliance (MSA) in 2012, squares with 1,000 meter (3,281 foot) sides and rounded corners (Figure 3), but in different areas ([HNF-53075](#)). The Hanford Site has a dense population of raptors; the populations are bolstered by the prevalence of artificial nesting structures (e.g., transmission towers, planted trees), on which 88 percent of the raptor nests were found in 2012 ([HNF-53073](#)). It has been proposed that the high density of raptors on the Hanford Site may be negatively impacting prey species, including Townsend's ground squirrels ([HNF-53073](#)). When the locations of active ground squirrel colonies were compared to the locations active raptor nests from 2012, it appeared that ground squirrel colonies were only present in locations far from active raptor nests. This also correlated to the lack of artificial nesting structures in the colony areas. The only exceptions to these observations were colonies in close proximity to human development, which may also minimize the likelihood of predation. Based on this theory, a 4,000 meters (2.5 miles) buffer was

made around all active raptor nests documented during 2012 ([HNF-53073](#)). Transects were then placed in the identified areas that were greater than 4,000 meters (2.5 miles) from a 2012 raptor nest (Figure 4). Priority was given to areas far from raptor nests and close to known active ground squirrel colonies. Transects were positioned so that the legs angled 45 degrees from the road. This generally resulted in diamond shaped transects that maximized the distance between the transect legs, maximized the areas surveyed far from roads, and minimized time surveyors spent walking while not surveying (aka dead-heading). Each "Diamond Transect" was designed to be completed by two surveyors, with each surveyor covering a 30 meter (98 feet) wide swath, for a total of 60 meters (197 feet) wide surveyed along the length of the transects. One surveyor carried the GPS and followed the transect path, while the second surveyor paralleled the first, staying 30 meters (98 feet) away.

Lastly, surveyors documented any colonies identified incidentally during ecological compliance reviews or other surveys. Any colonies observed were marked with a GPS using the same methods described above.

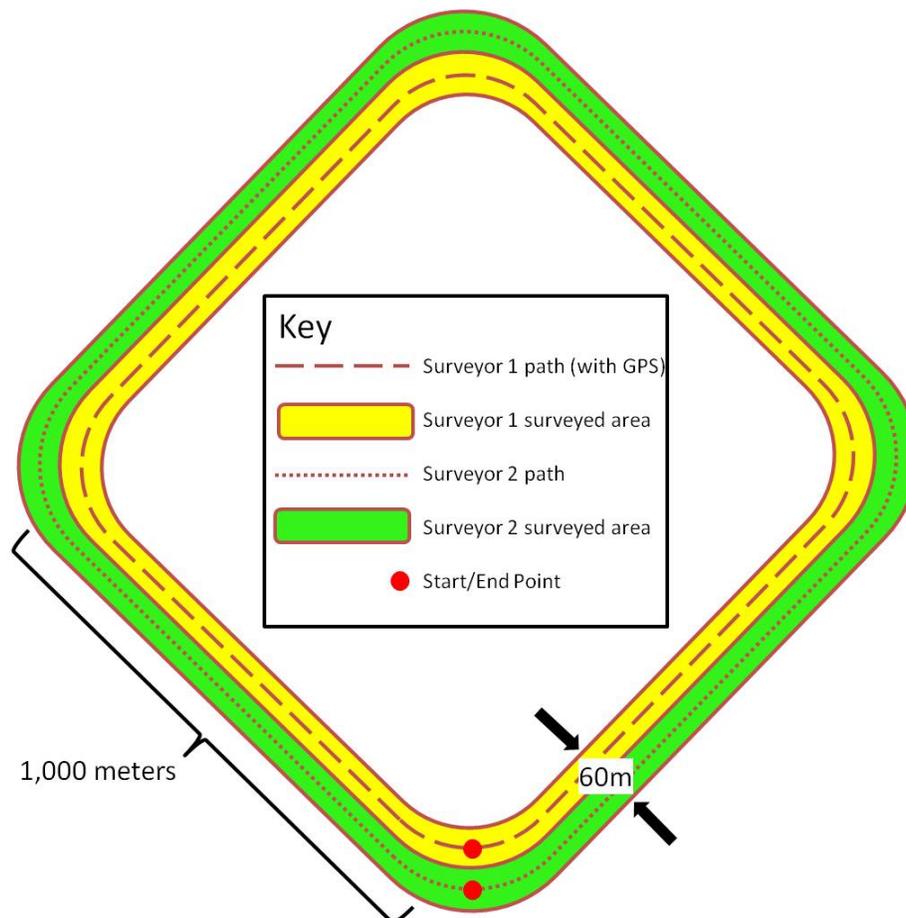


Figure 3. Diamond Transect Design used for Ground Squirrel Surveys

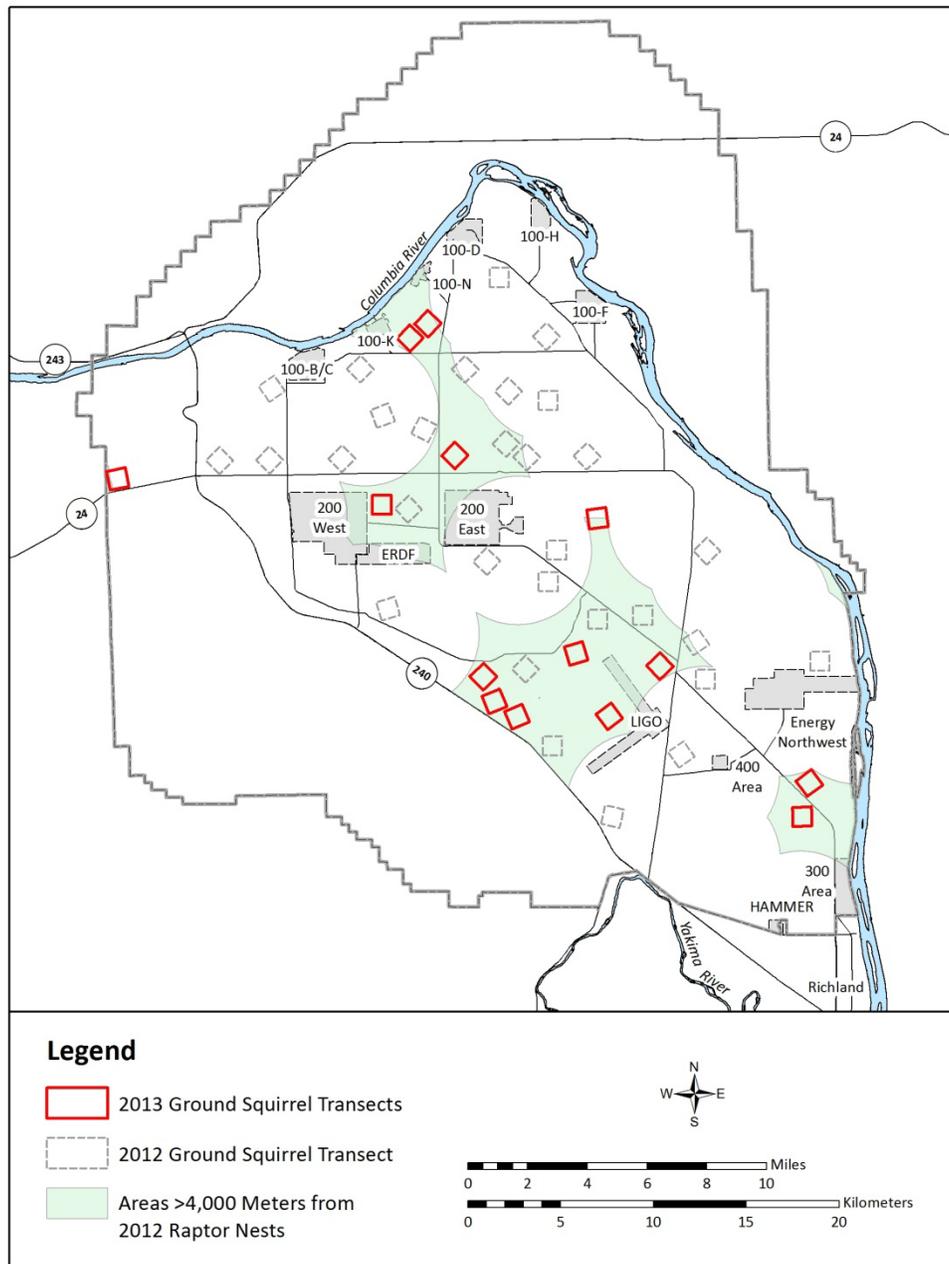


Figure 4. Transect Locations across the Central Portion of the Hanford Site

3.0 Results

Surveys at historical colony locations were performed at all locations documented as active during 2012, the results are shown in Table 1. These locations were used to gauge levels of activity and to calibrate burrow recognition for staff conducting the transect surveys.

Table 1. Monitoring Results at Historical Townsend's Ground Squirrel Colonies (2013)

| Location | Active 2013 | Comments |
|-------------|-------------|--|
| Vineyard | Yes | Several individuals observed and heard. |
| 300 Area | Yes | High level of burrowing activity exceeding previous years. |
| Wye | Yes | Fresh burrowing activity observed. |
| Gator | Yes | 1 individual observed on the surface, herbivory on <i>Cymopterus</i> . |
| Goose Egg | Yes | Fresh burrowing activity observed. |
| Clay Cliffs | Yes | Fresh burrowing activity observed. |
| Army Loop 2 | Yes | Fresh burrowing activity observed. |
| HAMMER | No | No burrows or fresh ground squirrel digs observed. Location appears to be inactive. |

Surveys were completed at 14 diamond transects (Figure 4) between April 24 and May 9, 2013. Each transect was completed in its entirety. No ground squirrel colonies were identified along any of these transects. A summary of survey results are shown in Table 1.

Table 2. Monitoring Results from Ground Squirrel Transects Completed in 2013

| Transect# | Date | Ground Squirrels Detected |
|-----------|-----------|---------------------------|
| GS 31 | 5/8/2013 | No |
| GS 32 | 5/9/2013 | No |
| GS 33 | 5/1/2013 | No |
| GS 34 | 5/7/2013 | No |
| GS 35 | 5/8/2013 | No |
| GS 36 | 5/6/2013 | No |
| GS 37 | 5/6/2013 | No |
| GS 39 | 5/6/2013 | No |
| GS 40 | 5/7/2013 | No |
| GS 41 | 5/7/2013 | No |
| GS 42 | 5/2/2013 | No |
| GS 43 | 4/24/2013 | No |
| GS 44 | 4/24/2013 | No |
| GS 45 | 5/1/2013 | No |

Field personnel incidentally discovered a new Townsend's ground squirrel colony on May 8, 2013. Surveyors named the new colony "Scurf Pea", so-called for the prevalence of the plant (*Psoralea lanceolata*) at the location. Six active burrows were identified at this location. All active Townsend's ground squirrel colonies documented during 2013 are shown in Figure 5.

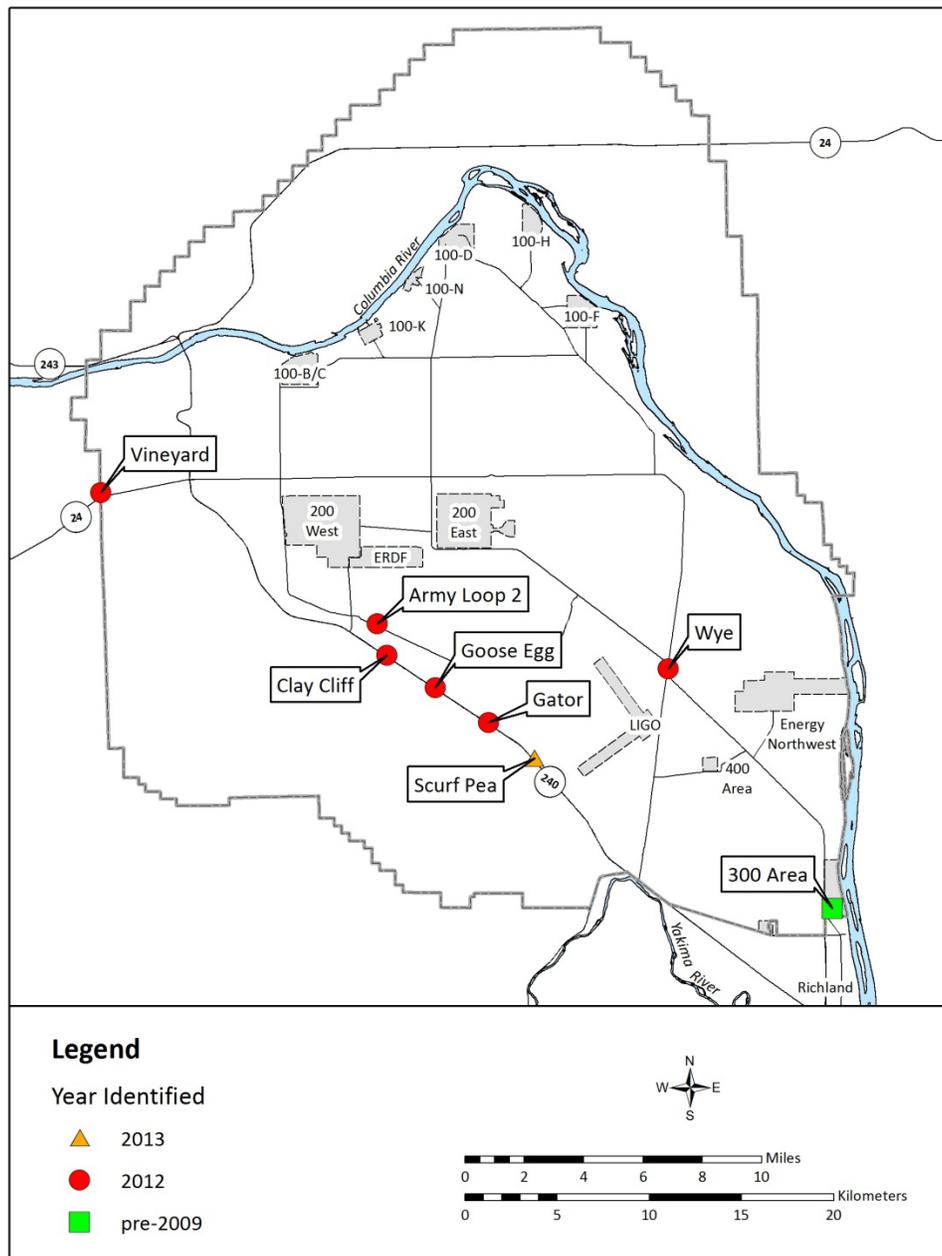


Figure 5. Active Townsend’s Ground Squirrel Colonies on the DOE-RL Managed Portion of Hanford Site in 2013

4.0 Discussion

A total of 56 kilometers (34.8 miles) were walked during transects completed in 2013, covering approximately 336 hectares (830 acres). When combined with the surveys from 2012, a total of 173 kilometers (108 miles), covering 1038 hectares (2,565 acres) have been surveyed for ground squirrels. These combined surveys have covered approximately 1.3 percent of the DOE managed

portion of the Hanford Site. Although covering a small percentage of the Hanford Site, this survey method was an efficient way to survey remote tracts of ground over a broad area and could prove useful for other surveying efforts. No new ground squirrel colonies were found during the 2012 or 2013 diamond transect surveys. The lack of ground squirrel detections using this survey method is likely due to the low density of ground squirrels present on the Hanford Site. Two new locations of Piper's Daisy (*Erigeron piperianus*), a Washington State Sensitive plant species, were located during the 2013 surveys ([WNHP 2013](#)). In addition, surveyors documented the level of black-tailed jackrabbit activity along each transect. This data is being used for the ongoing jackrabbit monitoring project being conducted by MSA on the Hanford Site.

The only Townsend's ground squirrel colony known prior to the 2012 survey that remains active on the Hanford Site today is the 300 Area Colony. The HAMMER Colony was no longer active during 2013, although it was marked as active at a very low level in 2012 ([HNF-53075](#)).

There are eight known active Townsend's ground squirrel colonies on the DOE-RL managed portion of the Hanford Site, including a single new colony in 2013, six locations identified in 2012, and the 300 Area Colony. The expanded number of documented colonies, compared to the pre-2009 data, provides additional research opportunities. Future work could include comparing site-specific conditions such as soil and vegetation at each location to determine what habitat characteristics Townsend's ground squirrels are selecting for on the Hanford Site. Continued monitoring of the status and size of identified ground squirrel colonies, and additional surveys for new colonies, would help determine trends in the ground squirrel population on the Hanford Site and ensure that ongoing Hanford Site cleanup activities do not impact existing Townsend's ground squirrel colonies.

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