

Land Condition Trend Analysis (LCTA) is one of the four components of the Integrated Training Area Management (ITAM) program. The ITAM program is DA DCSOPS program embedded in DPTMS - Range Control. Land Condition Trend Analysis is a repository of scientific data on the natural resources of Fort Lewis. LCTA collects physical and biological resources data from training lands and ranges in order to relate land conditions to training activities. LCTA incorporates this data into a relational database that can be queried for specific variables that are to be studied. This data is intended to provide information to proactively manage land use and natural resources.

The LCTA II objectives, under direction of HQs DA and FORSCOM, steer the Fort Lewis LCTA Workplan:

- Provide information that may affect force structuring and stationing at MACOM and DA levels.
- Provide current and predictive resource information that assists in training and testing activities.
- Identify impacts on resources by trainers, testers, and non-military land users.
- Identify and prioritize resource restoration, rehabilitation, and revegetation areas to ensure sustainable training and testing.

LCTA analyzes the condition of plant, bird, and small mammal populations and densities. The data is always collected within the Fort Lewis boundaries and can be used to measure the affects of training, nonmilitary use, and land management techniques.

The LCTA program was implemented to inventory and monitor Army natural resources. The major data collection efforts during the 1999 field season were put towards monitoring 98 special use vegetation plots, surveying 65 bird plots, surveying 43 small mammal plots, and completing land condition mapping of Johnson, Marion, and training area 6 prairie. The information is available to all units and agencies on the Installation. LCTA collects ecological data and delivers the results to Range Division. Range Division uses this information to better support units in their training missions. LCTA is unlike any other program on Fort Lewis in that it is a comprehensive data collection method that monitors the trends of flora and fauna in the training lands to provide information for maintaining the highest quality training realism for the Army's soldiers.

Each field technician was responsible for a priority component of the 1999 LCTA Workplan. These responsibilities included organizing the fieldwork and writing up the final "report of findings." **Enclosed is the collection of the report of findings for the 1999 season.**

The field crew is the ears and eyes for the LCTA program. They are in the field every day during the field season observing what is going on and how activities are affecting the habitat. This information is relayed to the LCTA Coordinator and who then passes the information onto the appropriate decision-makers. The crew has extensive knowledge of the installation and its habitats. They also have high caliber knowledge of the flora and fauna on Fort Lewis. They are thoroughly trained in the methods and use of all of the LCTA field equipment.

LCTA also provides support and information to the other components of the ITAM program and Range Control. LCTA research data assists Land Rehabilitation and Maintenance (LRAM) in measuring the effects of land rehabilitation techniques. The natural resource data provides information to the Environmental Awareness (EA) program to produce Fort Lewis informational tools to prevent unnecessary damage to the training lands. LCTA supports Training Requirements Integration (TRI) by providing scientific comments and recommendations to Range Control on general training activities projected by the I Corps master training calendar, as well as, on plans that units submit for a training exercise. The field crew also provides detailed spot reports of illegal dumping and other activities in training areas, both authorized and questionable, to Range Control.

During the 1999 field season, the LCTA program was partially funded by Fort Lewis Public Works Fish and Wildlife to monitor a Federally Listed wetland species. A total of 17 wetlands were monitored and a report and analysis was completed for Fish and Wildlife (see status report for Water howellia). The LCTA crew also assisted Public Works Forestry survey 10 Ponderosa Pine plots in exchange for assistance with data analysis from the Forestry ecologist. LCTA strives to incorporate cooperative projects between agencies on Fort Lewis into the yearly workplan. In addition to agencies on Fort Lewis, the LCTA program has been working closely with the State Fish and Wildlife on monitoring 4 target prairie species. The cooperation between the State and the Army is in support of the Army's commitment to land stewardship. The goal of this cooperation is so LCTA will be able to suggest proactive land use recommendations to the training community to minimize the effects a listed species could have on training. The mardon skipper butterfly species is currently being considered for listing as a State Endangered species.

The work presented in this document is the result of professional, hard working personnel. If you have any comments or suggestions for improvement please contact Angela Lombardi, LCTA Coordinator at 967-1550.

If you are interested in the species lists, then please visit the Fort Lewis ITAM web page at www.lewis.army.mil/itam.

Acknowledgments

The LCTA program would like to thank the following people for their comments and support of the work completed during the 2000 field season. Apologizes to anyone who may have been accidentally left off this list.

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John Weller	Range Officer
Walt Wilson	Deputy DPTMS

LAND CONDITION TREND ANALYSIS 1999 WORKPLAN

Prepared by Angela Lombardi, LCTA Coordinator

The overall goal for the 1999 season is to continue to monitor Fort Lewis high use training areas and areas of ecological importance. LCTA will also strive to fulfill the LCTA II requirement of providing current and predictive resource information that assists in training activities. At the end of the season all priorities will be written up in a "report of findings" by the lead field technician of that priority.

Priority #1 Vegetation Surveys

Priority Cost: \$32,742.12

The following areas will be surveyed during the 1999 field season. The established LCTA methods for special use plots will be used with the addition of quantitative military disturbance measurements. All the data collected from the surveys will be added to the LCTA relational database for analysis. (88 total plots)

- ☞ **13th Division Prairie Special Use Plots** All 13th Division Prairie special use plots will be monitored. (34 plots)
- ☞ **Training Areas 6 and 18 Plots** All LCTA special use plots in TA's 6 and 18 will be monitored due to its high tracked vehicle use. (22 plots)
- ☞ **Mortar Point 10** In continuation with the restoration project that was started in 1996, the ten special use plots will be monitored. The information from these plots will contribute to a better understanding of intensive restoration projects. (10 plots)
- ☞ **Range 50-51 Special Use Plots** The plots within these ranges will be surveyed to complete a 3-year monitoring program of the highest quality prairie on Fort Lewis. (3 plots)
- ☞ **Johnson Prairie (TA 22) Special Use Plots** All Johnson prairie special use plots will be monitored. Johnson prairie Scotch broom (*Cytisus scoparius*) was mowed by TNC in September 1998, so the data collected in the 1999 field season will be used to determine if there is an increase in native plant cover after the mowing treatment. (17 plots)
- ☞ **South Weir Prairie (TA 21) Special Use Plots** All South Weir prairie special use plots will be monitored. South Weir prairie was disturbed by training in 1996, so the data collected in the 1999 field season will be used to determine the long term effects of heavy training activities and the rehabilitation that followed. (4 plots)

Priority #2 Bird Surveys

Priority Cost: \$5,372.72

Survey the bird plots during the breeding season. The surveys will be conducted by one of the LCTA field technicians. A winter bird count will be performed in November by all of the field technicians to identify resident species.

Priority #3 Water howellia Study plots

Priority Cost: \$3,327.04

Monitor the 18 ponds that have populations of Water howellia using the monitoring plan produced by the WSNHP. Monitoring includes vegetation surveys, photos, and GPSing the locations. This monitoring is done with the support of Fort Lewis Fish & Wildlife.

Priority #4 Tracked Vehicle Impacts Study

Priority Cost: \$6,665.32

Survey the dry and wet treatment plots. Data collection includes vegetation surveys, soil measurements, and photos. Dry treatment was conducted in September 1998 and the wet treatment will be conducted in February 2000.

Priority #5 Small Mammal Surveys

Priority Cost: \$7,440.00

Survey the same 43 plots that were done in the 1998 field season. The small mammal surveys will be conducted with one LCTA field technician using the methods established in the LCTA Methodology Handbook. One field technician from June through August will conduct small Mammal surveys.

Priority #6 Land Condition Mapping

Priority Cost: \$20,479.28

Begin vegetative mapping for Johnson prairie and Training Area 6 grasslands. The mapping will assist in knowing the hot spots for LRAM, the high activity areas for training, and the potential seed source sites for the prairie. In conjunction with the mapping, a species list will be associated with the percent covers so that a map can relay more information to the natural resource manager.

Priority #7 Butterfly Surveys

Priority Cost: \$2,776.28

Continue monitoring butterfly species on the existing two transects in El Guettar and east Training Area 15. Survey known population of the Mardon Skipper (*Polites mardona*) within the southern part of the Artillery Impact Area. Begin general observation surveys of other prairies to determine if they would be appropriate for surveys. Coordinate with Fish and Wildlife so that efforts are not duplicated.

Priority #8 Aster curtus Demographics Study

Priority Cost: \$5,934.72

Monitor the existing *Aster curtus* research plots and survey the plots within the tracked vehicle project.

Priority #9 Seed Collection

Priority Cost: \$0.00

The areas that were seeded last year by the LCTA crew will be visited and monitored for species success rate. Seed source plots will be established in areas that satisfy the seed source criteria. Areas for seed collection will be GPS'd and provide to the LRAM Coordinator for the contracted seed collection project. Collected seeds will be properly labeled and stored for future use.

Priority #10 Noxious Weeds Monitoring

Priority Cost: \$2,776.28

Continue to monitor the known noxious weed populations within the training areas and along the section of the Nisqually River that flows through Fort Lewis boundaries. A GPS point or UTM coordinate and plant density measurement will be assigned to each location. The report of findings will be disseminated to the Fort Lewis noxious weed coordinator and the Pierce and Thurston Counties noxious weed board.

Priority #11 Threatened, Endangered, or Sensitive Species of Washington State

Priority Cost: \$1,483.68

Continue monitoring the known populations of *Trillium parviflorum*, *Carex comosa*, *Carex interupta*, *Pityopus californica*, and *Aster curtus*. No new surveys will be performed this season.

Priority #12 Spot Reports

Priority Cost: \$786.80

All trash or other "dump" items will be reported to Range operations. The spot reports will include details of the trash and directions to the site accompanied with the UTMs.

**Summary Report on LCTA Special Use
Vegetation Surveys Conducted on
Fort Lewis, WA. 1999**

Written by Erika Ressa

ABSTRACT:

The 1999 field season vegetation plots component was completed by three field technicians (M. Clegg, R. Gilbert, and E. Ressa). There was a total of 98 Special Use plots surveyed this field season. Prairie Special Use plots were established in 1993 due to the increased training with the introduction of the 3rd Brigade. Prairies surveyed this year include: 13th Division (TA 14 & 15), Johnson (TA 22), South Weir (TA 23), Marion (TA 18), Range 51, and MP10. In addition eleven new Special Use plots were established and surveyed in TA 6 (Pt. Salines drop zone) this year.

The LCTA crew monitors everything from avian, mammal, butterfly, to vascular plants on FLMR. Field observations suggest that many flora and fauna are at risk due to the rapid decline in prairie habitat. This decline can be attributed to such factors as temperature, agriculture, grazing, invasion of non-native plants, fire suppression, and even recreation.

**Avian Report
LCTA Program 1999
Fort Lewis, WA**

Written by Michael Clegg

ABSTRACT

In 1997 the Fort Lewis LCTA Program implemented the point count technique to determine the effects, if any, that military training has on bird diversity and abundance. During the 1999 field season, a total of 65 plots, 41 Douglas-fir Forest and 24 Oak Woodland, were surveyed twice within the breeding season. In addition to point count surveys, the LCTA crew also observed 8 new bird species which were previously unrecorded on Fort Lewis.

Status Report For
Water Howellia (*Howellia aquatilis*)
On Fort Lewis, Washington.

Prepared by
Rod Gilbert and Angela Lombardi

Introduction

Water howellia (*Howellia aquatilis*) is a rare regionally endemic aquatic annual forb that was Federally listed as Threatened under the Endangered Species Act 1973 (ESA) in July 1994. Water howellia was first found on Fort Lewis in the spring of 1994, and is currently known to occur in 17 wetlands on Fort Lewis. AR200-3 required an Endangered Species Management Plan (ESMP) be prepared for federally listed species occurring on the installation. In accordance with this requirement, the Washington Natural Heritage Program (WNHP) in conjunction with the U.S. Fish and Wildlife Service (USFWS) and the Nature Conservancy of Washington, developed a monitoring strategy to monitor Water howellia occurrence. WNHP personnel implemented the monitoring strategy in 1998. During the winter of 1998 LCTA personnel collected GPS coordinates for the water howellia survey stakes and in 1999 conducted the field surveys.

Land Condition Mapping Surveys Fort Lewis 1999

Written by Rod Gilbert

Introduction

Vast prairies, dotted with oak woodlands and massive prairie Douglas firs, welcomed the new American-European settlers when they arrived in the Pacific Northwest during the 1800's. They stretched from Vancouver Island, British Columbia to the Willamette Valley in Oregon, but were primarily located around the Puget Trough, where gravelly soils were deposited by melt-water from the retreating ice sheet around 12,000 years ago. These prairies had been maintained by fire for centuries by the native people to enhance food crop production. The unique physiological and geological conditions, though manipulated by humans, created a unique flora and fauna, including several species found nowhere else. Today, this unique ecosystem is all but gone, lost to agriculture, grazing, fire suppression, development, native and non-native plant encroachment. Only 3% of the estimated original prairie landscape remain. Much of this occurs on Fort Lewis.

Land Condition Mapping (LCM) is a simple methodology developed in 1997 by the LCTA crew to quickly assess the overall quality of the prairies on Fort Lewis. A series of GIS generated prairie maps are designed to assist military trainers and planners preparing for training exercises, and land use managers for Scot's broom control or restoration efforts. Each prairie is assessed according to a grid system of 25m² quadrats, using GPS coordinates at 25m intervals as survey grid lines. Each 25m² quadrat is quickly assessed for native grass cover, Scot's broom cover, Scot's broom height, and on prairies that receive tracked vehicle training, an assessment for disturbance. In addition, a simple presence or absence is assessed for two rare endemic prairie plants, white-topped aster (*Aster curtus*) and for TA 6 only, Puget balsamorhiza (*Balsamorhiza deltoidea*). Data are entered to a GIS database. Survey methodologies in 1999 remained unchanged, and can be found in greater detail in the 1997 and 1998 LCTA Field Reports. Surveys are easily replicable. During 1999, Johnson prairie, Marion prairie and TA 6 prairie were surveyed, in addition to 13th Div. prairie (1998) and Lower Weir prairie (1997).

**Summary Report of LCTA
Butterfly Surveys Conducted On
Fort Lewis, WA**

Written by Rod Gilbert

Abstract:

Butterfly surveys are conducted on Fort Lewis in cooperation with US Fish and Wildlife and Washington Natural Heritage Program to target 4 rare butterfly species found in South Puget Sound prairies. A total of 15 butterfly surveys were carried out by the LCTA crew during the 1999 field season at the regular butterfly survey transects in TA 15 and on Johnson Prairie. The crew assisted in two additional surveys targeting the mardon skipper and Puget Blue in the Artillery Impact Area with the Washington State Natural Heritage Program personnel. The mardon skipper is currently being considered for listing as a State Endangered species. High quality whulge checkerspot habitat in TA 15 was mown again this year in preparation for ROTC. Numbers of individual whulge checkerspots observed have plummeted in the last 3 years, from several hundred to just a few individuals this year. It is also important to note that The Nature Conservancy mowed the Scot's broom within the Research Natural Area boundaries of TA 15. Butterflies are delicate creatures, during all four life stages (eggs, larvae, pupae, and butterfly), and are highly susceptible to predation, the natural elements, environmental factors, human disturbance etc. Habitat quality and use are especially important factors. As a result butterflies are often used as indicators of high quality habitat, or adversely as indicators of pollution and habitat degradation as they are particularly sensitive to pesticides, herbicides and physical disturbance.

**Impacts of the M1A1 Abrams Tank on
Vegetation and Soil Characteristics of a Grassland Ecosystem at
Fort Lewis, Washington
1999 Field Report**

written by: Erika Ressa

ABSTRACT:

The Tracked Vehicle Impact Study was developed by Dave Jones, from the Center of Ecological Management of Military Lands (CEMML) and was implemented on Fort Lewis Military Reservation in 1998 as a contract through the Integrated Training Area Management (ITAM) program. The purpose of this study is to assess the effects of the M1A1 Abrams tank on soil compaction and vegetation cover on the prairie communities.

This is the second field season in which the LCTA crew conducted surveys for this project. The scope of work planned for this year has been delayed due to a wild fire that burned the study site. The project timeline will be moved out by one year, as we were not able to collect data for pre-tank wet application.

Aster curtus Demographic Survey
Fort Lewis, WA
1999

Written by: Erika Ressa

ABSTRACT:

Aster curtus, White-topped Aster, is listed by the Washington Natural Heritage Program (WNHP) as “sensitive” and it has been previously considered a candidate for the Endangered Species Act (ESA). Fort Lewis has the largest known populations of *A. curtus* in the state.

The LCTA crew has been conducting surveys, initiated by the University of Washington, on *A. curtus* populations since 1998. *A. curtus* is solely found growing in open prairies and sometimes along forest/prairie edges. Four prairies on the installation have been chosen as study sites. These prairies are: Marion (TA 18), Johnson (TA 22), and Upper and Lower Weirs (TA 21). The study sites were originally chosen from the existing LCTA special use vegetation plots. These plots have all the necessary information such as soil type and flora presence which aid in studying *A. curtus* and its habitat. The *A. curtus* demographic surveys would not be possible without the cooperation of LCTA, The Nature Conservancy (TNC), and the University of Washington.

LCTA 1999 Noxious Weed Report

Fort Lewis, WA

Written by Michael Clegg

Abstract

During the 1999 field season, the LCTA crew removed, monitored, and documented noxious weeds on Fort Lewis while enroute to performing mandated work requirements. Most importantly, the crew participated in a joint effort with Thurston County Noxious Weed Board to remove Meadow Knapweed from salmon spawning habitat along the Nisqually River. Secondly, all previously known noxious weed sites were revisited to determine their current status. Lastly, one new location for Diffuse Knapweed was documented on the NE side of Lake Sequalitchew and invasive Tumbleweed was found on Fort Lewis for the first time.

Threatened, Endangered and Sensitive Plant Report

LCTA Program - 1999

Fort Lewis, WA

Written by Michael Clegg

Abstract

During the 1999 field season, the LCTA crew conducted several Threatened, Endangered and Sensitive (TES) plant surveys across Fort Lewis. Most importantly, LCTA and Tracy Rush of the Washington Natural Heritage Program surveyed all Water howellia wetlands on Fort Lewis as part of a cooperative effort to monitor this Federally Threatened plant species. The Fort Lewis Fish and Wildlife Division provided funds to LCTA to complete the Water howellia surveys. Secondly, the crew conducted two separate surveys for the State Sensitive plant White-topped Aster; including the *Aster curtus* Demographics Study and recording the locations of *Aster curtus* sites in Johnson Prairie, Marion Prairie and Training Area 6 as part of the Land Condition Mapping Project. Finally, the LCTA crew revisited the Pine-foot site in Training Area (TA) 19 to check its current status and searched for any new rare plant locations on Fort Lewis.

**1999 Small Mammal Survey
of Fort Lewis Prairies**

Written by John R. Paul

Abstract

A survey of small mammals was conducted on five prairies of the Fort Lewis Military Installation, Washington. At each LCTA plot sampled we established a 30 x 50-m trapping grid. The grid consisted of four 50-m long traplines, each of which had 5 small Sherman traps and 2 large Sherman traps. Small traps were placed at 10-m intervals and large traps at 20-m intervals. The trapping was conducted from June to August 1999. Most of the 151 species caught were in the mice genera *Peromyscus*. Total number of captures and genera varied greatly between prairies. In general, prairies with greater disturbance had higher capture rates.