

Camp Rilea Armed Forces Training Center

Clatsop County, Oregon

Draft Integrated Natural Resources Management Plan

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For Plan Period

2001 – 2006



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Clatsop County, Oregon
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Signature Page

This Integrated Natural Resources Management Plan (INRMP) meets the requirements for INRMPs listed in AR 200-3 and the "Executive Summary and Scope" within this plan. It has set appropriate and adequate guidelines for conserving and protecting the natural resources of the Camp Rilea Armed Forces Training Center.

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Executive Summary and Scope

This plan is intended to describe how the Oregon Military Department (OMD) will manage natural resources at Camp Rilea for the next five years. The OMD has eight natural resource management goals for the site, and specific management objectives for each of the 11 management units. These focus on sustainable long-term use of the site for military training and the conservation/restoration of native biodiversity. Ecosystem management, integrated with training and other management programs, is emphasized. This plan is required by National Guard Bureau (NGB) policy. The participation of state and federal wildlife agencies in the development of this plan is also required. This plan is limited to natural resource management and natural resource projects. Although mentioned for purposes of integration, training plans and projects are not covered by this plan.

Camp Rilea is a 1,750-acre State-owned military training area located on the Pacific Coast in northwestern Oregon, about five miles south of Astoria. Used primarily by Oregon Army National Guard units, the camp contains a wide variety of facilities, including six firing ranges, over 120 support buildings, and miles of access roads. Training use is expected to increase slightly, along with developed facilities. The camp contains many different ecosystems, ranging from coastal meadows to spruce/fern forest. Non-native Scot's broom dominates the understory of large areas of the camp, limiting training opportunities and wildlife habitat values. Large-scale removal of Scot's broom and conversion of shore pine forest to spruce/hemlock forest is planned. Over 270 plant species and 165 species of wildlife have been documented at the camp. This includes two state-listed birds and several sensitive plants. Topography is dune and swale, oriented north-south (90 feet to sea level). Soils are mostly fine sands, and there is one stream (two forks) and two lakes.

Using the dominant vegetation, the landscape has been divided into 11 plant communities, which make up the management units. Table 1 (in this section) lists these management units or plant communities, and summarizes the plans for training and natural resource conservation, including specific projects. Monitoring will be undertaken to assess the effects of management and determine if the objectives are being met. Table 6 (page 44) shows the staff requirement, schedule for completion, and the funding source for the natural resource projects. The natural resource management plan has been integrated with the other plans and operating procedures for the camp.

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Finally, I'd like to thank all OMD/ORARNG staff who reviewed and provided comments and supported this effort, and any others who contributed that I failed to mention.

GAM

Table 1. Summary of Camp Rilea Management Plan

MGMT. UNIT/ PLANT COMM. *	OBJECTIVES	ENV. CONSTRAINTS	TRAINING USE	PROJECTS
Coastal zone meadows (353 ac.)	Maintain dune stability and vegetative cover; preserve native dune vegetation	Potentially unstable dunes; extreme tsunami risk; CSWCD Zone 1	Dismounted maneuvers (vehicles on roads); aviation drop zone	Road closures, posting signs; monitoring for bare sand and native dune grass
Floating aquatic/surface waters (11 ac. & 55 ac.)	Protect water quality and native flora and fauna; control non-natives	Maintenance of water quality; protection of fishery and rare plants (Colombia watermeal)	Engineer bridging; navy boat operations, dismounted maneuvers	Improvement of bridging sites; non-native bank vegetation removal; water quality monitoring
Sweet gale wetlands (1 ac.)	Maintain native vegetation	Wetlands; rare plant species (Sweet gale)	None; off-limits	Posting signs; vegetation monitoring
Forested wetlands (216 ac.)	Maintain area and native wetland flora and fauna	Wetlands; areas with high/extreme tsunami risk; CSWCD Zone 1	Dismounted maneuvers (vehicles on roads)	Monitoring of red-legged frogs; posting signs; reed canary grass control; drainage study
Non-native conifer forest (515 ac.)	Conversion to native conifer forest; maintain dune stability; maximize training opportunities	Areas of high soil erosion potential; areas with high/extreme tsunami risk; areas in CSWCD Zone 1	All training allowed; tracked vehicles on designated course	Tree thinning and removal; non-native plant removal; tree planting; limb removal; vegetation monitoring
Deciduous forest (18 ac.)	Maintain native flora and fauna; maximize training opportunities	Riparian habitat	All training allowed except deep digging; tracked vehicles on designated course	Non-native plant removal; posting signs
Spruce/fern forest (39 ac.)	Expand area and maintain native flora and fauna	Valuable wildlife habitat; areas of high soil erosion potential	All training allowed except deep digging; tracked vehicles on designated course	Vegetation monitoring; seed collection
Scots broom/beachgrass (141 ac.)	Conversion to native conifer forest or meadows; preserve rare plants; maximize military training	Rare plants (Big-headed sedge and yellow sand verbena); areas of high soil erosion potential; areas with high/extreme tsunami risk; areas in CSWCD Zone 1	All training allowed; tracked vehicles on designated course	Non-native vegetation removal; prescribed burning; planting of native vegetation; monitoring
Upland sedge meadows (92 ac.)	Expand area and maintain native flora and fauna; preserve Oregon silverspot butterfly (OSB) habitat	OSB habitat; rare plants (Big-headed sedge and yellow sand verbena); areas of high soil erosion potential	None in OSB habitat areas; dismounted maneuvers, with bivocking and vehicles on roads in other areas	OSB management per habitat plan; prescribed burning; selective herbicide treatments; monitoring
Wet sedge meadows (16 ac.)	Maintain area and native wetland flora and fauna	Wetlands	Dismounted maneuvers (vehicles on roads)	Posting signs; creation of buffer zone; non-native plant control
Cultivated grasslands (229 ac.)	Maintain area and native flora and fauna, especially rare plants	Rare plants (Big-headed sedge and yellow sand verbena); areas of high soil erosion potential	All training allowed; tracked vehicles on designated course	Prescribed burning; monitoring

*64 acres of developed area not included.

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CHAPTER 1. PLAN PURPOSE, GOALS, AND MANAGEMENT APPROACH

Purpose of the Plan

The purpose of this Integrated Natural Resources Management Plan (INRMP) is to guide natural resource management at Camp Rilea for the next five years (2001-2006) and ensure compatibility with military training and other activities. The Oregon Military Department (OMD)/Oregon Army National Guard (ORARNG) anticipates an increasing level of training (in both frequency and intensity) over this period, and must manage training areas to maximize use and maintain their carrying capacities without long-term degradation of the environment. This plan will support the military mission at the camp, provide for sound land management/stewardship, and ensure compliance with the various laws and regulations designed to protect and conserve our nation's natural resources and quality of life.

Management Plan Goals

The OMD/ORARNG has adopted the following goals for natural resources management at the camp:

- Identify and maintain the carrying capacity of training areas for military training
- Ensure compliance with all federal, state, and local environmental laws and regulations
- Minimize adverse impacts to natural ecosystems, communities, and resources
- Identify sustainable long-term uses of natural resources at the camp
- Control the spread of non-native species, especially nuisance species that restrict training and adversely impact wildlife habitat
- Limit the amount of soil erosion and restore actively eroding areas
- Increase or maintain the natural biodiversity (native ecosystems, communities, and species)
- Increase the age classes and amount of native species in the forested areas

Objectives for each management unit are presented in the management plan chapter.

OMD/ORARNG Natural Resource Policies

The OMD/ORARNG has adopted the following policies regarding natural resources at Camp Rilea:

- Adhere to an INRMP and review and revise this plan every 5 years
- Apply the concept of ecosystem management to the camp (defined below)
- Promote native species and enhance the natural biodiversity and ecological communities of the camp, with consideration of the camp's military mission. This includes taking on a leadership role in dune restoration and habitat protection/restoration for listed species.
- Protect and preserve special status resources (e.g., wetlands, listed species, rare species)
- Allow legitimate, limited public access and use of the camp and its resources as long as the military and conservation missions are not unduly compromised

- Support sustainable use of the camp's resources
- Cooperate with adjacent landowners and public agencies in the management of area ecosystems and natural resources

Ecosystem Management

The Department of Defense (DOD) has endorsed ecosystem management as the basis for future management of DOD lands and waters. The National Guard has defined ecosystem management as "management with fire, native species, erosion control, and other techniques to support the military mission and maximum biodiversity . . ." (Imley, 1995). This can best be accomplished through indigenous ecosystems, which includes native species, associations, and functions such as fire, grazing, predation, nutrient cycles, uneven forests, and unfragmented habitats (Imley, 1995).

Another, more general, definition of ecosystem management is that of a holistic approach focusing on systemic qualities, rather than on single species or elements (Trame and Tazik, 1995). Thus, goals of this approach are such things as enhancing biodiversity, ecosystem health, and biotic/ecologic integrity. Integrating human activities into naturally functioning communities and taking a landscape perspective are also emphasized (Trame and Tazik, 1995).

For this plan, management units are used that are based on plant communities developed by the Oregon State University Department of Botany and Plant Pathology. Where it was reasonable, plant communities were combined to make larger, more easily managed units. The plant communities (both versions) and the management plans are discussed in Chapters 4 and 5 respectively. In most cases, preserving and restoring native species/ecosystems and natural processes has been emphasized. In addition, attempts have been made to incorporate disturbance events.

Integrated Training Area Management

Integrated training area management (ITAM) is a management approach which seeks to match mission requirements with the long-term ecological integrity of the training area. The U.S. Army and the Army National Guard have embraced this approach and are implementing it on their installations and training areas. The goal of ITAM is to achieve and sustain the optimum use of training lands to support training and mission requirements indefinitely, while ensuring protection of natural resources. ITAM consists of four components: Land Condition Trend Analysis; Training Requirements Integration; Land Rehabilitation and Maintenance; and Environmental Awareness. The ORARNG is implementing ITAM at Camp Rilea and other training areas in Oregon.

Land Condition Trend Analysis (LCTA)

LCTA is basically long-term ecological monitoring. It includes natural resource inventories, field data collection, and data analysis. Ecological field methods and modern technological devices/products (e.g., GIS, GPS, remote imagery) are used. The purpose of LCTA is to identify adverse impacts and support decision-making related to training activities

and natural resource management projects. It also seeks to define the carrying capacity of land units for military training. It is anticipated that a limited LCTA effort will be started at Camp Rilea in 2001.

Training Requirements Integration (TRI) and Procedures

TRI uses LCTA information and U.S. Army training requirements to select appropriate training sites for units requesting training, and for the placement of training facilities. It applies the carrying capacity concept and seeks to minimize adverse impacts to training lands. TRI mandates a high level of coordination between operations, range control, engineering, and environmental staffs.

The procedure for conducting training at Camp Rilea begins with either a written or electronic request from the unit or group to the Range Control Office. Range Control then verifies the information and reserves the appropriate facilities and areas needed by the unit using the Range Facility Management Support System (RFMSS). Priorities, resource conditions, and the suitability of the training area for the requested use are considered along with unit needs when reservations are confirmed. After the unit completes its training, after action reports are completed and filed by Range Control. Information from the request is then edited in RFMSS to reflect the actual training that occurred. This data is then used to help identify LRAM projects and for analysis with existing LCTA data.

Land Rehabilitation and Maintenance (LRAM)

LRAM is essentially the planning, design, and implementation of projects to improve the ecological condition of training lands. These projects should be based on LCTA information and priorities derived through the ITAM process. Although LRAM often focuses on repairing military damage, the goal is to maintain training areas in an acceptable condition to support realistic training opportunities. LRAM-type rehabilitation projects have been occurring at the camp for decades. Official ITAM-funded LRAM projects were started in federal fiscal year 1998, upon implementation of the ITAM program, and are ongoing.

Environmental Awareness

Using educational opportunities and materials to help the land user understand the impacts of their action is environmental awareness. This applies to training site staff and units conducting training. These materials are also valuable to others interested in the site. Examples include awareness briefings and videos, posters, signs, and instructional field cards. ITAM-funded awareness projects that have been completed at the camp are informational signs for the Oregon silverspot butterfly habitat areas and an environmental video for briefing using units prior to training.

Specific ITAM projects for Camp Rilea are discussed in Chapters 5 and 6.

CHAPTER 2. COMPLIANCE AND RESPONSIBILITIES

Legal Requirements for INRMPs

Most requirements for preparation of integrated natural resources management plans derive from Department of Defense (DOD) or U.S. Army policies and regulations. These policies and regulations were drafted for the protection of the environment. The three most relevant requirements are summarized below:

DOD Instruction 4715.3, Environmental Conservation Program. This establishes a formal conservation program for all property under DOD control, sets policies, and mandates preparation of INRMPs.

Army Regulation (AR) 200-1, *Environmental Protection and Enhancement*. Among other things, this regulation requires conducting "an integrated, multi-use, natural resource and land management program" on lands under Army jurisdiction (1-39(10)).

AR 200-3, *Natural Resources – Land, Forest, and Wildlife Management*. This outlines the policy, procedures, and responsibilities for the conservation, management, and restoration of military land and resources. Chapter 9 describes the requirements for INRMPs.

These regulations are all applicable to Army National Guard properties supported with federal funding, over 500 acres in size, regardless of ownership (DA Memorandum of 21 March 1997 and NGB Memorandum of 30 June 1997). In addition, the ORARNG has its own regulation that establishes the conservation and management of natural resources as a major goal of its environmental program.

When an integrated natural resources management plan involving fish and wildlife is prepared, there is Congressional legislation, known as the Sikes Act (Public Law 86-797), mandating certain plan elements. The Sikes Act and Sikes Improvement Act of 1997 requires: Cooperative arrangements with the U.S. Fish and Wildlife Service and the appropriate state agency (for the fish and wildlife portions); that plans provide for habitat improvements or modifications, range rehabilitation, control of off-road vehicle traffic, and specific projects, activities, and protections for threatened and endangered species; and that no sales or leases of lands occur that are incompatible with the plan. Since Camp Rilea is not federal property, the Sikes Act does not technically apply. However, NGB and DOD policy require that the same issues be addressed and that coordination with state and federal resource agencies occur, so for all practical purposes, this plan will be Sikes Act compliant.

Environmental Review (NEPA Compliance)

The National Environmental Policy Act (NEPA) was created to identify and evaluate the potential environmental impacts of federal actions. Almost all OMD/ORARNG actions are subject to NEPA since some federal funding is normally used. The OMD uses NEPA to help

ensure its actions are properly planned, coordinated, documented, and implemented, with respect to minimizing unwanted adverse impacts to the human and natural environment.

NEPA is a three-stage process, as defined in the Department of the Army implementing instructions (AR 200-2, *Environmental Effects of Army Actions*).

1. If the proposed action meets a categorical exclusion as listed in AR 200-2, a Record of Environmental Consideration document is prepared for the action, and the action may proceed as planned. These are the most commonly prepared documents.
2. An Environmental Assessment (EA) may be required when the conditions for a Categorical Exclusion are not met. This often happens when extensive new military exercises, major construction, or land acquisition is planned; when the planned action involves a large area, or when wetlands or endangered species may be involved. A Finding of No Significant Impact is required for the action to proceed as planned. EAs are comprehensive documents that describe a proposed action and the alternatives to the action. Review periods are provided for public comment on draft and final documents.
3. If more study is needed or a Finding of No Significant Impact cannot be prepared, an Environmental Impact Statement must be written. These can be lengthy documents that require significant time and money to prepare.

This INRMP is a proposed federal action that must be reviewed in accordance with NEPA and AR 200-2 prior to implementation of the projects and other actions, including the goals and objectives found within. An EA will be written to address the implementation of this plan. Topics to be addressed in the EA are related to the potential effects of the proposed plan.

Other Environmental Regulations

There are numerous federal and state laws and regulations that apply to natural resources management. Required and relevant environmental regulations (both federal and state, including those discussed above) are referenced in Appendix 1. Copies of most of these laws and regulations are maintained in the OMD Environmental Branch for easy access.

Responsibilities

National Guard Bureau

The Environmental Programs Division (NGB-ARE) is responsible for reviewing and approving the INRMP and advising the OMD before formal submission to the U.S. Fish and Wildlife Service, the Oregon Department of Fish and Wildlife, the State Historic Preservation Office, and other state agencies. NGB-ARE ensures operational readiness by promoting environmental quality and an environmental ethic throughout the ARNG, and is responsible for tracking projects, providing technical assistance, quality assurance of written materials, and funding to support the programs.

OMD/ORARNG

The Adjutant General (TAG) is directly responsible for the operation and maintenance of Camp Rilea, which includes implementation of this INRMP. TAG ensures that all installation land users are aware of, and comply with, procedures, requirements, or applicable laws and regulations that accomplish the objectives of the INRMP. TAG also ensures coordination of projects and construction between environmental, training, and engineering staffs.

The Deputy Chief of Staff, Operations has the primary responsibility for scheduling military training and safety of all personnel while training exercises are being conducted. Secondary to scheduling is maintaining a high-quality training environment.

The OMD Environmental Branch (AGI-ENV) is responsible for characterizing the natural and cultural resources of the training sites; identifying compliance needs; and advising the OMD/ORARNG on the best ways to comply with federal and state environmental laws and regulations. AGI-ENV provides technical assistance to training site personnel including: developing projects, securing permits, conducting field studies, providing environmental awareness materials, locating and mapping natural and cultural resources, preparing plans, and revising the INRMP every five years. AGI-ENV also coordinates the ITAM program and oversees the NEPA process for the OMD/ORARNG.

Camp Rilea staff, primarily the Facilities Manager, Range Control/Operations, Facilities Engineer, and State Maintenance Supervisor and staff, is the primary stakeholder, who will ultimately implement this plan and assure its success. Camp Rilea staff is familiar with all aspects of the training area, including training scheduling (and conflicts), locations of training facilities, impairments or problems with human-made structures or natural functions, and needs for improvement or maintenance of the training land. Along with AGI-ENV, Camp Rilea staff will ensure that: LRAM projects are identified and executed; vegetative cover is maintained on highly erodible soils; wetlands, rare species, and important habitat areas are protected from construction and training activities; integrated pest management actions are implemented as planned; and environmental awareness materials are distributed to the using units.

The statewide Construction and Facilities Management Office (CFMO) provides a full range of engineering disciplines for all facilities under the jurisdiction of the OMD, including Camp Rilea. The CFMO is responsible for master planning and ensuring that all construction projects comply with environmental regulations by consulting with AGI-ENV prior to any construction by ORARNG engineers or contractors. The CFMO also provides necessary assistance with design of construction projects, such as roads and erosion control projects.

The Public Affairs Office (PAO) is expected to provide expertise in the development and production of Environmental Awareness materials for distribution to training site managers and troop commanders, and functions as a liaison with the public in public meetings and community educational events.

The Staff Judge Advocate (SJA) is expected to advise the TAG, POTO, CFMO and AGI-ENV on laws and regulations that affect training land use and environmental compliance.

Depending on the issue, this responsibility may be shared with the State Attorney General, as mandated by state law.

CHAPTER 3. TRAINING AREA OVERVIEW

Camp Location and Historical Background

Camp Rilea is a 1,750-acre training facility on the Pacific Coast in extreme northwestern Oregon, six miles south of Astoria (Figure 1). It is located on the Clatsop Plains, an area that was at least seasonally inhabited by the Clatsop tribe. By 1840 Euro-American pioneers began settling on the plains. The camp was created in 1927 through the purchase of private farmland by the OMD, who continues to own and manage the training area. By World War II most of the facilities and structures were in place, and many still date from that period. A more complete history of the area and camp can be obtained from the cultural resource survey report, Integrated Cultural Resources Management Plan, or archaeological survey report (see references).

The camp contains a wide variety of ecosystems, ranging from natural beaches to forests dominated by introduced pine trees. Camp Rilea is considered by NGB to be a major training area and offers classroom, maneuver, and specialized training opportunities in realistic field settings, with all the necessary support facilities. The camp also has a land use agreement to use over 200,000 acres of private forestland and over 140,000 acres of public forestland located directly to the east for infantry maneuver/field training exercises (Figure 2). However, this plan does not address the use of those lands.

Camp Military Mission

Camp Rilea's mission is to provide an integrated training package for up to brigade sized units (Nakata, 1999). However, the camp specializes in training for small infantry and engineer units. Although the focus is on servicing ORARNG units (who receive priority when scheduling), training facilities are used by national guard units of other states and the active components of the U.S. military. The training package includes billets, dining facilities, equipment maintenance, logistics, classrooms, weapons ranges, training courses, and maneuver training areas.

Current Training

Units of the ORARNG, national guard units from other states, the active U.S. Army, and other branches of the U.S. military conduct training activities at the camp. Almost all military training is done by engineer and infantry units. In addition, there is some use by non-military groups, such as the state police. Military training typically occurs at squad (5-10 soldiers), platoon (15-45 soldiers), company (90-150 soldiers), or battalion (500-1000 soldiers) levels, and usually lasts either two days (e.g., weekend drills) or two weeks (annual training). Training activities fall into two general categories: Live fire exercises and field exercises. Live fire exercises includes all training which uses live ammunition or ordnance (e.g., firing rifles, hand grenades, and demolitions). Because of potential threats to public and soldier safety, live fire

exercises are tightly controlled and occur only at designated locations (i.e., the weapons firing ranges). Field exercises involve a much wider variety of activities such as vehicle maneuvers, land navigation, aviation operations, bivouacking, construction of fortifications and obstacles, and deploying equipment and weapons. This type of training can take place in all training areas outside of the cantonment area. It is common to have several units engaged in different training activities simultaneously.

Camp Rilea has been divided into 13 different training areas (Figure 3), primarily for the purpose of controlling the physical location of soldiers in the field. This is necessary for ensuring their safety and to meet management and training objectives. Training Areas range in size from 49 to 174 acres. Except for tracked vehicle operations (which are only allowed on the designated tracked vehicle route shown on Figure 4), all types of field training are allowed in any of the 13 training areas, as long as the standard operating procedures are followed. For example, digging and bivouacking is allowed only at pre-approved sites. Training Areas 6 and 13 are the designated areas for engineer training that disturbs the soil. Therefore, engineer units are given priority over other units for these areas. All other training areas have not been designated for certain types of training. In general, the training areas have been managed as all-purpose training areas to support whatever training is requested (within reason). This has meant providing roads, trails, open areas, and wooded areas, and minimizing hazards in all of them.

Military units that train at Camp Rilea are scheduled and tracked using the Range Facility Management Support System (RFMSS). Information on training activities, dates, number of soldiers that participated, ranges/training areas used, equipment used, and bivouac/command center locations is recorded.

Camp Rilea totaled 106,182 person days (one person for one day) in training year (TY) 1998; 104,400 in TY99; and 152,724 in TY2000. These numbers include soldiers training in the adjacent forest land. This and other data is presented in Table 2.

Table 2. Camp Rilea Training Data and Projected Training Data*

	1998	1999	2000	2001	2002	2003	2004	2005
INFANTRY - firing ranges	8,484	10,645	14,827	9,500	10,450	11,495	12,645	13,910
INFANTRY - field exercises	8,877	20,479	18,763	22,000	24,200	26,620	29,280	32,210
ENGINEER - firing ranges	2,828	3,548	5,453	3,700	4,070	4,475	4,920	5,410
ENGINEER - field exercises	2,959	4,159	5,702	3,250	3,575	3,930	4,320	4,750
TOTAL - FIRING RANGES	11,312	11,493	20,280	13,200	14,520	15,970	17,565	19,320
TOTAL - FIELD EXERCISES	11,836	24,638	24,465	25,250	27,775	30,550	33,600	36,960
ORARNG TOTAL (Rilea only)	20,167	30,640	38,233	27,500	?	?	?	?
ORARNG TOTAL w/adjacent forestland	23,148	38,831	44,745	38,450	42,295	46,520	51,165	56,280
NON-ORARNG - firing ranges	56,323	44,385	63,592	62,000	62,000	62,000	62,000	62,000
NON-ORARNG - field exercises	26,711	21,148	44,387	26,000	26,000	26,000	26,000	26,000
TOTAL NON-ORARNG	83,034	65,569	107,979	88,000	88,000	88,000	88,000	88,000
GRAND TOTAL	106,182	104,400	152,724	126,450	130,295	134,520	139,165	144,280

* Data is in person days. 1997-2000 are actual data; the remainder is projected. ORARNG usage assumed to increase by 10% each year from TY2001, which is an average of the four previous TYs. Non-ORARNG includes other military and civilian law enforcement, and was assumed to remain the same as TY2001.

Existing Facilities

Most of the camp's facilities can be grouped into two categories: the cantonment area, and the adjacent training areas/ranges. The approximately 272-acre cantonment area (see Figure 3) consists of housing, simulation centers, administrative buildings, and supporting structures/infrastructure. There are over 120 buildings, including billets, barracks, huts, classrooms, messhalls, warehouses, latrines, staff residences, offices, a medical clinic, and an armory. A Unit Training Equipment Site (UTES) for the issue, storage, repair, and maintenance of military equipment and vehicles occupies the northeast corner of the cantonment area. There is also a wastewater treatment plant in the southeast corner. Paved roads and all utilities run throughout the cantonment area.

The adjacent training areas include the following facilities for training exercises:

- Military Operations in Urban Terrain (MOUT) site;
- Multiple Integrated Laser Engagement System (MILES) course;
- Rappel Tower;
- Hand Grenade Range;
- Pistol Range;
- Rifle Known Distance/Zero I Range;
- Rifle/Machine Gun/Zero II Range;
- Rifle/Machine Gun/Zero III Range;
- Claymore Range;
- Demolitions Range;
- Modified Record Fire (MRF) Range;
- Infantry Squad Battle Course;
- LAW/M-203 Range;
- Confidence Obstacle Course;
- Day/night land navigation compass course;
- Nuclear, Biological, Chemical (NBC) Chamber;
- Squad Engagement Training System (SETS) Building;
- Theater Specific Individual Readiness Training (IRT) Lanes (Checkpoints Charlie and Saudi).

In addition, there are designated engineer dig areas, air assault/helicopter landing/drop zones, beach amphibious assault zones, and engineer bridging sites. Figure 4 shows the locations of most of these facilities and sites. The remainder of the camp can be considered as undeveloped maneuver training areas with little or no facilities, other than access roads.

Future Facility Plans and Changes in Training

There will likely be many changes to the cantonment area to upgrade facilities and provide new training opportunities. For example, a Simulations Center is planned and new replacement latrines, huts, and classrooms will be built eventually. However, cantonment developments will be addressed in the camp master plan currently under preparation, and are not part of this management plan. This section will discuss proposed developments in the training area around the cantonment.

The OMD/ORARNG intends to greatly expand the field training opportunities that are offered at Camp Rilea over the next five years. The following projects have been proposed (locations are shown on Figure 4):

- Enhancement of Infantry Squad Battle Course (ISBC) to a Platoon Live Fire Battle Course (Training Areas 5,6,7,9, and 10)

This would involve constructing a new range tower, shoot house, fighting positions, bunkers, safety fence, and foot bridges; installing bleachers, sand tables, barber poles, a flag pole, new targets, lights, and a sound system; altering and moving the firing line; and ground leveling as necessary. The course would contain the ISBC and M-203/LAW Range within it and allow for these types of training as well.

- Pistol Range Upgrade

Existing targets need to be automated, with new targets added. The range tower should be rebuilt, to include lights, heating system, insulation, shelving, and a sound system.

- MOUT Expansion

Four new buildings are needed to complete the different types that should be offered. Construction of a tunnel system with the correct diameter is also needed. Lights, targets, a tower, and a sound system are proposed.

- Construction of new Combat Pistol Qualification Course (CPQC)

This would involve constructing a new 25 meter range with pop-up and specialized targets. It would be located south of the existing grenade impact range.

- Construction of Police Situation Bins (Training Area 4 or 5)

This would involve creating four earthen embayments of about 3,000 sq.ft. each. Officers of state and local law enforcement agencies would use them to simulate enforcement situations they could encounter on the job. The exact location for this facility has not yet been identified.

- Reconstruction of NBC Chamber

The existing NBC Chamber would be rebuilt with new exterior walls, roof, and other needed improvements.

- Improvement of Slusher Lake Bridging Site

This would involve construction of concrete footings and laying additional gravel to protect the lake bank and support engineer bridging operations at the three water training points.

Other planned improvements are: a new wooden Fast Rope Tower by the rappel tower; new equipment building at the MRF Range; new fencing around the Demolitions Range; repairing fencing on the north boundary and other locations as necessary; installing culverts at all beach access roads to facilitate drainage and keep roads open (pending completion of a drainage study); and new gravel for selected roads to improve and maintain all-weather use.

Finally, it is expected that training levels (e.g., numbers of soldier days) will increase over time as facilities are expanded. Projected future training levels are presented in Table 2.

Mission-Essential Natural Resources, Training Effects, and Natural Resource Limitations

Open, relatively level, grassy areas are desired for field exercises such as mechanized maneuvers, aviation training, and engineer operations. Thick woody vegetation would preclude their use for these types of training. Conversely, there should also be areas of woody vegetation for defensive concealment, and to provide infantry units a different type of terrain to negotiate.

Military field training activities can have both negative effects on and positive benefits to natural resources. Engineer heavy equipment operations and mounted maneuvering have by far the greatest potential negative effects on natural resources. Excavation and maneuvering heavy tracked and wheeled vehicles across even the best-suited landscapes on an infrequent basis can cause severe damage to vegetation and soils. In addition, regularly used areas such as trails, bivouac sites, and firing points can experience substantial loss of vegetation and soil impacts, especially if heavy equipment or vehicles were used. Soil and vegetation impacts can lead to soil erosion, soil compaction, loss of wildlife habitat, and introductions of unwanted pests and weeds. Wildlife can also be adversely impacted by training noise.

The greatest positive effect of the OMD/ORARNG mission on natural resources is the military presence. OMD control of the land keeps it in mostly undeveloped open space. The implementation of good land use practices, such as maintaining vegetation cover and wetlands, and prohibition of destructive landscape disturbances (for example, agricultural tillage, large-scale pesticide and fertilizer application, reduction of forest and wildlife habitat, and much recreational vehicle damage) means that natural communities are relatively undisturbed and protected. However, past dune stabilization efforts have led to a landscape that is largely dominated by non-native vegetation. This plan seeks to reverse that trend.

The natural resources of Camp Rilea present considerable limitations to field training activities. There are numerous large wetlands scattered around the camp, soils with severe erosion potential, one federally-threatened species with 68 acres of protected habitat, plant species of concern, a public beach, a shallow water table, and potentially unstable sand dunes where vegetative cover must be maintained. These all limit the allowable area for many types of training if adverse environmental impacts are to be minimized.

Future Military Mission and Training Effects on Natural Resources

Development of new field training facilities and expansion of training activities to provide more and better training opportunities will cause some adverse impacts to the natural resources of Camp Rilea. Disruption of soils and vegetation in the areas targeted for new facilities is anticipated. Some loss of wildlife habitat is also likely. The measures outlined in this management plan will help to minimize and mitigate these future effects. The environmental assessment prepared for implementation of this plan considers the effects of both future training and management plan actions on the human and natural environment, but only covers the latter for purposes of legal documentation. Additional NEPA documentation will be required for the development of training facilities.

CHAPTER 4. NATURAL RESOURCES OF CAMP RILEA

Land Use Setting

The area adjacent to the camp is rural residential (zoned residential agriculture), except for the ocean to the west. Residential areas of the City of Warrenton start at the north boundary. Approximately 300 households are within one mile of the camp boundaries. With some subdivision of property occurring, the rural residential population is expected to grow, although this should be limited by land use restrictions. Most of Camp Rilea is zoned by Clatsop County as a military reserve; some of the land appears to be listed as open space, parks and recreation. Surface waters and wetlands are in the Lake and Wetlands Zone. Appendix 2 contains the county regulations for land use in these three zones.

Past the residences next to the camp's eastern boundary is Highway 101, the major coastal transportation route. East of the highway, past the rural residential lands and agricultural areas, is over 350,000 acres of commercial forest land, owned by private timber companies and the State of Oregon. Camp Rilea has permission to use much of this forest land for certain training activities.

Ecological Setting and Climate

Camp Rilea is located within the Coastal lowlands ecoregion. Ecoregions are areas of similarity in ecosystems and in the type, quality, and quantity of environmental resources (Pater, et.al., 1998). This is an area of estuarine marshes, freshwater lakes, black-water streams, marine terraces, and sand dunes. These ecosystems still characterize the landscape of the camp.

The climate is considered marine temperate, and is dominated by the proximity to the Pacific Ocean. Winters are wet and cool, with summers drier and warmer. Average annual precipitation is 60 to 85 inches. More than 50 percent of this falls from November through March. The mean high temperature is 58.4 degrees F and the mean low temperature is 43.4 degrees F. The frost free period is 200-240 days.

Geology and Topography

The Coastal lowlands ecoregion is composed of Quaternary marine and non-marine terrace deposits, beach, and dune sands (Pater, et.al., 1998). The Clatsop Plains geographical area (which includes Camp Rilea) is believed to consist of an ancient terrace of marine and estuarine sedimentary rocks overlain by a sand dune complex built from Columbia River derived sediments (Cherry, 1977; Tasa and Connolly, 1994). This dune complex can be described as a series of ridge foredunes running parallel to the coastline separated by nearly flat interdune areas, which are often swales (Flitcroft, 1998; Tasa and Connolly, 1994). Deposition and outbuilding on this accreting coastline and vegetative stabilization created this topography. The dunes range in height from 5 to 30 meters (15 to 90 feet) above sea level (ASL) and in width from 250 to over 400 feet.

Camp Rilea has five dune ridges and five interdune areas, oriented north-south. Wetland or open water is present in all the interdune areas, except where fill material has been placed. Elevations range from about 30 meters ASL to sea level (Figure 5). Slopes are mostly gentle, only rarely exceeding 10 percent.

Management Implications

The dune topography presents challenges to many land uses. Active coastal dunes are unstable and inactive dunes can become unstable if vegetative cover is removed. This can lead to large movements of sand as discussed further below.

Soils

Description and Classification

Camp Rilea has six soil components within its boundaries, counting beaches and dunes, with two subdivided into slope classes (U.S. Soil Conservation Service, 1988). Figure 6 shows the eight soil mapping units, and Table 3 provides area and other data.

Table 3. Soils Data

MAP UNIT NAME	SYMBOL	ACRES	EROSION RISK
Beaches	4	136.6	severe, wind and water
Dune Land	15	230.8	severe, wind and water
Gearhart fine sandy loam, 15-30 percent slopes	19D	99.3	water slight, wind moderate
Gearhart fine sandy loam, 3-15 percent slopes	19C	111.1	water slight, wind moderate
Heceta-Waldport fine sands, 0-15 percent slopes	24C	155.1	water slight, wind severe
Waldport fine sand, 15-30 percent slopes	70D	560.1	water slight, wind severe
Waldport fine sand, 3-15 percent slopes	70C	372.8	water slight, wind severe
Warrenton loamy fine sand, 0-3 percent slopes	72A	42.1	slight, wind and water

As can be seen, individual soil mapping units tend to run north-south in rectangular bands similar to the dune topography. Beaches occur farthest west and are made up of sand and coarse

fragments, with little slope. East of this is the dune land component, an area of fine sand with a slope range of 3 to 30 percent. Next in line is Heceta-Waldport fine sands. Heceta soils are very deep and poorly drained, with slopes of 0 to 3 percent. They tend to form in interdunal depressions. Waldport soils are also very deep, but excessively drained, and form on stabilized sand dunes. Slope is 3 to 15 percent (for this component). In this mapping unit Heceta soils account for 50 percent of the area and Waldport 35 percent. To the east of this mix is a wide area of Waldport fine sand in two mapping units: 3 to 15 percent slopes and 15 to 30 percent slopes. Finally, along the eastern edge are the Gearhart and Warrenton soils. The former is a very deep fine sandy loam of stabilized sand dunes, somewhat excessively drained, in two slope classes: 3 to 15 percent and 15 to 30 percent. Warrenton is a loamy fine sand with little slope (0-3 percent), very deep and poorly drained, which forms in interdunal depressions.

Erosion Potential

According to the soil survey, the beaches and dune land series have severe erosion potential from both wind and water. All other series have slight erosion potential from water. As for wind, the Waldport series has a severe erosion potential; Gearhart and Heceta-Waldport have moderate erosion potential; and Warrenton has slight erosion potential.

Using the revised universal soil loss equation, potential soil loss and erodibility indices were calculated for each soil mapping unit by the Natural Resources Conservation Service. This data is presented in Appendix 3. Potential soil loss is an estimate of the tons per acre per year that would be eroded away by running water if the soil is devoid of vegetative cover (Campbell, personal communication). Therefore, it is a worst-case scenario. The erodibility index is a measure of the maintenance of soil productivity over time, derived by factoring soil depth into the equation (Campbell, personal communication). Since the camp is not engaged in commercial agricultural or forestry, potential soil loss is more relevant and is depicted in Figure 7 by soil mapping unit. As can be seen, the fine sandy soils with the steepest slope classes and the dune land have the highest potential soil loss.

Management Implications

The beaches and dune land series are not appropriate for most developments due to the severe erosion potential and their limited load supporting capacities. Training that eliminates the ground cover would also not be appropriate as it would lead to soil/dune instability. The Gearhart and Waldport series are excessively drained with rapid permeability. Therefore, activities and developments that have a high level of risk of introducing contaminants should be located elsewhere. In addition, Waldport soils are susceptible to wind erosion, so vegetative cover should be maintained where these soils occur. The dune land and fine, sandy soil mapping units have high potential soil erosion so vegetative cover should be maintained or replaced quickly if removed.

Water Resources

Coastal Zone

Camp Rilea has three miles of ocean frontage. However, the beach is a public resource managed by the Oregon Parks and Recreation Department, and not part of the camp. The camp

boundary ends at the ownership or beach zone line, which is the high tide line, more or less corresponding to the ocean-ward extent of vegetation. Therefore, beach management beyond the vegetation line is not part of this plan.

The camp is wholly within the coastal shorelands. Land use is regulated in the coastal shorelands by the county under the coastal zone management program, and in accordance with the applicable statewide planning goals. To protect the dunes and coastal resources, Clatsop County has created a Beaches and Dunes Overlay District, which also covers the entire camp. Regulations for this district are in Appendix 2. The Clatsop Soil and Water Conservation District (CSWCD) also regulates activities that affect vegetative cover of the coastal dunes. District regulations take precedence over county regulations. Actions that involve sand removal, dune grading, dune breaching, and that have the potential to cause erosion require approval of the District. This regulation applies to areas mapped as Zone 1 and 2 (Figure 8). Except for approved variances, no structures or unimproved roads are allowed in Zone 1 and all disturbed areas must be revegetated in both zones.

The Oregon coast is at risk for a tsunami event should there be a major earthquake along the Cascadia subduction zone fault system. Geologic evidence indicates that past earthquakes of large magnitudes have created large waves up to 40 feet in height that have periodically inundated coastal areas (Fiedorowicz, 1997). The recurrence interval suggests that an event such as this could occur anytime in the next 300 years. In response to this threat, the state Department of Geology and Mineral Industries has developed maps showing tsunami risk zones, based largely on topography. There are four zones along the coast ranging from extreme to low risk, with risk declining as you move inland. The first three zones would need to be evacuated if an off-shore earthquake occurred. Figure 8 presents the tsunami risk zones for Camp Rilea. (The zones for the southern third of the camp were developed by the OMD based on the 20, 30, and 40 foot contours.) Most coastal communities have developed evacuation plans. Camp Rilea has not, mainly because only undeveloped training areas are present in the three zones requiring evacuation.

Lakes, Streams, and Floodplains

There are two lakes on Camp Rilea: Slusher Lake and Sunset Lake (Figure 9). Slusher Lake is a 23 acre triangle-shaped body of water totally within the camp boundaries. Depth averages five feet (maximum is seven feet) and volume averages 80 acre-feet (Sanderson, et.al. 1973). There is no inflow or outflow, except when heavy rains cause the lake to rise and flow north over Slusher Lake Road into a forested wetlands. Sunset Lake (sometimes also called Neacoxie Lake) is long (over three miles) and narrow (50-700 feet), and about 110 acres in size (Sanderson, et.al., 1973). Only about 15 acres of the lake is within the camp boundaries. Maximum depth is 20 feet and volume averages 975 acre-feet (Swan, 1970). The lake outlets south into Neacoxie Creek. Water quality data for both lakes does not indicate any problems, although coliform counts in Sunset Lake can be high and blue-green algae often blooms there during summer months.

There is one stream flowing through the camp, Neacoxie Creek (see Figure 9). The hydrology of this creek is confusing given the past drainage alterations and it's very low

gradient. A recent hydrology review indicates that Neacoxie Creek originates in the Coffenbury Lake area and flows south, breaking up into two forks near the camp's northern boundary (Scheller, personal communication). Here the East Fork continues south past the entrance to the camp, on under Highway 101, and into the Skipanon River just shy of Cullaby Lake. The West Fork also flows south, through the eastern edge of Camp Rilea towards Sunset Lake. The surface water stops about 3,000 feet short of the lake; this area was filled in the 1930's or 1940's. Water ponds here every winter and there is probably subsurface flow to Sunset Lake. The West Fork outflows from Sunset Lake and continues south for 3.5 miles where it flows into Necanicum Bay.

Although the surface drainage is obscure and poorly understood, most of the camp seems to be within the Skipanon River Watershed and drains south and east to that stream (Scheller, personal communication). The southern third, which includes the two lakes, is in the Necanicum River Watershed, and drains south to Neacoxie Creek, a tributary. According to the Clatsop County Planning Department, there are no 100-year floodplains within the camp. Most of the camp is classified as Flood Zone C (areas with minimal flooding).

Wetlands

Camp Rilea has many large wetland areas. These were surveyed and mapped during the OSU Department of Botany and Plant Pathology (OSU Botany) floristic surveys in 1998 and 1999. OSU Botany mapped the camp's vegetation types using the existing vegetation (discussed below). The vegetation type classes with wetlands vegetation were then compared to the classes of the U.S. Fish and Wildlife Service (USFWS) wetlands classification system (Cowardin, 1979), and the appropriate USFWS wetlands class was assigned to each type. This became the camp's wetlands inventory, useful only for planning purposes, since the minimum mapping unit from the vegetation type mapping was one to one and a half acres. Therefore, boundaries and acreages are not exact. In any case, the inventory indicates that there are approximately 244 acres of wetlands in 29 separate areas, ranging in size from about one acre to 159 acres. All but nine are of the palustrine forested class, and this class accounts for 216 acres. Figure 9 and Table 4 shows the location of and present data on these wetlands. As can be seen, most are in the depression between the foredune and second dune.

Table 4. Wetlands Data

COWARDIN CLASS	NO. OF AREAS	ACRES
palustrine aquatic bed (PA)	6	11.3
palustrine emergent wetland (PE)	2	16.2
palustrine forested wetland (PF)	20	216.1
palustrine scrub-shrub wetland (PS)	1	0.9
TOTALS	29	244.5

Groundwater

The Quaternary marine and non-marine deposits and dune sands contain the principal aquifer of the area. This Clatsop Plains sand-dune aquifer is a complete local flow system recharged almost entirely by infiltrating precipitation (Sweet, Edwards, and Associates, 1981). Groundwater movement within the system is down-gradient from recharge to discharge zones. In the western half of the camp, lateral groundwater movement is towards the ocean. Conversely, the eastern portion of the southern half moves to Sunset Lake, while the eastern portion of the northern half moves to Neacoxie Creek (Frank, 1968). The entire camp can be considered a recharge area (Miller, 1999). The water table ranges in elevation from sea level to about 20 feet (Frank, 1968). Groundwater meets the surface at Slusher Lake, which rises and falls with the water table, having no discharge other than evaporation.

The aquifer is the primary water source for most persons living on the Clatsop Plains. Fortunately, water quality of this aquifer is good. Much of Camp Rilea sits above the downstream end of the Clatsop Plains aquifer, close to where it begins its submarine discharge. Nevertheless, Clatsop County has designated the entire area north of Slusher Lake and north of the cantonment area all the way to the boundary as an Aquifer Reserve Overlay District. Construction of sewage disposal systems, over-application of fertilizers, and inadequately protected oil and gas storage facilities are prohibited in this area.

Management Implications

Over two-thirds of the camp are within CSWCD regulated dune protection zones. This means all unvegetated areas must be quickly revegetated. Furthermore, in Zone 1 structures and unmaintained roads cannot be built. Any facilities built in the western third of the camp would also be at risk of destruction from tsunamis, which also could cause loss of life if bivouacking units could not be evacuated in time. The numerous wetlands impose further restrictions on training and facilities development, since fill or excavation cannot occur in these areas, which necessitates avoidance (except for most dismounted training), or adverse impacts mitigated if avoidance is not possible. Finally, since maintenance of groundwater quality is such a high priority, there is a need to guard against accidental contamination from spills. This is especially true for surface waters as they are often direct linked to the aquifer.

Natural History and Vegetation

Pre-Settlement Vegetation and Post-Settlement Changes

The first written accounts describing the vegetation of the Clatsop Plains came from the journals of the Lewis and Clark expedition. Visiting in 1805, they found the area to be open, rangy prairie and boggy with many large trees (Flitcroft, 1998). The trees were probably mostly Sitka spruce and alder. The former is considered to be the climax tree species of the forest (Sundberg, 1999). Research of the natural process of coastal sand dune construction indicates that forested areas would have developed in the more stable areas away from the accreting, active dunes, except where disturbance was too frequent (Wiedemann, 1984). However, large expanses of native grasses predominated, probably maintained through annual burning by Native Americans. In the near ocean areas sand deposition, wind, and salt spray would have limited the vegetation to dunegrasses and hearty herbaceous plants (Wiedemann, 1984).

Sketches and descriptions from Lewis and subsequent research indicate that the ocean shoreline was much further to the east at that time, approximately parallel with the western edge of Slusher Lake (Cherry, 1977). Thus, the western third of Camp Rilea did not exist at that time. Much of the remainder was probably part of the near ocean area and covered by open beach and dunegrass. Further inland vegetative cover likely changed to native grasses, except along the drainages where trees and shrubs would be expected.

The pre-settlement vegetation and natural dune-building process began to change with Euro-American settlement in the 1840s. Settlers built homesteads, drained bogs, and began farming and livestock grazing on the plains (Flitcroft, 1998). By the 1880s the new land use, particularly over-grazing, had created an environment much less stable than under natural conditions and a problem of moving sand dunes (Flitcroft, 1998). Jetties constructed at the mouth of the Columbia River in the late 19th century exacerbated the problem, by altering the historic sediment distribution/sand deposition patterns and vastly increasing deposition south of the river. In reaction to this dune instability problem, a massive dunes stabilization project was launched in the 1930s. The Civilian Conservation Corps was brought in to plant millions of grass, shrub, and tree starts. The three main species that were used were European beachgrass, Scot's broom, and lodgepole (shore) pine. Over 3,000 acres of moving sands were successfully stabilized, being replaced by non-native vegetation communities that still exist today.

The actual changes in vegetation communities at Camp Rilea from 1939 to 1996 was documented by a graduate student from Oregon State University (Flitcroft, 1998). The student examined aerial photographs from 1939, 1958, 1971, and 1996 and presented a chronological series showing how the vegetation evolved over time. Vegetation classes were mapped and acreages calculated for each of the four years. Figure 10 presents a graph showing the trends in grouped vegetation communities. Basically, the camp evolved from an area covered mostly by unvegetated sand and dunegrasses (over 1,450 acres in 1939), to one dominated by shrub and wooded communities (over 1,100 acres in 1971 and over 1,400 acres in 1996). Although this mimics the expected successional trend for a natural dune system, the existing communities are not natural and it is unclear whether they can or should be maintained.

Current Plant Communities

The existing plant communities are a direct result of the dune stabilization plantings of the 1930s. Therefore, there are few areas dominated by native vegetation. Much of the camp is covered with closed canopy forests of shore pine. Large areas of European beachgrass and forested wetlands are also present. This landscape neither resembles what was present in the past or what would have evolved under natural conditions, except perhaps the wetlands.

Using the U.S. National Vegetation Classification System (USNVCS), the OSU Department of Botany and Plant Pathology (OSU Botany) classified the existing plant communities into vegetation types during their floristic surveys of 1998-1999. Types were classified down to the Community Association level in the established hierarchy. The USNVCS is heavily based on existing vegetation and uses qualitative or quantitative data. A total of 20

vegetation types (excluding non-vegetated and developed) were recognized and are shown on Figure 11. The 20 types are described below (from Sundberg, 1999):

Open water: The open water category is actually non-vegetated, although submerged rooted and floating aquatic plants do occur in shallow water throughout the camp. Canadian waterweed (*Elodea canadensis*) and water buttercup (*Ranunculus aquatilis*) are rooted aquatics commonly found here. Common duckweed (*Lemna minor*), dotted water-flaxseed and duckweed fern are the most abundant floating aquatic species. South American water milfoil, a floating rooted aquatic species, occurs in patches too small to be mapped in that vegetation type.

Floating rooted aquatic (*Nuphar polysepala-Nymphaea odorata* Community Association): This vegetation type occurs in both forks of Neacoxie Creek, Sunset Lake, and Slusher Lake, although many patches are too small to be mapped. Dominant species are the native species, yellow pond lily (*Nuphar polysepala*) or the non-native species, fragrant water lily (*Nymphaea odorata*).

Sea rocket strand (*Cakile edentula-Cakile maritima* Community Association): This strand of vegetation occurs at and slightly above maximum high tide. It is dominated by two species of sea rocket (*Cakile edentula* and *Cakile maritima*) which are both non-native species. At the upper edge of the strand searocket co-occurs with beachgrass species (*Ammophila* spp.) of the accretion foredune.

Accretion foredune meadow (*Ammophila* spp.-*Leymus mollis* Community Association): The accretion foredune lies inland from the searocket strand. It is dominated by the non-native species European beachgrass and short-liguled beachgrass (*Ammophila breviligulata*), and the American dunegrass, which is native. These were originally planted in the camp to stabilize sand dunes and have spread extensively. This seaward portion of the foredune is partially covered by sand each year.

Foredune meadow (*Leymus mollis-Lathyrus japonicus* Community Association): The foredune meadow extends from the accretion foredune meadow to the west to the interdune meadow to the east. It spans the top of the foredune ridge. Vegetation consists of the native species American dunegrass and maritime peavine (*Lathyrus japonicus*). European beachgrass also occurs in some portions of the foredune meadow.

Interdune meadow (*Ammophila arenaria - Leymus mollis* Community Association): The interdune meadow is a rich mosaic of several plant communities that occur in patches too small to map in the current study. Most of the area is dominated by European beach grass and/or dune grass, with patches of the native species coastal strawberry (*Fragaria chiloensis*), yarrow (*Achillea millefolium*), pearly everlasting (*Anaphalis margaritacea*), non-native common velvetgrass (*Holcus lanatus*) and dozens of other native and non-native species. Wetland slough sedge, wetland willow, and upland Scot's broom scrub are common vegetation inclusions in the Interdune meadow vegetation type.

Disturbed European beachgrass meadow (*Ammophila arenaria*-*Holcus lanatus* Community Association): This vegetation type occurs in scattered areas where soils have been disturbed in recent years. It is dominated by European beach grass and typically includes assorted other non-native grasses and forbs.

Upland sedge meadow (*Carex pansa*-*Anthoxanthum odoratum* Community Association): Upland sedge meadows are found in the central portion of the camp. These are the "butterfly meadows" that are mowed annually to provide habitat for the Oregon silverspot butterfly. These meadows have a rich mix of native and non-native plant species. Sand sedge (*Carex pansa*) and sweet vernalgrass (*Anthoxanthum odoratum*) are dominant species. Several native species are conspicuous but not dominant, including hillside rein orchid (*Piperia elegans*), chocolate lily (*Fritillaria affinis*), elegant brodiaea (*Brodiaea elegans*), and hooked spur violet (*Viola adunca*), the larval host for the silverspot butterfly.

Planted/cultivated grassland (*Agrostis tenuis* or *Festuca arundinacea* Community Association): Planted/cultivated grasslands are maintained lawns or other managed grass areas. They surround most buildings in the cantonment area and are found in several other areas of the camp.

Slough sedge wet meadow (*Carex obnupta* Community Association): Slough sedge (*Carex obnupta*) wet meadows mostly occur in the depression inland from the foredune, adjacent to wetland willow forest vegetation. They also are found in small patches in the interdune meadow and along the edge of West Neacoxie Creek. Few species other than slough sedge occur in this vegetation type, and these are not significant components of the vegetation. Slough sedge meadows are typically inundated most of the year, drying up late in the summer and in the fall.

Cusick's sedge wet meadow (*Carex cusickii* Community Association): This vegetation type is found in one area along the edge of West Neacoxie Creek, in the northeastern portion of the camp. Much of the wetland consists of sedge hummocks surrounded by water, and thus soils are saturated or inundated all year. Groundwater level is typically at or within a few centimeters of the surface. Cusick's sedge (*Carex cusickii*) and other sedge species dominate Cusick's sedge meadow. The invasive weed purple loosestrife is scattered through much of the meadow, as is South American water milfoil, which occurs in pools interspersed throughout the wetland. Sphagnum moss (*Sphagnum* sp.) grows in small patches in a few areas.

Upland Scot's broom scrub (*Cytisus scoparius*/grasses Community Association): Dominated by Scot's broom, typically in dense thickets 2-3 meters tall with scattered grasses, this vegetation type is widespread in disturbed areas of the camp.

Wetland sweet gale scrub (*Myrica gale* Community Association): Sweet gale scrub occurs in scattered, nearly monospecific patches of low shrubs along the shore of East Neacoxie Creek.

Upland planted pine forest (*Pinus contorta*, *P. nigra* and/or *P. sylvestris* forest with *Cytisus scoparius* understory Vegetation Type): This includes even-age stands of shore pine, Scots pine (*Pinus sylvestris*), black pine (*Pinus nigra*) and/or Sitka spruce (*Picea sitchensis*). Maritime pine (*Pinus pinaster*) was also found during the plant surveys, but was not widely planted. These tree species were planted for dune stabilization over much of Camp Rilea. In some places the shrubs have been removed from the understory. There is little stratification of the canopy. The understory is typically sparsely vegetated, and in some areas consists mostly of a carpet of moss species. In many areas the non-native species, Scotch broom is abundant. Native shrub species include evergreen huckleberry (*Vaccinium ovatum*) and Pacific wax myrtle (*Myrica gale*). Forbs and grasses present include western rattlesnake plantain (*Goodyera oblongifolia*) and sweet vernalgrass.

Upland spruce/swordfern forest (*Picea sitchensis*/*Polystichum munitum* Community Association): This forest type is dominated by Sitka spruce and sword fern (*Polystichum munitum*). It is less disturbed than other forests in the camp. The canopy is typically stratified, with cascara (*Rhamnus purshiana*), red alder (*Alnus rubra*), red huckleberry (*Vaccinium parvifolium*) and Pacific blackberry (*Rubus ursinus*) dominating different levels of the canopy. The herbaceous stratum is dominated by sword fern and includes a rich mix of forbs and grasses.

Upland managed woodland (open spruce or shore pine with mowed understory): Managed woodland forest includes widely spaced Sitka spruce and/or shore pine trees. The understory in most of this forest type is managed by shrub removal and in some areas by mowing herbaceous vegetation.

Wetland willow forest (*Salix hookeriana*/*Carex obnupta* Community Association): Dominated by Hooker's willow (*Salix hookeriana*), this forest of trees approximately 7-8 meters tall, is flooded much of the year. The understory is dominated by slough sedge or is bare where the ground remains ponded for longer periods of time.

Wetland alder forest (*Alnus rhombifolia*/*Carex obnupta* Community Association): This forest type is dominated by white alder (*Alnus rhombifolia*) and slough sedge. It is restricted to one wetland that lies in a depression between old vegetated dunes west of North Neacoxie Road.

Wetland shore pine forest (*Pinus contorta*/*Carex obnupta* Community Association): This forest type occurs in a north-south-oriented band adjacent to wetland willow forests in the depression behind the foredune. Shore pine trees grow on low hummocks in a wetland that remains inundated late into the spring. The understory is dominated by slough sedge. This forest type also includes patches of red alder (*Alnus rubra*) and Sitka spruce trees.

Upland mixed deciduous forest (*Alnus rubra* - *Rhamnus purshiana* Community Association): This forest type is typically dominated by red alder, and cascara but may also include Hooker's willow, western crabapple (*Malus fusca*) and along the southern border of the camp, black locust (*Robinia pseudoacacia*).

Due to similarities in some of the above communities and how we plan to manage and use them, it was reasonable to combine a few. In addition, some types were renamed to facilitate interpretation. These combined and/or renamed plant communities form the management units for this plan. The final 11 communities/units are: coastal zone meadows (composed of sea rocket strand, accretion foredune meadow, foredune meadow, and interdune meadow); forested wetlands (wetland shore pine forest and wetland willow forest); non-native conifer forest (upland planted pine forest); deciduous forest (upland mixed deciduous forest); spruce/fern forest (upland spruce/swordfern forest); Scots broom/disturbed beachgrass (upland Scots broom scrub and disturbed European beachgrass); upland sedge meadow (upland sedge meadow); wet sedge meadow (slough sedge wet meadow and Cusick's sedge wet meadow); sweet gale wetland (wetland sweet gale scrub); floating aquatic (floating rooted aquatic and open water except for the two lakes); and cultivated grassland (planted/cultivated grassland). Figure 12 presents these 11 plant communities/management units used in this plan, and Table 5 lists the acreage of each and the training areas within which they are located. Representative photographs of each community are in Appendix 7.

Table 5. Plant Community/Management Unit Data

MODIFIED PLANT COM/MGMT. UNIT NAME	USNVCS NAME	NO. OF AREAS	ACRES	TRAINING AREAS
coastal zone meadows	sea rocket strand; accretion foredune, foredune, and interdune meadows	1	352.9	2-5,7,8,11
floating aquatic	floating rooted aquatic and open water	6	11.3	Cantonment
sweet gale wetland	wetland sweet gale scrub	1	0.9	Cantonment
forested wetland	wetland shore pine forest; wetland alder forest; and wetland willow forest	21	216.1	1-8, 10, 11,13
non-native conifer forest	upland planted pine forest and managed woodland	21	514.8	all
deciduous forest	upland mixed deciduous forest	12	18.2	1,6
spruce/fern forest	upland spruce/swordfern forest	15	38.7	1,2,6,10,13
Scots broom/beachgrass	upland Scots broom scrub and disturbed European beachgrass	52	141.2	all
upland sedge meadow	upland sedge meadow	5	91.5	1,6,9,10
wet sedge meadow	Cusick's and slough sedge wet meadows	2	16.2	2,10
cultivated grassland	planted/cultivated grassland	20	229.3	1,2,6,10

Floristic Survey Results

The surveys documented 274 plant species at Camp Rilea (Appendix 4). This is approximately six percent of the 4,423 plant species known to grow outside of cultivation in Oregon (Sundberg, 1999). Sixty-four families and 186 genera are represented. Forty-one percent of the species at Rilea are non-native; by comparison approximately 18 percent of plant species are non-native statewide. It was estimated that 95 percent of the plant species, subspecies and varieties were documented at Camp Rilea (Sundberg, 1999).

Although there are no listed plant species within the camp, there are four notable, rare native species present. These are discussed below:

Columbia watermeal (*Wolffia columbiana*) is a tiny, ellipsoidal, floating aquatic about one millimeter long. It is one of the smallest flowering plants in the world. It grows in several areas along West Fork Neacoxie Creek in Camp Rilea (Figure 13) and it is likely to periodically occur along the entire length of the creek. It has not been found on East Fork Neacoxie Creek. The species is listed as Category 2 (threatened or endangered in Oregon) by the ONHP but has no State or Federal status. Columbia watermeal is widely distributed in the Americas and is most commonly collected in the eastern United States and Argentina (Landolt 1986). The population at Camp Rilea is healthy and apparently stable. There are no apparent threats to the plant as long as the hydrology of the creek is maintained and the water does not become polluted to the extent that it is toxic to the plants.

Sweet gale (*Myrica gale*) is a medium-sized wetland shrub with fragrant leaves and inconspicuous flowers. Individual plants are either male or female. The species grows at the edge of Camp Rilea in dense stands along East Fork Neacoxie Creek (Figure 13) and constitutes the dominant species in the Wetland sweet gale scrub vegetation type (see Figure 11 or 12). This species has no State or Federal status, but has ONHP Category 3 status (Review list). Sweet gale is distributed along the Pacific Coast from Alaska to Oregon, east to Wisconsin, from Nova Scotia to North Carolina, and in Eurasia (Hitchcock and Cronquist 1973). The population at Camp Rilea is healthy and stable. There are no apparent threats to the plant as long as the hydrology of the creek is maintained and the water does not become excessively polluted.

Yellow sand verbena (*Abronia latifolia*) is a sprawling, sticky, succulent herb with round leaves and yellow flowers. In 1993 ONHP botanists found three plants north of Slusher Lake Road and north of Millersburg training area (MOUT site). In 1997 and 1999, additional plants were found in the MOUT site (Figure 13 and Appendix 7). In 1999 one plant was found growing in a sand pit in the newly constructed obstacle course north of Slusher Lake Road. Several vigorous plants were also seen in the M203 Range and in the Infantry Squad Live Fire Range, on either side of Second Causeway. In each case the ground had been disturbed in the past few years and the ground cleared of competing vegetation. It is likely that the species cannot tolerate annual disturbance. However, it is also apparent that it will not survive in many areas of Camp Rilea unless the ground is periodically cleared of vegetation. Yellow sand verbena has no State or Federal status. It is considered Category 4 (Watch list) by the ONHP. Yellow sand verbena occurs from southern Vancouver Island to the central California coast (Hitchcock and Cronquist 1973, Spellenberg 1993).

Big-headed sedge (*Carex macrocephala*) is a grass-like plant in the sedge family. It is notable for its clusters of flowers, which are the largest of any Oregon sedge. The species has no State or Federal status but is listed as Category 4 (Watch list) by the ONHP. It is sparsely distributed in Camp Rilea, occurring mainly on patches of open sand (Figure 13 and Appendix

7). It also periodically requires soil disturbance, as it does not persist in areas where European beachgrass and other plants cover the ground. Big-headed sedge grows from Coos County, on the central Oregon coast to Alaska, China and Japan (Hitchcock and Cronquist 1973, Wilson et al. 1999).

There are also a number of species that are not often found, yet are not sufficiently uncommon to be considered rare. Leather grapefern (*Botrychium multifidum*) and golden eyed grass (*Sisyrinchium californicum*) are examples. Black knotweed (*Polygonum paronychium*), sea purslane (*Honckenya peploides*), footsteps of spring (*Sanicula arctopoides*) and silver beachweed (*Ambrosia chamissonis*) are typical native dune species that are present, but not abundant at the camp. These species are not commonly seen.

Non-native vegetation is widespread on the camp and is a problem as it often restricts training and wildlife habitat. The most abundant non-native species at Camp Rilea were planted for dune stabilization, including European beachgrass, Scots broom, Scots pine (*Pinus sylvestris*) and black pine (*Pinus nigra*). Scots broom is now considered an invasive plant species in western Oregon. Other invasive or noxious weeds found at the site include purple loosestrife (*Lythrum salicaria*), English ivy (*Hedera helix*), tansy ragwort (*Senecio jacobaea*), South American water milfoil (*Myriophyllum aquaticum*), English holly (*Ilex aquifolium*), and meadow knapweed (*Centaurea pratensis*). Several non-native grass species are especially abundant, and many exotic species of forbs are found commonly throughout the camp. Species that have escaped cultivation include daffodil (*Narcissus pseudonarcissus*), European privet (*Ligustrum vulgare*), Etruscan honeysuckle (*Lonicera etrusca*), and tapegrass (*Vallisneria americana*), which is often grown in freshwater aquaria.

Management Implications

The plant communities illustrate the general biodiversity of the camp. If each native community is maintained, the high biodiversity is likely to be maintained as well. Locations of important natural communities that are rare or that contain desired conditions for other, non-native areas are also shown (e.g., wet sedge meadows and spruce/fern forest), and can therefore, be more easily protected. Undesired communities (Scots broom/disturbed beachgrass) are highlighted for treatment and monitoring. Rare plant species should also be preserved to maintain total species biodiversity. Preservation does not necessarily mean making locations off-limits to training and management activities; some species like or need disturbance. Based on field observations, Big-headed sedge and yellow sand verbena appear to be two such plants. Several species of non-native plants could cause future problems if they become dominant, which has already happened with Scots broom. The distribution of non-native plants should be closely monitored.

Wildlife

USGS Faunal Inventory

The Forest and Rangeland Ecosystem Science Center, Biological Resources Division of the U.S. Geological Survey (USGS) conducted a vertebrate faunal inventory at Camp Rilea from November, 1997 through March, 1999. Methods included avian point counts, small mammal

trapping, arboreal mammal trapping, infrared monitoring, mist netting, spotlighting, amphibian and reptile searches, habitat measurements, and incidental observations. USGS staff made 72 visits to the camp and documented the presence of 124 bird species, 33 mammal species, and 12 species of amphibians and reptiles. Avian point counts conducted in the spring were the most productive, and riparian areas had the greatest species richness and diversity. White-crowned sparrows (*Zonotrichia leucophrys*), American Robins (*Turdus migratorius*), and Savannah sparrows (*Passerculus sandwichensis*) had the highest frequency and relative abundances. American Widgeons (*Anas americana*) were the most observed waterfowl species and Sanderling (*Calidrus alba*) and Dunlins (*Calidrus alpina*) the most frequently recorded shorebirds. The willow wetlands plant community had the highest diversity index for small mammals. Deer mice (*Peromyscus maniculatus*) were the most frequently captured species. Only one species of bats was captured during mist netting, with one additional species identified from incidental observations. The most commonly encountered amphibians/reptiles species was Pacific Chorus Frogs (83.8%) during terrestrial surveys, and Red-legged Frogs (95.8%) during aquatic surveys. Appendix 5 contains the species lists for birds, mammals, and amphibians and reptiles. Additional data can be obtained from the full report (Henny, et. al., 1999).

Of all the species recorded, nine were non-native. Five of them were mammals, three were birds, and one frog. The European Starling (*Sturnus vulgaris*), cat (*Felis catus*), Black rats, and Bullfrogs are considered to be problems or pests. Starlings may be adversely affecting cavity nesting bird species and cats are likely to be a major predator of birds and small mammals. These four species are potentially reducing species richness and avian biodiversity at the camp.

A number of key habitat areas that appeared to be important for wildlife were noted. The riparian areas supported a diverse faunal community, and represented a major percentage of the plant communities available. The lakes, creeks, sloughs, willow wetlands, and open beach were also important habitat components. Riparian areas contained the highest species richness for birds from point counts, as well as the highest mean number of birds encountered per point. This area was important to the avian community during breeding and wintering seasons. Small mammal observations showed the willow wetland to have the highest species richness, although this varied with season. In spring when many lowlands were inundated, the adjacent beachgrass, and to some extent coniferous woodland, were important areas for small mammals. By fall, the now-dry willow wetlands had exceeded all other plant communities in species diversity. When considering overall species diversity on Camp Rilea, the open water, creeks, and beach zone were all important to their respective genera. Without question, the beach zone serves as an important area for migrant shorebirds, as shown by the large number of transient flocks and individuals observed. Inland permanent water was used throughout the year by resident and migrant waterfowl, and also served as brood rearing habitat. The presence of nest boxes on Neacoxie Creek enabled larger cavity nesters to use the area, especially given the absence of mature timber and snags. This added significantly to the creek's overall diversity.

Since the USGS inventory only lasted one year, much of the year-to-year variation of wildlife populations and their use of habitat was missed. For example, a plant community that contains high numbers of species one year may prove to be less significant the following year with changes in annual precipitation, land use on adjacent properties, and a host of other

variables. Data from one- or two-year inventories can only provide a partial look at the identification of key habitats on a study site. Furthermore, some species that were expected to occur were not recorded (see table in Appendix 5). Therefore, multi-year assessments of wildlife and habitats are needed to account for this variation.

Wood Duck Nesting Box Project

In 1990, science students from Jewell High School started a project to install and monitor nest boxes for wood ducks (*Aix sponsa*) on the Clatsop Plains (Jewell High School, 1997). Fifteen boxes were located in Camp Rilea, all along the west fork of Neacoxie Creek. The boxes have been visited every year and reproductive data gathered. For example, in 1997 the Camp Rilea boxes contained 292 wood duck eggs of which 170 hatched (58%). Hooded mergansers also used some of the boxes (44 eggs; 16 hatches). The Camp Rilea boxes averaged 314 wood duck and 22 hooded merganser eggs from 1990-97. For all of the project boxes, wood duck clutch size averaged 15 eggs (11 excluding dump nests). Hatch success averaged 43% for wood ducks and 53% for hooded mergansers. Most hatching occurred in either May or June. On average, over 45% of the boxes contained dump nests. Dump nests (over 16 eggs in a box) result when one wood duck female deposits her eggs on top of another clutch. It is believed to be related to the conspicuousness of nest boxes. Jewell High School intends to continue this project indefinitely.

Deer and Elk

Black-tailed deer and Roosevelt elk are present at Camp Rilea. However, no studies of deer or elk at Camp Rilea have been conducted. Therefore, anecdotal information, observations, and statistics from Oregon Department of Fish and Wildlife's (ODFW) Saddle Mountain Management Unit are the only sources of information.

The deer population appears to be rather dense at the camp. Camp Rilea and OMD staff report that it is common to see numerous deer, often in small herds (e.g., 6-12), while driving around or in the field. Since deer are not highly mobile and have home ranges approximating one square mile, these deer are probably year round residents (Nuzum, 1999). Saddle Mountain Unit census data from 1990-1998 suggest that there would be about 60 deer residing at Rilea. This was based on the Eastman model and assumes average habitat. Since Rilea's habitat is above average, it is likely that more deer are present. As for demographics, the census data suggest that around 12 percent of these animals would be bucks and 30 percent fawns.

Information on elk at Rilea is much better as a result of an ODFW live trapping program that has been going on for about 10 years. This trap and remove program is in response to private landowner complaints of elk property damage. Observations in 1998 indicate that there are apparently three herds of elk west of Highway 101, with two of these regularly visiting and using Camp Rilea. One herd has 16 individuals left (1998 trapping removed 7), the second has 14 (1998 trapping removed 17), and the third has 29 (1998 trapping removed 5). The middle herd is the one spending the most time at the camp, while the last herd has never been observed there (Harrison, 1999). It is believed that all three herds move up and down the coast from Hammond to Gearhardt and use Camp Rilea, which is consistent with their behavior and estimated home range size (Nuzum, 1999). Although they are in close proximity, the herds do

not seem to co-mingle (Harrison, 1999). There has been little change in total numbers observed over the last four years. The herds grow through reproduction and adults moving west from the Coast Ranges, and then are reduced through the trapping program (Harrison, 1999). Using Saddle Mountain Unit census data from 1990-1998, there are probably around 8-10 bulls and 20-25 calves west of Highway 101.

Fish and other Aquatic Animal Species

Information on fish is fairly limited and non-existent for other aquatic animal species for the surface waters of Camp Rilea. The ODFW has done intermittent gill netting and electroshocking for decades to gather information on the fisheries of Sunset and Slusher Lakes. The last survey was in June, 1995. Both lakes have bluegill, largemouth bass, yellow perch, sculpins, carp, and bullhead species. Sunset also has stocked rainbow trout, salmon, and steelhead (bluegill and bass are also stocked in this lake). For some unknown reason the warmwater fish in Sunset do not survive past the juvenile stage. Thus, what was once a good, popular warmwater fishery has declined to a poor state. The ODFW would like to investigate this problem and improve this fishery (Sheahan, 1999). No sampling has been done in Neacoxie Creek above Sunset Lake. Due to the stagnation of this creek, fish are thought to be absent (Sheahan, 1999).

Management Implications

Again, in order to maintain the high biodiversity that exists, the full range of natural plant communities and wildlife habitats should be maintained. However, some are more important than others, such as wetlands and open water; these must be preserved. Upland meadows should be maintained for deer and elk. In addition, within the communities structural elements that increase habitat value should be identified and maintained. These structural elements include well-developed understory vegetation, snags, forest openings, and downed wood. Control efforts may be needed for the four non-native species (cats, rats, bullfrogs, and starlings) if they are shown to be significantly affecting biodiversity. Good surface water quality should be maintained to help preserve aquatic faunal communities.

Threatened, Endangered, and Special Status Species

Appendix 6 lists the federal, state, and Oregon Natural Heritage Program (ONHP) species of concern that may occur on Camp Rilea. Species of concern includes those listed as threatened or endangered under the federal or Oregon Endanger Species Act (ESA), as well as candidates for ESA listing, state-critical, state-vulnerable, and ONHP watch list categories. The list was based on information provided by ONHP in November, 1999.

The highlights of the list are as follows: seven listed birds could be present (six state and federally-listed and one state-listed only); one federally-threatened fish (state critical list); one federally-threatened invertebrate; and one state-endangered plant. In addition, one mammal is on the state critical list; one other bird species is on the state critical list; one amphibian is on the state critical list; one reptile is on the state critical list; two other fish species are candidates for the federal list; and four plants are candidates for state ESA listing. All of these species are highlighted on the Appendix 6 list. The federally-threatened Stellar sea lion is not included since

the ocean and beach are not part of Camp Rilea. However, no observations of this species have occurred in the coastal area adjacent to the camp.

Camp Rilea has known that the federally-threatened Oregon silverspot butterfly is present since 1982 and has managed habitat for this species not long after this discovery. The number of female silverspot butterflies annually observed at the camp during late summer monitoring has varied from 82 to zero, declining steadily (Hammond, 1999). Currently 68 acres of meadow habitat is designated as protected habitat and maintained by periodic mowing to help perpetuate the existence of this habitat and (hopefully) the species on the Clatsop Plains (Figure 14). The OMD has completed the Section 7 (Endangered Species Act) process with the U.S. Fish and Wildlife Service (USFWS) and has adopted a formal habitat management plan for the Oregon silverspot butterfly. This plan should be consulted for detailed information on the biology, management, and monitoring of this species.

Three separate efforts have been made to determine whether any other special status species are present within the camp, particularly the species highlighted on the Appendix 6 list. The first was a brief inventory conducted by the ONHP in the spring/summer of 1993. This inventory failed to document the occurrence of any sensitive species other than the Oregon silverspot butterfly (Kagan, 1993). It was also reported that a lack of suitable habitat precluded the presence of most listed species.

The second effort was for vascular plants only, and consisted of floristic surveys by OSU Botany. Surveys were conducted during the growing season in both 1998 and 1999. No state or federally-listed plants or candidates were discovered. However, four species were encountered that are on the ONHP watch list and considered rare. These plants are: Columbia watermeal, Sweet gale, Yellow sand verbena, and Big-Headed Sedge. The four species were described in the section on natural history and vegetation. The observed locations of these plants are shown on Figure 13.

The third effort consisted of vertebrate faunal surveys by the Biological Resources Division of the USGS during 1997-1999 (discussed above). During their 72 visits to the camp USGS recorded three listed bird species: the Brown Pelican (state and federally endangered); the Bald Eagle (state and federally threatened); and the Peregrine Falcon (state endangered). In addition, one bird species (Pileated woodpecker) and one frog species (Northern red-legged frog) that the state or USFWS considers vulnerable or of concern were recorded (see Appendix 6).

Management Implications

Preservation and management of silverspot butterfly habitat is required by the USFWS. This entails annual mowing, monitoring, and a complete restriction on all training in these areas. At present the three ESA listed bird species are all occasional visitors, which limits concern to prevention of harassment, injuries, or deaths. The species of concern (the four plants discussed in the previous section, the Pileated woodpecker, and the Northern red-legged frog) and their important habitat areas should be protected to help maximize camp biodiversity and avoid potential future listings. Western snowy plovers were not observed, but habitat conditions could be created to encourage this listed species to re-colonize the coastal meadows within the camp.

CHAPTER 5. NATURAL RESOURCES MANAGEMENT

Management plans are presented below organized by plant community, which make up the management units (see Figure 12). In addition, the management of subjects that cut across plant communities is discussed after the 11 communities/units. Table 1 in the Executive Summary presented a summary of the plans for each plant community/management unit. Appendix 7 contains photographs of each community.

Coastal Zone Meadows

Management Objective

Maintain dune stability and vegetative cover in compliance with Clatsop County regulations and Oregon Statewide Planning Goal 18. Preserve native dune vegetation and where possible, restore native plant species or encourage natural re-colonization. Participate in Western snowy plover recovery efforts if appropriate.

Allowed Training Activities

Air assault (paratroopers) and dismounted maneuver/land navigation, with no assembly/bivouacking and no cutting of native vegetation. Support vehicles allowed only on existing roads/trails.

Management Approach and Projects

Due to the sensitivity of the dunes to potential erosion, military training is restricted. Using units, camp staff, and OMD project planners will be briefed on dune erosion sensitivity and state and local regulations. Attempts will also be made to restrict public use of this area. The open character of this ecosystem is desirable since it is within the beach drop zone (air assault training). The flora is dominated by European beachgrass, a non-native plant. An exception is the foredune meadow, which is dominated by Amercian dunegrass and maritime peavine. This plant community is globally imperiled and Camp Rilea contains one of the best examples of what little remains; it is perhaps the most important habitat within the camp (Kagan, personal communication). If feasible and cost-effective, attempts may be made to increase or restore the extent of this ecosystem and reduce the amount of European beachgrass. Any restoration projects in the coastal zone meadows will use native species such as American dunegrass. Because of the heavy beach traffic, it is questionable whether Western snowy plover recovery projects should be undertaken. That may be why the Camp Rilea coastline was not designated critical habitat. However, Camp Rilea participation in recovery efforts should be explored further.

Specific projects identified at this time are:

- Posting ITAM environmental awareness signs (for the military and the public).
- Closing and revegetating unimproved roads.

- Consulting with USFWS and local government agencies to determine if Western snowy plover recovery projects should be planned and implemented at the camp.

Monitoring

Objective: Observe no decrease in extent of foredune meadow and American dunegrass.

Observe no unvegetated areas within 100 meters of the camp boundaries.

Methods: Permanent photo points and ground surveys (annual); aerial photography or videography (five year intervals) to estimate dunegrass acreage.

Floating Aquatic (includes surface waters)

Management Objective

Protect water quality and ensure compliance with the Clean Water Act and DEQ regulations; maintain existing warmwater fishery and aquatic fauna; preserve rare plant species that are present; control non-native vegetation; minimize impact from engineer water training (bridging operations).

Allowed Training Activities

Engineer bridging operations at the three designated sites and stream rappelling at the rope bridge (see Figure 4). Navy boat operations in the three water training areas. Dismounted maneuver/land navigation only in shallow areas.

Management Approach and Projects

Surface waters are directly linked to the aquifer that serves most residents of the Clatsop Plains. Sunset Lake is also a popular warmwater fishery. The rare Columbia watermeal floats in at least two locations in Neacoxie Creek (see Figure 12). Therefore, most training is restricted to avoid potential contamination of water, to protect this rare plant, and to avoid conflicts with the fishery. Exception is made for engineer bridging operations, a required training task that should be done over water, which poses minimal risk to water quality. In addition, the banks of surface waters will be protected and enhanced to provide high-quality riparian wildlife habitat and buffer the surface waters from upland activities (except for the designated bridging sites). Bank protection is defined as preserving/restoring native vegetation and not disturbing soils.

Specific projects identified at this time are:

- Selective removal of Scots broom, blackberries, and other non-native vegetation along banks.
- Planting native trees and shrubs along the banks of surface waters.
- Hardening of banks (i.e., concrete or gravel) at bridge training sites to avoid bank erosion. Introducing fill into surface waters will be avoided as much as possible and the proper permit obtained if total avoidance is not possible.
- Posting ITAM environmental awareness signs and/or Siber stakes on surface water banks.

Monitoring

Objectives: Observe no decrease in selected water quality parameters for more than one year. Maintain presence of Columbia watermeal in Neacoxie Creek.

Methods: Annual water quality sampling (including macroinvertebrates). Columbia watermeal surveys every three years.

Sweet Gale Wetlands

Management Objective

Preserve areal extent of the community and the Sweet gale vegetation. Comply with Section 404 of the Clean Water Act and the DSL removal/fill law.

Allowed Training Activities

None; area is off-limits to training.

Management Approach and Projects

This is a shrub-scrub wetland plant community composed entirely of a rare plant species. It is small in area (<1 acre) and not needed for any required training, so making it an off-limits area poses no hardship. Using units, camp staff, and OMD project planners will be briefed on the location and sensitivity of this community and state and federal wetlands regulations.

Specific projects identified at this time are:

- Creating a 20-foot buffer (no ground disturbance) to help ensure avoidance.
- Posting ITAM environmental awareness signs and/or Siber stakes within the buffer zone.

Monitoring

Objective: Observe no decrease in extent of Sweet gale vegetation.

Methods: Permanent photo points (annual) and aerial photography or videography (five year intervals).

Forested Wetlands

Management Objective

Maintain existing area, but increase Sitka spruce patches within the area. Preserve the existing native vegetation and wildlife; especially rare Northern red-legged frogs and their important habitat areas. Comply with Section 404 of Clean Water Act and the DSL removal/fill law.

Allowed Training Activities

Dismounted maneuver/land navigation only. No assembly/bivouacking, and limited cutting of vegetation. Support vehicles allowed only on existing roads/trails.

Management Approach and Projects

These wetlands provide flood control, water quality protection, and high-quality wildlife habitat. They are areas of high biodiversity and harbor some rare species. Sitka spruce dominated wetlands are very rare, so increasing the amount of these would be positive (Kagan, personal communication). Nevertheless, limited training can be allowed without serious risk to the functions and values of this community, or the existence of the rare species. Using units, camp staff, and OMD project planners will be briefed on the location, value, and sensitivity of this community and state and federal wetlands regulations. It may be desirable to improve water circulation within the western wetlands strip via road culverts at the crossroads (see Figure 9). The effects on this community and drainage within and outside of the camp would be studied before this project is pursued.

Specific projects identified at this time are:

- Identifying and eliminating all reed canary grass, such as by the boat dock at Slusher Lake.
- Posting ITAM environmental awareness signs and/or Siber stakes within the buffer zone.
- Conducting a hydrological study of water movement and drainage with and without road culverts, and an analysis of the need and cost-effectiveness of installing these culverts.

Monitoring

Objectives: Observe no decrease in extent of forested wetlands. Observe an increase in area of Sitka spruce. Observe no decrease in the population trend of Northern red-legged frogs.

Observe no large areas of reed canary grass.

Methods: Permanent photo points (annual) and aerial photography or videography (five year intervals). Annual red-legged frog surveys. Reed canary grass surveys and herbicide spraying (herbicides approved for use around water) every three years.

Non-Native Conifer Forest

Management Objective

Decrease the acreage of this community through conversion to other forest community types. Also change the structural composition of much of the remainder by lowering the density of shore pines; creating small openings in forest interiors or connecting existing openings; and removing the non-native understory vegetation, especially around the silverspot butterfly habitat areas. Dune stability would be maintained and military training maximized.

Allowed Training Activities

Dismounted maneuver/land navigation; assembly/bivouacking; construction of defensive positions (shallow digging and temporary structures). No restrictions on the use of wheeled support vehicles.

Management Approach and Projects

Due to the condition of this community, it has limited value for both training and wildlife habitat. Conversion and manipulation (treatments) of the vegetation in this community should

greatly increase training opportunities and biodiversity. In addition, this community is senescent and unstable based on field observations and the lifespan of the dominant tree species (shore pine). Therefore, a more stable, late-successional forest type (spruce/fern or western hemlock) is desired. Selected areas will receive treatments (listed as projects below), which in some cases will be experimental. Not all areas in this community will receive these treatments, and treatments will vary in intensity across the community.

Specific projects (or treatments) identified at this time are:

- Tree thinning to lower stand density in areas showing good regrowth of trees. Trees to be removed will be flagged by the OMD/ORARNG. Contractors will cut and remove all flagged trees, as well as non-native shrubs. Care will be taken to avoid damaging the regrowth.
- Tree limb removal (under seven feet height) to increase dismounted maneuver safety. This would occur everywhere except in control areas and clear-cut areas.
- Clear-cutting extremely dense areas that have little or no regrowth of trees. This may also include creating small openings (one acre or less) within forest interiors, or cutting to connect existing openings to facilitate training operations and wildlife habitat connectivity.
- Removing non-native understory vegetation (e.g., Scots broom, holly, English ivy, Himalayan blackberry). Areas by silverspot butterfly habitat will receive priority.
- Planting Sitka spruce and other native conifers and shrubs in clear cut areas and in some thinned areas as necessary. Seedlings will come from Camp Rilea trees or a local source.

Monitoring

Objectives: Observe a decrease in the extent of this community. Observe an increase in native species diversity within this community.

Methods: Permanent photo points (annual) and aerial photography or videography (five year intervals). In addition, a small number of LCTA plots will be installed to get quantitative data for plant frequencies, better erosion calculations, and input into a U.S. Army training carrying capacity model.

Deciduous Forest

Management Objective

Conserve native vegetation and wildlife; maximize training opportunities (except for riparian [streamside] areas).

Allowed Training Activities

Dismounted maneuver/land navigation; assembly/bivouacking; and construction of defensive positions (shallow digging and temporary structures). No deep trenching or heavy equipment operations allowed (engineer training). No restrictions on the use of wheeled support vehicles. Riparian areas are dismounted maneuver only.

Management Approach and Projects

This is an early-successional community very limited in extent (only 18 acres). It is also a very common community type, and not especially valuable for conservation purposes (except for where it occurs by stream). However, it provides a type of forest very different from the conifer forests covering much of the camp. Therefore, it provides a different training environment. It is believed that the general camp-wide training restrictions are enough to conserve the native vegetation and wildlife. Conversely, the riparian areas are very critical for protecting water quality and water-dependant species. These areas must be protected like wetlands.

Specific projects identified at this time are:

- Creating a 20-foot buffer zone around riparian areas to help ensure avoidance.
- Posting ITAM environmental awareness signs and/or Siber stakes within the buffer zone.
- Removing non-native understory vegetation (e.g., Scots broom, holly, English ivy, Himalayan blackberry).

Monitoring

Objectives: Observe no destruction of native vegetation in riparian areas. Observe no increase in non-native plant species.

Methods: Permanent photo points (annual) and aerial photography or videography (five year intervals). Non-native plant surveys with removal every three years.

Spruce/Fern Forest

Management Objective

Preserve existing area and native vegetation and wildlife; encourage or actively attempt an increase in the acreage of this community and late-successional development.

Allowed Training Activities

Dismounted maneuver/land navigation; assembly/bivouacking; and construction of defensive positions (shallow digging and temporary structures). No deep trenching or heavy equipment operations allowed (engineer training). No restrictions on the use of wheeled support vehicles.

Management Approach and Projects

At present this community is very limited in extent (only 39 acres). However, it is a very desirable type of conifer forest for both maintaining biodiversity and providing realistic training environments. It also serves as a model for the desired future conditions of the non-native conifer forest. This desirability comes primarily from the late-successional characteristics, namely the openness of the understory and the longevity/stability of this community. These conditions are lacking in the non-native conifer forests. Thus, a large increase in the acreage of this type of forest is desired. It is believed that the general camp-wide training restrictions are enough to protect the health, functions, and values of this community.

Specific projects identified at this time are:

- Vegetation monitoring to document conditions and help identify the desired conditions that would be needed in other areas to expand this type of community.
- Seed collection and propagation for use in re-vegetating the non-native conifer forest.

Monitoring

Objectives: Observe an increase in the extent of this community. Observe an increase in late-successional characteristics. Observe no increase in non-native plant species frequency.

Methods: Permanent photo points (annual) and aerial photography or videography (five year intervals). In addition, a small number of LCTA plots will be installed to get quantitative data for forest characteristics, better erosion calculations, and input into a U.S. Army training carrying capacity model.

Scots Broom/Beachgrass Community

Management Objective

Eliminate or reduce the extent of this community through conversion to native upland meadows; preserve rare plant species that are present; maintain dune stability; and maximize military training opportunities.

Allowed Training Activities

Dismounted maneuver/land navigation; assembly/bivouacking; construction of defensive positions (shallow digging and temporary structures); and engineer digging and heavy equipment operations (in designated areas only). No restrictions on the use of wheeled support vehicles.

Management Approach and Projects

This community has little value for training or wildlife habitat. Scots broom forms a virtually impenetrable cover over most of it (except the disturbed beachgrass areas, which it is probably invading). Elimination of the non-native species and conversion to upland meadows would greatly increase training opportunities and biodiversity. The big-headed sedge and yellow sand verbena occur in this community in the Infantry Squad Battle Course, LAW range, and by the MOUT site. Range maintenance activities, which includes prescribed burning, appear to be perpetuating the existence of these plants and suppressing Scots broom and should be continued.

Specific projects identified at this time are:

- Removing all unwanted vegetation in the target areas using prescribed burning and herbicides (as appropriate and necessary), and planting native grasses and herbaceous vegetation.
- Continued prescribed burning of the selected firing ranges, to reduce fuel loads and assist native plant propagation, including big-headed sedge and yellow sand verbena, which appear to need disturbance events.

Monitoring

Objectives: Observe a decrease in the areal extent of this community. Observe an increase in the frequency of native vegetation, including big-headed sedge and yellow sand verbena.

Methods: Permanent photo points (annual) and aerial photography or videography (five year intervals). Big-headed sedge and yellow sand verbena surveys every three years. In addition, a small number of LCTA plots will be installed to get quantitative data for native plant frequencies, better erosion calculations, and input into a U.S. Army training carrying capacity model.

Upland Sedge Meadows

Management Objective

Preserve existing areal extent and native vegetation and wildlife (particularly the rare plant species that are present). Encourage or actively attempt an increase in the acreage of this community, and the amount of red fescue and native forbs. Comply with federal Endangered Species Act and approved habitat management plan (for the 68 acres of Oregon silverspot butterfly habitat).

Allowed Training Activities

Virtually no training is allowed in the protected habitat of the Oregon silverspot butterfly (see Figure 13). Other areas are dismounted maneuver/land navigation only, with assembly/bivouacking and limited cutting vegetation permitted. No restrictions on the use of wheeled support vehicles.

Management Approach and Projects

The silverspot habitat must be preserved and managed as outlined in the USFWS approved habitat management plan. This involves annual mowings, monitoring, and an almost complete ban on training. Other areas of this community type are valuable open areas required for many training tasks, such as bivouacking and setting up command centers. All areas of this community type are important foraging areas for deer and elk as well, and harbor many native herbaceous plants. Therefore, it is important for both maintaining biodiversity and providing different, realistic training environments. An increase in this community would be positive. An increase in the native grass red fescue and native forbs would also be positive. Big-headed sedges and yellow sand verbena occur in this community by the MOUT site. MOUT related disturbance appears to be perpetuating the existence of these plants.

Specific projects identified at this time are:

- Transplanting of violets into OSB Habitat Area 10 from the cantonment area as described in the OSB Habitat Management Plan.
- Prescribed burning of selected areas, such as the LAW range, to reduce fuel loads and assist native plant propagation, including big-headed sedge and yellow sand verbena, which appear to need disturbance events. This would not occur in any OSB habitat areas without the agreement of the USFWS, obtained through Section 7 consultation.

- Early spring herbicide treatments of selected areas to reduce non-native grasses. This may include Oregon silverspot butterfly habitat areas if agreeable to the USFWS.

Monitoring

Objective: Observe an increase in the extent of this community and the frequency of native grasses and herbaceous vegetation.

Methods: Permanent photo points (annual) and aerial photography or videography (five year intervals). Big-headed sedge and yellow sand verbena surveys every three years. Herbaceous plant surveys every five years during violet sampling for silverspot butterfly management. In addition, a small number of LCTA plots will be installed to get quantitative data for native plant frequencies, better erosion calculations, and input a U.S. Army training carrying capacity model.

Wet Sedge Meadows

Management Objective

Preserve existing areal extent of the community and native vegetation and wildlife. Comply with Section 404 of the Clean Water Act and the DSL removal/fill law.

Allowed Training Activities

Dismounted maneuver/land navigation only. No assembly/bivouacking, and no cutting of native vegetation. Support vehicles allowed only on existing roads/trails.

Management Approach and Projects

These emergent wetlands provide flood control, water quality protection, high-quality wildlife habitat, and have high biodiversity. The Cusick's sedge community in the northeast edge of the camp (see Figure 10) is a unique community by itself; it is very rare in the lower 48 states. The invasive non-native plant purple loosestrife is widespread in the Cusick's sedge community. Biological controls have been shown to work well on this plant, although it takes a while to achieve significant reductions after their introduction. Limited training can be allowed without serious risk to the functions and values of the wet meadows. Using units, camp staff, and OMD project planners will be briefed on the location, value, and sensitivity of this community and state and federal wetlands regulations.

Specific projects identified at this time are:

- Creating a 20-foot buffer (no ground disturbance) around these wetlands to help ensure avoidance.
- Posting ITAM environmental awareness signs and/or Siber stakes in the buffer zone as necessary.
- Control of purple loosestrife. Initially, herbicides approved for use around water and manual methods (cutting and bagging of seed heads) will be used. Introduction of biological control organisms will occur after this initial attack.

Monitoring

Objectives: Observe no decrease in the extent of this community. Observe a decrease in non-native plant species frequency, especially purple loosestrife.

Methods: Permanent photo points (annual) and aerial photography or videography (five year intervals). Qualitative non-native plant surveys with removal every three years.

Cultivated Grasslands

Management Objective

Maintain the areal extent and existing conditions of this community; preserve rare plant species that are present.

Allowed Training Activities

Dismounted maneuver/land navigation; assembly/bivouacking; construction of defensive positions (shallow digging and temporary structures); and engineer digging and heavy equipment operations (in designated areas only). No restrictions on the use of wheeled support vehicles.

Management Approach and Projects

Much of this community is occupied by the firing ranges and other developed training facilities, or is within the cantonment area. Still, it is valuable open space required for many training tasks, such as bivouacking and setting up command centers. This community type also serves as foraging areas for deer and elk. Therefore, it is important for both maintaining biodiversity and providing different, realistic training environments. A slight increase in this community would be acceptable. Big-headed sedges and yellow sand verbena occur in this community in the Infantry Squad Battle Course and LAW range. Range maintenance activities appear to be perpetuating the existence of these plants and should be continued.

Specific projects identified at this time are:

- Prescribed burning of selected areas, such as the LAW range, to reduce fuel loads and assist native plant propagation, including big-headed sedge and yellow sand verbena, which appear to need disturbance events.

Monitoring

Objectives: Observe no decrease in the extent of this community. Observe no decrease in extent of big-headed sedge and yellow sand verbena.

Methods: Permanent photo points (annual) and aerial photography or videography (five year intervals). Big-headed sedge and yellow sand verbena surveys every three years.

Cantonment (Developed) Area Management

Management of the cantonment area is not part of this plan. Management of this area will be covered in a future camp master plan. However, activities within and the management of natural resources within the cantonment will sometimes affect natural resources in the training areas, so cantonment area management should not conflict with the goals and objectives of this

plan. Thus, water quality will be protected, soil erosion limited, and non-native species controlled in a manner similar to that planned for the management units. Projects such as bat box installation, nutria and bullfrog control, best management practices to limit erosion, and water quality monitoring will be extended into the cantonment area as desired and necessary.

General Fish and Wildlife Management

Management by plant communities addresses the needs of much wildlife. However, many wildlife species use multiple plant communities. This is particularly true for wide-ranging species like birds and mammals. Therefore, a general wildlife management section is appropriate.

The restoration of native ecosystems and planned increases in native vegetation should greatly increase food, shelter, and nesting opportunities for wildlife. Measures beyond those discussed in each plant community are not really necessary (except for elk, as discussed below). However, there are several general management measures that will be undertaken. Bat and bird houses will be installed and maintained around the camp to ensure that there are ample places for native songbirds and bats to nest or roost. These houses will be monitored. Undesired, non-native nuisance wildlife species such as bullfrogs, nutria, English sparrows, and European starlings will be controlled to the extent possible to lessen competition with native fauna. A survey of moths and butterflies will be completed to establish a species list to serve as a baseline for future biodiversity analysis. Cavity-nesting songbird and Pileated woodpecker surveys will be done every three years to monitor the health of these populations as an indicator of habitat management effectiveness.

Elk Management

The Clatsop Plains elk herds have been a source of damage complaints from private landowners. This has led to management actions by ODFW, including trapping and removal of elk, to lower the population. Ft. Stevens State Park has recently initiated an elk management effort in cooperation with ODFW. Since elk frequently reside on Camp Rilea, an elk management plan is needed.

Like Ft. Stevens, the OMD and Camp Rilea consider the elk to be an asset. They are part of the camp's ecosystems and contribute to the native biodiversity. Therefore, the goal of elk management at Camp Rilea is to maintain their presence. The more specific objective is to keep the elk population at a level where it doesn't degrade camp vegetation (through overgrazing) and lead to excessive damage complaints from adjacent private landowners.

To meet this objective, the OMD and Camp Rilea will cooperate with and participate in the efforts being undertaken by ODFW and Ft. Stevens. Forage availability for elk will be improved on the camp, mainly as a result of the planned projects to restore native vegetation in the upland meadows and convert Scot's broom/beachgrass and Non-native conifer forest to upland meadows and spruce/hemlock forest respectively. It is believed that every acre that is converted creates an acre of elk habitat (Nuzum, personal communication). Elk forage needs will also be considered during the selection of species when reseeding and replanting areas, such

as the existing forest openings where restoration is planned. These efforts are expected to encourage elk to spend more time within the camp.

The OMD and Camp Rilea will also continue to allow ODFW to trap and remove elk from the camp as long as the need to do this is justified, and the long-term viability of the Clatsop Plains population is not jeopardized by this action.

Finally, the OMD will assist with the monitoring effort outlined in the Ft. Stevens State Park Elk Management Plan. This will include providing personnel or funds to assist with marking animals, and monitoring elk usage of areas within the camp. The monitoring will consist of pellet counts, creating fenced exclosures in some of the meadows, and vegetation plots within and outside of the exclosures to get quantitative data to assess forage production and usage.

Threatened and Endangered Species Management

The Oregon silverspot butterfly is the only threatened or endangered species that actually resides within the camp boundaries. A formal habitat management plan has been completed and approved by the USFWS. The plan describes in detail how the OMD will preserve and maintain 68 acres of meadow habitat for this species (Hammond, 1999). The objectives of the plan are to maintain an adequate number of key plants, observe silverspot butterflies, and have a low vegetation height in the fall. Mowing is the chief management tool that is being employed to keep the vegetation low and give a competitive edge to the native plants required by the silverspot. Plant monitoring and silverspot monitoring is conducted annually to assess habitat condition and check for the presence of the butterfly. Despite the management efforts, which plant monitoring shows to be improving habitat conditions, silverspots have not been observed at Camp Rilea since 1995. It is thought that the lack of other habitat areas may have caused the Clatsop Plains population to drop below a recoverable level (Hammond, 1999). Nevertheless, the Camp Rilea silverspot habitat will be maintained in the hope that the species will return, or to serve as a reintroduction site if the silverspot recovery group approves that action. The approved habitat management plan should be consulted for more detailed information. A biological assessment was written for implementation of the habitat management plan and a no-jeopardy biological opinion was received. Since this habitat management plan is being incorporated into this plan, a new biological assessment is not required.

The bald eagle and peregrine falcon are occasional visitors to the camp and do not nest there. There are no specific management efforts geared to either species, other than preserving the warmwater fishery and the various bird species, which provide food for these species. In addition, any future documented bald eagle perching or roosting trees will be preserved unless they pose a risk to property or human safety. A biological assessment is not necessary for these species as it is believed that this plan will not affect either one.

At this point it has not been determined if Western snowy plover recovery efforts should be undertaken. They may not be appropriate given the heavy beach use, which is not under the OMD's control or jurisdiction. Recovery efforts and potential projects will be explored with the

USFWS and local government agencies. If it is agreed that these should be pursued, plans and projects will be developed and added to this plan.

Soil Erosion Management

To maintain the productivity of the land and to keep excess sediment from entering streams and other surface waters, it is necessary to control soil erosion or potential soil erosion. This is especially true for areas with high potential soil loss estimates or erodibility indexes (see Figure 7). Bare ground areas should be promptly covered with soil amendments and vegetation. Areas of high-frequency, ground disturbing training should be considered for hardening with gravel or other materials. This is an especially good idea for wet or streamside areas. Best management practices developed for western Oregon will be employed at Camp Rilea. These include using native grasses and other plants, and the use of geotextile fabrics and straw mulches, among other things. The Clatsop County Soil and Water Conservation District and U.S. Natural Resources Conservation Service would be contacted to ensure that erosion control projects are properly designed and implemented.

Integrated Pest Management

Integrated pest management (IPM) activities will affect the natural resources of the camp. Much of this effort involves controlling unwanted vegetation and animal pests in the cantonment area. However, IPM activities will occur in the training areas, such as removal of non-native vegetation (Scot's broom, English ivy, etc.) and mosquito control. A statewide Integrated Pest Management Plan that included Camp Rilea was completed in 1998. This plan encourages non-chemical control over chemical, but allows for controlled use of pesticides, herbicides, and insecticides. Use of chemicals is curtailed or banned around certain natural resources, such as wetlands and OSB habitat. Therefore, very little use of chemicals usually occurs in the training areas. Except for uncontrolled infestations of invasive plants, it is likely that non-chemical methods can effectively control pest plants and animals in the training areas. Selective use of herbicides on hardened areas, fencelines, and on Scot's broom or other nuisance or noxious plants is foreseen, but only if biological, mechanical, and manual methods do not work well enough or have been shown by others to be ineffective without herbicides.

Cultural Resources Management

In December, 1994 an inventory of buildings and structures at Camp Rilea was completed which identified a number of historic structures and recommended the creation of two historic districts. The State Historic Preservation Officer (SHPO) reviewed the inventory, inspected the structures, and determined that 34 buildings and several miscellaneous structures were eligible for the National Register of Historic Places. These eligible buildings and structures are all located in the cantonment area. The SHPO did not agree with the proposal for historic districts or the significance of many of the structures. Since then a number of these buildings have been demolished in consultation with the SHPO. In addition, three historic structures were identified in the northwest corner of the camp that were overlooked by the 1994 inventory.

As for archeological resources, a new survey was completed in 2000. Although the entire camp was surveyed, the focus was on areas most likely to contain archeological sites (such as the shores of surface waters). Methods included pedestrian transects spaced at 20 meters and sub-surface shovel test pits. No resources were discovered.

Cultural resources management is not covered by this plan. Their management is addressed in a statewide Integrated Cultural Resources Management Plan (ICRMP), completed in December, 2000. This plan should be examined for more detailed information. Several projects designed to mitigate past and future adverse effects on cultural resources are being planned and are discussed in the ICRMP. Most of these projects will occur in the cantonment area and are not likely to affect natural resources. Recently the entire Camp Rilea landscape has been recommended as a potential historic resource. If determined to be a historic resource eligible for the National Register of Historic Places, the general character of the landscape should be maintained. This plan, while altering the vegetation of the camp to a more natural state, will maintain the general character since the area in each plant community and mix of open versus wooded space will not change that much.

Noise Management

Noise management is also not part of this plan. The OMD/ORARNG will attempt to work with the local community to develop a noise management program for Camp Rilea. The program should be in compliance with AR 200-1 and include a complaint resolution process, mitigation measures, and documentation of sound levels, among other things.

Hazardous Materials/Waste Management

Hazardous materials and wastes must be dealt with according to state and federal regulations (see Appendix 1). In addition, the OMD has completed a statewide Hazardous Waste Management Plan (ORARNGR 420-47) and a Pollution Prevention Plan. A statewide Installation Spill Contingency Plan also exists (ORARNGR 210-6). Furthermore, Camp Rilea has standard operating procedures based on the above plans that detail the exact behavior and process that is expected when dealing with these issues. Taken together, these documents help ensure that strict procedures are followed in order to ensure pollution prevention and minimize environmental impacts. In general, storage of hazardous materials and wastes is limited to facilities designed for that purpose, and use/handling is primarily by persons trained and licensed to deal with these materials and wastes (this is often required). Except for chemicals used to control problem-causing non-native species, all hazardous materials and wastes used or created in the training areas are promptly removed to approved facilities in the developed area of the camp. Wastes are then disposed of in accordance with state and federal regulations.

Public Use and Outdoor Recreation

In general, public use of Camp Rilea is not encouraged. No hunting is allowed. Fishing is allowed in the two lakes with a state license, but very little fishing actually occurs. There is considerable public use of the beach, but again this is not part of the camp. Some beach users cross over the foredune into the camp, but usually do not stay and recreate. There is a

recreational vehicle park in the cantonment area, but it is only open to military and ex-military personnel. Fort Clatsop National Memorial has proposed creating a trail from the memorial south to the Lewis and Clark Salt Works in Seaside, which may be routed through the southeastern portion of the camp. This project has been endorsed by the OMD and is described in the draft cultural resources management plan and ICRMP. If the project is completed, increased public use (i.e., hiking) is expected. The trail is not likely to affect important natural resources; wetlands and rare plant locations would be avoided. In addition, wetland boardwalks may be built at selected locations, both near the proposed trail and at other locations, to facilitate wildlife viewing by the users of Camp Rilea and the public.

Public Safety

Public safety and enforcement of laws and regulations is the responsibility of camp staff, primarily the Range Control Office. Additional law enforcement and control of access is provided by a private security company. Range Control and camp staff also provide emergency services, including fire response. Unplanned fires will be extinguished immediately. Other law enforcement agencies and local emergency services, such as fire departments, are requested as necessary to supplement Camp Rilea resources.

CHAPTER 6. PLAN IMPLEMENTATION

Public Involvement and NEPA

Numerous state, local, and federal agencies; relevant Native American tribes; and the local community were consulted during development of this plan (see References and Agencies/Persons Contacted sections). This included meetings at the camp to discuss management concepts and projects ideas. The USFWS, ODFW, ODA, CSWCD all participated. The management approach and specific projects were then communicated to the local community and various agencies and organizations through letters and newspaper advertisements during the environmental assessment (EA) process required to implement the plan.

The EA addressed all projects listed in the management chapter. When further project details are developed or amendments made to the plan, NEPA documentation will be updated as necessary. Again, the EA for this plan does not cover future training developments discussed in Chapter 3. Separate NEPA documentation is required for these, if not already completed.

Relationship to Other Plans and Standard Operating Procedures

A Real Property Development Plan, Range/Training Land Assessment, Integrated Cultural Resources Management Plan, Integrated Pest Management Plan, Hazardous Waste Management Plan, Pollution Prevention Plan, and Installation Spill Contingency Plan have all been prepared for Camp Rilea or prepared for the ORARNG and apply to Camp Rilea. All of these documents were examined for consistency with this plan at the time it was written and are incorporated by reference. Any subsequent changes to these documents should be coordinated with this plan to maintain consistency. In addition, Camp Rilea has completed standard

operating procedures (SOPs) for users of the camp. The SOPs will be revised to be consistent with this plan. If a master plan is written for the cantonment area, it will incorporate and be made consistent with this plan. Finally, this plan has also been closely coordinated with the ITAM program and is consistent with the five-year ITAM workplan, which describes the projects that will be undertaken with ITAM funds. Several of the projects in this plan are being funded through the ITAM program as shown in the following section.

Budget Requirements, Staffing, and Training

Table 6 lists the projects that will be implemented with this plan. How the project would be accomplished, the project schedule (by fiscal years-FY), and the source of funding are also shown. Estimated project costs are not subject to public disclosure, but are available from AGI-ENV to authorized persons. Projects will be established in the NGB Environmental Program Requirements Report or ITAM Workplan and undertaken as funding becomes available.

Table 6. INRMP Project List

PROJECT	HOW ACCOMPLISHED	SCHEDULE	FUNDING SOURCE
Wetlands/riparian buffer; signs or stakes for these areas and the dunes	AGI-ENV Natural Resources Specialist (NRS) and camp staff	FY01	ITAM
Water sampling	NRS and contract lab	FY01-05	AGI-ENV
Control of reed canary grass and purple loosestrife	NRS, camp staff, and contractor	FY01-05	AGI-ENV
Butterfly/moth survey	NRS and OSU	FY01-02	AGI-ENV
Photo points and orthophoto monitoring	NRS and/or ONHP	FY01-05	AGI-ENV
Elk monitoring	NRS, ONHP, and/or ODFW	FY01-05	AGI-ENV
Rare plant monitoring	NRS, ONHP, and/or OSU, <i>USFWS</i>	FY01 and 04	AGI-ENV
Tree removal flagging	NRS and camp staff	FY01-05	ITAM
Non-native tree and shrub removal (understory and canopy thinning/clear cutting)	Contractor	FY01-05	ITAM
Native plant seed collection and propagation	NRS, camp staff, and contractor <i>USFWS</i>	FY01-05	ITAM
Tree and shrub planting	Contractor	FY01-05	ITAM
Bank protection, non-native plant control, and planting	Contractor	FY02 and 05	ITAM
Red-legged frog, pileated woodpecker, and cavity nesting songbird surveys	ONHP	FY02 and 05	AGI-ENV
Road closures/revegetation in coastal meadows	Contractor	FY02	ITAM

*Bighead Salt off
for marshall
Aborn*

*What spp?
where?*

PROJECT	HOW ACCOMPLISHED	SCHEDULE	FUNDING SOURCE
Installation of nest boxes	NRS and camp staff	FY02 and 05	AGI-ENV
Non-native fauna control	NRS, ONHP, and/or USFWS	FY02-05	AGI-ENV
Undesired plant survey and remove monitoring	NRS, ONHP, and/or OSU USFWS	FY02 and 05	AGI-ENV
LCTA plot monitoring	ONHP	FY02-05	ITAM
Restoration monitoring	ONHP	FY02-05	AGI-ENV
Prescribed burning and herbicide treatments	NRS, ONHP, and/or USFWS	FY02-05	AGI-ENV
Hydrology investigation and culvert study	OSU or Contractor	FY02	ITAM
Orthophotography and/or videography	Contractor	FY02	ITAM

Plan Revision and Amendment Process

This plan will be officially revised in 2006. Plan revision will include consultation and coordination with the appropriate state and federal agencies, Native American tribes, and local community. A NEPA document will also be completed for the revised plan. Prior to the scheduled revision, it may be necessary to amend the plan to reflect management changes. Changes are likely since the philosophy of adaptive management is embraced and information is constantly being improved. Proposed amendments will be drafted into a letter and mailed to the appropriate state and federal agencies, Native American tribes, and local community for review and comments. If no comments are received, or if there is no significant issue raised, the amendment will be adopted into the plan.

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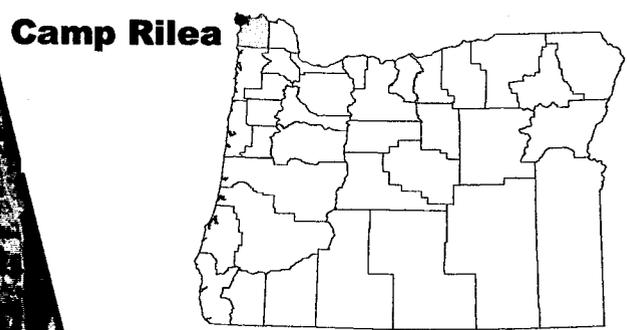
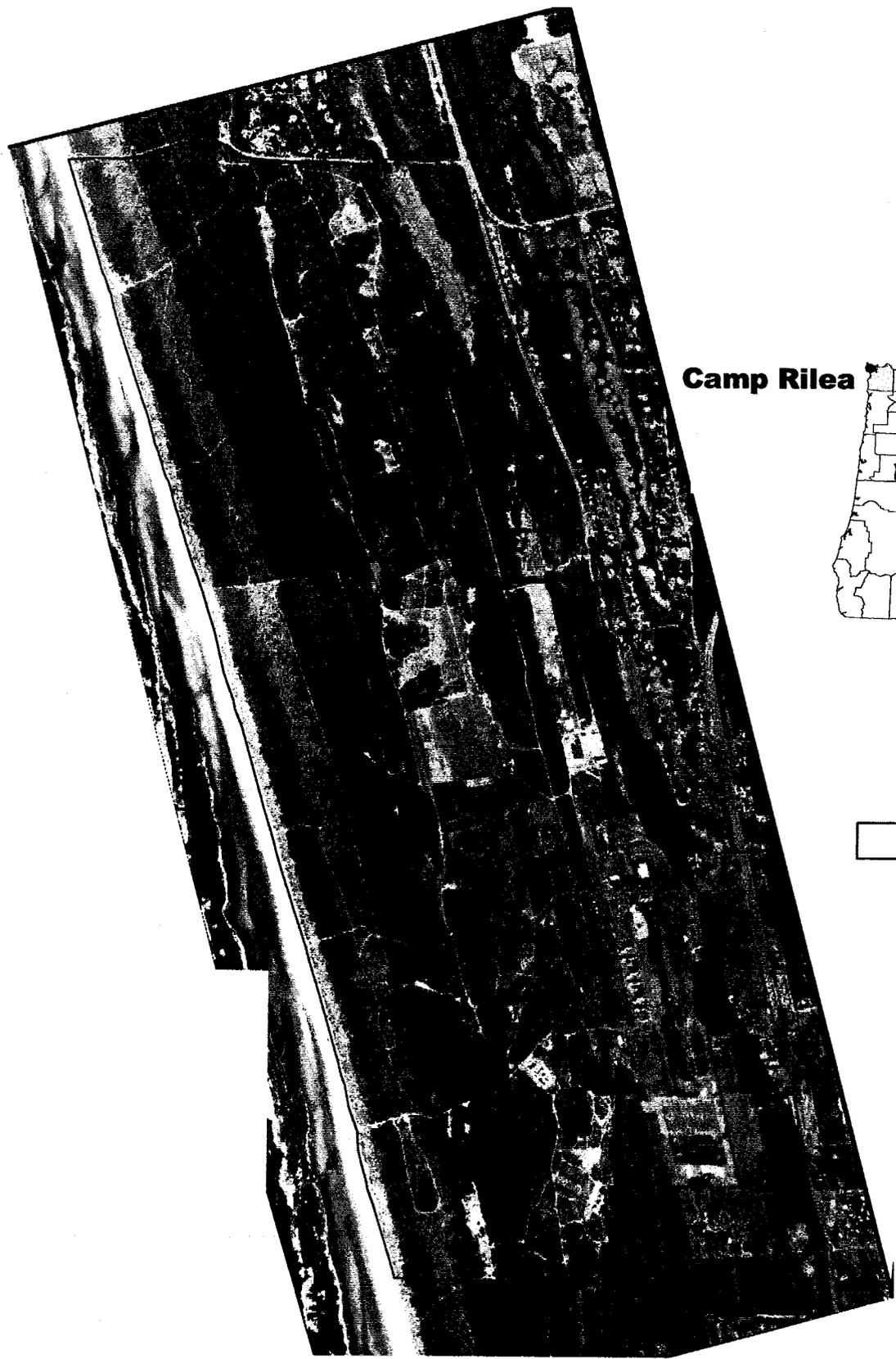
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Jim Scheller, Skipanon Watershed Council and Water Control District
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Jimmy Kagan, ONHP
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APPENDICES

1. Environmental Regulations
2. Clatsop County Land Use Regulations
3. Soil Erosion Hazard Data
4. Plant Species List
5. Wildlife Species List
6. ONHP List
7. Modified Plant Community and Species Photographs
8. USFWS and ODFW letters



 **Rilea Boundary**

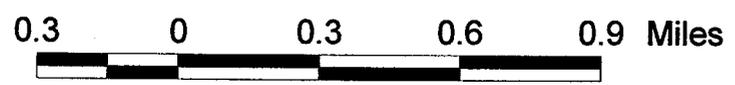


Figure 1. Camp Rilea

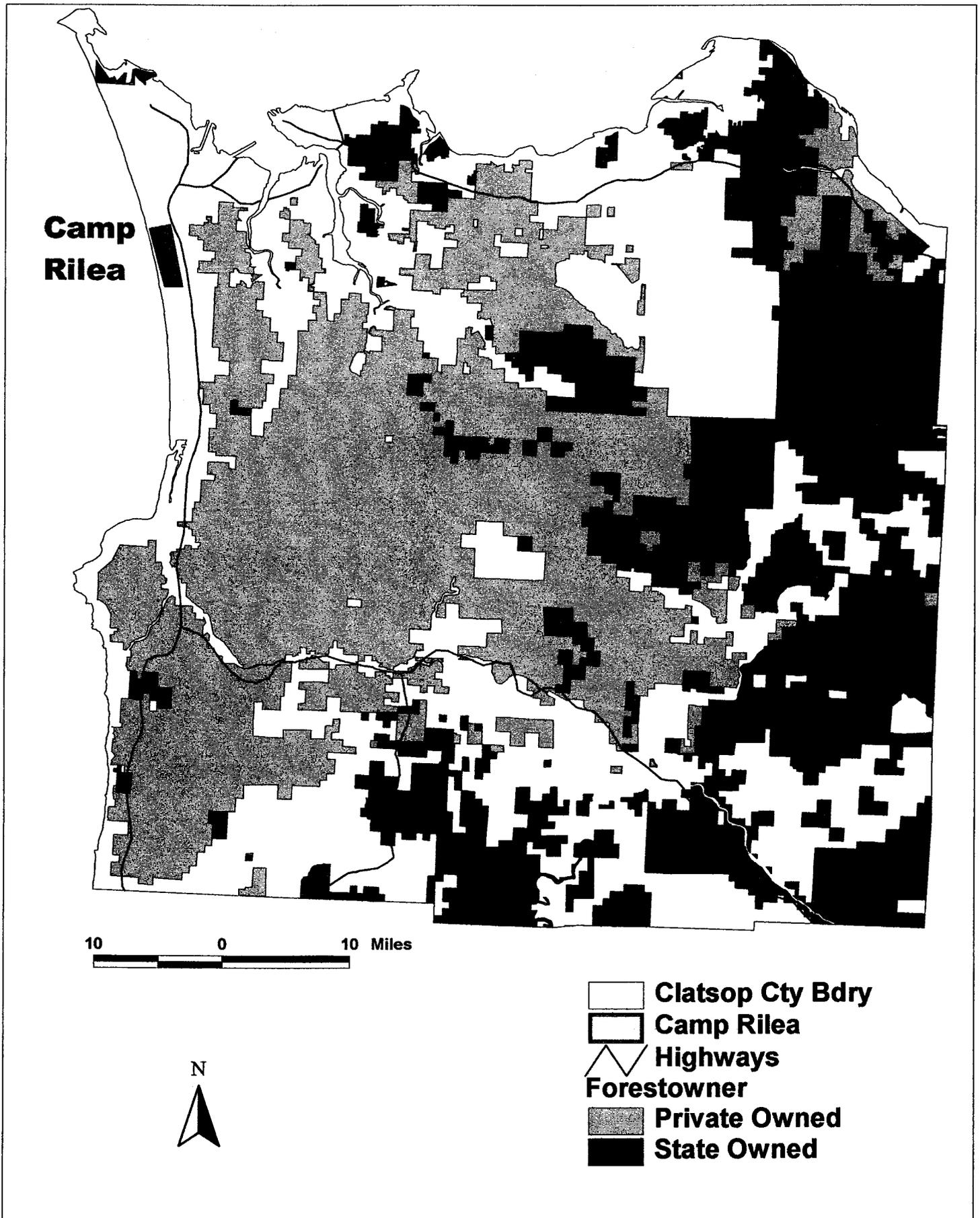


Figure 2. Adjacent training lands

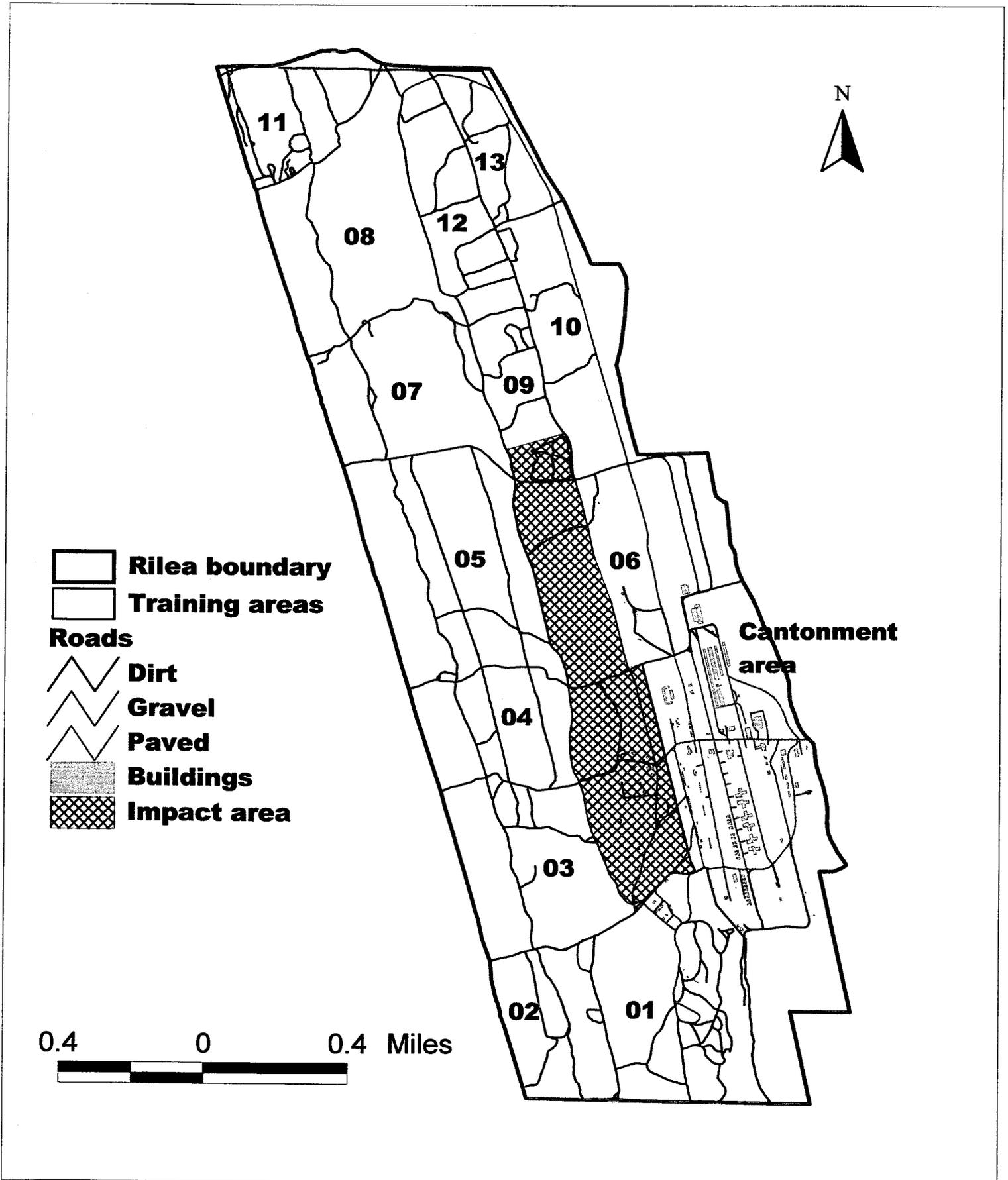


Figure 3. Training areas and roads

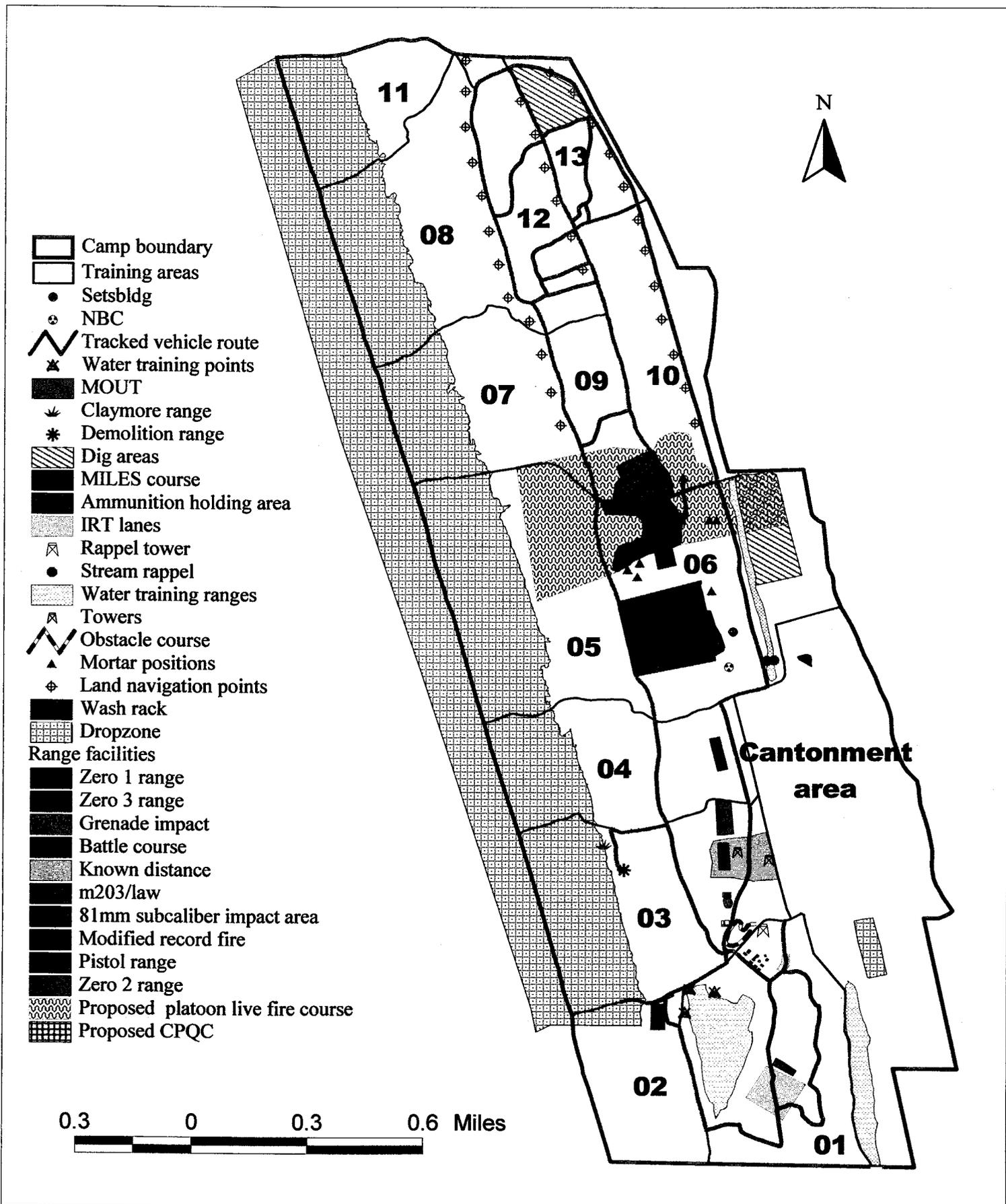


Figure 4. Existing training area facilities and proposed facilities

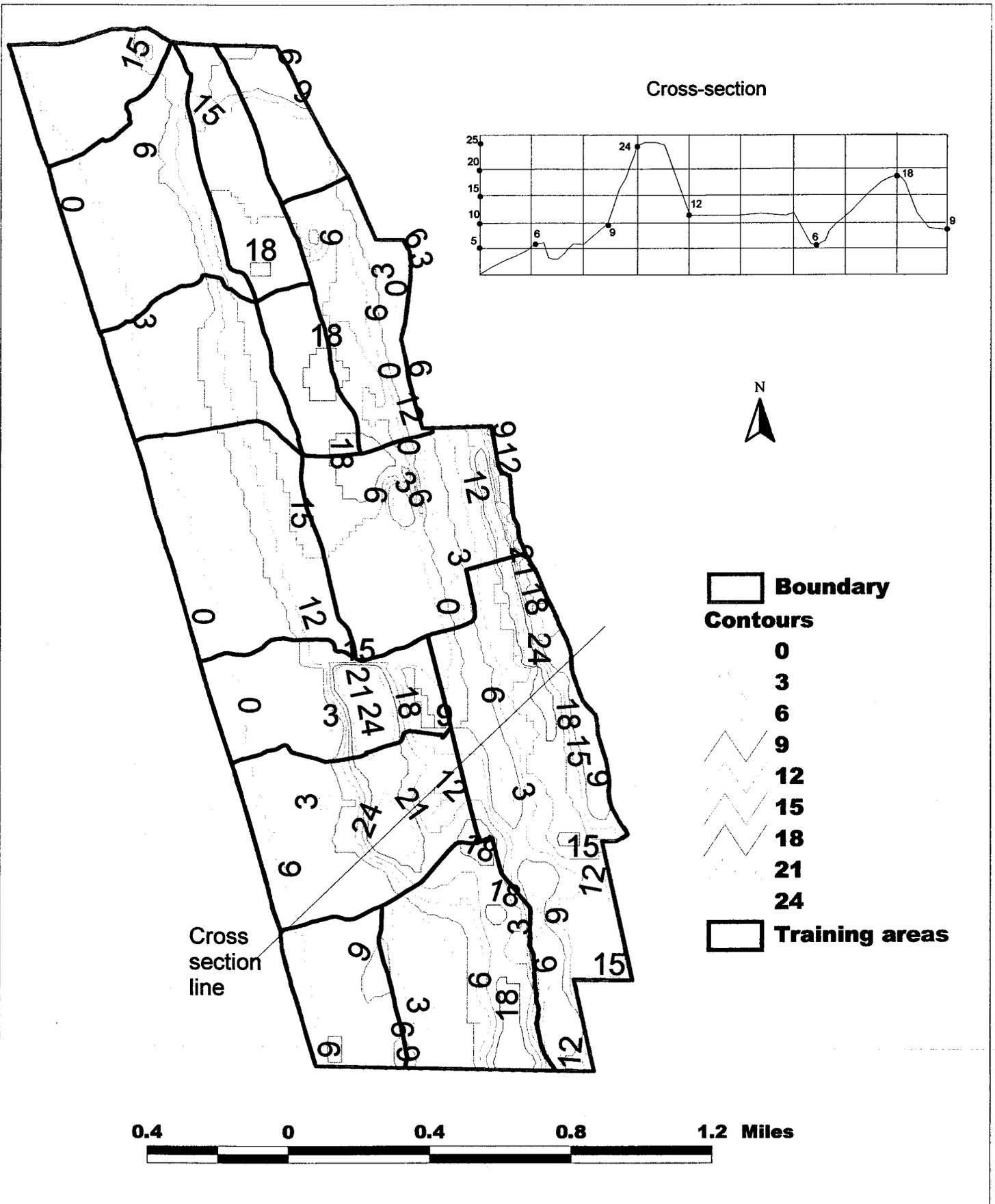


Figure 5. Topography (m ASL)

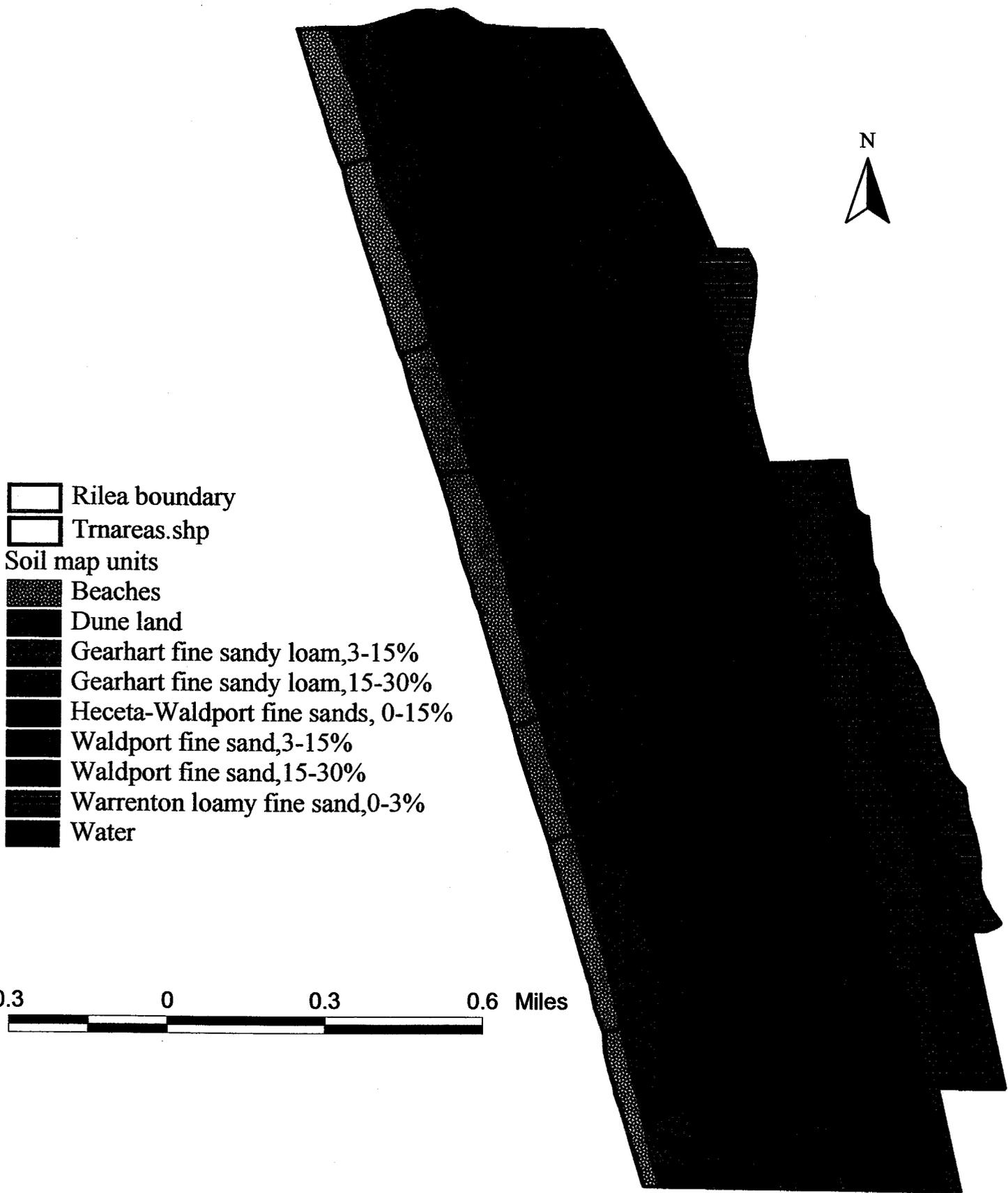


Figure 6. Soils

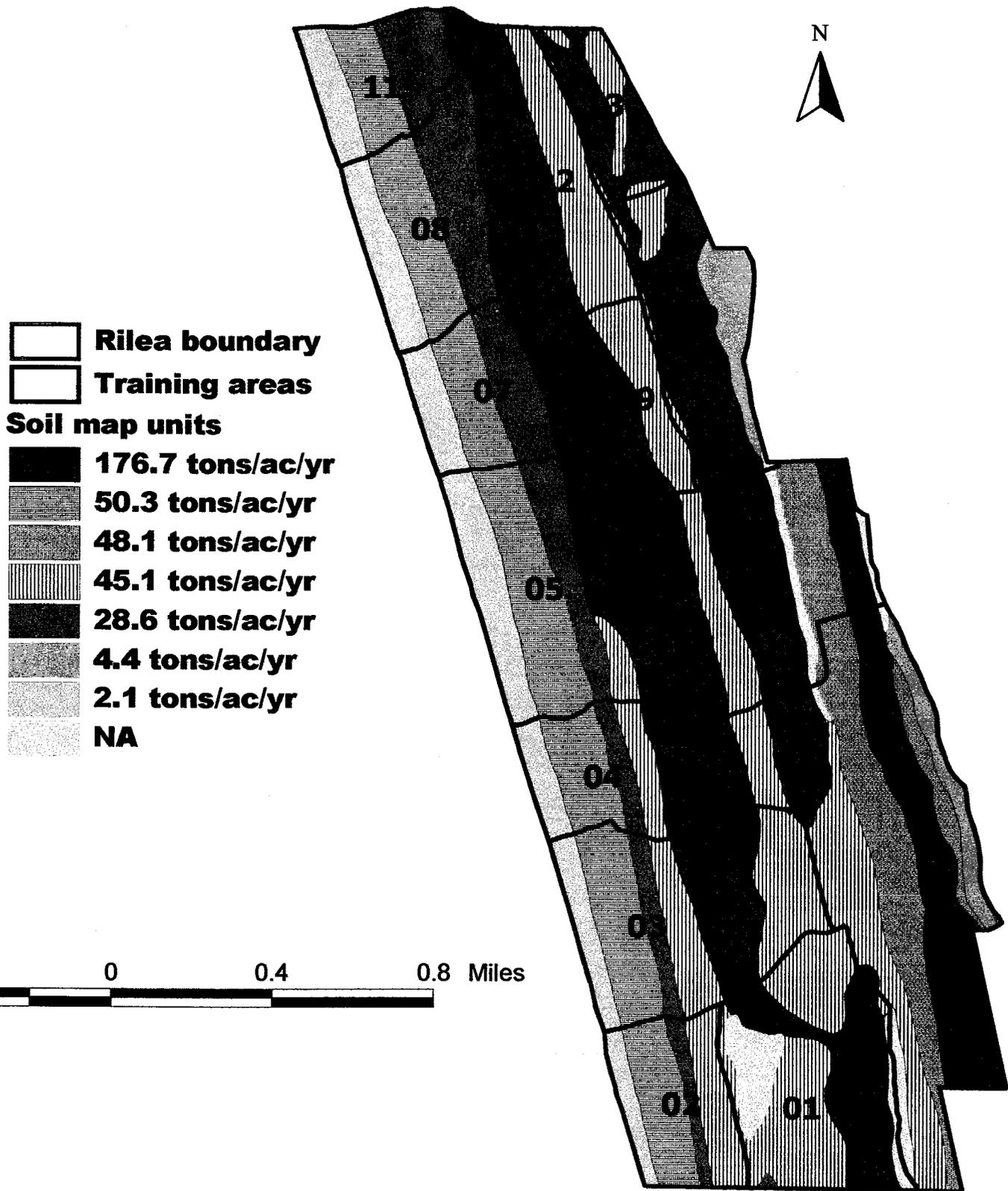


Figure 7. Potential soil loss (sheet erosion)

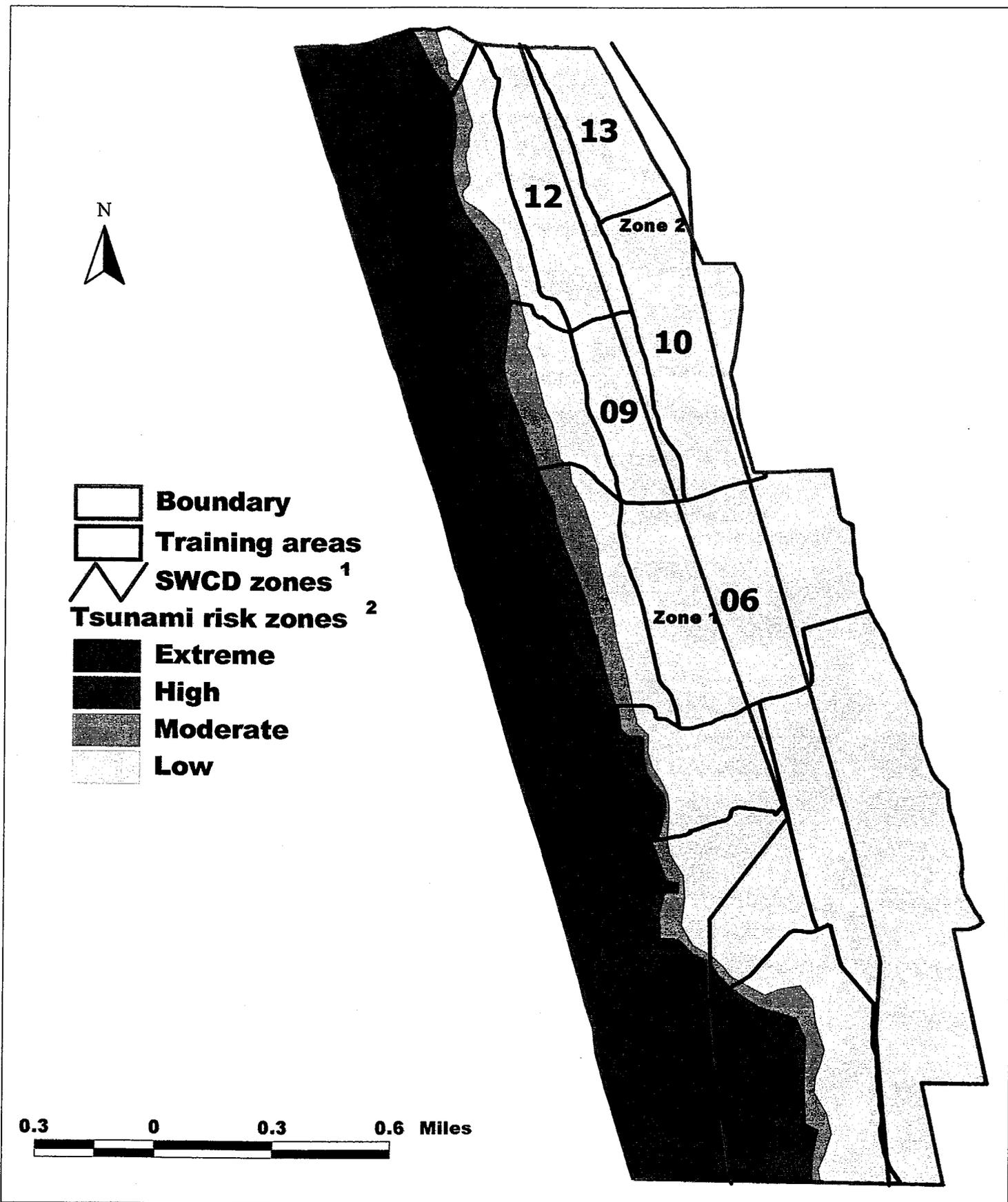


Figure 8. Tsunami risk zones and SWCD regulatory zones

1. Interpolated from SWCD map.
 2. Southern third interpolated from topography.

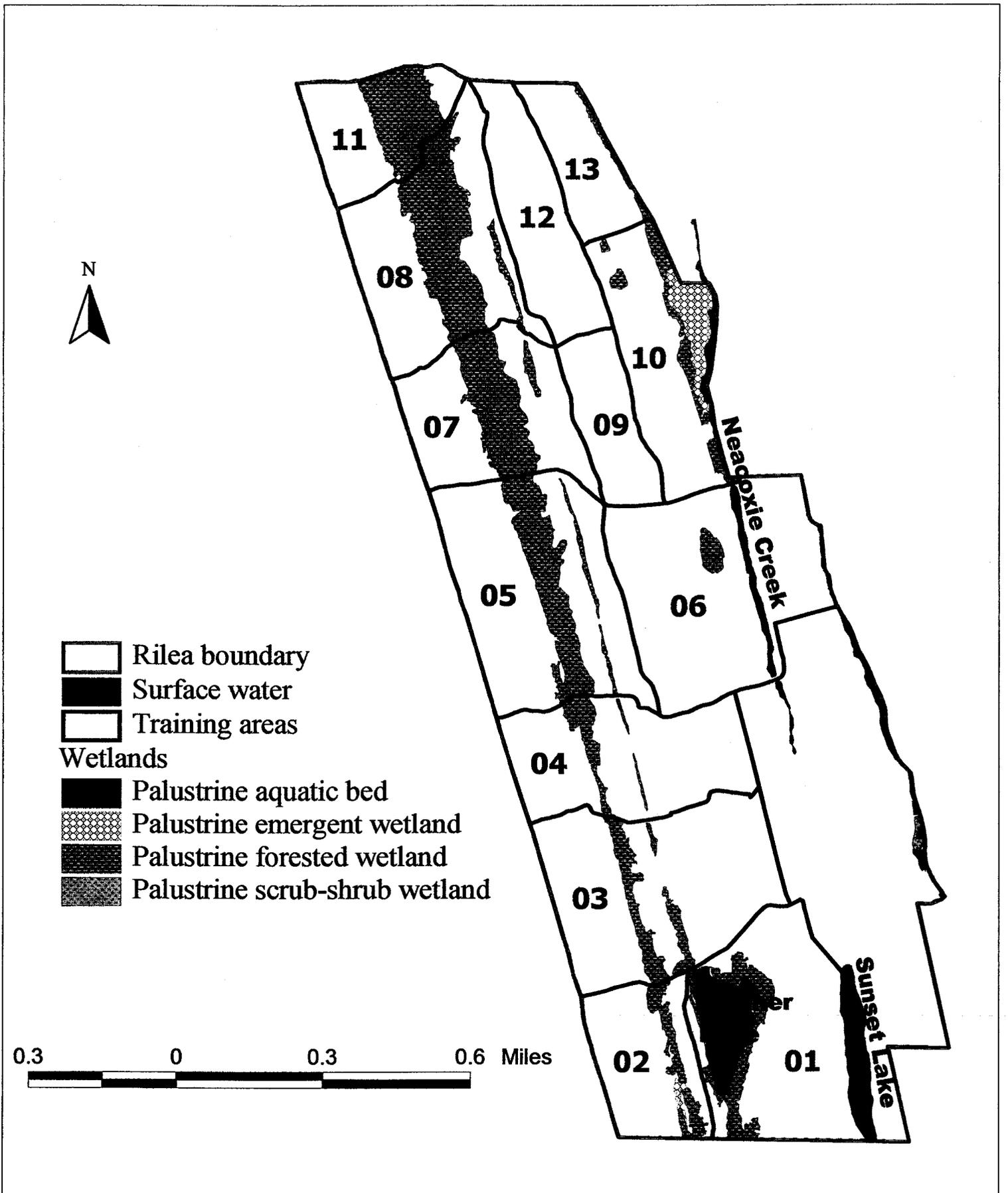
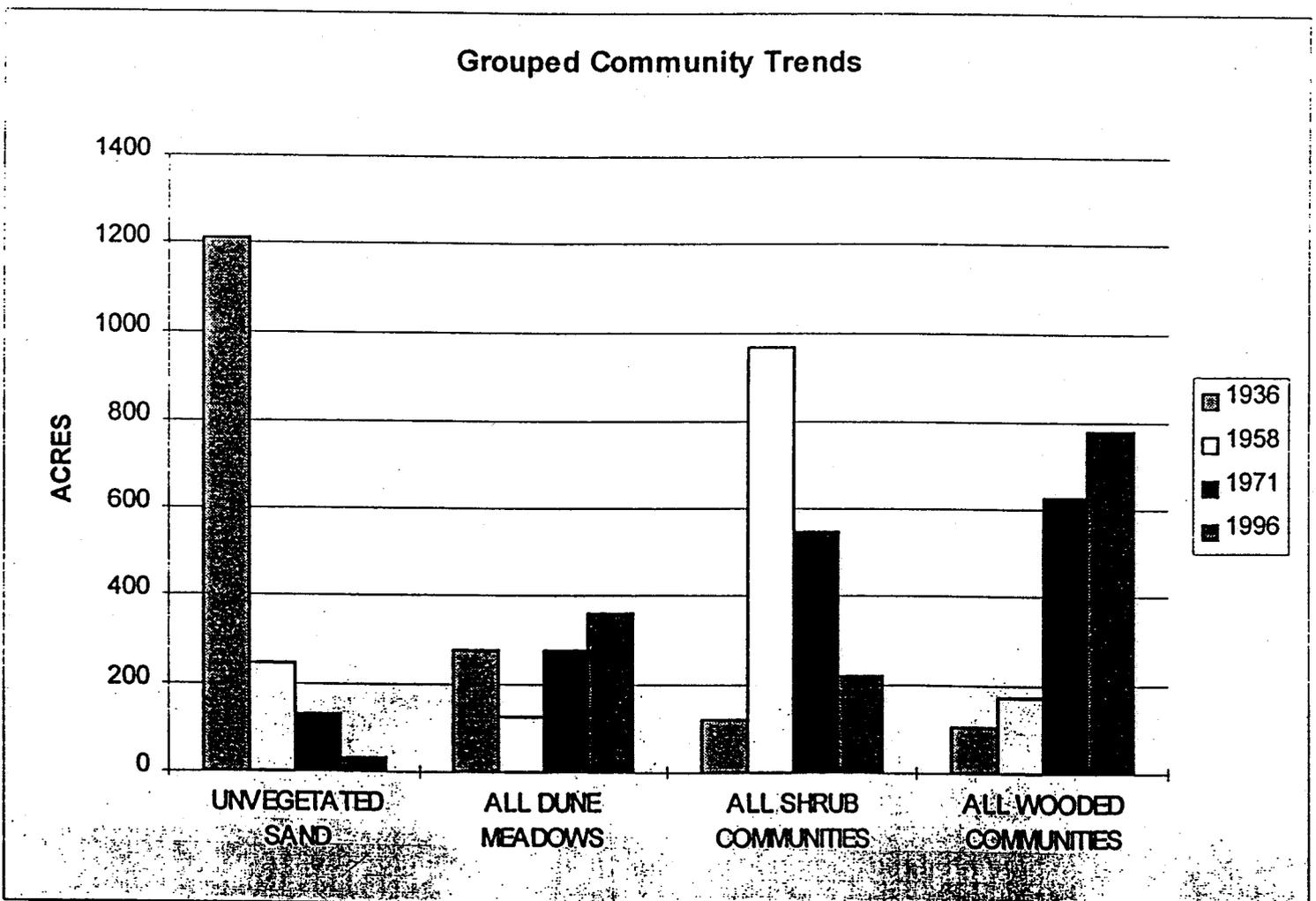


Figure 9. Wetlands and surface waters

Figure 10. Grouped Community Trends Graph.

This graph contains groupings of individual categories. Unvegetated sand is the only one that has not been grouped. The "All Dune Meadows" category includes: Accretion Dune Meadow, Foredune Meadow and Complex Interdune Meadow. "All Shrub Communities" includes Shrub Wetland and shrub. "All Wooded Communities" includes Wooded and Wooded Wetland.



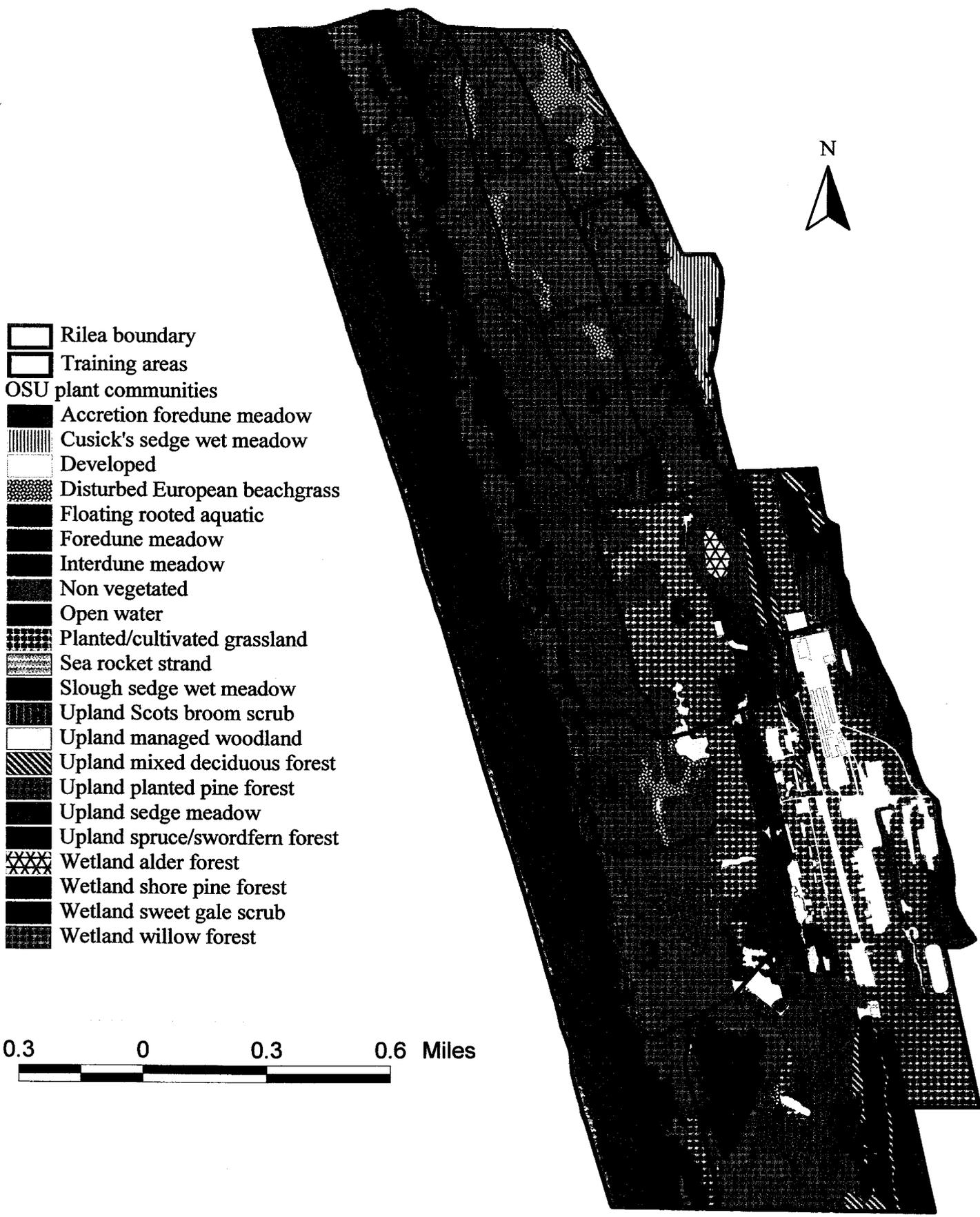


Figure 11. USNVCS plant communities

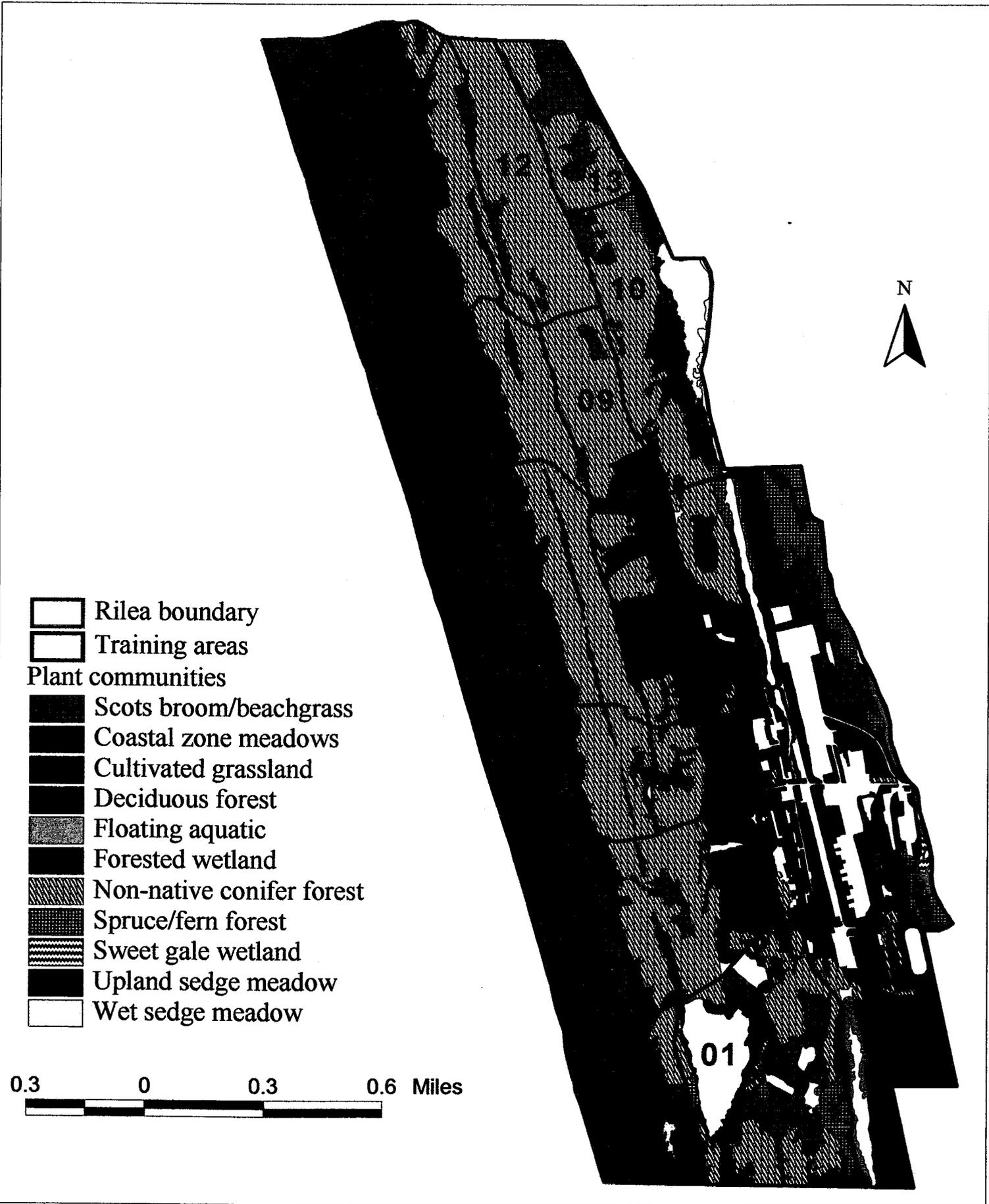


Figure 12. Modified plant communities/management units

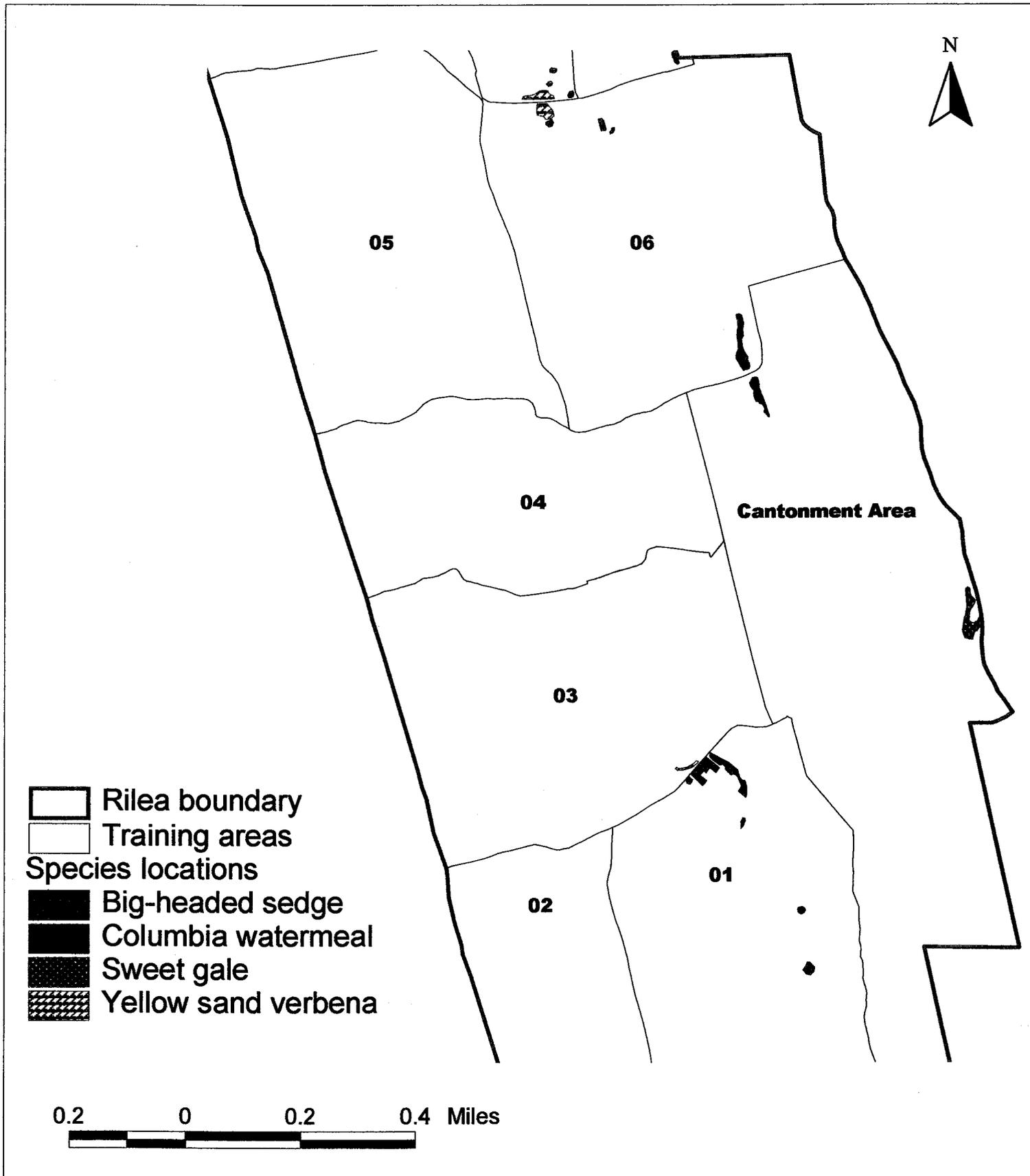


Figure 13. Locations of plant species concern

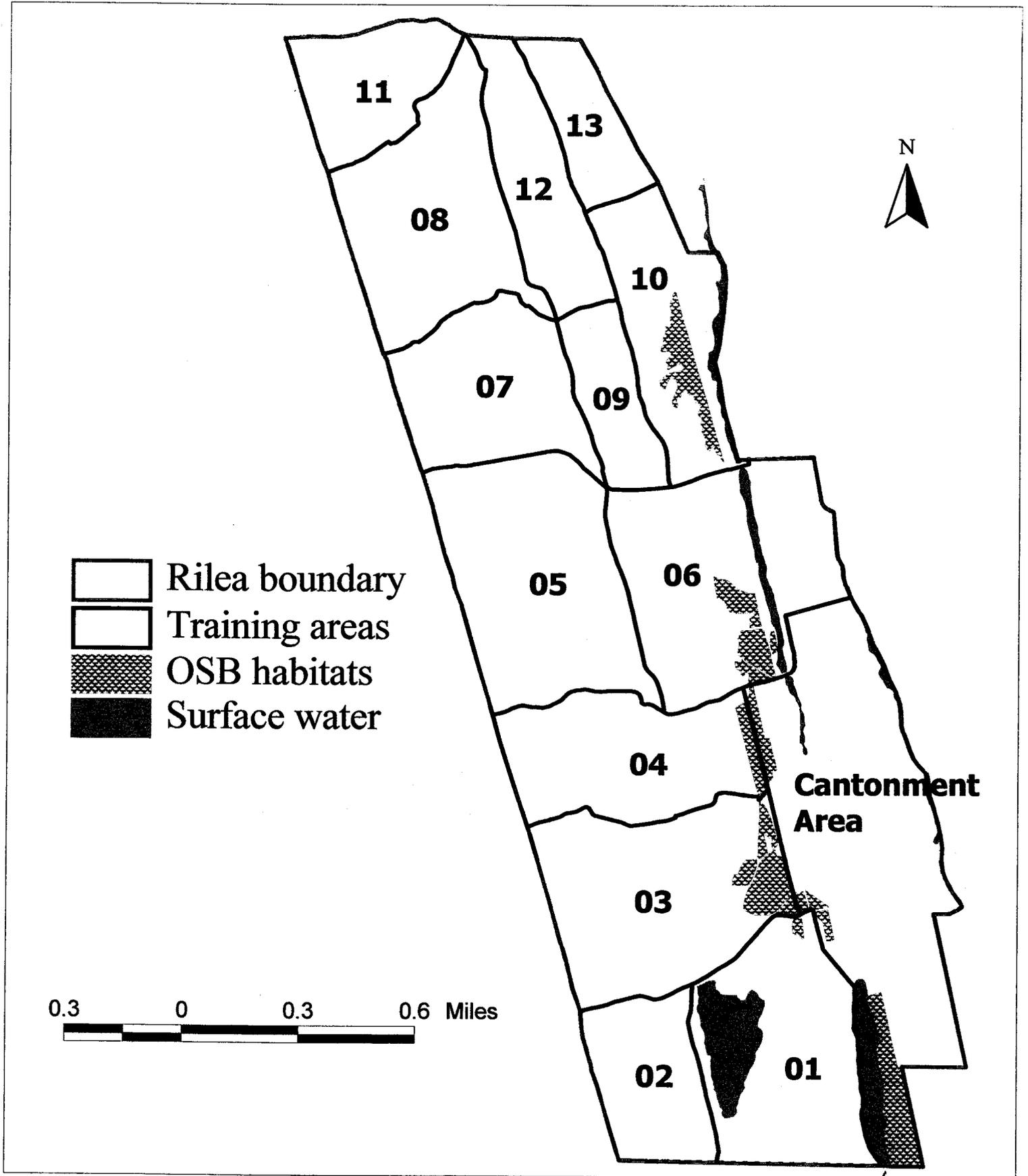


Figure 14. OSB habitat areas

APPENDIX 1. Required and Relevant Environmental Regulations

Federal Laws, Regulations, and Executive Orders

- Animal Damage Control Act.....7 U.S.C. 426 et seq.
- Animal Damage Control on Federal Lands..... Executive Order 11870
- Archaeological and Historical Preservation Act of 197416 U.S.C. 469 et seq.
- Archaeological Resources Protection Act of 1979(16 U.S.C. 470 et seq.) 32 CFR 22 and 229
- Bald and Golden Eagle Protection Act.....16 U.S.C. 668 et seq.
- Clean Air Act, as amended.....42 U.S.C. 7401 et seq.
- Endangered and Threatened Wildlife and Plants 50 CFR 17
- Endangered Species Act of 1973, as amended16 U.S.C. 1531 et seq.
- Entering Military, Naval, or Coast Guard Property 18 U.S.C. 1382
- “Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds”, William Clinton, Presidential Memorandum, April 26, 1994
- Exotic Organisms Executive Order 11987
- Floodplain Management..... Executive Order 11988
- Farmland Protection Act(7 U.S.C. 4201 et seq.); (10 U.S.C. 2667 et seq.) 7 CFR 658
- Federal Compliance with Pollution Control Standards.....42 USC 4321
- Federal Insecticide, Fungicide, and Rodenticide Act, as amended7 U.S.C. 136 et seq.
- Federal Land Policy and Management Act43 U.S.C. 1701 et seq.
- Federal Noxious Weed Act7 U.S.C. 2801 et seq.
- Federal Water Pollution Control Act (Clean Water Act).....33 U.S.C. 1251 et seq.
- Fish and Wildlife Conservation Act.....16 U.S.C. 2901 et seq.
- Fish and Wildlife Coordination Act16 U.S.C. 661 et seq.
- Hunting and Fishing on Federal Lands10 U.S.C. 2671 et seq.
- Land and Water Conservation Act of 196516 U.S.C. 4601 et seq.
- Legacy Resource Protection Program ActP.L. 101-511
- Migratory Bird Conservation Act.....16 U.S.C. 715 et seq.
- Migratory Bird Treaty Act..... 16 U.S.C. 703-711
- Mineral Exploration and Leasing43 U.S.C. 155 et seq.
- National Environmental Policy Act of 1969, as amended42 U.S.C. 4321 et seq.
- National Historic Preservation Act of 196616 U.S.C. 470 et seq.
- National Register of Historic Places, current edition 36 CFR 60 Parts 78,79,800, and 1228
- National Trails System Act16 U.S.C. 1241 et seq.
- Off Road Vehicles Use on Public Lands..... Executive Order 11989
- Oil Pollution Liability and Compensation.....33 U.S.C. 2701 et seq.
- Outleasing for Grazing and Agriculture on Military Lands 10 U.S.C. 2667
- Protection and Enhancement of the Cultural Environment..... Executive Order 11593
- Protection and Enhancement of Environmental Quality Executive Order 11514
- Protection of Wetlands Executive Order 11990
- Sales of Forest Products on Federal Lands.....10 U.S.C. 2665 et seq.
- Sikes Act “Conservation Programs on Military Reservations”..... 16 U.S.C. 670a et seq.
- Soil and Water Conservation Act.....16 U.S.C. 2001 et seq.
- Water Pollution Prevention and Control33 U.S.C. 1251 et seq.

Federal Guidelines

- Cooperative Agreement between the U.S. Department of Defense (DOD) and The Nature Conservancy (TNC) for assistance in natural resources inventory
- Memorandum Of Agreement (MOA) for Professional And Technical Assistance Conducting Biological Surveys, Research And Related Activities between The Department Of Defense and The National Biological Service of The Department Of The Interior
- Memorandum of Understanding (MOU) between the U.S. Environmental Protection Agency and the DOD with respect to Integrated Pest Management
- Memorandum of Agreement (MOA) for Federal Neotropical Migratory Bird Conservation Program and addendum ("Partners in Flight-Aves De Las Americas,") among DOD, through each of the Military Services, and over 110 other Federal and State agencies and nongovernmental organizations
- Memorandum of Understanding (MOU) for Watchable Wildlife Programs
- Memorandum of Understanding between the U.S. Army Environmental Center and the Soil Conservation Service for Watershed and Environmental Enhancement of U.S. Army Installations

Department of Defense Regulations and Guidance

- Environmental Conservation ProgramDOD Instruction 4715.3
- Environmental Effects of Army Actions.....AR 200-2
- Environmental Protection and EnhancementAR 200-1
- Fish and Wildlife Management TM 5-633
- Forest Management TM 5-631
- Granting Use of Real EstateAR 405-80
- Historic PreservationAR 420-40
- Land Management..... TM 5-630
- Natural Resources - Land, Forest, and Wildlife ManagementAR 200-3
- Natural Resources - Land, Forest, and Wildlife Management DA Pam 420-7
- Pest ManagementAR 420-76
- Training Land TC 25-1
- Use of Off-Road Vehicles on Army Lands.....AR 210-9

Applicable State Laws and Regulations

- Pacific Ocean Resources Compact.....ORS § 196.175 *et. seq.*
- Ocean Resources Management.....ORS § 196.405 *et. seq.*
- Removal/Fill LawORS § 196.600 *et. seq.*
- Comprehensive Land Use Planning.....ORS Chapter 197
- Solid Waste Management.....ORS Chapter 459

- Hazardous Waste and Hazardous Materials IORS Chapter 465
- Reduction of Use of Toxic Substances
and Hazardous Waste GenerationORS § 465.03 *et. seq.*
- Removal Or Remedial ActionORS § 465.200
- Hazardous Waste and Hazardous Materials II.....ORS Chapter 466
- Storage, Treatment, and Disposal of Hazardous Waste and PCBORS § 466.005 *et. seq.*
- Spill Response and Cleanup of Hazardous Materials.....ORS § 466.605 *et. seq.*
- Oil Storage Tanks..... ORS § 466.706 *et. seq.*
- Air Pollution Control.....ORS § 468A.005 *et. seq.*
- Water Pollution Control.....ORS § 468B.005 *et. seq.*
- Oregon Wildlife Laws.....ORS Title 41 (Chapters 496 to 501)
- Oregon Forest Practices Act.....ORS § 527.610 *et. seq.*
- Watershed Management and Enhancement..... ORS § 541.351 *et. seq.*
- Wildflowers; Threatened or Endangered Plants..... ORS Chapter 564
- Preservation of Property of Historic Significance..... ORS § 358.635 *et. seq.*
- Archaeological Objects and Sites.....ORS § 358.905 *et. seq.*
- Archaeological Sites and Historical Material.....ORS § 390.235 *et. seq.*
- Indian Graves and Protected Objects..... ORS § 97.740 *et. seq.*

APPENDIX 2

Clatsop County Land Use Regulations for the Military Reserve;
Open Space, Parks, and Recreation; and Lakes and Wetlands Zones

Section 3.845. Military Reserve Zone (MR).

Section 3.847. Purpose. The MR zone is intended to accommodate the immediate foreseeable demand for military activities in areas where a commitment to such activities has already occurred through existing uses by the military. In areas where residential development has already occurred, the MR zone is intended to separate these uses from conflicting uses that may occur on the Military Reserve.

Section 3.849. Development and Use Permitted. The following development and their accessory developments are permitted under a Type I procedure subject to applicable development standards:

1. Military reserve and activities directly related such as:
 - a. Training of military personnel.
 - b. Movement of military personnel.
2. Dwelling units for military personnel stationed on the military reserve.
3. One caretaker's residence for every one hundred acres of land in the military reserve.
4. Storage facilities for military equipment and supplies.
5. Minor utilities.
6. Property line adjustment.
7. Low intensity recreation.

Section 3.851. Conditional Development and Use. The following developments and their accessory developments may be permitted only under a Type II procedure and Sections 5.000 to 5.030 and subject to applicable standards:

1. Public/semi-public development.
2. Utilities necessary for public service.
3. Extraction, processing, and stockpiling of rock, sand, mineral and other surface materials.
4. Airports, heliports.
5. Public or private recreation facilities such as riding stables, golf courses, boating docks or ramps etc. subject to the provisions of Section S4.200-S4.234.

Section 3.853. Additional Conditional Development and Use. The following developments and their accessory developments may be permitted only under a Type III procedure and shall be subject to conditions set by the Planning Director or Planning Commission:

1. Storage of hazardous wastes.
2. Nuclear power generation facilities.

Section 3.855. Development and Conditional Development and Use Standards.

1. Development shall be permitted as required to meet State sanitation requirements and local setback and Ordinance requirements. The following shall be the criteria for determining requirements of each development proposed:
 - a. The nature of the proposed use in relation to the impacts on nearby properties, and

- b. Consideration of State sanitation requirements, local setbacks and other standards of this Ordinance.
 - c. All residential development shall be subject to the standards of Section 3.180 (RA-1) of this Ordinance.
2. Maximum building height: 35 feet.
With the exception of antennas, control towers, and field training facilities for military personnel.
 3. All new development shall indicate on the building permit how storm water is to be drained from the property. The Building Official shall require the installation of culverts, dry wells or retention facilities in cases where development has major storm drainage impacts.
 4. The setback requirements for all structures shall be seventy-five (75) feet from the line of non-aquatic vegetation.
 5. Chapters 1, 2, 5 and 6 and Section 3.180 of Chapter 3 of this Ordinance along with Chapters 2 Section S2.010-S2.300 and Chapter 3 Section S3.010-S3.152, S3.158-S3.214, S3.550-S3.708 of the Standards Document of this Ordinance.
 6. An accessory structure separated from the main building shall be located in accordance with yard setback requirements.

Section 3.857. Additional Development and Use Standards.

A buffer zone a minimum of 200 feet around the perimeter of any new Military Reserve zone and within the property boundaries of any military use area shall be established. This buffer shall be designated OPR and subject to the restrictions set forth in Chapter 4 in the Standards Document of this Ordinance and subject to Section 3.580 of this Ordinance.

Section 3.859. State and Federal Permit. If any state or federal permit is required for a development or use, an applicant, prior to issuance of a development permit or action, shall submit to the Planning Department a copy of the state or federal permit.

Section 3.580. Open Space, Parks, and Recreation Zone (OPR).

Section 3.582. Purpose. The OPR zone is intended to provide for the conservation of open space; the protection and development of areas uniquely suited for outdoor recreation and the protection of designated scenic, natural and cultural resource areas.

Section 3.584. Development and Use Permitted. The following developments and their accessory developments are permitted under a Type I procedure subject to applicable development standards.

1. Farm use.
2. Forest use.
3. Wildlife refuge or management area.
4. Public regional park or recreation area excluding campgrounds.
5. Historical or archaeological site/area.
6. Golf courses except in areas identified as Coastal Shorelands.
7. R.V. Park subject to Section S3.550-S3.552 except in the Clatsop Plains Planning Area.
8. Other watersheds.
9. Public or private neighborhood park or playground.
10. Golf driving range.
11. Municipally owned watersheds.
12. Accessory development customarily provided in conjunction with the above developments.
13. Property line adjustment.
14. Low intensity recreation.

Section 3.586. Conditional Development and Use. The following developments and their accessory developments may be permitted under a Type II procedure and Sections 5.000 to 5.030 subject to applicable criteria and development standards and site plan review.

1. Campground, primitive except in areas identified as Coastal Shorelands.
2. Group camping facilities (e.g. youth, church) except in areas identified as Coastal Shorelands.
3. Hunting and fishing clubs except in areas identified as Coastal Shorelands.
4. Hiking, nature observation or horse trails.
5. Marinas, boat launchings and moorage facilities.
6. Structures for viewing or exhibition of natural resources.
8. Cemetery except in areas identified as Coastal Shorelands.
9. Other developments within a historical structure provided the use would not result in the modification of the outward appearance of the structure.
10. Riding stables except in areas identified as Coastal Shorelands.
11. Accessory development customarily provided in conjunction with the above developments.

Section 3.588. Conditional Development and Use Criteria. The following limitations and requirements shall apply to conditional developments:

1. The proposed development shall be consistent with the Clatsop County Comprehensive Plan.
2. The development shall be compatible with and appropriate to the natural resources and features, recreational characteristics and current predominant land use of the area for which it is proposed.
3. In no event shall the proposed development destroy or endanger the natural and recreational resources giving value to the area.
4. The proposed development shall include adequate measures to reduce fire hazards and prevent the spread of fire to surrounding areas.
5. The location of buildings, signs, parking, recreation areas and open space shall be compatible with adjacent areas and the natural scenic amenities of the locality.

Section 3.590. Development and Use Standards. The following standards are applicable to permitted and conditional developments in this zone:

1. Setbacks. No structures shall be placed closer than 100 feet to perennial streams, lakes or other water bodies or closer than 60 feet to arterials, collectors or public roads and highways or closer than 20 feet to other roads and property lines.
2. Utility Services. All utility services, including power and telephone, shall be installed underground where physical conditions permit.
3. Building Height. Maximum height for all structures shall be 35 feet or the maximum height allowed in an adjacent zone that has a lower maximum height standard.
4. Area and Lot Size. The minimum area and lot size shall be that determined to be necessary for the protection of health and natural resources.
5. An accessory structure separated from the main building shall be located in accordance with yard setback requirements.

Section 3.592. State and Federal Permits. If any state or federal permit is required for a development or use, an applicant, prior to issuance of a development permit or action, shall submit to the Planning Department a copy of the state or federal permit.

Section 3.610. Lake and Wetlands Zone (LW).

Section 3.611. Purpose. The purpose of the LW zone is to assure the conservation of important shoreland and wetland biological habitats and conserve examples of different natural ecosystem types and to assure a diversity of species and ecological relations in Clatsop County.

Low intensity uses which do not result in major alterations are appropriate in this zone. Low to moderate intensity recreation is appropriate in coastal lakes.

This zone includes coastal and non-coastal lakes, significant non-estuarine freshwater marshes and important upland biological habitat.

The freshwater marshes in this district are of two categories: those designated under Goal 17 which were formed by coastal processes, and those designated under Goal 5.

Section 3.612. Zone Boundaries. The zone shall be designated on the Clatsop County Land and Water Development and Use Ordinance zoning map, and shall conform to the 1" to 400' photocontour maps entitled "Significant Shoreland and Wetland Biological Habitats" on file at the Clatsop County Department of Planning and Development office and hereby adopted by reference.

Section 3.613. Development and Use Permitted. The following developments are permitted under a Type I procedure subject to the applicable development standards:

1. Low intensity recreation.
2. Passive restoration.
3. Vegetative shoreline stabilization.
4. Submerged cable, sewerline, waterline or other pipeline.
5. Maintenance and repair of existing structures.
6. Cultivation and harvest of cranberries, including irrigation equipment, pumps and ditches necessary for the management and protection of cranberries. This use is permitted only in the Delmoor Loop Road area as described in the County's Goal 5 Element.
7. Bridges and pile supported walkways or other piling supported structures under 500 sq.ft., other than docks.
8. Property line adjustment.

Section 3.614. Conditional Development and Use Permitted. The following developments may be permitted under a Type II procedure and Sections 5.000 to 5.030 subject to applicable criteria and development and site plan review:

1. Active restoration.
2. Structural shoreline stabilization limited to riprap.
3. Boat launch.
4. Bridges and pile supported walkways or other piling supported structures 500 sq.ft. or greater, other than docks.
5. Individual docks limited to 500 square feet for recreational or fishing use and necessary piling.

6. Vegetation removal from coastal lakes east of U.S. Highway 101 that is acceptable to the Oregon Department of Fish and Wildlife and other state and federal agencies.
7. Developments necessary for and accessory to cranberry cultivation and harvest, including equipment storage sheds, access roads and temporary cranberry storage facilities, but not including a residence. This use is permitted conditionally only in the Delmoor Loop Road area as described in the County's Goal 5 Plan Element.

Section 3.615. Additional Conditional Uses and Activities Permitted in Goal 5 Wetlands. The following uses may be permitted under a Type II procedure and Sections 5.000 to 5.030 subject to applicable standards. In addition, the use must be analyzed by the procedure in the Goal 5 Administrative Rule (OAR 660-16) and meet either Section 3B or 3C of that rule.

1. Low intensity, non-structural agricultural uses subject to standards in S4.602.
2. Selective harvesting of timber, subject to standards in S4.604.

Section 3.616. Development and Conditional Development and Use Standards.

1. All standards as set forth in the Clatsop County Development Standards Document 80-14, as amended.
2. Uses that are not water-dependent or water-related shall be set back to the extent of riparian vegetation identified in the Comprehensive Plan. Riparian vegetation shall be protected in accordance with Section S4.500. At such time that a development is proposed in the vicinity of the wetlands area, the county may require a site investigation to determine the exact location or the boundary. The site investigation shall be performed by a qualified expert, such as a biologist from the U.S. Army Corps of Engineers, Oregon Division of State Lands, or the Oregon Department of Fish and Wildlife. Nothing in this provision shall allow for a redefinition or major alteration of the wetlands boundary. In order to maintain consistency, the site investigation shall employ the same criteria originally used to identify freshwater wetlands in the County. (The study performed by Dr. Duncan Thomas of CREST, entitled "Significant Shoreland and Wetland Habitats in the Clatsop Plains").

Section 3.617. State and Federal Permits. If any state or federal permit is required for a development or use, an applicant, prior to issuance of a development permit or action, shall submit to the Planning Department a copy of the state or federal permit.

Section 4.060. Beaches and Dunes Overlay District (/BDO).

Section 4.061. Purpose. The intent of this section is to regulate actions in those areas identified as coastal beaches and dunes including built and committed active dunes for which an Exception to Goal 18 Beaches and Dunes has been taken but not for other active dunes in order to:

- (1) Ensure the protection and conservation of coastal beach and dune resources.
- (2) Prevent economic loss by encouraging development consistent with the natural capability of beach and dune landforms.
- (3) Provide for clear procedures by which the natural capability of dune landforms can be assessed prior to development.
- (4) Prevent cumulative damage to coastal dune resources due to the incremental effects of development.
- (5) Provide for such protection of beach and dune resources above and beyond that provided by the underlying zoning district.

Section 4.062. Mapping. The /BDO District is applied to all coastal beach and dune landforms, except active dunes but including active dunes for which a built and committed Exception has been taken. The Beach and Dune forms are identified in the Clatsop County Comprehensive Plan.

Section 4.063. Intent. The requirements imposed by the /BDO District shall be in addition to those imposed by the underlying zone district. Where the requirements of the /BDO District conflict with those of the underlying zoning district, the more restrictive requirements shall apply.

Section 4.064. Development and Use Permitted. Any permitted or conditional development and use allowed in the underlying zone is permitted subject to applicable standards except as may be provided otherwise in Section 4.065.

Section 4.065. Special Uses. The following specified developments and uses, and no others, may be permitted under a Type I procedure subject to applicable development criteria and standards:

- (1) (a) Uses.
 - (i) Buried fuel tanks.
- (b) Criteria.
 - (i) The tanks are entirely free of leaks and have an impermeable coating,
 - (ii) The tank is located, to the greatest extent feasible, in a well-drained area,
 - (iii) The tank is not on active dunes or other foredunes which are conditionally stable and that are subject to ocean undercutting or wave overtopping.
 - (iv) and meets DEQ standards.
- (2) (a) Uses.
 - (i) Hiking, equestrian, and nature trails.
 - (ii) Prescribing the time, amounts and types of materials and the methods to be used in restoration of dune vegetation.
 - (iii) Prescribing setbacks greater than required in the underlying zone in order to comply with the intent of the Clatsop County Comprehensive Plan and this Ordinance.
 - (iv) Prescribing the location, design and number of proposed developments.

Section 4.066. Other Special Uses. The following developments and their accessory development may be permitted as a Conditional Development and Use under a Type IIa procedure and Sections 5.000 to 5.030 subject to applicable criteria and development standards and site plan review:

- (1) (a) Uses.
 - (i) Public beach access.(b) Criteria.
 - (i) Public need must be shown for the establishment of State public beach access points. If it is found to be needed, the State must satisfactorily prove why this location for the proposed beach access, when compared with other locations, best serves the public need.
- (2) (a) Uses.
 - (i) Commercial removal of sand.(b) Criteria.
 - (i) The area is not an ocean beach.
 - (ii) Historic surplus accumulations of sand exist.
 - (iii) A Site Investigation Report, as specified by Section 4.069 below is conducted.
 - (iv) Removal of surplus sand can be accomplished without significant impairment of the natural functions of the beach and dune system, and hydraulic processes, according to the Site Investigation Report and a Conditional Development and Use Permit has been granted.
- (3) (a) Uses.
 - (i) Foredune breaching.(b) Criteria and Conditions.
 - (i) The breaching is required to replenish sand supply in interdune areas; or
 - (ii) Emergencies on a temporary basis.
 - (iii) Such breaching does not endanger existing development.
 - (iv) The breaching does not adversely impact critical wildlife habitat or Coastal Lake or Freshwater Wetland zone areas.
 - (v) The areas affected by the breaching are restored according to an approved restoration plan.
- (4) (a) Uses.
 - (i) Commercial drift log removal from beaches.(b) Criteria.
 - (i) The removal will result in significant public benefit, improved recreational access, improved scenic values, or protection of wildlife habitat.
 - (ii) The removal will not result in increased beach or foredune erosion which will endanger existing development.
 - (iii) Secure approval of a permit from the State (Oregon Department of Transportation).
- (5) (a) Uses.
 - (i) Beachfront protective structures.(b) Criteria.
 - (i) The structure is to protect development existing on January 1, 1977.
 - (ii) Visual impacts are minimized.

- (iii) Public access is preserved.
- (iv) Negative impacts on adjacent property are minimized.
- (v) Long-term or recurring costs to the public are avoided.
- (vi) There is a demonstration that the development is being threatened by erosion hazard.
- (vii) There is a demonstration that maintenance of existing riparian vegetation and/or planting of new riparian vegetation will not provide adequate protection.

Section 4.067. Additional Site and Development Requirements. The Beach and Dune Area Requirements of Sections S4.100 to S4.138 of Chapter 4 of the Development and Use Standards Document and the following requirements apply to all development except the harvesting of timber as allowed by the District with which the /BDO District is combined. Timber harvesting activities shall conform to Oregon Forest Practices rules regulating logging practices in dune areas:

- (1) Development shall not result in the clearance of natural vegetation in excess of that which is necessary for the structures, required access, fire safety requirements and the required septic and sewage disposal system.
- (2) Vegetation-free areas which are suitable for development shall be used instead of sites which must be artificially cleared.
- (3) Areas cleared of vegetation during construction in excess of those indicated in Section 4.064-4.066 above shall be replanted within nine months of the termination of major construction activity.
- (4) Sand stabilization shall be required during all phases of construction and post-construction as specified by standards set forth in the Standards Document or by Soil Conservation Service.
- (5) Developments shall result in the least topographic modification of the site as is possible.
- (6) All conditions shall be found by the Department of Planning and Development to provide for or protect the public health, safety or general welfare, protect the dune, and protect adjacent properties both present and in the future.
- (7) Conditions of approval shall be sufficient to protect the property from erosion by wind or water or both, the dune from the loss of stabilizing vegetation, and the permanent drawdown of the groundwater supply.

Section 4.068. Procedures. Application for the construction of all structures and construction of developments permitted subject to conditions in Section 4.064-4.066 are required and shall be made to the Planning Director or his designate on forms prescribed by Clatsop County. The applicant shall be required to provide at least the following information:

- 1. a map showing the location of the proposed developments and surrounding developments including structures, vegetation, etc.
- 2. description of the extent to which a sand dune will be altered as a result of the proposed development; and
- 3. other such information as is needed to determine conformance with this Ordinance.

Section 4.069. Site Investigation Report. A site specific investigation report performed by a qualified person such as a geologist, soils scientist, or geomorphologist shall be required by the Planning Director prior to the issuance of a development permit in areas that the Planning Director feels may be subject to wind erosion or other hazard potential.

Section 4.070. Guarantee of Performance. The applicant for the development permit shall be required to post a performance bond to insure that safeguards recommended in the detailed site investigation report are in fact provided if the Planning Director determines that such bond is necessary. The method of guarantee, inspection and certification and release of guarantee are specified in Section 10.110 of this Ordinance.

Section 4.071. Time Limits. Prior to approval of the permit the subdivider or developer and the Department of Planning and Development shall agree upon a deadline for the completion of the required improvements, such deadline not to exceed one year from the time of the permit. The County shall have the power to extend the deadline for improvements for one additional year when the subdivider or developer can present substantial reason for doing so.

The subdivider or developer shall restore the vegetation within the first planting season (October to April) using the amounts and types of materials and methods prescribed by the Department of Planning and Development.

The timing of the permits should be made so that restoration may be started as early in the planting season as possible.

Section 4.072. State and Federal Permits. Any use authorized by the provisions of this overlay district shall also require the securing of any necessary State or Federal permit, lease, easement or similar type of authorization.

APPENDIX 3. Camp Rilea Soil Erosion Hazard Data

MAP UNIT SYMBOL	MAP UNIT NAME	COMPONENT NAME	R	K	Kf	SLOPE LOW (%)	SLOPE HIGH (%)	SLOPE AVG. (%)	AVG. SLOPE LENGTH (FT)	AVG. RUSLE LS	T	POTENTIAL SOIL LOSS (R x K x LS) tons/acre/yr - bare soil surface	RUSLE Erodibility Index (EI)
4	Beaches	BEACHES	120	0.05	0.05	0	3	2	300	0.35	5	2.1	0.4
15	Dune land	DUNE LAND	120	0.10	0.10	3	30	17	200	4.19	5	50.3	10.1
19C	Gearhart fine sandy loam, 3-15%	GEARHART	120	0.17	0.17	3	15	9	400	2.36	2	48.1	24.1
19D	Gearhart fine sandy loam, 15-30%	GEARHART	120	0.17	0.17	15	30	23	350	8.66	2	176.7	88.3
24C	Heceta-Waldport fine sands, 0-15%	HECETA	120	0.10	0.10	0	15	8	300	1.77	5	21.2	4.2
24C	Heceta-Waldport fine sands, 0-15%	WALDPORT	120	0.17	0.17	0	15	8	300	1.77	5	36.1	7.2
70C	Waldport fine sand, 3-15%	WALDPORT	120	0.17	0.17	3	15	9	350	2.21	5	45.1	9.0
70D	Waldport fine sand, 15-30%	WALDPORT	120	0.17	0.17	15	30	23	350	8.66	5	176.7	35.3
72A	Warrenton loamy fine sand, 0-3%	WARRENTON	120	0.10	0.10	0	3	2	400	0.37	5	4.4	0.9

APPENDIX 4. Camp Rilea Plant List

Family	Plant Name	Common name	Origin	Abundance
Apiaceae	<i>Angelica lucida</i>	sea watch	Native	common
Apiaceae	<i>Cicuta douglasii</i>	Douglas water hemlock, w. water hemlock	Native	occasional
Apiaceae	<i>Conioselinum pacificum</i>	Pacific hemlock parsley	Native	common
Apiaceae	<i>Daucus carota</i>	wild carrot, Queen Anne's lace	Exotic	common
Apiaceae	<i>Heracleum lanatum</i>	cow parsnip	Native	common
Apiaceae	<i>Hydrocotyle ranunculoides</i>	floating marsh pennywort	Native	common
Apiaceae	<i>Lomatium nudicaule</i>	barestem lomatium	Native	occasional
Apiaceae	<i>Oenanthe sarmentosa</i>	Pacific water parsley	Native	common
Apiaceae	<i>Osmorhiza berteroi</i>	mountain sweet cicely	Native	common
Apiaceae	<i>Sanicula arctopoides</i>	footsteps of spring, bear's foot sanicle	Native	occasional
Apiaceae	<i>Sanicula crassicaulis</i>	Pacific snakeroot, western snakeroot	Native	occasional
Aquifoliaceae	<i>Ilex aquifolium</i>	English holly	Exotic	common
Araceae	<i>Lysichiton americanus</i>	skunk cabbage	Native	scarce
Araliaceae	<i>Hedera helix</i>	English ivy	Exotic	common
Asteraceae	<i>Achillea millefolium</i>	yarrow, milfoil	Native	abundant
Asteraceae	<i>Ambrosia chamissonis</i> var. <i>chamissonis</i>	silver beachweed, beach bur	Native	scarce
Asteraceae	<i>Anaphalis margaritacea</i>	pearly everlasting	Native	abundant
Asteraceae	<i>Anthemis arvensis</i>	corn chamomile, field chamomile	Exotic	occasional
Asteraceae	<i>Anthemis cotula</i>	mayweed chamomile, dogfennel	Exotic	occasional
Asteraceae	<i>Anthemis tinctoria</i>	yellow chamomile, golden marguerite	Exotic	scarce
Asteraceae	<i>Artemisia suksdorfii</i>	Suksdorf's sagewort, coastal mugwort	Native	common
Asteraceae	<i>Aster chilensis</i>	common California aster, Pacific aster	Native	common
Asteraceae	<i>Bellis perennis</i>	English daisy, lawn daisy	E	common
Asteraceae	<i>Bidens cernua</i>	nodding beggar ticks, bur marigold	N	occasional
Asteraceae	<i>Centaurea cyanus</i>	bachelor's button, cornflower	E	scarce
Asteraceae	<i>Centaurea pratensis</i>	meadow knapweed	E	common
Asteraceae	<i>Cichorium intybus</i>	wild succory, common chicory	E	scarce
Asteraceae	<i>Cirsium edule</i>	Indian thistle, edible thistle	N	common
Asteraceae	<i>Cirsium vulgare</i>	bull thistle, common thistle	E	common
Asteraceae	<i>Conyza canadensis</i>	Canadian fleabane, horseweed	N	common
Asteraceae	<i>Cotula coronopifolia</i>	brass buttons	E	occasional
Asteraceae	<i>Crepis capillaris</i>	smooth hawksbeard	E	occasional
Asteraceae	<i>Erechtites minima</i>	Australian burnweed, toothed coast fireweed	E	common
Asteraceae	<i>Gnaphalium californicum</i>	California cudweed, California everlasting	N	occasional

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Asteraceae	<i>Gnaphalium purpureum</i>	purple cudweed	N	common
Asteraceae	<i>Gnaphalium uliginosum</i>	marsh cudweed	E	common
Asteraceae	<i>Hypochaeris radicata</i>	rough cat's ear, hairy cat's ear	E	abundant
Asteraceae	<i>Leontodon taraxacoides</i> ssp. <i>taraxacoides</i>	hairy hawkbit, rough hawkbit	E	common
Asteraceae	<i>Leucanthemum vulgare</i>	oxeye daisy	E	common
Asteraceae	<i>Matricaria discoidea</i>	pineapple weed	N	occasional
Asteraceae	<i>Petasites frigidus</i> var. <i>palmatus</i>	sweet coltsfoot, western coltsfoot	N	scarce
Asteraceae	<i>Senecio jacobaea</i>	tansy ragwort	E	common
Asteraceae	<i>Senecio sylvaticus</i>	woodland groundsel, wood groundsel	E	common
Asteraceae	<i>Senecio vulgaris</i>	old man in the spring, common groundsel	E	occasional
Asteraceae	<i>Solidago canadensis</i> var. <i>salebrosa</i>	Canada goldenrod, meadow goldenrod	N	common
Asteraceae	<i>Solidago simplex</i> var. <i>spatulata</i>	dune goldenrod, coast goldenrod	N	common
Asteraceae	<i>Sonchus asper</i>	prickly sow thistle	E	occasional
Asteraceae	<i>Tanacetum camphoratum</i>	dune tansy	N	common
Asteraceae	<i>Taraxacum officinale</i>	common dandelion	E	common
Azollaceae	<i>Azolla filiculoides</i>	duckweed fern	N	occasional
Betulaceae	<i>Alnus rhombifolia</i>	white alder	N	common
Betulaceae	<i>Alnus rubra</i>	red alder, Oregon alder	N	abundant
Blechnaceae	<i>Blechnum spicant</i>	deer fern	N	occasional
Boraginaceae	<i>Myosotis discolor</i>	yellow and blue forget me not or scorpion grass	E	occasional
Boraginaceae	<i>Myosotis scorpioides</i>	common forget me not, water scorpion grass	E	scarce
Brassicaceae	<i>Barbarea orthoceras</i>	American wintercress	N	occasional
Brassicaceae	<i>Cakile edentula</i> var. <i>edentula</i>	American searocket	E	abundant
Brassicaceae	<i>Cakile maritima</i>	European searocket, searocket	E	abundant
Brassicaceae	<i>Cardamine breweri</i> var. <i>orbicularis</i>	coast bittercress	N	occasional
Brassicaceae	<i>Cardamine oligosperma</i>	little western bittercress	N	common
Brassicaceae	<i>Raphanus raphanistrum</i>	jointed charlock	E	occasional
Brassicaceae	<i>Teesdalia nudicaulis</i>	shepherd's cress, teesdalia	E	common
Callitrichaceae	<i>Callitriche stagnalis</i>	pond water starwort	E	occasional
Caprifoliaceae	<i>Lonicera etrusca</i>	Etruscan honeysuckle	E	occasional
Caprifoliaceae	<i>Lonicera involucrata</i> var. <i>ledebourii</i>	coastal twinberry	N	common
Caprifoliaceae	<i>Sambucus racemosa</i> var. <i>arborescens</i>	red elderberry	N	common
Caryophyllaceae	<i>Arenaria</i> sp.	sandwort	E	scarce
Caryophyllaceae	<i>Cardionema ramosissima</i>	sandmat	N	abundant
Caryophyllaceae	<i>Cerastium glomeratum</i>	sticky chickweed, sticky cerastium	E	common

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Caryophyllaceae	<i>Cerastium nutans</i>	nodding chickweed, nodding mouse ear	N	scarce
Caryophyllaceae	<i>Dianthus armeria</i>	Depford pink, grass pink	E	occasional
Caryophyllaceae	<i>Honckeya peploides</i>	sea purslane, seabeach sandwort	N	scarce
Caryophyllaceae	<i>Sagina apetala</i>	common pearlwort, arctic pearlwort	N	occasional
Caryophyllaceae	<i>Sagina decumbens</i> ssp. <i>occidentalis</i>	western pearlwort	N	occasional
Caryophyllaceae	<i>Scleranthus annuus</i>	annual knawel	E	abundant
Caryophyllaceae	<i>Spergula arvensis</i>	stickwort, cornspurry	E	abundant
Caryophyllaceae	<i>Spergularia rubra</i>	red sandspurry	E	scarce
Caryophyllaceae	<i>Stellaria borealis</i> ssp. <i>sitchana</i>	few flowered northern starwort	N	common
Caryophyllaceae	<i>Stellaria longipes</i> var. <i>longipes</i>	longstalk starwort	N	common
Caryophyllaceae	<i>Stellaria media</i>	common chickweed	E	common
Ceratophyllaceae	<i>Ceratophyllum demersum</i>	hornwort, coontail	N	occasional
Chenopodiaceae	<i>Chenopodium album</i>	lamb's quarter, pigweed	E	scarce
Convolvulaceae	<i>Calystegia sepium</i>	hedge bindweed, lady's nightcap	E	occasional
Cyperaceae	<i>Carex canescens</i>	silvery sedge	N	occasional
Cyperaceae	<i>Carex cusickii</i>	Cusick's sedge	N	common
Cyperaceae	<i>Carex lenticularis</i> var. <i>limnophila</i>	lakeshore sedge	N	occasional
Cyperaceae	<i>Carex macrocephala</i> (1)	big headed sedge	N	occasional
Cyperaceae	<i>Carex obnupta</i>	slough sedge	N	abundant
Cyperaceae	<i>Carex pansa</i>	sand sedge	N	abundant
Cyperaceae	<i>Eleocharis palustris</i>	creeping spike rush	N	abundant
Cyperaceae	<i>Scirpus microcarpus</i>	panicled bulrush, small fruited bulrush	N	common
Dennstaedtiaceae	<i>Pteridium aquilinum</i> var. <i>pubescens</i>	bracken fern, brake fern	N	common
Dryopteridaceae	<i>Athyrium filix-femina</i> var. <i>cyclosorum</i>	northwestern lady fern	N	common
Dryopteridaceae	<i>Polystichum munitum</i>	common sword fern	N	abundant
Equisetaceae	<i>Equisetum arvense</i>	field horsetail, common horsetail	N	common
Equisetaceae	<i>Equisetum hyemale</i> var. <i>affine</i>	common scouring rush	N	scarce
Ericaceae	<i>Erica carnea</i>	spring heath	E	scarce
Ericaceae	<i>Gaultheria shallon</i>	salal	N	common
Ericaceae	<i>Pyrola asarifolia</i>	alpine pyrola, bog wintergreen	N	scarce
Ericaceae	<i>Vaccinium ovatum</i>	evergreen blueberry	N	common
Ericaceae	<i>Vaccinium parvifolium</i>	red bilberry, red huckleberry	N	common
Fabaceae	<i>Cytisus scoparius</i>	Scots broom	E	abundant
Fabaceae	<i>Lathyrus japonicus</i> var. <i>glaber</i>	maritime peavine, beach pea	N	common
Fabaceae	<i>Lathyrus littoralis</i>	beach peavine, gray beach pea	N	occasional

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Fabaceae	Lotus corniculatus	birdsfoot trefoil	E	common
Fabaceae	Lotus micranthus	field lotus, small flowered lotus	N	occasional
Fabaceae	Lupinus arboreus	tree lupine, yellow bush lupine	E	occasional
Fabaceae	Lupinus littoralis	seashore lupine	N	common
Fabaceae	Medicago lupulina	black medic, hop clover	E	occasional
Fabaceae	Robinia pseudoacacia	black locust	E	occasional
Fabaceae	Trifolium arvense	hare's foot, rabbitfoot clover	E	occasional
Fabaceae	Trifolium dubium	least hop clover	E	occasional
Fabaceae	Trifolium pratense	red clover	E	common
Fabaceae	Trifolium repens	white clover, Dutch clover	E	common
Fabaceae	Trifolium subterraneum	subterranean clover	E	common
Fabaceae	Trifolium wormskjoldii	springbank clover	N	common
Fabaceae	Vicia gigantea	giant vetch	N	occasional
Fabaceae	Vicia hirsuta	hairy vetch, tiny vetch	E	occasional
Fabaceae	Vicia sativa var. angustifolia	common vetch, tare	E	occasional
Fabaceae	Vicia villosa var. glabrescens	hairy vetch	E	occasional
Gentianaceae	Centaurium erythraea	common centaury, European centaury	E	occasional
Geraniaceae	Erodium cicutarium	filaree	E	occasional
Geraniaceae	Geranium dissectum	cutleaf geranium	E	occasional
Geraniaceae	Geranium molle	dovefoot geranium	E	occasional
Grossulariaceae	Ribes divaricatum	coast black gooseberry, straggly gooseberry	N	occasional
Grossulariaceae	Ribes laxiflorum	trailing black currant, coast trailing currant	N	occasional
Haloragaceae	Myriophyllum aquaticum	South American water milfoil, parrot's feather	E	common
Hippuridaceae	Hippuris vulgaris	mare's tail	N	scarce
Hydrocharitaceae	Egeria densa	Brazilian waterweed, South American waterweed	E	common
Hydrocharitaceae	Elodea canadensis	Canadian waterweed, Rocky Mountain waterweed	N	common
Hydrocharitaceae	Vallisneria spiralis	tapegrass, American water celery	E	scarce
Hypericaceae	Hypericum perforatum	Klamathweed, common St. John's wort	E	common
Iridaceae	Iris pseudacorus	yellow flag, yellow iris	E	occasional
Iridaceae	Sisyrinchium bellum	handsome or beautiful blue eyed grass	N	occasional
Iridaceae	Sisyrinchium californicum	golden eyed grass	N	scarce
Juncaceae	Juncus articulatus	jointed rush, jointed leaved rush	N	common
Juncaceae	Juncus breweri	salt rush, Brewer's rush	N	abundant
Juncaceae	Juncus bufonius	toad rush	N	common
Juncaceae	Juncus effusus var. effusus	common rush	N	common

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Juncaceae	Juncus effusus var. gracilis	shiny rush	N	common
Juncaceae	Juncus effusus var. pacificus	Pacific rush, common rush	N	common
Juncaceae	Juncus falcatus var. sitchensis	sickle leaved rush	N	occasional
Juncaceae	Juncus nevadensis var. inventus	Oregon rush	N	occasional
Juncaceae	Luzula comosa	common woodrush	N	occasional
Lamiaceae	Lycopus uniflorus	northern bugleweed	N	scarce
Lamiaceae	Mentha arvensis var. canadensis	field mint, corn mint	N	occasional
Lamiaceae	Mentha piperita ssp. piperita	peppermint	E	occasional
Lamiaceae	Prunella vulgaris var. lanceolata	native heal all	N	common
Lamiaceae	Stachys cooleyae	great betony, Cooley's hedgenettle	N	occasional
Lemnaceae	Lemna minor	common duckweed, water lentil	N	common
Lemnaceae	Spirodela polyrrhiza	greater duckweed, duckmeat	N	common
Lemnaceae	Spirodela punctata (2)	dotted duckweed	E	common
Lemnaceae	Wolffia columbiana (3)	Columbia water meal	N	common
Liliaceae	Allium cernuum	nodding onion	N	occasional
Liliaceae	Brodiaea elegans ssp. hooveri	elegant brodiaea	N	common
Liliaceae	Fritillaria affinis	checker lily, mission bells	N	occasional
Liliaceae	Lilium columbianum	Columbia lily, Oregon lily	N	occasional
Liliaceae	Maianthemum dilatatum	false lily of the valley, beadruby	N	common
Liliaceae	Narcissus pseudonarcissus	dafodil	E	scarce
Liliaceae	Prosartes smithii	fairly lanterns, largeflower fairybells	N	scarce
Liliaceae	Triteleia hyacinthina	hyacinth triteleia, hyacinth brodiaea	N	occasional
Lythraceae	Lythrum portula	purslane loosestrife, water purslane	E	scarce
Lythraceae	Lythrum salicaria	purple loosestrife	E	common
Myricaceae	Myrica californica	Pacific wax myrtle	N	common
Myricaceae	Myrica gale (4)	sweet gale	N	common
Nyctaginaceae	Abronia latifolia (5)	yellow sandverbena	N	common
Nymphaeaceae	Nuphar polysepala	yellow pond lily, wakas	N	abundant
Nymphaeaceae	Nymphaea odorata	fragrant water lily	E	common
Oleaceae	Ligustrum vulgare	European privet	E	scarce
Onagraceae	Epilobium ciliatum ssp. watsonii	Pacific willowherb	N	common
Onagraceae	Ludwigia palustris	false loosestrife	N	scarce
Ophoglossaceae	Botrychium multifidum	leather grapefern	N	common
Orchidaceae	Goodyera oblongifolia	western rattlesnake plantain, rattlesnake orchid	N	abundant
Orchidaceae	Piperia elegans	hillside rein orchid, elegant rein orchid	N	common

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Orchidaceae	<i>Spiranthes romanzoffiana</i>	hooded ladies tresses	N	scarce
Orobanchaceae	<i>Orobanche uniflora</i>	naked broomrape	N	scarce
Oxalidaceae	<i>Oxalis corniculata</i>	creeping yellow wood sorrel	E	occasional
Pinaceae	<i>Picea sitchensis</i>	Sitka spruce	N	abundant
Pinaceae	<i>Pinus contorta</i> var. <i>contorta</i>	shore pine	N	abundant
Pinaceae	<i>Pinus nigra</i>	black pine	E	common
Pinaceae	<i>Pinus pinaster</i>	maritime pine	E	occasional
Pinaceae	<i>Pinus sylvestris</i>	Scots pine	E	abundant
Pinaceae	<i>Pseudotsuga menziesii</i> var. <i>menziesii</i>	coast Douglas fir, Douglas fir	N	scarce
Pinaceae	<i>Tsuga heterophylla</i>	western hemlock	N	common
Plantaginaceae	<i>Plantago lanceolata</i>	English plantain, buckhorn plantain	E	common
Plantaginaceae	<i>Plantago major</i>	common plantain	E	common
Plumbaginaceae	<i>Armeria maritima</i> var. <i>californica</i>	California thrift, California sea pink	N	common
Poaceae	<i>Agrostis capillaris</i>	colonial bentgrass	E	common
Poaceae	<i>Agrostis exarata</i>	spike bentgrass	N	common
Poaceae	<i>Agrostis stolonifera</i>	florin creeping bent	E	abundant
Poaceae	<i>Aira caryophylla</i>	diffuse hairgrass, elegant hairgrass	E	common
Poaceae	<i>Aira praecox</i>	early hairgrass, little hairgrass	E	common
Poaceae	<i>Ammophila arenaria</i>	European beachgrass	E	abundant
Poaceae	<i>Ammophila breviligulata</i>	American beachgrass	E	abundant
Poaceae	<i>Anthoxanthum odoratum</i>	sweet vernalgrass	E	abundant
Poaceae	<i>Bromus carinatus</i>	California brome	N	occasional
Poaceae	<i>Bromus hordeaceus</i>	soft brome	E	common
Poaceae	<i>Bromus rigidus</i>	riggut brome	E	occasional
Poaceae	<i>Calamagrostis nutkaensis</i>	Pacific reedgrass	N	occasional
Poaceae	<i>Cynosurus echinatus</i>	hedghegog dogtail	E	common
Poaceae	<i>Dactylis glomerata</i>	orchard grass, cock's foot grass	E	abundant
Poaceae	<i>Danthonia californica</i>	California danthonia, California oatgrass	N	occasional
Poaceae	<i>Digitaria sanguinalis</i>	hairy crabgrass	E	occasional
Poaceae	<i>Echinochloa crusgalli</i>	large barnyard grass	E	occasional
Poaceae	<i>Festuca arundinacea</i>	tall fescue	E	abundant
Poaceae	<i>Festuca rubra</i> var. <i>rubra</i>	red fescue	E	common
Poaceae	<i>Holcus lanatus</i>	common velvetgrass, Yorkshire fog	E	common
Poaceae	<i>Leymus mollis</i> ssp. <i>mollis</i>	American dunegrass, dune wildrye	N	abundant
Poaceae	<i>Lolium perenne</i>	perennial ryegrass	E	occasional

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Poaceae	Melica smithii	Smith melic	N	occasional
Poaceae	Melica subulata	Alaska oniongrass	N	occasional
Poaceae	Panicum capillare	witchgrass	N	occasional
Poaceae	Phalaris arundinacea	reed canary grass	N	common
Poaceae	Poa annua	annual bluegrass	E	common
Poaceae	Poa pratensis ssp. pratensis	Kentucky bluegrass	E	abundant
Poaceae	Poa trivialis	roughstalk bluegrass	E	occasional
Poaceae	Polygonum monspeliensis	rabbitfoot grass, annual beardgrass	E	occasional
Poaceae	Torreyochloa pallida var. pauciflora	pale false mannagrass, weak mannagrass	N	scarce
Poaceae	Triticum aestivum	wheat	E	scarce
Poaceae	Vulpia myuros	foxtail fescue, rat tail fescue	E	occasional
Polygonaceae	Polygonum arenastrum	common knotweed, doorweed	E	common
Polygonaceae	Polygonum hydropiperoides	waterpepper	N	occasional
Polygonaceae	Polygonum lapathifolium	curltop ladythumb, willow weed	N	scarce
Polygonaceae	Polygonum paronychia	black knotweed, nailwort knotweed	N	occasional
Polygonaceae	Polygonum persicaria	spotted ladythumb, heartweed	E	occasional
Polygonaceae	Rumex acetosella	sheep sorrel, sour dock	E	abundant
Polygonaceae	Rumex conglomeratus	clustered dock	E	occasional
Polygonaceae	Rumex crispus	curly dock	E	common
Polyodiaceae	Polypodium glycyrrhiza	licorice fern	N	common
Portulacaceae	Claytonia exigua ssp. exigua	pale springbeauty	N	occasional
Portulacaceae	Claytonia rubra ssp. depressa	redstem springbeauty	N	occasional
Portulacaceae	Claytonia sibirica	Siberian candyflower	N	common
Potamogetonaceae	Potamogeton richardsonii	Richardson's pondweed	N	common
Ranunculaceae	Ranunculus aquatilis var. aquatilis	stiff leaved water buttercup	N	common
Ranunculaceae	Ranunculus flammula	creeping buttercup, lesser spearwort	N	occasional
Ranunculaceae	Ranunculus occidentalis var. occidentalis	western buttercup	N	common
Ranunculaceae	Ranunculus repens	creeping buttercup	E	scarce
Rhamnaceae	Rhamnus purshiana	cascara, chittam	N	common
Rosaceae	Aphanes occidentalis	western lady's mantle	N	occasional
Rosaceae	Cotoneaster franchetii	orange cotoneaster	E	occasional
Rosaceae	Crataegus monogyna	one seeded hawthorn, English hawthorn	E	occasional
Rosaceae	Crataegus suksdorfii	Suksdorf's hawthorn	N	occasional
Rosaceae	Fragaria chiloensis	coastal strawberry, Chilean strawberry	N	abundant
Rosaceae	Malus fusca	western crabapple, Oregon crabapple	N	occasional

APPENDIX 4. Camp Rilea Plant List

Rosaceae	<i>Oemleria cerasiformis</i>	osoberry	N	common
Rosaceae	<i>Potentilla anserina</i> ssp. <i>pacifica</i>	Pacific silverweed	N	abundant
Rosaceae	<i>Potentilla palustris</i>	marsh cinquefoil, purple cinquefoil	N	occasional
Rosaceae	<i>Rosa nutkana</i> var. <i>nutkana</i>	Nootka rose	N	common
Rosaceae	<i>Rubus armeniacus</i>	Himalayan blackberry	E	common
Rosaceae	<i>Rubus laciniatus</i>	evergreen blackberry, cut leaved blackberry	E	occasional
Rosaceae	<i>Rubus parviflorus</i>	thimbleberry	N	common
Rosaceae	<i>Rubus spectabilis</i>	salmonberry	N	occasional
Rosaceae	<i>Rubus ursinus</i>	Pacific blackberry, Pacific dewberry	N	abundant
Rosaceae	<i>Spiraea douglasii</i> var. <i>douglasii</i>	Douglas spiraea	N	common
Rubiaceae	<i>Galium aparine</i>	stickywilly, cleavers	N	common
Rubiaceae	<i>Galium trifidum</i> var. <i>pacificum</i>	small bedstraw	N	common
Rubiaceae	<i>Galium triflorum</i>	sweet-scented bedstraw	N	common
Rubiaceae	<i>Sherardia arvensis</i>	blue field madder	E	scarce
Salicaceae	<i>Salix hookeriana</i>	coastal willow, Hooker's willow	N	abundant
Salicaceae	<i>Salix lucida</i> ssp. <i>lasiandra</i>	Pacific willow	N	occasional
Saxifragaceae	<i>Tellima grandiflora</i>	large fringedcup	N	scarce
Saxifragaceae	<i>Tiarella trifoliata</i> var. <i>trifoliata</i>	trefoil foamflower	N	occasional
Scrophulariaceae	<i>Digitalis purpurea</i>	foxglove	E	common
Scrophulariaceae	<i>Parentucellia viscosa</i>	yellow parentucellia	E	common
Scrophulariaceae	<i>Triphysaria pusilla</i>	dwarf triphysaria, dwarf owl clover	N	occasional
Scrophulariaceae	<i>Veronica americana</i>	American brooklime	N	common
Scrophulariaceae	<i>Veronica arvensis</i>	common speedwell	E	occasional
Scrophulariaceae	<i>Veronica scutellata</i>	marsh speedwell, skullcap speedwell	N	common
Solanaceae	<i>Solanum dulcamara</i>	bittersweet, climbing nightshade	E	occasional
Sparganiaceae	<i>Sparganium emersum</i>	simple stem bur reed	N	scarce
Typhaceae	<i>Typha latifolia</i>	common cattail, broad leaf cattail	N	common
Valerianaceae	<i>Plectritis brachystemon</i>	shortspur white plectritis	N	occasional
Violaceae	<i>Viola adunca</i>	hookedspur violet, western longspur violet	N	abundant
Violaceae	<i>Viola palustris</i>	marsh violet	N	scarce

APPENDIX 5.

Camp Rilea Wildlife List

COMMON NAME	GENUS/SPECIES
Birds	
American Coot	<i>Fulica americana</i>
American Crow	<i>Corvus brachyrhynchos</i>
American Goldfinch	<i>Carduelis tristis</i>
American Green-winged Teal	<i>Anas crecca</i>
American Kestrel	<i>Falco sparverius</i>
American Pipit	<i>Anthus rubescens</i>
American Robin	<i>Turdus migratorius</i>
American Widgeon	<i>Anas americana</i>
Bald Eagle (T)	<i>Haliaeetus leucocephalus</i>
Band-tailed Pigeon	<i>Columba fasciata</i>
Barn Swallow	<i>Hirundo rustica</i>
Belted Kingfisher	<i>Ceryle alcyon</i>
Bewick's Wren	<i>Thryomanes bewickii</i>
Black Brandt	<i>Branta bericla</i>
Black Turnstone	<i>Arenaria melanocephala</i>
Black-bellied Plover	<i>Pluvialis squatarola</i>
Black-capped Chickadee	<i>Parus atricapillus</i>
Black-throated Gray Warbler	<i>Dendroica nigrescens</i>
Bonaparte's Gull	<i>Larus philadelphia</i>
Brown Pelican (E)	<i>Pelecanus occidentalis</i>
Brown-headed Cowbird	<i>Molothrus ater</i>
Bufflehead	<i>Bucephala albeola</i>
California Gull	<i>Larus californicus</i>
Canada Goose (I)	<i>Branta canadensis</i>
Canvasback	<i>Aythya valisineria</i>
Caspian Tern	<i>Sterna caspia</i>
Chestnut-backed Chickadee	<i>Parus rufescens</i>
Cinnamon Teal	<i>Anas cyanoptera</i>
Cliff Swallow	<i>Hirundo pyrrhonota</i>
Common Bushtit	<i>Psaltriparus minimus</i>
Common Goldeneye	<i>Bucephala clangula</i>
Common Loon	<i>Gavia immer</i>
Common Merganser	<i>Mergus merganser</i>
Common Raven	<i>Corvus corax</i>
Common Snipe	<i>Gallinago gallinago</i>
Common Yellowthroat	<i>Geothlypis trichas</i>
Cooper's Hawk	<i>Accipiter cooperii</i>
Dark-eyed Junco	<i>Junco hyemalis</i>
Double-crested Cormorant	<i>Phalacrocorax auritus</i>
Downy Woodpecker	<i>Picoides pubescens</i>
Dunlin	<i>Calidris alpina</i>
European Starling (I)	<i>Sturnus vulgaris</i>
Eurasian Widgeon	<i>Anas penelope</i>
Evening Grosbeak	<i>Coccothraustes vespertina</i>
Fox Sparrow	<i>Passerella iliaca</i>
Gadwall	<i>Anas strepera</i>
Glaucous Gull	<i>Larus hyperboreus</i>

APPENDIX 5.

Camp Rilea Wildlife List

COMMON NAME	GENUS/SPECIES
Golden-crowned Kinglet	<i>Regulus satrapa</i>
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>
Great Blue Heron	<i>Ardea herodias</i>
Great Horned Owl	<i>Bubo virginianus</i>
Greater White-fronted Goose	<i>Anser albifrons</i>
Greater Yellowlegs	<i>Tringa melanoleuca</i>
Green-backed Heron	<i>Butorides striatus</i>
Hairy Woodpecker	<i>Picoides villosus</i>
Heerman's Gull	<i>Larus heermanni</i>
Hermit Thrush	<i>Catharus guttatus</i>
Herring Gull	<i>Larus argentatus</i>
Hooded Merganser	<i>Lophodytes cucullatus</i>
Horned Grebe	<i>Podiceps auritus</i>
Hudsonian Godwit	<i>Limosa haemastica</i>
Hutton's Vireo	<i>Vireo huttoni</i>
Killdeer	<i>Charadrius vociferus</i>
Least Sandpiper	<i>Calidris minutilla</i>
Lesser Scaup	<i>Aythya affinis</i>
Long-billed Curlew	<i>Numenius americanus</i>
MacGillivray's Warbler	<i>Oporornis tolmiei</i>
Mallard	<i>Anas platyrhynchos</i>
Marbled Godwit	<i>Limosa fedoa</i>
Marsh Wren	<i>Telmatodytes palustris</i>
Merlin	<i>Falco columbaris</i>
Mew Gull	<i>Larus canus</i>
Northern Flicker	<i>Colaptes auratus</i>
Northern Harrier	<i>Circus cyaneus</i>
Northern Pintail	<i>Anas acuta</i>
Northern Shoveler	<i>Anas clypeata</i>
Orange-crowned Warbler	<i>Vermivora celata</i>
Osprey	<i>Pandion haliaetus</i>
Pacific Golden-Plover	<i>Pluvialis fulva</i>
Peregrine Falcon (E)	<i>Falco peregrinus</i>
Pied-billed Grebe	<i>Podilymbus podiceps</i>
Pileated Woodpecker (S)	<i>Dryocopus pileatus</i>
Pine Siskin	<i>Carduelis pinus</i>
Purple Finch	<i>Carpodacus purpureus</i>
Red Crossbill	<i>Loxia curvirostra</i>
Red-breasted Merganser	<i>Mergus serrator</i>
Red-breasted Nuthatch	<i>Sitta canadensis</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Redhead	<i>Aythya americana</i>
Ring-billed Gull	<i>Larus delawarensis</i>
Ring-necked Duck	<i>Aythya collaris</i>
Ring-necked Pheasant (I)	<i>Phasianus colchicus</i>
Ruby-crowned Kinglet	<i>Regulus calendula</i>
Ruddy Duck	<i>Oxyura jamaicensis</i>

APPENDIX 5.
Camp Rilea Wildlife List

COMMON NAME	GENUS/SPECIES
Ruddy Turnstone	<i>Arenaria interpres</i>
Ruffed Grouse	<i>Bonasa umbellus</i>
Rufous Hummingbird	<i>Selasphorus rufus</i>
Rufous-sided Towhee	<i>Pipilo erythrophthalmus</i>
Sanderling	<i>Calidris alba</i>
Savannah Sparrow	<i>Passerculus sandwichensis</i>
Semipalmated Plover	<i>Charadrius semipalmatus</i>
Sharp-shinned Hawk	<i>Accipiter striatus</i>
Snow Bunting	<i>Plectrophenax nivalis</i>
Song Sparrow	<i>Melospiza melodia</i>
Sora	<i>Porzana carolina</i>
Steller's Jay	<i>Cyanocitta stelleri</i>
Surf Scoter	<i>Melanitta perspicillata</i>
Swainson's Thrush	<i>Catharus ustulatus</i>
Tree Swallow	<i>Tachycineta bicolor</i>
Unknown Gull (Immature)	<i>Larus</i>
Varied Thrush	<i>Ixoreus naevius</i>
Violet-green Swallow	<i>Tachycineta thalassina</i>
Virginia Rail	<i>Rallus limicola</i>
Western Flycatcher	<i>Empidonax difficilis</i>
Western Grebe	<i>Aechmophorus occidentalis</i>
Western Gull	<i>Larus occidentalis</i>
Western Meadowlark	<i>Sturnella neglecta</i>
Western Sandpiper	<i>Calidris mauri</i>
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
White-winged Scoter	<i>Melanitta fusca</i>
Wilson's Warbler	<i>Wilsonia pusilla</i>
Winter Wren	<i>Troglodytes troglodytes</i>
Wood Duck	<i>Aix sponsa</i>
Yellow-rumped Warbler	<i>Dendroica coronata</i>

124 species; 1272 detections

Mammals

Bat, Big Brown	<i>Eptesicus fuscus</i>
Bat, Little Brown	<i>Myotis lucifugus</i>
Beaver	<i>Castor canadensis</i>
Cat (I)	<i>Felis catus</i>
Chipmunk, Townsend's	<i>Eutamias townsendii</i>
Coyote	<i>Canis latrans</i>
Deer, Black-tailed	<i>Odocoileus hemionus columbianus</i>
Elk, Roosevelt	<i>Cervus elaphus</i>
Ground Squirrel, Beechy	<i>Spermophilus beecheyi</i>
Jumping Mouse, Pacific	<i>Zapus trinotatus</i>
Mink	<i>Mustela vison</i>
Mole	<i>Scapanus</i>
Mouse, Deer	<i>Peromyscus maniculatus</i>
Muskrat	<i>Ondatra zibethicus</i>
Nutria (I)	<i>Myocastor coypus</i>

APPENDIX 5.
Camp Rilea Wildlife List

COMMON NAME	GENUS/SPECIES
Opposum, Virginia (I)	<i>Didelphis virginianus</i>
Otter, River	<i>Lutra canadensis</i>
Pocket Gopher, Mazama	<i>Thomomys mazama</i>
Rabbit, Brush	<i>Sylvilagus bachmani</i>
Raccoon	<i>Procyon lotor</i>
Rat, Black (I)	<i>Rattus rattus</i>
Rat, Norway (I)	<i>Rattus norvegicus</i>
Shrew, Baird's	<i>Sorex bairdii</i>
Shrew, Marsh	<i>Sorex bendirei</i>
Shrew, Trowbridge	<i>Sorex trowbridgii</i>
Shrew, Vagrant	<i>Sorex vagrans</i>
Skunk, Stripped	<i>Mephitis mephitis</i>
Squirrel, Douglas	<i>Tamiasciurus douglasi</i>
Squirrel, Northern Flying	<i>Glaucomys sabrinus</i>
Vole, Creeping	<i>Microtus oregoni</i>
Vole, Townsend's	<i>Microtus townsendii</i>
Weasel, Short-tailed	<i>Mustela erminea</i>

32 species; 351 detections

Amphibians and Reptiles

Northwestern Salamander	<i>Ambystoma gracile</i>
Rough-skinned Newt	<i>Taricha granulosa</i>
Pacific Chorus Frog	<i>Pseudacris regilla</i>
Red-legged Frog	<i>Rana aurora</i>
Bullfrog (I)	<i>Rana catesbiana</i>
Northwestern Garter Snake	<i>Thamnophis ordinoides</i>
Common Garter Snake	<i>Thamnophis sirtalis</i>

7 species; 1092 detections

- T = state or federally threatened
 E = state or federally endangered
 S = state sensitive
 I = introduced (non-native)

Species Expected to Occur, but not Observed,
Camp Rilea, 1998.

Birds:	Justification ^a
Turkey Vulture (<i>Cathartes aura</i>)	1,2
California Quail (<i>Lophortyx californicus</i>) (I)	1,2
Common Egret (<i>Casmerodius albus</i>)	1,2
Western Snowy Plover (<i>Charadrius alexandrinus</i>)	1
Mourning Dove (<i>Zenaidura macroura</i>)	1,2
Screech Owl (<i>Otus asio</i>)	1,2
Barn Owl (<i>Tyto alba</i>)	1,2
Red-Breasted Sapsucker (<i>Sphyrapicus ruber</i>)	1,2,3
Purple Martin (<i>Progne subis</i>)	2
Common Nighthawk (<i>Chordeiles minor</i>)	2
House Wren (<i>Troglodytes aedon</i>)	1,2
Cedar Waxwing (<i>Bombycilla cedrorum</i>)	1,2
Townsend's Warbler (<i>Dendroica townsendi</i>)	1
Brewer's Blackbird (<i>Euphagus cyanocephalus</i>)	1,2
House Sparrow (<i>Passer domesticus</i>) (I)	1, 2
Mammals:	
Red Fox (<i>Vulpes vulpes</i>)	1,2,3
Spotted Skunk (<i>Spilogale gracilis</i>)	1,2
Long-tailed Weasel (<i>Mustela frenata</i>)	1
Bushy-tailed Woodrat (<i>Neotoma cinerea</i>)	1,2
Porcupine (<i>Erethizon dorsatum</i>)	1
California Myotis (<i>Myotis californicus</i>)	1,2
Mountain Beaver (<i>Aplodontia rufa</i>)	1,2,3
Bobcat (<i>Lynx rufus</i>)	1,2
Amphibians and Reptiles:	
Ensatina (<i>Ensatina eschscholtzi</i>)	1
Long-toed Salamander (<i>Ambystoma macrodactylum</i>)	1
Western Toad (<i>Bufo boreas</i>)	1
Northern Alligator Lizard (<i>Elgaria coerulea</i>)	1

a - 1 = Appropriate habitat exists on the training site, and site is within the distribution range of this species.

2 = This species was observed on lands adjacent (within 1 km) to the training base boundary during 1999.

3 = Evidence of this species past presence was found on Camp Rilea, i.e. Sapsucker bark damage to deciduous trees, anecdotal accounts of Red Fox.

(I) = Introduced (non-native) species

APPENDIX 6

Oregon Natural Heritage Program List of Species of Concern for Camp Rilea

Scientific Name	Common Name	Fed	State	HP	Doc
Mammals					
<i>Arborimus albipes</i>	White-footed vole	SoC	SU	3*	B
<i>Corynorhinus townsendii townsendii</i>	Pacific western big-eared bat	SoC	SC	3	
<i>Eumetopias jubatus</i>	Steller sea lion	LT	SV	3	
<i>Lasionycteris noctivagans</i>	Silver-haired bat		SU	3*	
<i>Martes americana</i>	American marten		SV	3*	
<i>Myotis evotis</i>	Long-eared myotis	SoC	SU	4*	
<i>Myotis thysanodes</i>	Fringed myotis	SoC	SV	3	B
<i>Myotis volans</i>	Long-legged myotis	SoC	SU	3	B
<i>Myotis yumanensis</i>	Yuma myotis	SoC		4*	
<i>Sciurus griseus</i>	Western gray squirrel		SU	3*	
Birds					
<i>Brachyramphus marmoratus</i>	Marbled murrelet	LT	LT	1	
<i>Branta canadensis leucopareia</i>	Aleutian Canada goose	LT	LE	1	
<i>Branta canadensis occidentalis</i>	Dusky Canada goose			4*	
<i>Charadrius alexandrinus nivosus</i>	Western snowy plover	LT	LT	1	B
<i>Contopus cooperi</i>	Olive-sided flycatcher	SoC	SV	3*	
<i>Drycopus pileatus</i>	Pileated woodpecker		SV	4*	
<i>Gavia immer</i>	Common loon			2-ex	
<i>Empidonax traillii brewsteri</i>	Little willow flycatcher	SoC	SV	3*	
<i>Falco peregrinus anatum</i>	American peregrine falcon		LE	1	
<i>Haliaeetus leucocephalus</i>	Bald eagle	LT	LT	1	B
<i>Oceanodroma furcata</i>	Fork-tailed storm-petrel		SV	2	
<i>Pelecanus occidentalis</i>	Brown pelican	LE	LE	2	
<i>Ptychoramphus aleuticus</i>	Cassin's auklet			3*	
<i>Progne subis</i>	Purple martin		SC	3	
<i>Strix occidentalis caurina</i>	Northern spotted owl	LT	LT	1	
Amphibians					
<i>Aneides ferreus</i>	Clouded salamander		SU	3*	
<i>Ascaphus truei</i>	Tailed frog	SoC	SV	3	
<i>Bufo boreas</i>	Western toad		SV	3*	
<i>Dicamptodon copei</i>	Cope's giant salamander		SU	2	
<i>Rana aurora aurora</i>	Northern red-legged frog	SoC	SU	3*	
<i>Rhyacotriton kezeri</i>	Columbia seep salamander		SC	3	

Reptiles

<i>Clemmys marmorata marmorata</i>	Northwestern pond turtle	SoC	SC	2	
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Fish

<i>Acipenser medirostris</i>	Green sturgeon	SoC		3	B
<i>Lampetra ayresi</i>	River lamprey	SoC		4*	
<i>Lampetra tridentata</i>	Pacific lamprey	SoC	SV	3*	
<i>Oncorhynchus clarki clarki</i>	Coastal cutthroat trout	C	SV	3	
<i>Oncorhynchus kisutch</i>	Coho salmon (Oregon coast)	LT	SC	1	Bh
<i>Oncorhynchus mykiss</i>	Steelhead (Oregon coast)	C	SV	1	

Invertebrates

<i>Archilestes californica</i>	California giant damselfly			4*	
<i>Bembidion tigrinum</i>	Cryptic beach carabid beetle			3*	
<i>Cicindela hirticollis siuslawensis</i>	Siuslaw sand tiger beetle			3*	
<i>Deroceras hesperium</i>	Evening fieldslug			1	
<i>Eusattus rectus</i>	Sandbar darkling beetle			3*	
<i>Gomphus kurilis</i>	California clubtail dragonfly			3*	
<i>Hemphillia glandulosa</i>	Warty jumping-slug			2	
<i>Incisalia polia obscura</i>	Hoary elfin butterfly			2	
<i>Lygus oregonae</i>	Oregon lygus bug			2	
<i>Megomphix hemphilli</i>	Oregon megomphix (snail)			1	
<i>Mesovelia mulsanti</i>	Mulsant's small water strider			3*	
<i>Nabidula propinqua</i>	Marsh nabid (bug)			3*	
<i>Ostrea lurida</i>	Native oyster			3*	
<i>Pinalitus solivagus</i>	True fir pinalitus (bug)			3*	
<i>Philocasca oron</i>	Clatsop philocascan caddisfly	SoC		3	
<i>Physella columbiana</i>	Rotund physa (snail)			1	
<i>Platylygus pseudotsugae</i>	Douglas-fir platylygus (bug)			3*	
<i>Plebejus saepiolus insulanus</i>	Insular blue butterfly			1	
<i>Prophysaon dubium</i>	Papillose tail-dropper (slug)			2	
<i>Speyeria zerene hippolyta</i>	Oregon silverspot butterfly	LT		1	D
<i>Vorticifex neritoides</i>	Nerite ramshorn (snail)			3	

Plants

<i>Abronia latifolia</i>	Yellow sandverbena			4*	
<i>Abronia umbellata ssp breviflora</i>	Pink sandverbena	SoC	LE	1	
<i>Carex brevicaulis</i>	Short stemmed sedge			3*	
<i>Carex livida</i>	Pale sedge			2	
<i>Carex pluriflora</i>	Many-flowered sedge			2	

<i>Cimicifuga elata</i>	Tall bugbane	SoC	C	1
<i>Cyperus bipartitus</i>	Shining cyperus			3*
<i>Eriophorum chamissonis</i>	Russet cotton-grass			2
<i>Juncus gerardii</i>	Mud rush			3*
<i>Lilaea scilloides</i>	Flowering quillwort			3*
<i>Lycopodiella inundata</i>	Stiff club-moss			2
<i>Montia howellii</i>	Howell's montia	SoC	C	1
<i>Myrica gale</i>	Sweet gale			3*
<i>Ophioglossum pusillum</i>	Adder's-tongue			2
<i>Plantago macrocarpa</i>	North pacific plantain			2
<i>Poa marcida</i>	Weak bluegrass			4*
<i>Polypodium calirhiza</i>	Hotroot polypody			3*
<i>Samolus parvilforus</i>	Water-pimpernel			3*
<i>Scirpus subterminalis</i>	Water clubrush			2
<i>Sidalcea hendersonii</i>	Henderson's sidalcea			2
<i>Sidalcea hirtipes</i>	Bristly-stemmed sidalcea		C	1
<i>Spirodela punctata</i>	Dotted water-flaxseed			3*
<i>Triglochin striata</i>	Three-ribbed arrow-grass			3*
<i>Utricularia gibba</i>	Humped bladderwort			2
<i>Utricularia minor</i>	Lesser bladderwort			2
<i>Vaccinium oxycoccos</i>	Wild bog cranberry			4*
<i>Viola langsdorfii</i>	Aleutian viola			3*
<i>Wolffia borealis</i>	Dotted water-meal			2
<i>Wolffia columbiana</i>	Columbia water-meal			2
Liverworts				
<i>Diplophyllum plicatum</i>	(no common names)			2
<i>Herbertus aduncus</i>				2
<i>Herbertus sakuraii</i>				2
<i>Metzgeria temperata</i>				2
<i>Plagiochila semidecurrens</i> var. <i>alaskana</i>				2
<i>Radula brunnea</i>				2
Mosses				
<i>Campylopus schmidii</i>	(no common names)			2
<i>Iwatsukiella leucotricha</i>				2
<i>Limbella fryei</i>		SoC	C	1
<i>Tetraplodon mnioides</i>				2
Lichens				
<i>Bryoria bicolor</i>	(no common names)			3*

Bryoria subcana		3*
Erioderma solediatum		2
Hypogymnia pulverata		2
Hypogymnia subphysodes		2
Niebla cephalota		3*
Ochrolechia subplicans		3*
Pannaria rubiginosa		3*
Pseudocyphellaria rainierensis		3*
Telochistes flavicans		2
Usnea hesperiana		3*
Usnea rubicunda		3*
Fungi		
Asterophora parasitica	(no common names)	3*
Bondarzewia mesenterica		3*
Chamonixia caespitosa		3*
Clitocybe senilis		3*
Dichostereum boreale		3*
Elaphomyces decipiens		3*
Nolanea staurospora var. incrustata		3*
Phaeocollybia gregaria		3*
Phaeocollybia lilacifolia		3*
Pseudoaleuria quinaultiana		3*
Radiigera bushnellii		3*
Rhizopogon clavitisporus		3*
Tuber asa		3*

FEDERAL STATUS DEFINITIONS

LE = Listed Endangered. Taxa listed by the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) as Endangered under the Endangered Species Act (ESA), or by the Departments of Agriculture (ODA) and Fish and Wildlife (ODFW) of the state of Oregon under the Oregon Endangered Species Act of 1987 (OESA).

LT = Listed Threatened. Taxa listed by the USFWS, NMFS, ODA, or ODFW as Threatened.

PE = Proposed Endangered. Taxa proposed by the USFWS or NMFS to be listed as Endangered under the ESA or by ODFW or ODA under the OESA.

PT = Proposed Threatened. Taxa proposed by the USFWS or NMFS to be listed as Threatened under the ESA or by ODFW or ODA under the OESA.

C = Candidate taxa for which NMFS or USFWS have sufficient information to support a proposal to list under the ESA, or which is a candidate for listing by the ODA under the OESA.

SoC = Species of Concern. Former C2 candidates which need additional information in order to propose as Threatened or Endangered under the ESA. These are species which USFWS is reviewing for consideration as Candidates for listing under the ESA.

STATE STATUS DEFINITIONS (animals only)

CRITICAL (SC) - Species for which listing as threatened or endangered is pending; or those for which listing as threatened or endangered may be appropriate if immediate conservation actions are not taken. Also considered critical are some peripheral species which are at risk throughout their range, and some disjunct populations.

VULNERABLE (SV) - Species for which listing as threatened or endangered is not believed to be imminent and can be avoided through continued or expanded use of adequate protective measures and monitoring. In some cases the population is sustainable, and protective measures are being implemented; in others, the population may be declining and improved protective measures are needed to maintain sustainable populations over time.

PERIPHERAL OR NATURALLY RARE (SP) - Peripheral species refer to those whose Oregon populations are on the edge of their range. Naturally rare species are those which had low population numbers historically in Oregon because of naturally limiting factors. Maintaining the status quo for the habitats and populations of these species is a minimum requirement. Disjunct populations of several species which occur in Oregon should not be confused with peripheral.

UNDETERMINED STATUS (SU) - Animals in this category are species for which status is unclear. They may be susceptible to population decline of sufficient magnitude that they could qualify for endangered, threatened, critical or vulnerable status, but scientific study will be required before a judgement can be made.

ONHP LIST DEFINITIONS

List 1 contains taxa that are threatened with extinction or presumed to be extinct throughout their entire range

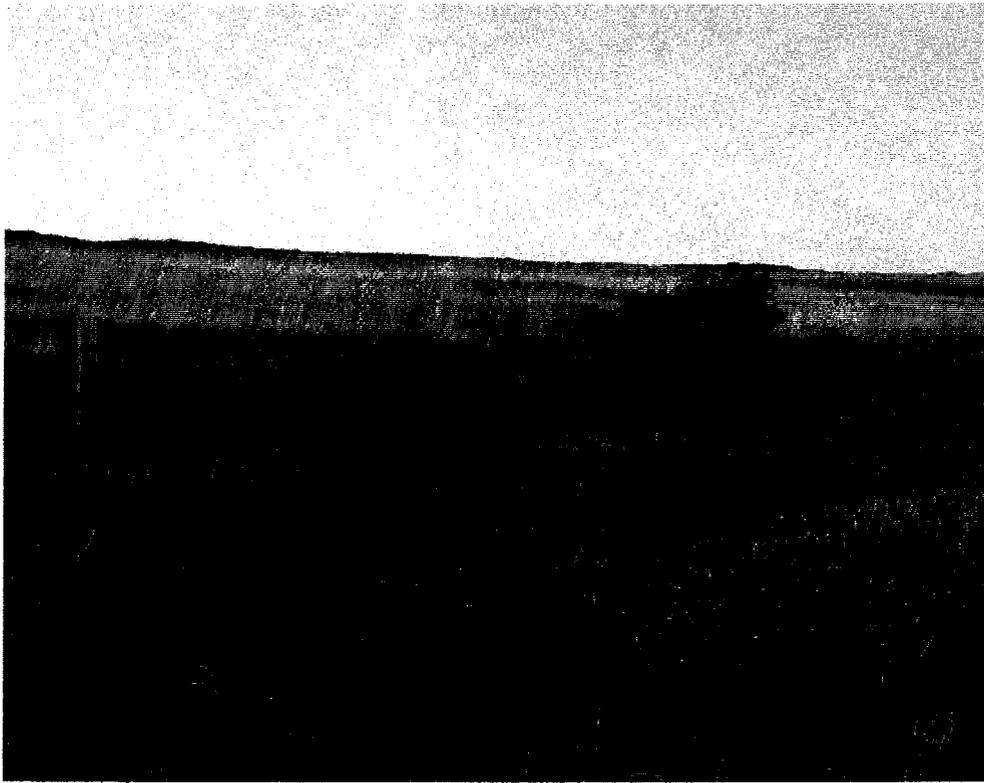
List 2 contains taxa that are threatened with extirpation or presumed to be extirpated from the state of Oregon. These are often peripheral or disjunct species which are of concern when considering species diversity within Oregon's borders. They can be very significant when protecting the genetic diversity of a taxon. ORNHP regards extreme rarity as a significant threat and has included species which are very rare in Oregon on this list.

List 3 contains species for which more information is needed before status can be determined, but which may be threatened or endangered in Oregon or throughout their range.

List 4 contains taxa which are of conservation concern but are not currently threatened or endangered. This includes taxa which are very rare but are currently secure, as well as taxa which are declining in numbers or habitat but are still too common to be proposed as threatened or endangered. While these taxa currently may not need the same active management attention as threatened or endangered taxa, they do require continued monitoring.

An "ex" noted after the HP List number means that it is considered to be extirpated from the state of Oregon, e.g. a species with "1-ex" is considered threatened or endangered throughout its range and is also presumed extirpated from Oregon. A "2-ex" species is more abundant elsewhere but presumed extirpated from Oregon.

APPENDIX 7. Modified Plant Community and Species Photographs



Coastal Zone Meadows



Floating Aquatic



Sweet Gale Wetlands



Forested Wetlands



Non-Native Conifer Forest



Deciduous Forest



Spruce/Fern Forest



Scot's Broom/Beachgrass



Upland Sedge Meadows



Wet Sedge Meadows



Cultivated Grasslands



Big-headed Sedge



Yellow sand verbena



Elk