

2011 Problems

High School Mathematical Contest in Modeling (HiMCM)

Problem B: Search and Find

Finding lost objects is not always an easy task, even when you have knowledge of a general location. Consider the following scenario: you have lost a small object, such as a class ring, in a small park see [map 1](#). It is getting dark and you have your pen light flashlight available. If your light shines on the ring, you assume that you see it. You cannot possibly search 100% of the region. Determine how you will search the park in minimum time. An average person walks approximately 4 mph. You have about 2 hours to search. Determine the chance you will find the lost object.

Using [map 2](#), assume, a jogger is lost who was going on a 5 mile run. Determine how you search the region to have a good chance of finding the lost jogger (who might be unconscious). Assume it is night and you only have your pen light as a light source.

Map 1

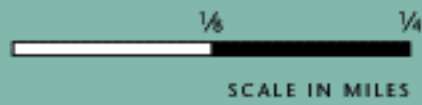
HOPKINTON STATE PARK- MAIN RECREATION AREA



LEGEND

- Hopkinton State Park
- Paved Road
- Unpaved Road
- Hiking Trail
- Self-Guided Nature Trail
- ⊕ Picnic Area
- ⊠ Restrooms
- P Parking
- ⌂ Pavilion
- ⚓ Boat Ramp (No gasoline engines)
- I Gate*
- Town Boundary
- ++ Railroad
- Wetland
- Brook
- Pond, Reservoir
- Contour Line (30' Interval)

* Gates are in place to discourage motor vehicle use. All other trail users are welcome to travel beyond gate.



FORT ORD PUBLIC LANDS

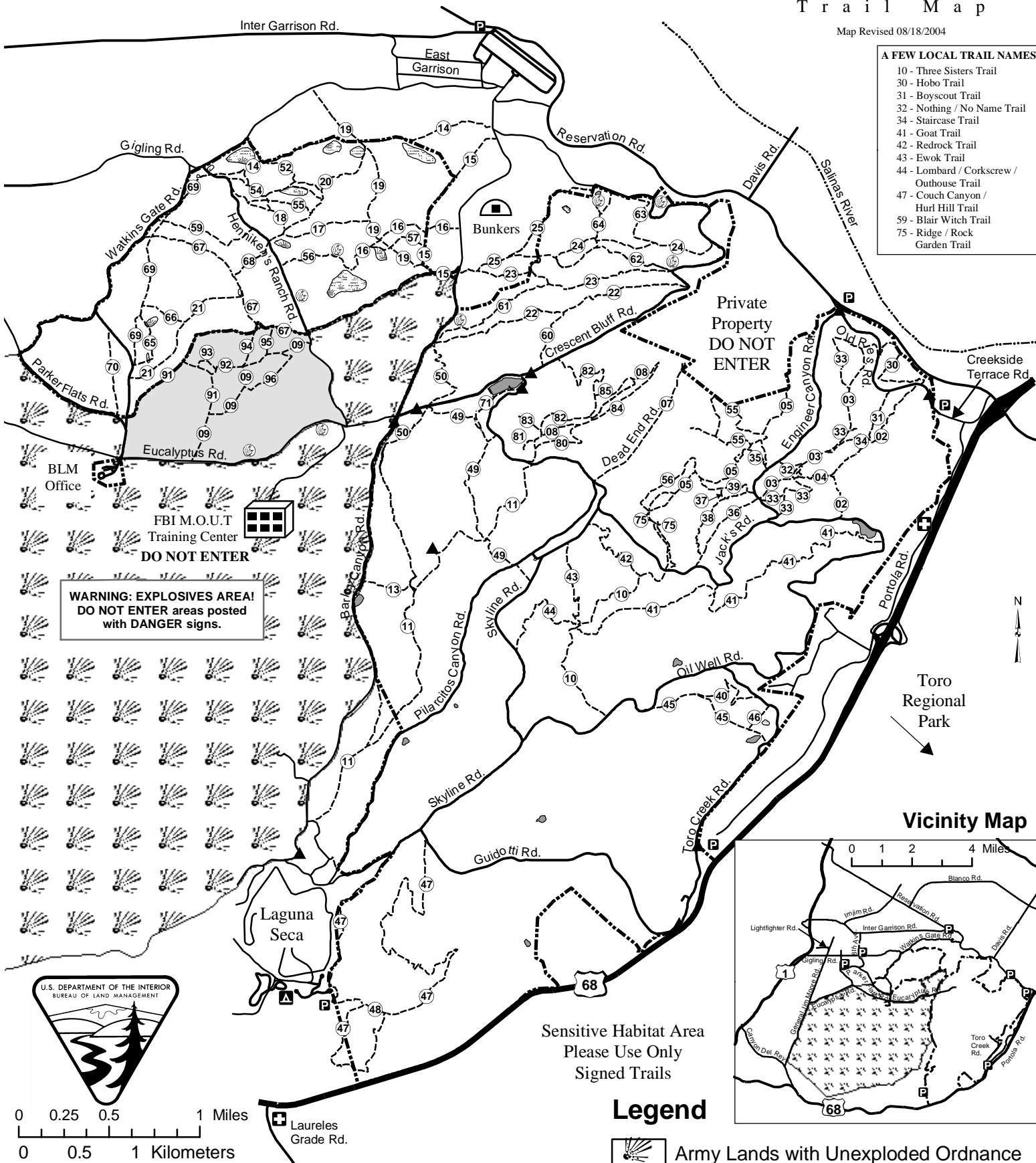


Trail Map

Map Revised 08/18/2004

A FEW LOCAL TRAIL NAMES

- 10 - Three Sisters Trail
- 30 - Hobo Trail
- 31 - Boy Scout Trail
- 32 - Nothing / No Name Trail
- 34 - Staircase Trail
- 41 - Goat Trail
- 42 - Redrock Trail
- 43 - Ewok Trail
- 44 - Lombard / Corkscrew / Outhouse Trail
- 47 - Couch Canyon / Hurl Hill Trail
- 59 - Blair Witch Trail
- 75 - Ridge / Rock Garden Trail

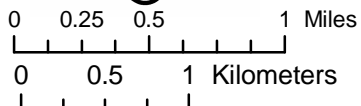
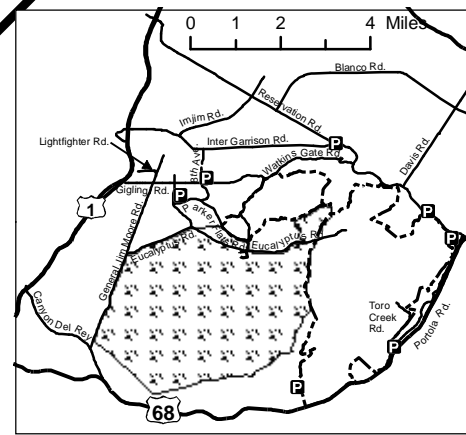


WARNING: EXPLOSIVES AREA!
DO NOT ENTER areas posted with DANGER signs.

DO NOT ENTER

Sensitive Habitat Area
Please Use Only Signed Trails

Vicinity Map



Legend

- Army Lands with Unexploded Ordnance
- Fire Station
- Plant Reserve
- Parking
- Gates
- Campground
- Trails
- BLM Public Lands Border
- Open Army Trails
- Ponds
- Lake
- Pond/FW Marsh
- Vernal Pool
- Wetland

About Explosives at Former Fort Ord...
While every effort has and is being made to clear dangerous materials, 60 years of military occupation make it possible that live rounds and explosives may remain in public areas as well as posted areas. **DO NOT TOUCH unfamiliar objects, especially metal. Instead, MARK THE LOCATION and CALL THE FEDERAL POLICE at (831) 242-7851 or (831) 242-7924.**

