THE COLUMBIA PLATEAU
ECOREGIONAL ASSESSMENT:

A PILOT EFFORT IN ECOREGIONAL CONSERVATION

Prepared by The Nature Conservancy's Columbia Plateau Ecoregional Planning Team - 1999

THIS REPORT WAS DEVELOPED BY THE NATURE CONSERVANCY'S COLUMBIA PLATEAU ECOREGIONAL PLANNING TEAM

Phase 1 Team: Portfolio Development
Sandy Andelman, Washington Field Office, Project Leader
Kit Gillem, Oregon Field Office
Craig Groves, Western Regional Office
Chris Hansen, Washington Field Office
John Humke, Western Regional Office
Trish Klahr, Idaho Field Office
Linda Kramme, Washington Field Office
Bob Moseley, Idaho Conservation Data Center
Marion Reid, Western Regional Office
Dick Vander Schaaf, Oregon Field Office
Michelle Coad, Volunteer
Chris DeForest, Volunteer

Phase 2 Team: Threats, Strategies and Implementation
Cathy Macdonald, Oregon Field Office, Project Leader
Jeff Baumgartner, Western Regional Office
Jon Hak, Oregon Field Office
Chris Hansen, Washington Field Office
Steve Hobbs, Nevada Field Office
John Humke, Western Regional Office
Trish Klahr, Idaho Field Office
Lou Lunte, Idaho Field Office
Laura Smith, Washington Field Office
Curt Soper, Washington Field Office
Dick Vander Schaaf, Oregon Field Office

Collaborators: Frank Davis and David Stoms,
University of California, Santa Barbara

Funding: The Foster Foundation
Pacific Gas and Transmission
TNC HO, WRO and Field Offices
IBM (to Frank Davis, UCSB)

CONTENTS

APPENDICES

Appendix 1: Conservation Targets

Appendix 2: Existing Conservation Areas

Appendix 3: Experts Workshop Portfolio

Appendix 4: Biodiversity Management Area Selection (BMAS) Model

Appendix 5: First Iteration Conservation Portfolio (January 1998) (**Columbia Plateau Sites.mdb** found on the CD is an Access database that contains basic site information (name, size, ownership, targets) about the conservation portfolio.)

Appendix 6: Lessons Learned

LIST OF FIGURES

LIST OF TABLES

Introduction and Background on the Pilot Project

This report summarizes the process and results of the portfolio selection phase of the Columbia Plateau Pilot Project in Ecoregional Conservation. In 1996, The Nature Conservancy (TNC) adopted Conservation by Design, a framework to assist the Conservancy and others to develop new approaches for more efficient and effective conservation at larger geographic scales.

Both conservationists and academic scientists now recognize that maintaining viable populations of native species and the ecological integrity of large scale natural communities requires a flexible approach for working efficiently at multiple geographic scales. The long-term viability of many imperiled species and natural systems depends on large scale ecological patterns and on processes that transcend individual sites. Maintaining or restoring these processes may require and be best accomplished by strategies that extend beyond the scale of individual sites, and even beyond the scale of individual states or countries. From this perspective, integrating local, site-specific conservation actions with regional scale planning across many sites makes good conservation sense. However, both within and outside the Conservancy there is a wide range of views about what ecoregional conservation might involve, and about how this approach might affect the efficiency and effectiveness of TNC's or others' conservation activities.

The Columbia Plateau project is one of ten pilot projects initially proposed by TNC to help define the organization's approach to working and planning on an ecoregional scale. The project was coordinated by a team of Conservancy staff, with critical input from TNC colleagues, public agency land managers and academic scientists.

The three main goals of TNC's Columbia Plateau project were to:

1) Identify a first iteration of a portfolio of conservation sites that, collectively (and with appropriate conservation actions) could maintain all viable native species and natural communities within this ecoregion;

2) produce a companion conservation plan and report to provide additional context and guidance for use and implementation of the conservation portfolio; and

3) evaluate different approaches to identifying and designing ecoregion-scale conservation portfolios, to inform future ecoregional conservation efforts by TNC or others.

From the beginning of this effort, TNC has recognized that there are numerous opportunities to learn from and potentially also to support and enhance compatible efforts by others, both in this ecoregion (e.g., the Interior Columbia Basin Ecosystem Management Project) and in other regions where the Conservancy works. Thus, the purpose of this report is to document the initial iteration of TNC's Columbia Plateau project and to propose conservation actions that will begin to achieve conservation at the ecoregional scale. The project is dynamic, and will evolve over time as conservation actions occur and as ecological, political and social conditions change.

Conservation Goal for the Columbia Plateau Ecoregion

The conservation goal for the Columbia Plateau Ecoregion is a restatement of the conservation goal found in "Conservation by Design". The goal calls for the long-term survival of all viable native species and community types in the ecoregion.

Overview of the Columbia Plateau Ecoregion

Geographic Setting

The Columbia Plateau is a broad expanse of sagebrush covered volcanic plains and valleys, punctuated by isolated mountain ranges and the dramatic river systems of the Snake, Owyhee, Boise and Columbia. Covering 301,329 km^2 (Figure 1), the Columbia Plateau stretches across the sagebrush steppe of southern Idaho, connecting the Columbia Basin of eastern Washington and Oregon to the northern Great Basin of Nevada, Utah and California. State representation in the ecoregion is varied with Oregon having the largest percentage of the area at 32%, followed closely by Idaho. Nevada and Washington have similar representations (17-18%) but California, Utah and Wyoming have only minor area within the ecoregion (Table 1).

TABLE 1. State Representation within Columbia Plateau Ecoregion

State	Size (Sq. Km)	Percent of Ecoregion
California	5565.0447	1.85
Idaho	89491.5617	29.70
Nevada	51455.9877	17.08
Oregon	96957.8168	32.18
Utah	2089.0641	0.69
Washington	55741.4180	18.50
Wyoming	28.3087	0.01

Elevations range from near sea level at the western end of the ecoregion to over 3000 meters on the highest mountain peaks. Precipitation occurs on a declining gradient from west to east with forest vegetation being supported only at higher elevations. In the rain shadows of mountain ranges there are alkali deserts that receive less than 15 cm of precipitation a year. Geologically and ecologically speaking, much of the ecoregion has quite modern origins dating back only a million years to the Pleistocene.

Biological Values

At least 239 vulnerable plants and animals (species that are considered to be globally threatened with extinction), including approximately 72 endemic plant species, are found in the Columbia Plateau ecoregion. The vulnerable species occur in all habitats and sections of the ecoregion but they are not distributed equally across it. There are concentrations of endemism in unique habitats and there are also concentrations of vulnerable species found in habitats that have been significantly altered by human activities. Some of the most threatened species are invertebrates which are only beginning to be taxonomically defined by experts. In this semi-arid land it is instructive to be reminded that the ecoregion's fisheries are an important part of its diversity. The Columbia River system, first bisecting the ecoregion between Oregon and Washington and then forming the core of its extent in Idaho and stretching all the way into northern Nevada, at one time sustained one of the largest salmon runs in the world. Today, the salmon runs have declined to less than a tenth of their former size due to the effects of dams, diversions, over-fishing and upland habitat degradation. The fisheries in those portions of the ecoregion not in the Columbia River basin are made up of numerous isolated desert fishes that are threatened throughout the ecoregion. The sagebrush steppe ecosystem supports huge herds of pronghorn that still have seasonal migrations and numerous species of birds of prey nest here at higher densities than anywhere else on earth.

Approximately 46 plant community alliances (according to the Gap Analysis Program (GAP) of U.S. Geological Survey) and approximately 450 plant community associations (according to TNC/Heritage classification) occur in the Columbia Plateau (Appendix 1). These plant communities are representative of the incredible biological diversity present in the ecoregion. Over 20% of these plant associations (105 plant community associations) are considered vulnerable by Heritage Programs in the ecoregion. Riparian and aquatic natural communities, that are only now beginning to be classified, represent along with their resident species another aspect of diversity that is yet be fully realized.

Ownership Patterns

Nearly half of the Columbia Plateau ecoregion is owned by the federal government, much of which is managed by the Bureau of Land Management (BLM) (Figure 2). The Department of Energy (DOE) manages two large tracts of land, Hanford Military Reservation and the Idaho National Engineering and Environmental Laboratory (INEEL), that are critical strongholds of biodiversity in the ecoregion. A number of relatively smaller, but ecologically important sites are managed by the U.S. Fish & Wildlife Service as National Wildlife Refuges. Private lands cover a similar percentage of the landscape as public lands but their distribution differs considerably from public lands. Valley bottomlands, stream drainages and the arable lands are all largely in private ownership. Land conversion, mostly to foster intensive agriculture, has occurred to a considerable extent on private lands in the ecoregion. Table 2 shows the percentage of land ownership by section of all major land owners in the ecoregion.

Different sections of the ecoregion display different ownership patterns as well. The Columbia Basin and the Palouse (Sections 342I and 331A) are dominated by private lands with over 75% of the land base in private ownership and much of that in intensive agriculture. The High Lava Plains (Section 342H) is evenly split between private and BLM ownership, again with the private lands used for agriculture. The Upper and Lower Snake River Plains (Sections 342D and 342C) have significant private lands holdings that are largely used for irrigated agriculture but there is a greater amount of land in BLM ownership which has grazing as a dominant use. The Upper Snake River Plains also has one of the large DOE holdings at INEEL. BLM lands cover nearly two-thirds of the western Basin & Range (Section 342BW) in contrast to the eastern Basin & Range (Section 342BE) which has over 40% its lands under US Forest Service (USFS) management, the only section in the ecoregion with significant Forest Service presence.

Table 2. Percent Representation of Agency, Private, Tribal, and State Lands within Ecoregion on a Section Basis.

SECTION	AGENCIES										
	BLM	BOR	DOD	DOE	NPS	PRIV	STATE	TNC	TRIBAL	USFS	USFWS
342I	6.60	1.73	1.26	1.03	0.00	72.67	10.69	0.70	2.28	0.07	2.47
331A	0.20	0.00	0.02	0.00	0.00	84.15	4.72	7.69	1.37	0.83	0.00
342D	49.25	0.38	0.00	3.87	0.79	35.51	3.30	0.01	2.98	0.97	0.73
342H	45.76	0.00	0.00	0.00	0.53	46.09	0.32	0.00	0.00	7.30	0.00
342C	57.00	1.31	0.21	0.00	0.00	25.71	6.40	9.10	4.52	0.00	0.00
342BW	65.90	0.00	0.65	0.00	0.00	21.91	5.55	0.00	1.54	2.64	4.27
342BE	15.62	0.00	0.28	0.00	0.00	36.43	4.39	0.24	0.00	41.67	0.00
FOR ENTIRE ECO REGION	40.45	0.95	0.73	1.21	0.07	45.46	3.57	0.01	2.84	2.76	1.40

Regional Economy

The Columbia Plateau's economic base remains firmly rooted in agriculture and commodity extractive related businesses and industry, although there are strong indications that extractive sectors of the economy are declining in importance. Irrigated agriculture is the most significant economic force in the ecoregion with crops ranging from potatoes and peas to wheat and alfalfa. Agriculture is prominent throughout the Snake River Plains of Idaho and the Columbia Basin which dominates portions of three states: Oregon, Washington, and Idaho. Throughout much of the rest of the ecoregion ranching is the dominant industry. Small family ranches mixed in with larger corporate ranches dot vast areas of the Basin & Range country and the Owyhee Uplands. Industrial development is limited mostly to Boise and the Tri Cities of Washington. One of the largest employers in the ecoregion is the federal government which is tied to its prominent land ownership. Population centers are widely dispersed in the ecoregion with only one metropolitan area, Boise, Idaho, exceeding 100,000 in population. Other cities are growing rapidly, however, with the Tri Cities of Washington (Kenniwick, Pasco, Richland); Bend, Oregon; Moscow, Twin Falls and Idaho Falls, Idaho all likely to become major centers in the near future. Growth is occurring in these population centers but it has not dramatically affected much of the ecoregion which still retains its rural character.

Principal Threats

Principal threats to the maintenance of biodiversity in the ecoregion include:

1. Poorly managed livestock grazing;
2. Changes to large-scale ecological processes such as fires and floods;
3. Invasive exotic species such as cheatgrass;
4. Water withdrawal and other hydrologic alterations;
5. Fragmentation of natural landscapes by agriculture and roads.

Extent of Conservation

Only 3% of the ecoregion has formal management designation that gives priority to maintaining biological diversity. To put this figure in perspective, approximately 3% of the terrestrial land base world-wide is managed for biodiversity (McNeely 1994). Biodiversity designations include Research Natural Area (RNA), Area of Critical Environmental Concern (ACEC), National Wildlife Refuge, TNC Preserve, National Park, Wild & Scenic River, and established Wilderness Area. Of the 3% that is designated for biodiversity protection, a much smaller percentage are adequately designed and managed to maintain that diversity. Many of the existing conservation areas are small, continue to support competing and unbalanced management goals (such as cattle grazing and recreation), and receive only minimal management and monitoring.

Conservancy Experience

Inventory: Biodiversity inventory efforts have not been evenly distributed across the ecoregion, although most state field offices and Heritage Programs have been actively engaged in inventory projects in the ecoregion.

Private Lands Protection: TNC currently owns and manages 25 preserves in the ecoregion, totaling 6,577 acres. A total of 24 target elements (7% of TNC's vulnerable species and community targets for the ecoregion) occurs on TNC lands, including 20 plant and animal species and 4 plant communities.

Public Lands Protection: In Washington state, TNC has worked for several years on public lands projects, including working to secure appropriate management designation of the Department of Energy's Fitzner-Eberhard Arid Lands Ecology Reserve as well as for the designation of the Hanford Reach - the last free-flowing stretch of the Columbia River - as a Wild and Scenic River. In Idaho, TNC recently purchased a ranch in the Owyhee Canyonlands, and has worked with federal agencies for many years to designate Areas of Critical Environmental Concern and Research Natural Areas, including the Snake River Birds of Prey Conservation Area. In Oregon TNC has worked on the Boardman RNA

(Department of Defense), Warner Wetlands ACEC (BLM) and at Hart Mountain National Antelope Refuge (USFWS) and has played a significant role in the identification and designation of RNAs and ACECs on BLM lands. The Nevada field office has several ongoing inventory efforts on Forest Service, USFWS and BLM lands in the ecoregion, and recently, acquired a key private parcel in the Jarbidge drainage.

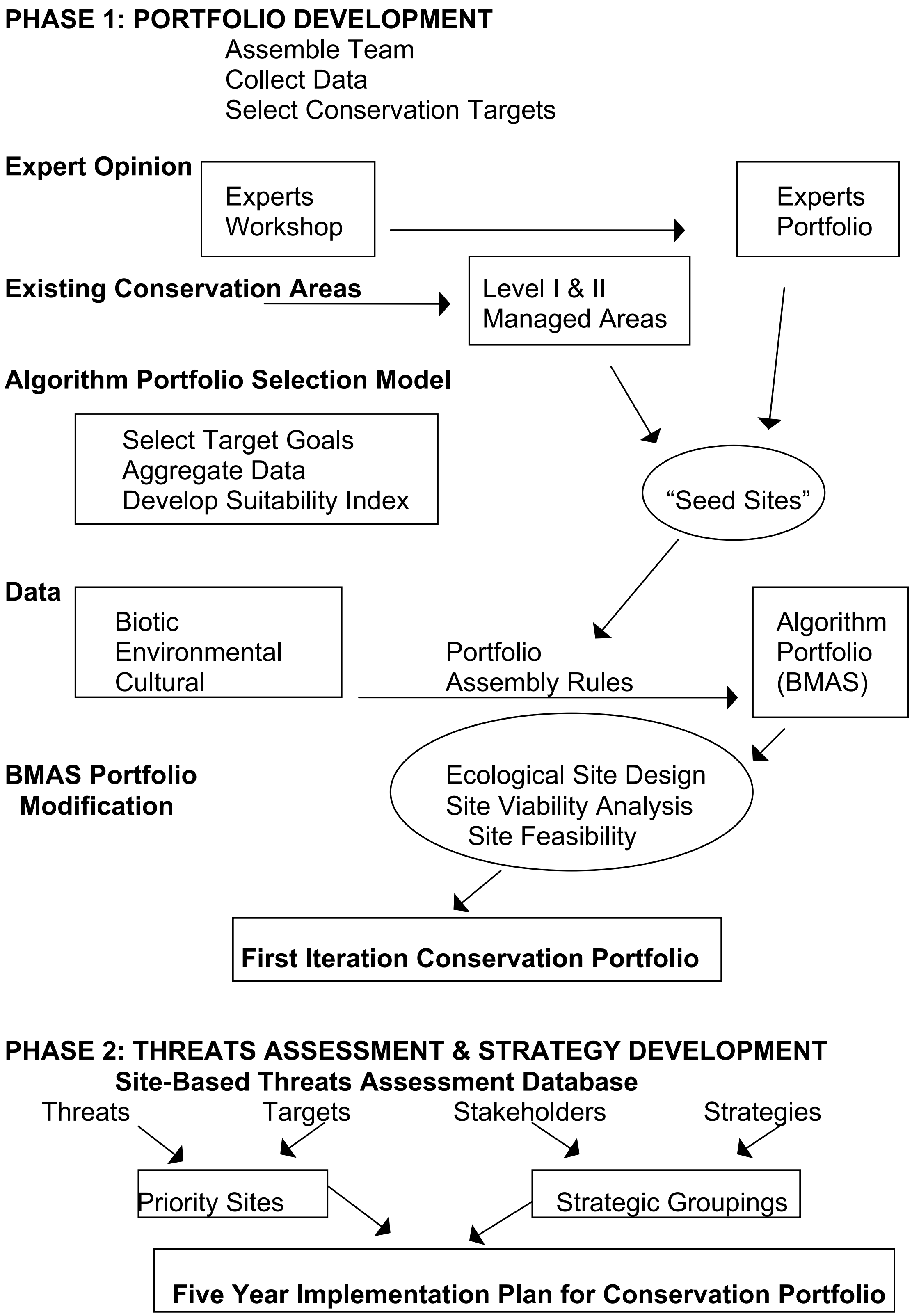
Overview of Columbia Plateau Planning Process

A diagram of the Columbia Plateau planning process is shown in Figure 3. The core planning team was selected from knowledgeable individuals within TNC field offices and Heritage Programs within the ecoregion. In addition, there was representation on the team by the Western Regional Office and the Western Regional Heritage Task Force. At the outset of the planning process, two distinct and sequential planning phases were envisioned: Phase 1, to develop the first iteration of the conservation portfolio; and Phase 2, to conduct a threats assessment of the portfolio sites and craft strategies and an implementation plan. As the process evolved and the portfolio development phase was taking place, it was decided to utilize a second planning team to work on the threats and strategies phase of the plan. This Phase 2 team included several members of the Phase 1 team as well as other persons who did not participate in the Phase 1 aspects of the planning process. All members of both planning teams are listed at the beginning of this document.

Because this was a pilot effort, there was some experimentation with different approaches to compiling data and assembling the portfolio of sites. After a first “credible iteration” of the portfolio was developed, the threats assessment process was begun, again using some experimentation of different approaches to arrive at the ultimate format for the assessment and subsequent strategies development. The threats assessment process was designed in such a way as to drive the conservation strategies and implementation phase of the ecoregional assessment.

Data compilation took the form of developing data sets that were compatible with Geographic Information System based (GIS) computer analysis. Some data layers were acquired directly as GIS files from various sources, other data layers were created through conversion of database files into GIS files, and still other sources of information had to be converted from text files to maps and then digitized into GIS data layers. Considerable effort was expended in making data sets complete and compatible. All information was stored and analyzed in ARCINFO/ARCVIEW compatible formats.

Figure 3. Columbia Plateau Planning Process



Three interrelated approaches were used to assemble draft portfolios that resulted in the final portfolio or first iteration of conservation sites. The approaches were, (1) experts workshop; (2) Biodiversity Management Area Selection (BMAS) model developed by the Frank Davis lab in the Institute of Earth System Sciences at the University of California, Santa Barbara; (3) BMAS with modifications made by the planning team and other persons knowledgeable with the ecoregion. The BMAS modeling process, using information derived from the experts workshop, was the ultimate source of the conservation portfolio after site modifications were made by members of the core planning team. The GIS was also used to compare the results of the different portfolio assembly approaches.

The BMAS modeling approach tested various methods for developing a conservation portfolio for the ecoregion. These methods included (1) TNC's fine filter concept which focuses on rare species as a means for protecting biodiversity; (2) TNC's coarse filter concept which focuses on protecting communities and ecosystems as surrogates for the species which inhabit them; and (3) a combined fine filter/coarse filter approach. More information regarding the BMAS model and the approaches used in its development can be found in the Davis et al paper included in Appendix 3.

The portfolio assembly process, the approaches taken, and the resulting conservation portfolios are explained in detail in later sections of the report.

Threats assessment, conservation strategies development and plan implementation were organized within a GIS environment utilizing a comprehensive site-based database. The database facilitated rapid analysis of multi-site threats, interested parties, and conservation targets. The database also analyzed and made comparisons of numerous sites that could employ similar conservation strategies.

Gathering the Data and Setting Conservation Targets

Ecoregion Boundaries

The boundaries of the Columbia Plateau Ecoregion are based on the US Forest Service ECOMAP framework map (Bailey et al 1994) as modified and adopted by TNC as the base map for TNC ecoregional units across the United States (Geography of Hope, TNC, 1997). The Columbia Plateau Ecoregion is derived from Bailey's Intermountain Semi-Desert Province #342. The Columbia Plateau team further modified the ecoregional boundaries by including the Palouse Prairie section (#331A) of Eastern Washington and Western Idaho in the ecoregion and omitting the disjunct portion of ecoregion that occurs in Wyoming (sections #342E, 342G, 342F, 342A). A minor modification was made to section #342B, Northwestern Basin and Range, effectively splitting it into eastern and western halves denoted by 342B-E and 342B-W section numbers. The exact boundaries of the ecoregion were refined slightly to conform to landform and vegetation patterns in the ecoregion.

The modified TNC ecoregion which was originally called the Intermountain Semi-Desert Province was re-named the Columbia Plateau Ecoregion to better represent the geographic landscape it covered. The Columbia Plateau includes the lower elevation portions of the Columbia Basin as well as the northern portion of the Great Basin, the Palouse, and the Snake River Plains. The Columbia Plateau ecoregion is distinguished by its sagebrush steppe dominated vegetation which rarely includes expansive montane coniferous forests. The US Forest Service's Interior Columbia Basin Ecosystem Management Project (ICBEMP) includes these coniferous forests and thus covers a broader geographic area than the Columbia Plateau project.

The Columbia Plateau Ecoregion included the following Bailey sections as modified by TNC:

331A	Palouse Prairie section
342I	Columbia Basin section
342H	High Lava Plains section
342B-W	Northwestern Basin and Range section-West
342B-E	Northwestern Basin and Range section-East
342C	Owyhee Uplands section
342D	Snake River Basalts section

Data Sources

Sources of data on the status and distribution of elements of biological diversity included:

- State Natural Heritage Programs (California, Idaho, Oregon, Nevada, Utah, Washington)
- Interior Columbia Basin Ecosystem Management Project (US Forest Service)
- Gap Analysis Program of the U.S. Geological Survey
- State Departments of Fish and Wildlife (Oregon, Washington, Idaho, Nevada)

Other data sets that were used in the portfolio analysis included:

- Environmental Data: elevation, rainfall, fire regimes, erosion potential, stream recovery potential
- Human Use and Impacts Data: predicted road density, mining claim density, population density, agricultural land conversion, current fire regime, land ownership.

Data sources are discussed in more detail in Appendix 1-A: Gathering the Pieces.

Data Management

Data management responsibilities reside with the Oregon Field Office in its GIS shop which is shared with the Oregon Natural Heritage Program. Three types of data are maintained in electronic formats:

1) Database files
2) GIS import files
3) GIS project files

The Database files consist of information that is organized around the first iteration conservation portfolio. These files include information about conservation targets, vegetation targets, threats and conservation strategies related to the portfolio sites. GIS import files are the files which came from the Data Sources cited above and include Heritage element occurrences (EOs), GAP vegetation coverages for the ecoregion, and other environmental data. The GIS import files are generally not specific to the conservation portfolio; they typically pertain to the ecoregion, overall. Finally, the GIS project files are files which have been created by TNC for the purposes of analysis and display. The project files utilize the database files and/or the GIS import files in a GIS format to provide site selection information, threats analysis, and map displays.

Plants

Natural Heritage Program botanists from Idaho, Washington and Oregon met in September 1996 to draft the list of vulnerable plant species for the Columbia Plateau ecoregion. At that time it was decided to include all G1-G3 species and all G4-G5, S1-S3 species as conservation targets (Appendix 1). Collectively, 349 plant species are tracked in this ecoregion by the six state natural heritage programs. Of these, 189 species are considered globally rare (i.e., they are ranked G1 - G3), and 160 are considered rare at the scale of one or more individual states (i.e., G4 - G5, S1 - S3). Many (n=72) of the G1 - G3 plants are endemic to the Columbia Plateau and most of these are endemic to a single section of the Columbia Plateau ecoregion. At the time of portfolio assembly it was decided to only include the G1-G3 plant species in the assembly process as the data set was too large and unwieldy when the S1-S3 species were included. It was assumed that a coarse filter approach would take into account the representativeness of the state sensitive (S ranked) plant species. During the analysis phase of the project, no attempt was made to determine if this assumption was well founded.

Invertebrates

All invertebrates with global ranks of G1, G2 or G3 are considered conservation targets (Appendix 1) in the Columbia Plateau. This list undoubtedly excludes many imperiled invertebrates, however relevant data are lacking for most invertebrate species. For the purposes of the site selection process 48 invertebrate species, including both terrestrial and aquatic species, were considered as conservation targets. Available data for many of these species is considered incomplete. For instance, the data set included only one known occurrence per section for most G1 - G3 terrestrial invertebrates, and only a few invertebrates had more than 3 known occurrences per section.

Terrestrial Vertebrates

Six hundred and nine terrestrial vertebrate species (9 G1s, 6 G2s, 15 G3s, 55 G4s, 524 G5s) occur in the Columbia Plateau, (Natural Heritage Program network 1996). After review by heritage program scientists, a total of fifty-seven species, excluding fish species, were selected as conservation targets. Selected targets included 12 herptile species, 30 species of birds and 15 mammals (Appendix 1). Species not known to breed in the ecoregion, those with greater than 95% of their distribution outside the ecoregion (e.g., kit fox, Yellow-billed Cuckoo), or those for which habitat was only minimally included within the ecoregion (e.g., Ruby-crowned Kinglet which depends on forest habitats) were eliminated from the list of potential conservation targets.

The final list of target vertebrates includes all rare and/or vulnerable vertebrates. Species with global ranks of G1, G2 or G3 in the Natural Heritage Database; G4 and G5-ranked species with documented population declines; endemic species;

species with documented threats; and G4 and G5-ranked neotropical migratory songbirds that had documented declines as determined in the Partners in Flight Breeding Bird Survey data were all considered vulnerable and were potential candidates for conservation target status. The status of bats, amphibians, and reptiles could not be determined from information in the Heritage database. For these species, expert opinion was relied on to determine rarity and/or vulnerability. It should be noted that Heritage Programs did not have element occurrence information for nearly 70% of the target vertebrates, making it impossible to assess how well the conservation portfolio protected these species.

Aquatic Vertebrates

Heritage Programs were initially contacted in order to compile a list conservation targets in this group. This resulted in a list of 80 species, some of which were common species (G5 rank) and included 28 exotic species as well. A more complete list of aquatic vertebrates was located with the Interior Columbia Basin Ecosystem Management Project (ICBEMP). The ICBEMP list included 91 native species and it noted those which were narrow endemics as well as those which had some associated conservation status such as federally listed, state listed or were considered candidates or sensitive species. The Heritage list and the ICBEMP list were then compared and all species occurring on either list that were narrow endemics or had some conservation status were retained.

For the site selection process 44 fish species were included as conservation targets, however, 72% species had no EOs associated with them. Because of this, the algorithm-based site selection assessment (BMAS) did not have adequate data to represent sites for aquatic vertebrate occurrences. Refinement of the aquatic vertebrate conservation target list, particularly with regards to runs of anadromous fish, will be a priority for the next iteration of the Columbia Plateau ecoregional assessment.

The lack of aquatic data was addressed in the project by using surrogates in the site selection process. Surrogates used for vulnerable aquatic species as well as riparian and aquatic communities came from ICBEMP which developed an Aquatic Integrity Index for the project. The Index classified watersheds as having high, medium or low aquatic habitat integrity which is thought to correlate well with aquatic species diversity. A watershed with high aquatic integrity has a mosaic of well-connected, high quality water and habitats that support a diverse assemblage of native and desired non-native species, the full expression of potential life histories and dispersal mechanisms, and the genetic diversity necessary for long-term persistence and adaptation in a variable environment (ICBEMP 1996).

Plant Communities

There are a total of 449 plant associations documented or suspected to occur in the ecoregion, based on the TNC regional classification for plant associations

(TNC-WRO 1996). Out of these nearly 450 associations, there are 113 G1 and G2 associations which form the basis for conservation targets for vulnerable plant associations in the ecoregion. The vulnerable associations include Granks of: G1, G1?, G1Q, G1G2, G2, G2? & G2Q; they are listed as Rare and Uncommon plant associations in Appendix 1. Of these G1-G2 associations, 32 associations are considered to be restricted to the Columbia Plateau Ecoregion (Appendix 1). Heritage ecologists recommended not including G3 ranked plant associations with the more vulnerable associations (G1 and G2) because it would have greatly increased the number of conservation targets, many for which there were no EOs.

For these ranked associations we have Element Occurrence Records (EOs) for 71 associations while 42 associations have no EOs. There are a total of 169 EOs for G1 & G2 plant associations of which 28 of the EOs date back to 1980 or older. A large number of the EOs are for plant associations that occur within existing protected areas such as RNAs and ACECs. Because of the anomaly of the data, site selection based on rare plant community occurrences will be biased towards the existing protected areas.

Conservation targets for plant associations also included representatives of more common associations (G3, G4, and G5 ranks). These more common associations were crosswalked with GAP cover types and the GAP cover types were then used as surrogates for the more specifically defined plant associations.

The GAP vegetation maps which are the basis for the vegetation layer in the GIS were developed through an involved process that required extensive edge mapping of adjoining states' GAP vegetation maps. The process also required that cover types agree across state lines and that the mapping resolution was relatively uniform. For a more complete description of this process see Stoms et al. (1997) that is included in Appendix 4.

Viability Analysis

Viability analysis for occurrences of conservation targets is important to provide a reasonable level of assurance that sites selected on the basis of the presence of particular targets will remain viable into the foreseeable future. Given adequate data on occurrences that are recorded in the Heritage databases the EO rank provides such an assessment. However, within the Columbia Plateau data sets many target species EOs have not been assigned ranks and most target community EOs do not have ranks. Therefore, the viability of target occurrences was assessed using more indirect measures. For vulnerable species (G1-G3), all element occurrences in the Natural Heritage database not reconfirmed by ground truthing since 1980 were excluded from the analysis under the assumption that the occurrence may no longer be present. Other element occurrence records lacking critical information such as date, location or observer were excluded from the data sets.

In contrast to EOs for vulnerable species, “historic” occurrences (pre -1980) for vulnerable plant associations (G1-G2) were not excluded from the data sets because most of the occurrences are still likely to occur where they were found in the past. The exclusion of pre-1980 plant community EOs would have resulted in nearly half of the community EOs not being used in the analysis, thereby making the site selection process quite insensitive to vulnerable communities.

Establishing Levels of Representation for Conservation Targets

Ecologists agree that some level of replication or redundancy in representing each conservation target within a portfolio of sites is essential. With more examples of each element in the portfolio, it is more likely that the full array of genotypic and/or phenotypic variation within that element will be maintained, the likelihood of catastrophic loss may be reduced, effective population sizes may be increased, and for some species, metapopulation structures may be enhanced (e.g., Soule & Simberloff 1986; Lande & Barrowclough 1987; Noss 1995). However, the importance of redundancy will vary both within and among ecosystems. For example, in highly fragmented or converted landscapes, where there is “less room for mistakes,” greater redundancy may be more critical than in relatively intact ecosystems. Moreover, ecological considerations need to be balanced against the increased area and costs of greater levels of redundancy.

Although ecologists agree that some redundancy is essential when deciding how many sites to protect for a species or ecosystem, there is little agreement about the optimal level of redundancy. For example, for natural land systems in New South Wales, Pressey and Nicholls (1989) applied a flexible level of replication, from one to five sites per conservation target, depending on the frequency of known occurrences; in Latin America and the Caribbean, Dinerstein et. al. (1995) proposed that three replicates of each habitat type is sufficient; whereas in Florida, based on extrapolations from Lande & Barrowclough, Cox et. al. (1996) conclude that for vertebrates ten replicates is required.

In principle, the number of replicates required to ensure persistence should depend on the level of biodiversity under consideration (e.g., a single species vs. a vegetation community), the spatial and temporal pattern and distribution of the target, as well as its vulnerability to ecological change (such as fragmentation, conversion, catastrophes, etc.). However, in practice, data for specific conservation targets are rarely sufficient to complete these kinds of evaluations on a case by case basis.

To help determine appropriate levels of representation for conservation targets in the Columbia Plateau, we plotted the probability of losing all known sites within a section for an element $(p_s)^N$ as a function of the probability of losing a single site for that element (p_s) and the number of protected sites for that element in the section (N).

Vulnerable Species
For occurrences of vulnerable plant and animal species, target levels of representation were based simply on the number of occurrences, since, for most species, data on population size or aerial extent of the occurrence were not available. It was not possible to base levels of representation on EO ranks for targets (i.e. only A or B ranked occurrences will be used for meeting conservation goals) as many EOs were not ranked.

Plants
For G1 - G3 plants endemic to a single section of the Columbia Plateau, the conservation goal was to represent all known occurrences up to a total of five occurrences per section, in the portfolio.

For more widespread G1-G3 plants (i.e., those occurring in two or more sections), the conservation goal was to represent up to a total of three occurrences per section in the portfolio.

Vertebrates
For those G1 - G3 vertebrates (terrestrial and aquatic) restricted to a single section, the goal was to represent all known occurrences up to five per section in the conservation portfolio. For more widespread vertebrates (i.e., those occurring in two or more sections), the goal was to represent all known occurrences, up to a total of three per section. These representation goals mimic those of target plant species with similar element ranks.

Invertebrates
Maintaining invertebrate populations typically requires little land, and therefore the cost of redundancy should be low for most invertebrates relative to other taxa. An arbitrary goal of representing all known occurrences of each G1 and G2 invertebrate per section within the portfolio was utilized in the site selection process. For G3 invertebrates the goal was to represent all known occurrences up to a total of five per section within the portfolio. It should be noted that only 5 G1-G2 invertebrate species (out of a total of 15 species) had more than 5 EOs, thus protecting all G1-G2 species occurrences was not unduly biasing the portfolio.

This representation goal should be reconsidered in future iterations of the portfolio in light of increased data for this group of species.

Rare Plant Communities
Rare plant community targets were split into two main groups: rare communities (G1, G2) and more common communities (G3, G4, G5). For the group of rare communities, sites were identified using EO data from the Natural Heritage

Programs. As noted previously, nearly half of these rare communities had no EOs associated with them and thus a significant "data gap" occurs for these biodiversity elements. Some of these communities will be captured along with more common communities in the process described below.

The more common communities were crosswalked with the GAP cover type map at the section level in order to use the GAP types as surrogates for the more common communities. Although the GAP map is not differentiated at the section level, this crosswalk process allows for the analysis of these communities x GAP type x sections.

Finally, the GAP cover types based on natural vegetation were categorized into 4 groups to take into consideration the following factors:

a. Overall regional distribution.
b. Value of the cover type and communities in it as "coarse filters".
c. Relative rarity of the cover type and communities in it.
d. Pattern of distribution within the Columbia Plateau, focusing on whether the types occur in small patches or cover large areas.

Determination of the coarse filter value of cover types was made by Heritage ecologists based on their individual and collective knowledge. Species diversity of the particular cover types was an important criteria as was habitat uniqueness and the possible implications this may have for ecological values such as future speciation potential and genetic diversity.

The GAP alliances or cover types included within each of these Groups are displayed in Table 3 below.

Table 3. Representation Goals for GAP Land-Cover Types

Land-cover type	**Mapped Distribution (km^2)**
Group A - coarse-filter < 500 km^2 (50% goal)	
Seasonally/temporarily flooded cold-deciduous forest	382
Populus tremuloides woodland	184
Quercus garryana woodland	463
Non-tidal temperate or subpolar hydromorphic rooted vegetation (marsh and wetland)	482
Sparsely vegetated sand dunes	345
Sparsely vegetated boulder, gravel, cobble, talus rock	69
Group A - coarse filter > 500 km^2 (25% goal)	
Pinus ponderosa woodland	5,804
Artemisia rigida dwarf shrubland	700

Temperate deciduous shrub types -- Mountain brush	2,027
Cercocarpus ledifolius or *C. montanus* shrubland	516
Purshia tridentata shrubland	1,140
Seasonally/temporarily flooded cold-deciduous shrubland	1,279
Sarcobatus vermiculatus shrubland	3,576
Seasonally/temporarily flooded sand flats	1,670
Group B - small patch communities (20% goal)	
Abies species (*A. concolor, A. grandis* or *A. magnifica*) forest or woodland	1,397
Picea engelmannii and/or *Abies lasiocarpa* forest or woodland	83
Pseudotsuga menziesii forest	2,149
Populus tremuloides forest	740
Pinyon woodland (*Pinus edulis* or *P. monophylla*)	165
Pinyon-juniper woodland (*Pinus edulis* or *P. monophylla* with *Juniperus osteosperma* or *J. scopulorum*)	193
Pseudotsuga menziesii woodland	27
Artemisia cana shrubland	536
Artemisia tripartita shrubland	3,696
Artemisia nova dwarf-shrubland	164
Group C - large patch communities (10% goal)	
Juniper woodland (*Juniperus osteosperma* or *J. scopulorum*)	2,101
Juniperus occidentalis woodland	18,380
Artemisia tridentata ssp. vaseyana shrubland	17,181
Artemisia arbuscula-A. nova dwarf shrubland	1,816
Artemisia tridentata-A. arbuscula shrubland	45,144
Artemisia tridentata shrubland	64,574

Land-cover type	**Mapped Distribution (km^2)**
Mixed salt desert scrub (*Atriplex* spp.)	11,304
Dry grassland - *Pseudoroegneria* (*Agropyron*)-*Poa*	15,671
Moist grassland - *Festuca*	2,671
Group D - peripheral communities (0% goal)	
Pinus contorta forest	176
Pinus ponderosa forest	153
Pinus ponderosa-Pseudotsuga menziesii forest	784
Pinus monticola-Thuja plicata forest	20
Pinus flexilis or *P. albicaulis* woodland	104
Pinus contorta woodland	22
Pinus jeffreyi forest and woodland	2
Alpine tundra	3
Wet or dry meadow	30

Group E - cultivated, developed types and water (0% goal)

Agropyron cristatum seedings, *Poa pratensis*, hayfields, and Conservation Reserve Program lands	8,169
Annual grasses - *Bromus tectorum*, etc.	10,177
Urban or human settlements and mining	1,201
Agriculture	69,820
Water	3,568

Goals for Plant Communities

1. For those G1 through G2 communities for which EOs are available, it was desirable to include all those locations in the selected sites. There are some of these communities for which many EOs exist, but typically they are small, fragmented patches of once extensive vegetation types (e.g. Palouse grassland types). Rare communities or which there are no EOs will be identified for future inventory and protection efforts.

2. The more common associations were treated as components of the GAP cover type surrogates. Goals identified below that call for a percent representation are on a *per section basis.* The cover types were grouped into the following 4 groups based on factors stated previously. Representation goals for these groups reflect both the coarse filter values attributed to the cover types as well as the overall rarity of the types and their patch size. In other words, the higher the coarse filter value, the more rare the type, and the smaller the patch size of the type then the representation goal is correspondingly higher on a per section basis.

Group A: Those which have high (1) or medium (2) coarse filter value, and typically occur in small patches in the landscape. Most of these are restricted to unusual substrate or hydrologic conditions (or maybe even disturbance regimes), and/or are limited in their distribution and so need to be protected in the Columbia Plateau.

Goal A: 50% for types less than or equal to 500 sq. km,
25% for types greater than 500 sq. km

Group B: Those which have medium coarse filter value (2) and occur in relatively small patches. This is an interesting group of alliances, and contains 2 different patterns of vegetation types: those that are “disjunctly peripheral” to this ecoregion, and yet cover large areas and are important; and some of the less common *Artemisia* alliances with limited ranges of distribution. Most of these have total areas of < 500 sq. km.

Goal B: 20% per section

Group C: All those with high (1) to medium (2) coarse filter value and typically found in big patches. This includes the vegetation types that really "distinguish" the Columbia Plateau from surrounding mountainous ecoregions: *Juniper* Woodlands, *Artemisia* shrublands, big sage - low sage mixed shrublands, *Atriplex* salt desert, perennial grasslands. Most of these are very heterogeneous containing many associations. Several of them cover >10,000 sq. km and all are over 1000 sq. km in area in the Columbia Plateau. Interestingly, most of these are very poorly represented in Level 1 or 2 management areas.

Goal C: 10% per section

Group D: Those which have low (3) coarse filter value and which are mostly in small patches. These are primarily vegetation types which are only peripherally in the CP ecoregion because of the vagaries of the boundaries. Their primary range of distribution is outside of this ecoregion, and so most protection will not occur in the CP.

Goal D: Goal implemented was 0%

SUMMARY OF REPRESENTATION GOALS FOR CONSERVATION TARGETS

Rare Species (G1-G3) and Rare Communities (G1-G2)

If target occurs only in 1 section: All occurrences up to 5 per section

If target occurs in 2 or more sections: Up to three occurrences per section

Representative Vegetation (% of cover type on a per section)

Group A:	50% for types less than or equal to 500 sq. km 25% for types greater than 500 sq. km
Group B:	20%
Group C:	10%
Group D:	0%

Evaluating Existing Conservation Areas

Existing conservation areas within the Columbia Plateau Ecoregion account for approximately 3% of the landscape. These sites are a subset of a much greater number of sites that fall under a wide variety of management designations. All designated sites were individually evaluated as to their contribution towards the conservation of biodiversity and the complementarity of the goals of their management plans, when such plans exist. The ranking of conservation sites followed the guidelines outlined in Chapter 6 of "Geography of Hope" with all sites being assigned to categories I-IV; Level I sites having the greatest conservation value regarding biodiversity conservation and Level IV being of least value[1]. Sites ranked Levels I and II were compiled into a GIS data layer of conservation areas that was used in the final portfolio analysis for the Columbia Plateau project. Nearly all of these sites were incorporated into the final portfolio with only a few exceptions. Figure 4 shows the existing conservation areas in the Columbia Plateau that have identified conservation Levels of I and II.

The principal sources of information and instruction used in evaluating existing conservation areas were:

1. GAP Management Status (GIS Data Layer provided by the Biogeography Lab - University of California at Santa Barbara).

2. Natural Areas GIS data layer clipped to the TNC Columbia Plateau Ecoregion from the BVBNAT GIS Data Layer provided by Angela Evenden, US Forest Service, Missoula, MT.

3. "Evaluating the Contribution of Existing Conservation Areas," draft chapter for TNC's Geography of Hope guidelines.

4. Management level (1-4) rankings for the natural areas listed in item 2. (above) provided by: Idaho - Bob Moseley, Nevada - Steve Hobbs, Oregon - Dick Vander Schaaf, and Washington - Curt Soper.

Conservation areas included in the final portfolio are listed by site name in Appendix 2 with accompanying information regarding site designation and ownership, size, state and section in which they occur. Also included in Appendix 2 is supplementary information regarding procedures used to create the conservation areas data layer.

Of the 338 plant and animal species targeted by TNC as conservation priorities in the Columbia Plateau, less than 10% occur within existing protected areas.

---

[1] Reference Appendix 2 for an explanation of reasons for deviating from the standard Level 1 - Level IV Managed Area ranks.

Expert Opinion

Even in a relatively data rich ecoregion such as the Columbia Plateau, there continues to be large gaps in the data contained in established data sets that were heavily relied upon for the algorithm site selection process. A way to capture ecological information that does not currently exist in Heritage Programs is to solicit expert opinion regarding conservation targets and potential sites for conservation actions. Convening a workshop of knowledgeable experts to supplement available digital data proved particularly useful for the Columbia Plateau project, and is already being replicated by the Conservancy in other ecoregions. In addition to insuring consideration of the most up to date information in the portfolio assembly process, involving regional experts in the process enhances the credibility of the TNC's efforts, and builds an important constituency for the organization's work within the ecoregion.

Workshop Goal

Develop a list of sites in the Columbia Plateau ecoregion that, if managed for conservation, will protect the full range of biodiversity in the ecoregion.

Workshop Attendees

Over fifty experts attended from diverse organizations such as Natural Heritage programs, BLM, USF&WS, State Fish and Wildlife Programs, universities, private consulting firms, and TNC. Members of the Columbia Plateau Core Planning Team, other TNC staff and volunteers served as panel facilitators, recorders, and mapping coordinators.

Process

DAY 1: After a brief description of TNC's ecoregional planning efforts, the Columbia Plateau project goals and workshop goals, participants divided into panels organized around the following six topics: plants and plant communities; mammals; birds; herptiles; terrestrial invertebrates; and fish and aquatic communities.

Each panel had both a facilitator and recorder. A training session was conducted prior to the workshop for facilitators and recorders to make the panel sessions as smooth and productive as possible. Facilitators kept panels on task and ensured equal opportunity for participants to discuss sites. Recorders took notes on site selection rationale, discussion of specific species and communities, threats, data gaps, and other issues.

Experts had been asked to come prepared to nominate and map the most important sites in the ecoregion, both for conservation "targets" (i.e., G3 and above species and communities) and for representative sites (i.e., excellent examples of more common plant/animal communities). Lists of conservation targets were provided to panel members for each of the six categories. Experts were asked to bring maps and complete a Site Nomination Form describing the significance and threats for each nominated site .

Each panel accomplished the following:

- reviewed and modified conservation targets lists
- mapped approximate boundaries of nominated sites on mylar overlay of 1:500,000 scale map of the ecoregion
- labeled each mapped site to match its corresponding Site Nomination Form
- discussed threats and opportunities at sites
- discussed data gaps
- suggested other experts to contact

After each panel finished mapping sites, their task for the day was complete. That evening, several Core Team members and colleagues consolidated the sites onto one mylar overlay, using different colors to distinguish the six categories. Three copies of this consolidated mylar were made for use during the Day 2 sessions.

DAY 2: All participants convened to look at the composite map of nominated sites. The experts were eager to see the combined results of the panels' work. Participants were invited to offer comments on the previous day's effort. A lively discussion followed about how to tackle the next step: synthesizing the site information. There was much discussion of whether and how to consolidate overlapping site boundaries, and about whether to group concentrations of smaller sites into larger macrosites. There was also a suggestion to reach consensus on "crown jewel" sites in the ecoregion.

The participants split into three groups, each with a mixture of expertise. Each group evaluated a different portion of the ecoregion and attempted to identify the following: common threats and processes for sites; "crown jewel" sites; resources available to help with biodiversity protection; and data gaps. The groups also attempted to answer, "With the sites now mapped, can we say we have captured the full range of biodiversity within the ecoregion?" This question allowed experts to better apply the information they had provided the day before, but it still proved difficult for groups to address. All groups recognized this portion of the workshop as important but were somewhat frustrated with their end product.

Products/Follow Up

- Over 250 sites were nominated by workshop panels that, after eliminating duplications, resulted in approximately 120 discrete areas.
- Each site was digitized into GIS, and separate data layers were created for each of the panel categories.

- Panel minutes and list of workshop participants were sent to each panel member for edits/corrections
- Panel minutes were summarized and distributed to the Core Team.

An analysis of the portfolio compiled by the experts workshop which is a compilation of all sites nominated by all of the panels, after eliminating duplicate sites, is contained in Appendix 3. Lists of Conservation Targets met by groupings of 1-5 panels and 3-5 panels are included in the Appendix.
In general the 3-5 panel grouping resulted in meeting fewer of the Conservation Targets than the 1-5 panels grouping which incorporated results from the panels which chose to nominate sites. The terrestrial invertebrates panel nominated few sites, choosing to rely on a more coarse filter approach to protect biodiversity within this diverse group of species. At the other end of the spectrum, the Aquatics panel chose sites that more often than not were entire watersheds, covering a significant portion of the entire ecoregion. The Aquatics panel also noted that the ecoregion boundaries, by not being drawn on watershed lines, would not serve conservation efforts well.

Sites selected by at least four experts workshop panels were used to develop the starting condition for the portfolio assembly process. Figure 5 shows the sites selected by each expert panel. Sites which were selected by at least four panels became part of the starting condition for the algorithm driven site selection process.

Portfolio Assembly

The Columbia Plateau project utilized an algorithm approach for assembling the conservation portfolio. This approach was based largely upon the sources of data described in the Data Gathering section of this report but the approach also used information derived from the experts workshop as well as GIS files related to managed areas in the ecoregion. Several iterations of the portfolio were produced following review and analysis by the core team and Heritage scientists. The final portfolio, termed the first iteration portfolio, was the end product of these modifications and is described more fully in the following section of the report entitled “Conservation Portfolio”.

A detailed description of the computer-based algorithm approach to portfolio assembly is provided in Appendix 4. The initial portfolio assembly phase of the project was conducted under contract by the Institute for Computational Earth System Science and Department of Geography, University of California, Santa Barbara. All assembly work was done in a GIS environment that allowed for rapid assessment of alternative portfolios.

Identifying Site Selection Units

Working at a regional scale, it was neither feasible nor desirable to delineate detailed ecological boundaries for all potential conservation sites in the Columbia Plateau (but see Goldsmith 1987; Kershaw et. al. 1995 for exceptions). For a region of this size, this type of delineation is most appropriately done as part of the site conservation planning process. Therefore, instead of relying on detailed, ecologically defined sites, we used a set of relatively uniform selection units as the potential “building blocks” of the conservation portfolio. The advantages of this approach for identifying potential reserve systems at both regional and global scales are widely recognized (e.g., Australia: Margules & Nicholls 1987; Purdie 1987; Purdie et. al. 1986; Pressey & Logan 19xx; Europe: Ryti 1992; Saetersdal et. al. 1993; Williams et. al. 1996; South Africa: Cowling & Bond 1991; Lombard et. al. 1991; Rebelo & Siegfried 1992; Freitag et. al. 1996; Willis et. al. 1996; Lombard et. al. in press; North America: Stoms 1994; Davis et. al. 1996; et. al. 1997).

Assuming that site identification and portfolio assembly are followed by more intensive delineation of ecological boundaries based on ground truthing and interpretation of low elevation aerial photography, a variety of potential selection units can be used to assemble conservation portfolios. Potential units include arbitrarily sized, regular grid cells (Kirkpatrick 1983; Purdie 1987; Purdie et. al. 1986; Rebelo & Siegfried 1990; 1992; Kirkpatrick & Brown 1991; Vane-Wright et. al. 1991; Belbin 1993; Church et. al. 1996; Williams et. al. 1996; Lombard et. al. in press); other regular shapes such as hexagons (Pennisi 1993; Csuti 1994; Csuti et. al. 1997); units of ownership or land use (Pressey & Nicholls 1989);

resource management units (RACAC 1996); or natural subdivisions such as watersheds (Lewis et. al. 1991; Bedward et. al. 1992; Davis et. al. 1996).

For the Columbia Plateau, we chose USGS “6th HUC subwatersheds” as the selection units for potential conservation sites. There are 4,036 of these subwatershed units in this ecoregion (Figure 6). They vary in size from 693 to 86,942 hectares, with an average individual size of 8,668 hectares (21,419 acres). Subwatersheds are reasonable selection units because they are based on natural landscape features delineated by easily recognized physiographic criteria; their size is a reasonable scale for managing ecological or hydrologic processes (or several units can be aggregated where larger sites are needed); and they approximate the scale of ecologically defined sites TNC field offices or other land managers might typically work at in this ecoregion (note that sites are ecologically defined, and often are larger than the boundaries of strict preserves). GIS data layers delineating subwatershed units were available for the entire project area from the Interior Columbia Basin Ecosystem Management Project, which used them for resource and ecological assessments, as well as for allocating potential management units.

Assembly Rules

The goal in assembling the BMAS portfolio was to maximize the representation of conservation targets up to the stated goals and to optimize the suitability of the sites selected, while simultaneously minimizing the number of sites and total area within the portfolio.

For each potential site or site selection unit, the following questions were asked: a) is the conservation target present; b) is the conservation target already adequately protected; c) is the site suitable or potentially suitable; d) is there a better or more efficient site?

Because of the large number of potential site selection units (subwatersheds) and conservation targets in the Columbia Plateau, it would not have been possible to use this approach to site selection and portfolio assembly without a Geographic Information System and the use of a computer to process all of the potential decisions and choices required for each site selection unit. It should be noted that each computer modeling run required considerable computational time.

Index of Conservation Suitability

In order to integrate programmatic, economic and socio-political concerns into the portfolio assembly process an Index of Conservation Suitability was developed. The index was used to determine the relative suitability of site selection units (subwatersheds) for potential inclusion into the conservation portfolio by means of a value compiled from factors characterizing the subwatershed. The index was calculated for each site selection unit (subwatershed), based on the following factors: distance to level 1 and 2 managed areas, already selected subwatersheds and sites selected by at least 4 experts panels; human population density; road density; % of habitat converted; aquatic integrity; and % of watershed in private ownership.

The index functioned as a screen for site viability and as a filter for the conservation feasibility of the particular subwatershed being evaluated. Factors related to site viability included road density, % habitat converted, aquatic integrity, and expert opinion. Factors related to conservation feasibility included population density, % private, and distance to seed or core areas. An example of how the suitability index was used is that when a conservation target is present in two subwatersheds (that biodiversity-wise are identical) which have different conservation suitabilities, as indicated by the index, the algorithm model selects the more suitable subwatershed for the BMAS portfolio. By utilizing the suitability index at the initial stages of site selection it was hoped that the planning team could avoid some of the difficult decision-making involving site evaluation at a later date. This is especially important when selected sites are not well known to TNC and are thus difficult to evaluate from a conservation feasibility standpoint.

Index of Conservation Suitability Factor Weights

Road Density = 0.2
Pop Density = 0.2
Pct Private = 0.2
Pct Converted = 0.2
Km to Seeds = 5.0 (Existing BMA + Expert Num >=4)
Expert Opinion = 0.2
Aquatic Integrity = 0.2

(note: BMA=Level 1 or 2 Managed Area and/or BMAS site)

Starting Condition for Algorithm Process

Starting Condition = existing Level 1 & 2 managed areas + sites selected by at least 4 experts panels from the experts workshop

The starting condition for the algorithm portfolio assembly process was based upon the level I and II existing managed areas within the ecoregion and sites selected by at least four panels of experts from the experts workshop. Figure 4 shows the existing conservation areas in the Columbia Plateau that have identified conservation levels of I and II. Figure 5 shows the sites which were selected by at least four panels that became part of the starting condition for the algorithm driven site selection process.

The starting condition sites acted as "seed" sites for the algorithm process whereby the subwatersheds in which they existed would be given a weighted preference in terms of potential site selection in determining the conservation portfolio.

Preliminary Portfolios

In addition to the conservation portfolio produced at the experts workshop, there were two preliminary conservation portfolios developed sequentially before the "first credible iteration" was finalized in January 1998. The progression or development of these portfolios is described below in chronological order with the changes between the previous version and the current version noted. Each successive portfolio utilizes the previous portfolio as a starting point from which the described portfolio was developed. The portfolio analyses and subsequent modifications focused on enhancing site viability and capturing conservation targets that were under-represented.

The purpose for describing in detail the successive portfolios which led to the "first credible iteration" portfolio is to show how the approaches differed as well as how they were used to arrive at the conservation portfolio in January 1998.

1) Experts Workshop Portfolio--January 1997

As noted previously in the section of the report titled "Expert Opinion", the experts workshop for the Columbia Plateau project resulted in a conservation portfolio that was a composite of sites recommended by each of the six panels of experts. In the estimation of the experts at the workshop, protection of this portfolio of sites will conserve the biodiversity present in the ecoregion. The 258 sites nominated by experts panels reduced down to approximately 120 sites in the composite experts portfolio after duplicate and overlapping sites were taken into account. The experts workshop portfolio covers 191,422 sq. km and yet still leaves 18 of the 195 vulnerable land-cover types under represented (Stoms et al 1997). This portfolio meets two-thirds of the conservation targets for species and 90% of the conservation targets for vulnerable plant communities. The area covered by this version of conservation portfolio is approximately 63% of the entire Columbia Plateau, an area that would be very challenging from a conservation standpoint and would be politically untenable.

2) BMAS Portfolio--May 1997

The BMAS portfolio, developed by the Institute for Computational Earth System Sciences and Department of Geography at the University of California, Santa Barbara, was the product of the algorithm site selection process. The operative goal of the BMAS model was to meet the representativeness goals for the conservation targets in an as efficient manner as possible. Efficiency is defined as meeting the target goals with as few sites as possible requiring the least total area. The portfolio used subwatersheds for site selection units and tested several alternative portfolio assembly approaches based on (1) land-cover types alone (coarse filter), (2) rare elements alone (fine filter), and (3) cover types and rare elements together (integrated coarse and fine filters). Level I and II managed areas were assumed protected in all alternatives as were all subwatersheds identified by at least four of the six experts workshop panels.

The managed areas accounted for 9693 sq. km and the 105 subwatersheds identified by at least four experts panels accounted for another 9145 sq. km. The coarse filter alternative required an additional 185 subwatersheds be included in the portfolio while the fine filter alternative required an additional 501 subwatersheds to achieve the representation goals established for the conservation targets. Of particular importance when comparing these two alternative approaches are the changes to the total suitability index, the sum of the all suitability indexes for all subwatersheds in the alternative. (Note: the higher the suitability index, the lower the suitability of the watershed.) The total area of the subwatersheds containing the rare elements (fine filter alternative) is 160% greater than the area of the subwatersheds representing the GAP alliances (coarse filter alternative) while the suitability index was more than 400% greater. This result shows that there are fewer options (alternative sites) for meeting conservation goals for fine filter targets than for coarse filter targets and these fewer alternative sites come at a substantial cost in terms of less overall conservation suitability as portrayed by the higher index value. See Stoms et al 1997 in Appendix 4 for additional discussion of these alternative approaches of portfolio assembly.

The actual BMAS conservation portfolio is based on an integrated coarse- and fine-filter approach. The model selected 567 subwatersheds in addition to 105 subwatersheds accounted for by the experts workshop for a total of 75,191 sq. km. There was some efficiency gained in the integrated approach but again there were few optional sites with regards to fine filter conservation targets. A map of the BMAS portfolio is shown in Figure 7.

Results of the BMAS portfolio are detailed in Table 4 of Appendix 4. By design, the BMAS model met all the established representation goals for conservation targets except for those targets that did not have EOs associated with them.

The BMAS portfolio is useful as a benchmark from which to evaluate existing reserve systems or other potential conservation portfolios, it is not intended to be a final portfolio of sites without further evaluation as to economic, political and environmental factors. These factors include consideration of site design, site viability, site conservation feasibility, and changes in public lands management. For these reasons, BMAS became the starting point from which the first iteration conservation portfolio was developed.

3) BMAS Modified Portfolio--June 1997

The Columbia Plateau Ecoregional planning team used the BMAS model as a starting point from which to further refine site boundaries and to incorporate site information that could not be factored into the algorithm process. These modifications were made to the BMAS portfolio during an interactive meeting with Heritage Program scientists, the planning core team, and a GIS operator. Modifications were made on mylar overlays and flat maps of the BMAS portfolio using the computer-based GIS to identify conservation targets associated with the sites.

Modifications made to sites were based on expert Conservancy and Heritage knowledge of the site and of the conservation targets present, including viability of the site as it pertains to the element occurrences (EOs) as well as the viability of the site as it pertains to overall site persistence within the landscape. In other words, viability analysis of the portfolio sites was conducted at this time on a site by site basis using expert opinion of the sites and the conservation targets. Modifications made to sites because of consideration of viability issues were extensive and involved essentially all sites in the initial BMAS portfolio. Feasibility of potential conservation action was also factored in to portfolio modifications.

Examples of site modifications included re-designing site boundaries basing them more on landscape boundaries instead of merely subwatersheds. This often involved combining a number of subwatershed "sites" from BMAS into a single large site. Sometimes, boundaries were modified to capture only the intended target, resulting in shrinking the original subwatershed to a much small size. In other cases, entire BMAS sites were dropped because they were in landscapes that were highly degraded or fragmented and may have been originally selected for conservation targets such as long-billed curlew that could be easily met elsewhere.

Other portfolio modifications included: reducing site size for sites selected for rare plants in the Palouse and other places from subwatersheds to nominal point sites (0.202 sq. km or 50 acres); extending sites to the edges of the ecoregion when they would likely be identified as a site in an adjacent ecoregion (North and Middle Fork John Day River, South Fork Snake River); adding conservation buffers to sites designed around existing Level I and II managed areas; extending sites along major rivers in the ecoregion in order to capture additional aquatic diversity; joining subwatersheds into larger sites that were overlaid with BLM WSA designations such as in the Owyhee Plateau; adding acreage to existing sites to capture cover types that may have been lost due to other sites being dropped from the portfolio.

Site modifications continued to occur over a period of several months and involved core team members, Heritage scientists, and field office staff. Most modifications were made on draft maps of the portfolio and were then digitized into the GIS. Mapping errors occurring at this stage of the process may have resulted in some EOs being inadvertently omitted from the final portfolio. It is assumed that site conservation planning, which will occur when field offices implement the results of the ecoregional assessment, will be responsible for fine tuning site boundaries and targets.

The Conservation Portfolio

The conservation portfolio, entitled the first credible iteration in “Geography of Hope”, was the last of several successive iterations of the BMAS portfolio. After the initial modifications to the BMAS portfolio (June 1997) were incorporated into the GIS and a revised portfolio was mapped, analysis of the conservation targets showed that a number of targets no longer met conservation goals established for the ecoregion. The targets that were most easily addressed were the species-based targets.

Core team members from their respective states addressed these issues on a section by section basis in the ecoregion, in many cases reflecting on the veracity of the selection of certain species as targets. In some instances it was decided that EO data was insufficient for these species when their conservation goals were based on numbers of occurrences per section. Species which were involved in these types of concerns could be grouped into two distinct categories: 1) species which are not currently tracked by all Heritage programs and/or species which may not have had much effort expended to record observations (i.e. short-horned lizard (*Phrynosoma douglasi*), and long-billed curlew (*Numenius americanus*); and 2) species which are on the periphery of their range that is more accurately centered within another ecoregion (i.e. kit fox (*Vulpes macrotis*) and green-tinged paintbrush (*Castilleja chlorotica*). In addition, there were several instances where conservation targets were not met because species EOs did not have adequate location information such as latitude/longitude coordinates. This resulted in EOs for the Borax Lake chub (*Gila boraxobius*) being inadvertently omitted from the BMAS portfolio even though the only occurrence of the species is on a TNC preserve.

Further refinements to portfolio sites, based on expert site knowledge, resulted when it was believed that the land had been converted or was of undesirable quality. In addition, there were site boundary changes made to include high quality lands adjacent to existing sites in the portfolio so as to include more intact landscapes. Site-based changes are detailed in Appendix 5 in a memo from Chris Hansen from WAFO.

Revisions to the June 1997 portfolio also were made when it became apparent that there were additional level I and II managed area sites within the portfolio that were not initially identified. Out of 43 newly identified managed areas within the portfolio, 15 were added as new sites, 16 were appended to existing sites, 11 areas were dropped from the portfolio as they added nothing in terms of biodiversity conserved, and for 1 site there was no action taken on it due to a lack of knowledge (the site is in California which was not actively involved in the ecoregional planning effort.) A FAX memo from Chris Hansen lists the 43 managed areas and their eventual disposition with regards to the final portfolio sites (Appendix 5).

First Iteration of the Conservation Portfolio (*January 1998)*

The first iteration of the conservation portfolio for the Columbia Plateau ecoregion includes 139 sites covering 63,860 sq. km, over 20% of the ecoregion (Figure 8). The sites are well distributed throughout the ecoregion with sizable representation in each of sections with the exception being in the Palouse country, section # 331A and in the eastern Basin & Range, section 342B-E. The largest site is centered on Steens Mountain in Oregon and includes the Alvord Desert as well as the Malheur National Wildlife Refuge; this site alone covers 5352 sq. km or over 1.3 million acres. The smallest sites are mostly rare species sites that were arbitrarily established at 0.202 sq. km or 50 acres. A tabular description of each of the sites selected with conservation targets present and major land ownerships is complied in Appendix 5. Also, an Access database titled "Columbia Plateau Sites" that contains information on each of the sites, including conservation targets and major land ownerships, is available upon request and is included on the CD version of the assessment. A list of the portfolio sites is included in Table 4 below.

Table 4. First Iteration Conservation Portfolio Sites for the Columbia Plateau Ecoregion.

Poly ID	Site Name	State	Section	Size (Sq. Km)	Targets
1	Dyer Haystacks	WA	342I	162.1470	communities
2	Grand Creek	WA	342I	706.3220	inverts;plants;animals
3	Waterville Plateau	WA	342I	307.6300	rare animals
4	Sinking Creek	WA	342I	616.2680	sharptail grouse
5	Wilson Creek	WA	342I	34.7690	rare plants
6	Rock Island Creek	WA	342I	630.0920	plants
7	Sagebrush Flat	WA	342I	177.5400	animals, comm
8	Douglas Creek	WA	342I	104.7410	rare plants
9	Upper Crab Creek	WA	342I	23.2560	rare plants
10	Crab Creek	WA	342I	933.4100	comm; plants
11	Turnbull NWR	WA	342I	75.1930	rare plants
12	Beezley Hills	WA	342I	305.1120	animals - verts
13	Hog Lake	WA	342I	27.2370	comm
14	Rock and Bonnie Lakes	WA	342I	72.7260	comm
15	Marcellus (Rocky Coulee)	WA	342I	100.6600	rare plants, comm
16	Rising Trout Meadows	WA	342I	85.6670	verts; inverts
17	Upper Dry Gulch	WA	342I	133.9650	rare plants
19	Potholes Reservoir	WA	342I	808.2890	water birds, comm
20	Steptoe point sites (2)	WA	331A	148.9140	rare plant
21	Hanford/Yakima TC	WA	342I	3588.0830	rare plants, comm
22	L.T. Murray	WA	342I	398.3120	fish; riparian; plants
23	Kahlotus	WA	342I	221.4940	comm
24	Esquatzel Coulee	WA	342I	837.9190	t&e animals, birds
26	Snake Breaks	WA	331A	370.3370	rare plants; comm
27	Alpowa	WA	331A	102.4030	cover
29	Horse Heaven Hills	WA	342I	779.0320	plants; b. owls; hawks
30	Upper Touchet Creek	WA	331A	29.6130	riparian communities

31	Juniper Dunes	WA	342I	168.1850	t&e animals, birds
32	Walla Walla	WA	342I	144.4950	fish; butterfly; plant
33	Alder Creek Ridge	WA	342I	156.2470	t&e plants, b. owls
34	Rock Creek	WA	342I	229.6740	comm; cover; animals
36	Columbia Hills	WA	342I	468.8900	plants, inverts, comm
107	Palouse pot. restore pt site	WA	331A	3.0410	plants, comm
108	Palouse pot. restore pt site	WA	331A	0.2020	plants, comm
109	Eureka Flats point sites	WA	342I	0.2020	
111	P. ponderosa comm pt. sites	WA	342I	0.2020	
112	Magnusson Butte	WA	342I	0.2020	
119	P. ponderosa comm pt. sites	WA	342I	0.2020	
134	Cowiche Canyon ACEC	WA	342I	2.2590	
135	TNC Rose Creek Preserve	WA	331A	0.0700	
97	Raft River Mountains	UT	342B-E	185.0180	t&e plant
73	Steens/Alvord/Malheur	OR, NV	342B-W	5352.2250	t&e species
92	Oregon Canyon Mtns	OR, NV	342B-W	301.8850	t&e plants, comm
65	Succor Creek	OR, ID	342C	2770.4880	rare plants, comm
86	Hart Mtn/Warner Basin	OR, CA	342B-W	2394.4670	t&e species, comm
35	Boardman	OR	342I	679.9860	comm, t&e animals
37	Willow Creek	OR	342I	146.6880	riparian
38	Umatilla River	OR	342I	479.4980	t&e plants; riparian; fish
39	Deschutes River	OR	342I	665.1210	rare snails; chinook
40	Birch Creek	OR	342I	212.6050	rare plants
42	Butter Creek	OR	331A	84.4140	fish
43	Lawrence Grasslands	OR	342I	248.5240	communities
44	Clarno Canyon	OR	342H	757.2010	communities
45	Mutton Mountains	OR	342I	110.6350	rare snails; chinook
46	Middle - North Fork John Day	OR	342H	505.7940	fish, comm
47	Painted Hills/Sutton Mtn	OR	342H	238.6380	rare plants;comm
48	S Fork /Main stem John Day	OR	342H	350.9350	rare plants/fish
49	Metolius Bench	OR	342H	32.9050	riparian
50	Cline Buttes	OR	342H	1018.5110	comm
52	North Fork Crooked River	OR	342H	225.5110	riparian comm
54	Powell Butte	OR	342H	3.1430	comm
55	Cottonwood Mtn	OR	342C	413.4560	comm
56	Bear Creek	OR	342H	107.1370	comm
57	E. cusickii pt. site #2	OR	342B-W	0.2020	rare plants
59	Castle Rock	OR	342C	66.6200	comm
61	Horse Ridge	OR	342H	4.7540	comm
63	Harper	OR	342C	308.1440	rare plants, comm
67	Devils Garden ACEC	OR	342B-W	131.6870	comm
68	Squaw Ridge WSA	OR	342B-W	111.6190	comm
69	Dry Creek	OR	342C	404.7610	comm/plants
71	Four Craters WSA	OR	342B-W	61.1880	comm
72	Lost Forest	OR	342B-W	173.4640	comm
74	Connley Hills	OR	342B-W	21.7140	comm
75	Saddle Butte	OR	342C	677.3720	bats, comm
80	Summer Lake	OR	342B-W	423.8220	fish, comm
83	Crooked Creek	OR	342C	194.2910	t&e plants, comm
84	Lake Albert	OR	342B-W	380.8400	shorebirds; comm
88	Guano Slough	OR	342B-W	18.0890	comm
91	Deep Creek	OR	342B-W	110.1960	fish/rare plants/
96	Hawk Mtn	OR	342B-W	97.2250	t&e comm
106	Alkali Gulch	OR	342C	279.4010	t&e plants
113	Mousetail	OR	342I	0.2020	t&e plants
114	Venator Canyon	OR	342B-W	0.2020	t&e plants

115	Juniper Mountain	OR	342B-W	0.2020	comm
116	Malheur Cave	OR	342B-W	0.2020	rare inverts
117	Barren Valley	OR	342B-W	0.4040	t&e plants
120	E. cusickii pt. site #1	OR	342B-W	0.2020	rare plants
121	Foster Flat RNA	OR	342B-W	27.7800	comm
125	E. chrysops point sites	OR	342C	0.2020	t&e plants
138	Benjamin Pasture ACEC/RNA	OR	342B-W	2.6810	comm
139	Stockade Mountain ACEC/RNA	OR	342C	2.9860	comm
94	Piute Creek/Sheldon	NV, OR	342B-W	2795.8520	t&e plants/fish
89	Jarbidge Creek	NV, ID	342B-E	1357.4620	fish; bighorn; plants
98	Santa Rosa Mtn	NV	342B-W	594.1760	comm
103	Pyramid Lake	NV	342B-W	1854.3640	rare fish
60	Teton Marsh	ID, WY	342D	739.9310	birds, cover
18	Liberty Butte	ID, WA	331A	52.2480	community
93	Goose Creek	ID, UT, NV	342B-E	741.0850	endemic plants;comm
90	Albion Mtns	ID, UT	342B-E	433.5610	t&e plants; fish;comm
87	Owyhee Canyon Lands	ID, OR, NV	342C	4121.7740	comm, animals
95	Duck Valley	ID, NV	342C	344.4430	wetlands
25	Paradise Ridge	ID	331A	109.4250	rare plant; comm
28	Camas Prairie	ID	331A	432.4280	rare plants, comm
41	Substation Tract ACEC	ID	342D	1.7620	
51	Weiser Sand Hills	ID	342C	508.1010	plants/animals/comm
53	St. Anthony Dunes	ID	342D	1463.5550	tiger beetle; cover
58	Camas Mud Lake	ID	342D	549.5710	t&e species
62	Big Desert (INEL)	ID	342D	2385.6760	t&e species, cover
64	Boise Front	ID	342C	372.1400	end plants
66	Idaho Falls Dunes	ID	342D	157.1480	tiger beetle
70	Craters of the Moon	ID	342D	1617.0440	t&e birds, plants, cover
76	Birds of Prey NCA	ID	342C	658.2040	bird/comm/sturgeon
77	Blackfoot wetlands	ID	342B-E	634.9390	wetlands, birds
78	American Falls	ID	342D	312.7520	shorebirds, t&e species
79	Bruneau-Jacks Creek	ID	342C	2140.8740	snails
81	Middle Snake River Corridor	ID	342D	1984.8760	fish, snails, waterbirds
82	Dietrich Dunes	ID	342D	57.5180	tiger beetle
85	Formation Spring	ID	342-BE	6.9310	aquatic values, comm
110	Palouse pot. restore pt site	ID	331A	0.2020	
118	Curlew Natl Grsslnd pt sites	ID	342B-E	0.2020	
122	S. Fork Snake River	ID	342D	340.2610	
123	Salmon Falls Creek	ID	342C	747.8720	
124	Black Pine Crest	ID	342B-E	24.3450	
126	Big Juniper Kipuka RNA/ACEC	ID	342D	1.3070	comm
127	Sand Kipuka RNA/ACEC	ID	342D	1.3020	comm
128	TNC Stapp-Soldier Creek Pres	ID	342C	0.3640	comm
129	Dry Creek WSR/RNA	ID	342C	4.4190	comm
130	Big Wood WSR	ID	342C	2.4600	riparian
131	TNC Silver Creek Preserve	ID	342C	7.5170	riparian
132	ID-33-015 WSA	ID	342D	2.9900	comm
133	Middle Frk Clearwater WSR	ID	331A	18.4130	riparian
136	Trapper Creek PRNA	ID	342B-E	1.8550	
137	Tex Creek Wildlife Mgmt Area	ID	342B-E	68.6820	
99	Upper Surprise Valley	CA, NV	342B-W	256.9770	
100	Lower Surprise Valley	CA, NV	342B-W	274.8890	
101	Madeline Plains	CA, NV	342B-W	220.7600	
102	Honey Lake Valley	CA, NV	342B-W	1600.4990	
105	Upper Long Valley	CA, NV	342B-W	87.3010	
104	Five Spring Mtn	CA	342B-W	20.0660	

The conservation portfolio includes a broad spectrum of land ownerships; essentially all the land owners in the ecoregion are represented in the portfolio in relatively similar proportions to their ownership in the ecoregion as a whole. The percent ownership of major land owners in the portfolio are listed below.

Land Owner	Total Area of Sites (Sq. Km)	Percent Total Area
BLM	24045.13	37.65
DOD	1380.43	2.16
DOE	2765.02	4.33
PRIVATE	23114.55	36.20
STATE	3089.06	4.84
TNC	19.96	0.03
TRIBAL	1514.81	2.86
USFS	1826.18	2.86
USFWS	3969.00	6.22
OTHER GOV	1110.20	1.74

The portfolio sites are widely distributed throughout the ecoregion but with some tendency to have more sites and more total acreage of sites in certain sections than in others. Table 5 below shows the total number of sites per section, the total acreage of sites and the size of the section for comparison purposes. The percent of the section included in the conservation portfolio is also shown in Table 5.

It can be seen that the larger sections contain more acreage of portfolio sites, however there are some notable exceptions to this generalization. Two sections, the Palouse (section 331A) and the Eastern Basin & Range (section 342B-E) have a considerably smaller percentage of their lands in the portfolio. The reasons for this is related to several factors. Section 331A consists of a higher percentage of private lands than other sections in the ecoregion and these lands have a higher percent of land conversion to crop agriculture than other sections with the possible exception of the Columbia Basin (section 342I). Consequently many of the sites within section 331A are small, being the minimal size of 0.202 sq. km, with little potential for landscape level conservation. Section 342B-E has a smaller percentage of its lands in the portfolio based largely on the fact that there was little Heritage Program data for the section and few managed areas. Without EO data and existing protected areas there were few sites selected initially by the BMAS model, and very little added in later iterations due to lack of knowledge of the section.

Table 5. Numbers of Portfolio Sites and their Combined Areas per Section.

Section	# of Sites	Site Area (Sq. Km)	Section Area (Sq. Km)	Percent of Section
331A	13	1351.71	18444.30	7%
342I	41	14843.68	64399.72	23%
342H	10	3244.53	16334.29	20%
342D	14	9615.69	32365.54	30%
342C	21	14025.89	62953.20	22%
342B-W	30	17315.18	72911.76	24%
342B-E	10	3454.08	33920.12	10%

Conservation Targets Met in First Iteration Portfolio

The conservation portfolio did a reasonably good job of meeting the conservation goals for the targets identified for the ecoregion plan. Documentation of conservation target goals met by the ecoregional assessment are included in Appendix 5. Goals related to vulnerable species and vulnerable plant communities were most easy to assess as they were based on EOs captured by the portfolio in each of the sections of the ecoregion in which they occurred. Goals related to percent cover of GAP land cover types represented in the portfolio were more difficult to assess as there were 4 different representation goals, each attributed to a specific group of GAP cover types (see p. 27 for goals).

The analysis of GAP cover type goals was assessed on a section by section basis in order to portray how the conservation portfolio fared in the different sections in the ecoregion. Table 6 below shows this analysis. It should be noted that this analysis does not show on a percentage or acreage basis how well individual cover types are protected in the portfolio.

Table 6. GAP Cover Type Conservation Goals Met in Portfolio

Section	Total # alliances	Target Met Y	Target Met N	% Met
331A	11	5	6	45
342I	19	15	4	79
342H	16	12	4	75
342BW	29	23	6	79
342BE	24	15	9	63
342C	24	17	7	71
342D	16	16	0	100
TOTAL	139	103	36	74%

In most sections one or more GAP alliances did not meet the representation goals. A small number of alliances were not well represented in several sections and should be the focus of additional inventory and conservation efforts in order to locate appropriate sites that can be incorporated into the conservation portfolio. The alliances needing conservation attention include: (41) lowland riparian forest; (72) aspen woodland; (97) big sagebrush shrubland; (102) bitterbrush; (110) alluvial riparian shrubland.

Conservation target species and rare communities met by the first iteration portfolio are summarized below in Table 7.

Table 7. Conservation Target Species and Communities Goals Met by First Iteration Portfolio

Group	#Total Targets	#Targets Met	% Met	#Targets w/ EOs	%Targets w/ EOs Met
Plants	189	93	49%	133	70%
Plant Communities	113	58	51%	72	81%
Mammals	16	7	44%	11	64%
Inverts	48	15	31%	23	65%
Herptiles	12	8	67%	10	80%
Fish	44	10	23%	12	83%
Birds	30	11	37%	23	48%
Total	452	202	45%	284	71%

This table indicates that out of a total of 452 conservation targets only 202 targets (45%) met the goals established for them by the conservation portfolio. At first glance this seems like an unacceptable number of targets not meeting conservation goals but when the summary table is further examined taking into account the targets for which there are EOs then the percentage of conservation targets meeting their goals becomes 71% out of a total of 284 targets. In this analysis 82 targets, all of which had EOs associated with them, did not meet the conservation goals set for them.

There are a number of reasons why the conservation goals were not met for the above noted targets. Vulnerable plant communities, for instance, have not been well represented by EO records in Heritage Program databases. This is related to both a lack of inventory for these elements and a lack of recording occurrences into the database as well. The lack of government contracts, in some states, for inventory of and for managing data on such communities is partly responsible for the omission of community EOs from Heritage Program databases. Invertebrates also suffer from lack of inventory as there are few experts who know the species and, until recently, there has been little interest in these species from federal land management agencies and conservationists. Finally, a number of the wildlife targets (birds, mammals, herptiles) have historically not had occurrences reported to Heritage Programs when the species are encountered. This is a result of agency biologists not being keyed into Heritage Programs' data collection and record updating needs; it is not a reflection on biologists not caring about these species.

The largest group of taxa that did not meet the conservation goals were plants, and there are some general reasons why this occurred. One reason that there were so many plants not meeting target goals is that there were more plant species targets than any other group of taxa. This fact is somewhat exacerbated by the extensive EO data for plants such that more occurrences in more sections of the ecoregion translates into more section goals to be met. Another reason for the large number of unmet goals for plant targets is that 12 of the unmet targets had only 1 EO within the ecoregion and are not considered to be truly Columbia Plateau species. In other words, these species' habitats are more characteristic of neighboring ecoregions. Their occurrences within the Columbia Plateau are related more to the vagaries of indistinct boundaries between ecoregions than to concerns that the species' habitat really extends into this ecoregion in any significant way. Nevertheless, there remains some consideration for "edge of range" effects on genetic and species conservation. Within the plant group, 23 of the unmet targets are G3 species, 12 are G2 species and 5 species are G1s.

Regarding the unmet G1 plant targets, *Thelypodium howellii ssp. spectabilis* has only 1 occurrence in the ecoregion and is more closely associated with the Idaho Batholith ecoregion; *Arabis falcatoria* is a narrow endemic which must be protected in this ecoregion; *Astragalus collinus var. laurentii* is also restricted to the ecoregion and is well represented in the portfolio in one section.

Unmet conservation target goals are a serious concern for the ecoregional assessment that will need to be addressed in several ways. Site conservation planning will need to consider modifying site boundaries when unmet target occurrences are nearby. Additional inventory work is necessary for many vulnerable communities and invertebrate targets. And finally, better reporting of targets by field biologists has the potential to greatly expand the databases which were the basis for much of the site selection in the conservation portfolio.

Conserving Ecological Processes

In addition to conservation target goals, there were also general conservation goals for the portfolio that are related to the maintenance of ecological processes across the landscape. These goals are difficult to assess from an objective point of view but subjectively, looking at the suite of sites selected in the portfolio, there appears to be adequate representation of large landscape sites that have some level of intact ecological processes. Sites that include landscapes which may support ecological processes are listed in Table 8.

Table 8. Portfolio Sites Capable of Supporting Landscape Scale Ecological Processes

Site ID	Site Name	Section	Size (Sq. Km)
2	Grand Creek	342I	706.32
19	Potholes Reservoir	342I	808.29
21	Hanford/Yakima TC	342I	3588.08
22	L.T.Murray	342I	398.31
23	Kahlotus	342I	221.49
24	Esquatzel Coulee	342I	837.92
35	Boardman	342I	468.89
44	Clarno Canyon	342H	757.20
62	Big Desert (INEL)	342D	2385.68
65	Succor Creek	342C	2770.49
70	Craters of the Moon	342D	1617.04
73	Steens/Alvord/Malheur	342BW	5352.23
79	Bruneau-Jacks Creek	342C	2140.87
81	Middle Snake River Corridor	342D	1984.88
86	Hart Mtn/Warner Basin	342BW	2394.47
87	Owyhee Canyon Lands	342C	4121.77
89	Jarbidge Creek	342BE	1357.46
90	Albion Mtns	342BE	433.56
93	Goose Creek	342BE	741.09
94	Piute Creek/Sheldon	342BW	2795.85
102	Honey Lake Valley	342BW	1600.50

In addition, there are many other portfolio sites in each section that have the potential to act as large functioning landscapes in the future given restoration of their ecosystems.

Threats Assessment

Background

Summary and analysis of ecological, social, political and economic information on sites selected for the ecoregional portfolio served as the basis for the development of ecoregional conservation strategies and actions. Site information was summarized in graphic and tabular form to highlight patterns, assess the scope of conservation efforts needed, and categorize the relative importance and urgency of sites, strategies, and actions. Specifically, the purpose of the site information and threats assessment process was to:

1) Assess the feasibility of protecting targeted elements at each site;
2) Identify the scope of our conservation challenges in the ecoregion;
3) Categorize sites by importance and urgency;
4) Identify the most urgent threats to high priority sites;
5) Identify and rank multi-site threats;
6) Identify site and multi-site stakeholders/key players, opportunities, and obstacles;
7) Identify TNC's potential role at sites and in the ecoregion;
8) Set the baseline status of conservation (site management status and threat ranks) in the ecoregion for measuring the effectiveness of conservation efforts over time; and
9) Identify conservation strategies.

Information assembled in the ecoregional site database included the site size, target occurrences, ownership, and current conservation management status of sites in the portfolio. To complete the site and threats assessment additional data was developed for each site that addressed the threats, human context, potential strategies, and TNC role at each site selected for the portfolio. This data was incorporated into the threats assessment database (Columbia Plateau Sites.mdb).

Threats Assessment Methods

The threats assessment phase of the Columbia Plateau ecoregional assessment project was conducted by a subgroup of the core team which began working together in August 1997. As much of the site selection phase of the project was conducted within a GIS environment, it was decided to continue to use GIS in the threats assessment phase as well.

A site-based threats assessment database was developed in Access that linked sites, land ownership patterns, and conservation targets with threats. The database is organized around forms that contain discrete types of information. The forms are labeled "Site," "Species" and "Threat." Basic fields on the forms were populated from the GIS site database, such as site name, ownership, vegetation cover, EOs present; other fields were then completed by the core team. All fields on the forms are searchable within the database and multiple level complex searches can also be undertaken. The database relies upon site based knowledge, which was not always present. A lack of knowledge about a site was able to be recorded in most fields.

A copy of the edited version of the database titled “Columbia Plateau Sites.mdb” is included on the CD or available by contacting the Conservancy.

The threats assessment database has its utility in being able to analyze the portfolio sites from a number of different perspectives. These perspectives include, but are not limited to: ownership, conservation targets, habitats, managed areas and threats. Within each of these perspectives there may be several different scaled parameters which can also be analyzed. For instance, in terms of threats, each type of threat that is noted to be of concern for a site is evaluated as to its scope or affect (loss likely, significant, minor, unknown); when it occurred (in past, now, within 5 years, 5-15 years); whether it is reversible; and the level of knowledge regarding the threat (good, moderate, minor, none).

A summary of the threats reported for the portfolio sites in the ecoregion is displayed in Table 9 below. The table lists by threat the number of times a particular threat is recorded for all sites, regardless of the scope of the threat or when is occurred. The threat occurrences are compiled on a section by section basis, based on where the sites are located. The total number of occurrences attributed to each type of threat in the threats database is shown in the far right-hand column of the table.

The summary shows that the most frequently cited threats for the portfolio sites (and their number of occurrences) are: grazing (105), non-native plants (85), altered fire regime (49), recreation (44), crop agriculture (42), residential development (27), diversions (26), and hydrologic alteration (19). Except for recreation and possibly residential development, these threats were assumed at the outset of the project to represent the most significant challenges to conservation of biodiversity in the ecoregion. The table also shows which sections in the Columbia Plateau recorded the greatest number of threats. The Columbia Basin (section 342I) had the greatest number of recorded threats (183 threats) for the portfolio sites contained within the section followed by the western Basin & Range (section 342B-W) with a total of 138 individual threats. The Lower Snake River Plains/Owyhee Uplands (section 342C) was third in terms of total threats with 78 threats. The other sections trailed these sections in total threats.

Table 9. Portfolio Site Threats Compiled by Section of the Ecoregion

THREATS	331A	342BE	342BW	342C	342D	342H	342I	TOTAL THREAT OCCUR
blank							2	
Agriculture - Crop	4	1	9	4	2	2	20	42
Air Pollution							1	1
Altered Fire Regime	2	1	14	12	1	8	11	49
Aquaculture			1		1			2
Commercial Development			2			1	1	4
Commercial Development (comm sites)		1						1
Concentrated Livestock			1				3	4
Dams			3		1		3	7
Diversions	2	1	8	3	1	4	7	26
Dredging	1		3				1	5
Dredging (Flood Control)			1					1
Fishing			1				1	2
Grazing	5	8	25	19	7	10	31	105
Ground Water Withdrawal			2	2	2		5	11
Hazmat Spill (Railroad and I80)			1					1
Hunting			3					3
Hydrologic Alteration	1	1	5	3	4		5	19
Industrial Production			1					1
Logging	2	3		1		3	1	10
Loss of Habitat Elsewhere	1	1	1				4	7
Mining		1	5	6	1	1		14
Mining (Gravel)			1					1
Native Population Outbreak		1						1
Non-native Aquatic Invertebrates					1		1	2
Non-native Fish		1	4		1	1	5	12
Non-native Mammals			1				4	5
Non-native Plants	7	2	13	13	6	11	33	85
Other Harvest (Fuelwood Gathering)			1					1
Other Land Use							1	1
Pesticide drift	1							1
Recreation	1	1	15	7	5	2	13	44
Residential Development	2	2	5	2	4	4	8	27
Restriction of Range	3	1	1		1		3	9
Roads/Rights Of Way	1	1			1		4	7
Seedings			1	1				2
Small Population	2		4	2	1		4	13
Vandalism & Harassment			1				2	3
Water Pollution	2		2	1	1	2	7	15
Water Pollution (Ag Return)			1					1
Weapons Testing/Training				2			2	4
TOTAL THREATS PER SECT	37	27	136	78	41	49	183	549

In addition to the most common threats in the ecoregion, it is instructive to note the least common threats in Table 9. Threats that were noted to occur less than 5 times in the threats database include: air pollution, aquaculture, commercial development, concentrated livestock, dredging (flood control), fishing, hazardous materials spills, hunting, industrial production, native population outbreak, non-native aquatic invertebrates, non-native fish, fuelwood gathering, other landuse, pesticide drift, seedings, vandalism, water pollution (ag runoff) and weapons testing/training. The few instances these threats occur does not imply that they are not significant threats to biodiversity conservation, but rather that they may have diminished utility regarding the development of multi-site strategies to abate them.

Table 9 also shows in which sections of the ecoregion particular threats are most prevalent. Crop agriculture is a dominant threat in section 342I, the Columbia Basin, but it is much less important in most other sections. Altered fire regime is a threat that is most often attributed to the western Basin & Range (section 342BW) but it also has numerous occurrences in portfolio sites in the Columbia Basin section. Recreation and hydrologic alteration threats show similar patterns in terms of being prominent in both the western Basin & Range and in the Columbia Basin. Grazing is cited as being the dominant threat in nearly all sections of the ecoregion with only the Columbia Basin showing another threat (Non-native plants) as having as many occurrences.

The GIS format can be linked to the threats database to show patterns of threats across the ecoregion, displaying the information listed in Table 9. For example, the scope of the threat to biodiversity across the portfolio sites is shown in Figure 9. Here it can be seen that the likely loss of a conservation target is predicted for only a few portfolio sites, but significant threats are far more common, being cited for nearly two-thirds of the portfolio.

Conservation Strategies and Assessment Implementation

For the Columbia Plateau ecoregion, the evaluation and determination of conservation strategies that will conserve biodiversity is based on information derived from the threats assessment database and analyzed within a framework of grouping similar sites together for purposes of analysis. The process developed for determining conservation strategies is portrayed in Figure 10. Assessment implementation is based on site priorities, site knowledge, conservation opportunities and leverage as well as the capabilities and resources of the individual state field offices. Site priorities have been derived from a combination of biodiversity values and threat severity and urgency. Site knowledge, conservation opportunities and leverage were determined on a best estimate basis by core team members.

Key Stakeholders in the Ecoregion

Stakeholders in the ecoregion were assessed on a site by site basis by the core team members. The stakeholders identified included:

- Federal Agencies
- State Agencies
- County/Local Government
- Native American Interests
- Private Interests
- Recreation Interests
- Organized Groups

Due to the outdated nature of this information, it was deleted from the current version of the database, but was used to generate the analyses discussed below.

A tally of the key stakeholders, based on the results of the threats database, is shown in Table 10. The table summarizes which stakeholders were cited most often as being an “interest” group in portfolio sites. Stakeholders noted less than 10 times in the database of sites are not included in the table.

Table 10. Key Stakeholders Identified in the Columbia Plateau Ecoregional Assessment

Stakeholder	Database Occurrences	Stakeholder	Database Occurrences
BLM	97	USFS	20
Ranchers	89	Recreation Grps	19
State FW Dept	47	NRDC	18
State Enviro Grps	44	State Lands	17
Hikers	41	Local Enviro Grps	14
Farmers	37	Anglers	14
State Cattle Assn.	37	Anti Enviro Grps	12
Local Cattle Assn.	30	Campers	11
County Planning	30	Water Res. Dept	10
Researchers	29	Dept Enviro Qual	10
ORV Users	24	Miners	10
Hunters	22	Power Co.	10
Tribes	21	Educators	10
USFWS	21	BOR	10

The most frequently cited stakeholders are, not surprisingly, the largest landowners in the conservation portfolio, namely the BLM and ranchers. The next two most often cited stakeholders are a bit more interesting as State Fish and Wildlife Departments and State-based environmental organizations are noted to be prominent interest groups in fully a third of the 139 portfolio sites. The stakeholder list also held several other surprises, including County planning, researchers, and recreationists who could play strategic roles in conservation activities in the ecoregion.

The stakeholder list is of interest in and of itself but it will become even more useful in the development and implementation of conservation strategies for the ecoregion.

TNC Role in Ecoregional Conservation

Similar to the stakeholders assessment, TNC's role in ecoregional conservation was evaluated using the threats assessment database. The database compiled information on TNC's current role in the conservation of the portfolio sites. The database recorded 78 sites in which TNC has a current role at the site. Current role was defined as including land ownership, land management, advocacy, fund raising, acquisition assistance, and management expertise. Due to the dated and sensitive nature of this information, it was also deleted from the database.

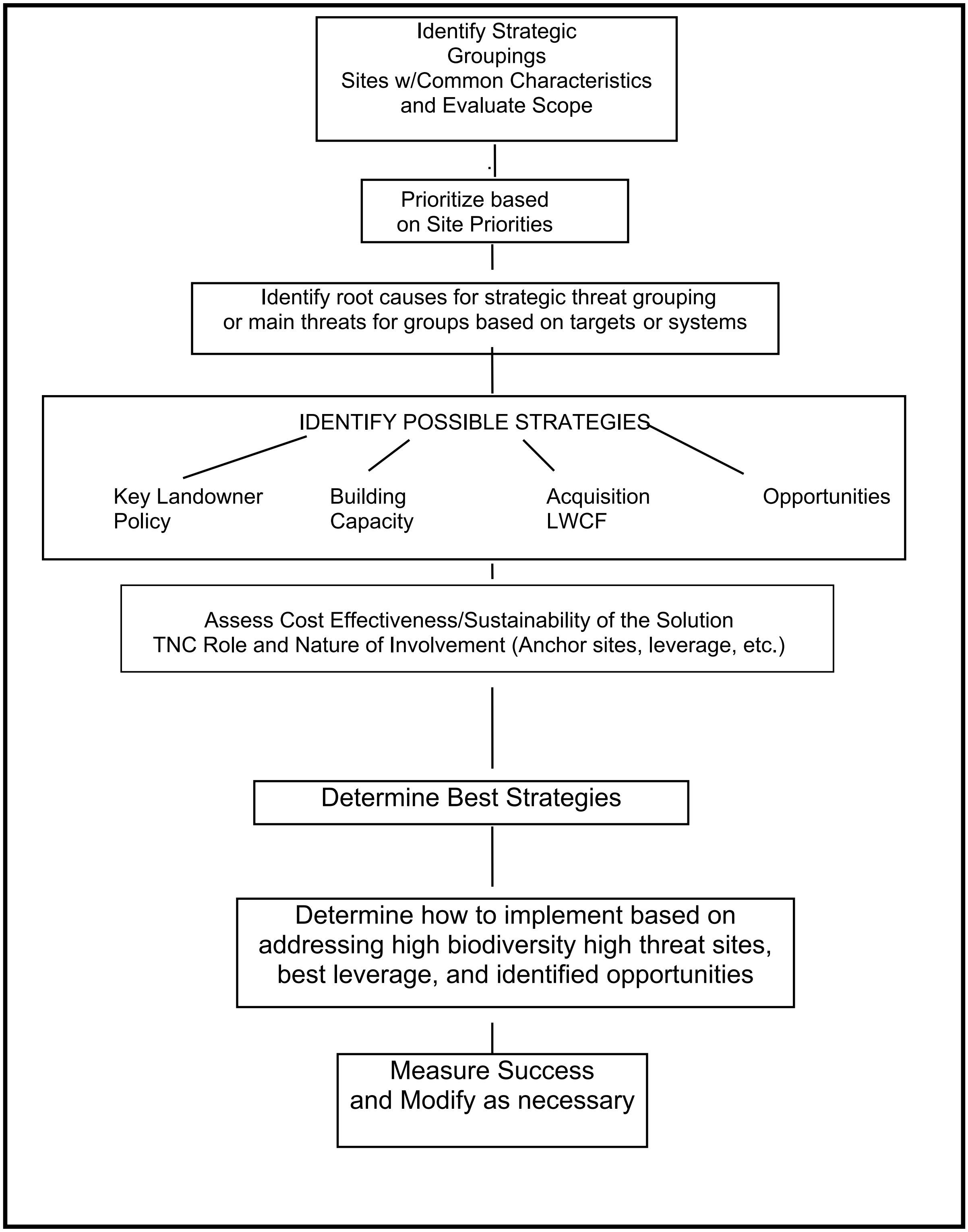
Strategic Groupings

The threats database has its utility in being able to analyze the portfolio sites from a number of different perspectives. These perspectives include, but are not limit to: ownership, conservation targets, habitats, threats, and human context. Because of the seemingly endless numbers of perspectives from which to analyze the database, the large number of portfolio sites and the many kinds of threats present in the ecoregion there was a definite need to hone down the number of analyses or perspectives from which conservation strategies would be derived. Given an almost infinite number of possible ways to look at the data the core team used a “strategic groupings” concept as a means to limit the number of combinations and to act as a starting point for analysis. From these varied perspectives, sites, and threats a number of strategic groupings became apparent when the data was reviewed. The strategic groupings were based on dominant threats, ownership patterns, and prominent conservation strategies. Some of these groupings were expected, such as grazing and weeds being significant threats for many sites, but others were not anticipated prior to looking at the data.

Queries to the database were made to develop summary data for the following strategic groupings:

- Grazing
- Altered fire regimes
- Non-native plants
- Aquatic threats (dams, diversions, hydrologic alterations, non-native species)
- Palouse grasslands
- BLM WSAs
- Opportunity sites
- Managed Areas--level I & II
- Easily conserved sites
- Sites with TNC presence
- DOE and DOD sites
- Residential and commercial development
- Agriculture

Figure 10. Conservation Strategies Development Process



Core team members were each assigned one or more strategic groupings to analyze based on the process diagrammed in Figure 10. For each strategic grouping the process includes the following steps:

- Scope of issue
- Description of future vision
- Root causes and stakeholders
- All possible strategies
- Purpose of strategy
- Cost assessment, leverage potential, TNC role, probability of success, time frame, measures of success
- Implementation recommendation

The strategic groupings listed above represented most of the sites in the portfolio and accounted for approximately 90% of the conservation target goals in the ecoregion. Many sites fell into more than one strategic grouping but this was of no consequence as the goal was to evaluate the grouping as a whole, not as individual sites that may be represented by it. The intended result of evaluating the grouping is to come up with a finite set of multi-site strategies that will efficiently and effectively conserve biodiversity in the ecoregion.

Developing Multi-Site Strategies

The results from the strategic grouping evaluation process, as outlined in Figure 10, will include a set of conservation strategies for each grouping. The strategies developed are, by definition, multi-site strategies, as each strategic grouping includes more than one site. (It should be noted that there is some overlap between different strategic groupings as a number sites may be classified as one or more groupings.) The strategies developed for the different groupings will be compared and contrasted in order to arrive at a more refined list of strategies that have the potential to effect the most conservation across the ecoregion.

There will be some conservation strategies common to a number of strategic groupings, such as working with federal land management partners, that will be relevant across many sites in the ecoregion. Conversely it is expected that there will be other proposed conservation strategies that may only apply to a limited number of sites but, because of the importance of these sites, these strategies may be implemented in the same time frame and with the same commitment of resources as more broad-based strategies.

Setting Priorities Among Sites

Site priorities were assessed by evaluating the biodiversity values, threats, leverage and landscape-scale ecological processes that are present at each site. Biodiversity values were classified by placing each of the portfolio sites into one of six categories, listed below:

- sites with 5 or more G1s
- sites with at least 3 G1s
- sites with at least 1 G1
- sites with more than 50 EOs
- sites with less than 50 EOs, no G1s, at least 5 G2 or G3s
- sites with less than 50 EOs, no G1s, at least 1 G2 or G3s
- sites with less than 50 EOs, no G1-G3s
- site knowledge none

Sites were also classified as to the severity and number of threats present, utilizing the following categories:

- loss likely of conservation target(s) occurring now or within 5 years
- at least 5 significant threats occurring now or within 5 years
- at least 3 significant threats occurring now or within 5 years
- at least 1 significant threat occurring now or within 5 years
- sites with at least 1 significant threat other than now or within 5 years
- sites with only minor or unknown threats

A matrix of portfolio sites was developed to portray biodiversity values and threats. Priority sites include those sites which have a combination of high biodiversity values and high urgency based on threats. The matrix with corresponding site ID numbers are shown in Table 11 below.

Table 11. Portfolio site priority matrix displaying levels of threat and biodiversity value. Values in the matrix cells represent site ID numbers; Table 4 relates the site names to the site ID numbers.

	At least 1 sig. threat occur now or w/in 5 years and loss likely	at least 5 sig. threats occur now or w/in 5 years	At least 3 sig. threats occur now or w/in 5 years	At least 1 sig. threat occur now or w/in 5 years	No sig. threats occur now or w/in 5 years	At least 1 sig. threat other than now or w/in 5 years	Minor or unknown threats
At least 5 G1s	2,6	81	10,21,22, 26,28,53, 65	5,23, 93,102 107	0	0	49
At least 3 G1s	0	79	35,36	14,40	9,90	125	0
At least 1 G1	34	38,73,86	30,91,117	18,34,61, 70,78,85, 87,101, 112, 116, 114, 119	20,66	15	88
At least 50 EOs, no G1s	57	19	24,29,31, 64	0	0	0	0
<50 EOs at least 5 G2/G3s, no G1s	0	4,7,50,80	3,76,87,99	8,17, 51,62,110	63,89	13	0
<5 G2/G3s, no G1s	0	84	80	0	129	134	57,58,83, 113
<50 EOs, no G1s	103	16,48,50 ,80,92	37,42,43, 44,46,47, 49,52,55, 56,75,112	1,11,12,58,6 9,72,77,83,9 6,100,106,1 13, 120,121, 122,133, 139	41,57,67,95, 118,123,126 ,127, 128,135, 136,137, 138	0	0
Site knowledge is none	0	0	0	0	39,97	0	0

Priority sites within the Columbia Plateau Ecoregion identified because of the biodiversity values and threats are defined as those sites which have at least 1 significant threat occurring now or within the next 5 years and at least 3 G1s; or the sites have a likely loss of a conservation target within 5 years; or there are at least 5 significant threats occurring now or within 5 years and there are at least 50 EOs present at the site.

Portfolio sites which are capable of supporting landscape scale ecological processes are listed in Table 8. These sites are also considered priority sites. Finally, sites which have a high potential for leverage of conservation actions in the ecoregion have also been included as priority sites. High leverage sites include areas where TNC has established a preserve as well as where TNC has worked or intends to work with landowners and managers on broad-based conservation activities. Table 12 lists the priority portfolio sites which will be targeted for conservation action in the next five years.

Table 12. Priority Portfolio Sites.

Site ID	Site Name	State	Section	Size (sq. km)
2	Grand Creek	WA	342I	706.32
3	Waterville Plateau	WA	342I	307.63
6	Rock Island Creek	WA	342I	630.09
10	Crab Creek	WA	342I	933.41
12	Beezley Hills	WA	342I	305.11
14	Rock and Bonnie Lakes	WA	342I	72.73
18	Liberty Butte	WA,ID	331A	52.25
19	Potholes Reservoir	WA	342I	808.29
21	Hanford/Yakima TC	WA	342I	3588.08
22	L.T. Murray	WA	342I	398.31
23	Kahlotus	WA	342I	221.49
24	Esquatzel Coulee	WA	342I	837.92
26	Snake Breaks	WA	331A	370.34
28	Camas Prairie	ID	331A	432.43
29	Horse Heaven Hills	WA	342I	779.03
34	Rock Creek	WA	342I	229.67
35	Boardman	OR	342I	679.99
36	Columbia Hills	WA	342I	468.89
38	Umatilla River	OR	342I	479.50
40	Birch Creek	OR	342I	212.61
46	Middle-North John Day	OR	342H	505.79
50	Cline Buttes	OR	342H	1018.51
53	St. Anthony Dunes	ID	342D	1463.56
62	Big Desert (INEEL)	ID	342D	2385.68
65	Succor Creek	OR,ID	342C	2770.49
73	Steens, Alvord/Malheur	OR,NV	342BW	5352.23
79	Bruneau-Jacks Creek	ID	342C	2140.87
81	Middle Snake Corridor	ID	342D	1984.88
86	Hart Mtn/Warner Basin	OR,CA	342BW	2394.47
87	Owyhee Canyonlands	ID,OR,NV	342C	4121.77
89	Jarbidge Creek	ID,NV	342BE	1357.46
90	Albion Mtns	ID,UT	342BE	433.56
93	Goose Creek	ID,NV,UT	342BE	741.09
102	Honey Lake Valley	CA,NV	342BW	1600.50
103	Pyramid Lake	NV	342BW	1854.36
107	WA	WA	331A	9.51

Multi-Site Strategies

Multi-site strategies are still being developed for the ecoregion and are dependent upon the individual assessments of the strategic groupings that were referred to previously. While most of the time honored conservation strategies that TNC has used for years will come into play in the Columbia Plateau ecoregion there will be need to be a more intensive focus on several strategies that have the potential to affect many of the sites within the ecoregion.

Federal Partners
The largest landowner in the conservation portfolio is the BLM which manages over 40% of the combined land area of the portfolio sites. The BLM ownership contains a comparable amount of the biodiversity represented in the portfolio and, while not immune from threats, the agency is intent on addressing the threats which impact their lands. To date, the Conservancy has enjoyed a good relationship with the agency based on common interests in rare species management and in the emerging fields of restoration and adaptive management. Our relationship with the BLM has begun to spread to the BLM's traditional affected public as well, the ranching community. The Conservancy would be hard pressed to select a better strategy than working with the BLM in this ecoregion.

In addition to the BLM, the Conservancy will need to strengthen ties to DOD and DOE at the important sites which they manage in the ecoregion as well as the US Fish & Wildlife Service, both on their refuges as well as in conjunction with the endangered species program which they administer.

Ranchers and Grazing Management
Going hand in hand with the BLM lands are the ranchers who traditionally have had the greatest control over the public lands in the ecoregion and much of the private lands, at least in several of the sections. The Conservancy has some ongoing alliances with the ranching community in this ecoregion that have been in place for up to 10 years. Nevertheless there are other areas of the country where TNC has worked with this industry at many more sites and in a variety of arrangements that could serve as potential models for conservation strategies at some portfolio sites in the Columbia Plateau.

Water Issues
Under the broad heading of dams, diversions, groundwater withdrawal, and hydrologic alteration there are numerous occurrences of threats to biodiversity in the ecoregion (Table 9). Strategies to mitigate and abate these threats include working with the crop agriculture community, ranchers, aquaculture interests in Idaho, power companies and municipal water delivery managers. No single strategy will work within the diverse field of water issues but rather TNC will have to work at the site level when some of our most threatened species are of concern, as well as at the watershed level where there may be a host of species spanning several taxa. Some of the most complex resource problems facing the ecoregion in the next century revolve around water issues.

Recreation and Residential Development
While not always thought of in the same breadth, the threats are closely related and involve population growth in an ecoregion that is currently mostly rural and

thought of as containing some of the most remote lands in the country. Cooperating with county planning agencies will be important in conserving important tracts of land near growing population centers. Equally important will be connecting with user groups and, through education, making them part of the conservation solution at portfolio sites which have high recreation values.

Insights and Implications for Partnerships and Public Lands Management

Several important insights emerged relating to the significance of federal lands for biodiversity conservation in this ecoregion. For example, the US Department of Energy owns only 1.2% of the ecoregion, but DOE lands contain two of the highest quality and most significant examples of sagebrush steppe ecosystems remaining in the Intermountain West.

The ecoregional project also has given TNC a new perspective on the ICBEMP and the proposed management outcomes for federal lands. In May,1997, based on the ICBEMP assessment, the US Forest Service and BLM announced a “preferred management alternative” for federal lands in the ecoregion. Members of the planning team reviewed the DEIS and commented that the preferred management alternative (or any of the others) would not be effective for maintaining biodiversity and recommended that a new preferred alternative be developed.

Overall, approximately 50% of the Conservancy’s target vulnerable species and communities occur on lands whose management will be affected by the Interior Columbia Basin Management Plan (i.e., USFS and BLM lands).

Both TNC and the federal agencies agree that effective management of public lands is critical to the long-term maintenance of biodiversity in this ecoregion. However, the ICBEMP alternative does not recommend designation of any new reserves, and instead emphasizes multiple use of all federal lands, combined with intensive management and restoration activities. As part of TNC’s comments on the ICBEMP proposed alternative, the organization will provide data not considered by the federal assessment as well as a technical review of the modeling approach, and an assessment of whether the proposed management is likely to accomplish the desired outcome.

Timeline for Next Iteration of Columbia Plateau Ecoregional Assessment

The Columbia Plateau Ecoregional Assessment will be reviewed for accuracy and progress on a regular basis. A state by state evaluation of progress will be compiled by members of the core team and summarized by the team leader or other designated team member to facilitate information sharing regarding projects initiated during the past year and current progress at threat abatement in the ecoregion. The summary report will be distributed to all states within the ecoregion with state directors and other affected staff being the target audience. An annual meeting of the Columbia Plateau core team will be given high priority in order to assess implementation progress.

Most states in the ecoregion will be involved in planning for other ecoregions within their states for the next five years. Because of these commitments there will not be a planned second iteration ecoregional assessment for the Columbia Plateau for at least six years or until the affected states have finished the first round planning for all ecoregions. The five year planning horizon will likely be adequate in terms of not missing any opportunities and it is unlikely that there will be any significant changes with respect to threats, ownership or other important factors relevant to conservation in the ecoregion.

The next iteration will focus on incorporating new data into the data sets and on including a diverse array of partners in the assessment process. Data gaps will be one of the priority areas that the next iteration will focus on with a special emphasis being placed on incorporating what is expected to be a nearly complete riparian community classification and inventory for the ecoregion. The next iteration will also have more complete data sets for aquatic elements, particularly aquatic invertebrates. It is also anticipated that other public and private partners will contribute to the assessment process, both in refining the scope and methodologies used for the assessment and in determining the final products and implementation strategies.

Data Gaps

Data gaps are inevitable when gathering together information across an ecoregion. In the Columbia Plateau ecoregion, where inventories have been restricted in remote areas and where certain taxa have only recently been discovered, data gaps have affected the development of the conservation portfolio and the threats assessment phase of the planning project. In the portfolio development phase, data gaps came into play when conservation targets and GAP vegetation cover types were evaluated. Many areas of the ecoregion had no EOs associated with them and thus were largely excluded from consideration as portfolio sites. In the threats assessment phase, lack of data for some of the sites selected for the portfolio resulted in a lack of specificity regarding threats at these sites which had corresponding impacts to potential conservation strategies.

Terrestrial Vertebrates

Three types of data gaps were identified for each target species in each state that it occurred.

1) If a species occurred in a state but was not tracked by a Heritage program at the element occurrence (EO) level;
2) Incomplete species inventories; and
3) information for a species exists but has not been incorporated in the Heritage program's databases.

Data gaps regarding vertebrates were addressed at the experts workshop when ornithologists and mammalogists recommended additions and deletions to the proposed list of conservation targets. Unfortunately most of the recommended species were not currently being tracked by Heritage Programs and thus could not be included within the BMAS modeling aspect of the site selection process as there was no EO data associated with the species. The recommended species did figure into the portfolio, at least in a minor way however, as expert workshop sites were used as “seeds” for the BMAS derived portfolio.

Invertebrates

Invertebrates present a special challenge in terms of gathering comprehensive data for ecoregional planning. Few species of invertebrates are tracked by Heritage Programs, in large part, because the taxa are poorly known and have not had adequate surveys. In addition, the invertebrates represent a very large and diverse group of organisms that are still largely unknown in terms of even their basic biology and taxonomy. For these reasons invertebrates have often been relegated to being captured by coarse filter types of identification techniques. Obviously, for invertebrate species, which as a group surely are far larger in terms of numbers of species than plants or vertebrates in the Columbia Plateau and elsewhere, this is potentially a major data gap that should be focused on in the next iteration. Given the lack of knowledge of the group as a whole it is probably safe to assume that invertebrates will remain a significant data gap in most ecoregions for the foreseeable future.

Aquatics

Aquatic elements of diversity presented a special challenge to ecoregional planning as Heritage and Conservancy knowledge was relatively low in terms of aquatic species present and their rarity. This was also true for aquatic and riparian communities which have only begun to be adequately classified by Heritage programs. Because EO data were distinctly lacking for aquatic species and communities, surrogates were used in an attempt to capture these elements in the portfolio. The surrogates acted as coarse filters with a large reliance being placed on using the Aquatic Integrity Index database developed by ICBEMP as a factor within the larger suitability index in the BMAS site selection model. The species selected as conservation targets also were chosen to act as coarse filter representatives for other species and communities that may be associated with them.

Plants and Plant Communities

Data for vulnerable plant species, vulnerable plant communities and more common communities included some of the largest and most complete data sets used in the project. Nevertheless, data gaps still existed, largely due to lack of inventory in the more remote areas of the ecoregion. These gaps resulted in some areas which may have considerable biological diversity being overlooked for their potential contribution in the selected portfolio. There was also some inconsistency between Heritage programs in terms of knowledge of their respective portions of the ecoregion. This was especially true for California and Utah which had only small areas included within the ecoregion.

Conservation targets for plant communities were, for the most part, dependent upon the quality of GAP cover type data. The GAP data was often used as a surrogate for more narrowly defined plant community types which occurred in much smaller patches that what could be determined by the mapping techniques employed by GAP researchers. As was addressed above in the aquatics section, significant data gaps occurred with regards to aquatic and riparian communities. GAP cover type maps or GIS layers do not even depict riparian communities such that conservation goals for these groups of communities had no direct means of being met and thus sites were not directly selected to meet these key goals. The inclusion of riparian and aquatic communities in the portfolio was primarily addressed during the site modification work by Heritage experts that occurred after the BMAS model was developed. A second iteration of the assessment will likely have access to more complete community classifications for at least riparian communities and may include aquatic types as well.

Lessons Learned

The Columbia Plateau ecoregional assessment was conceived as an experimental pilot project that would test a number of techniques designed to develop a comprehensive conservation portfolio. The project was challenging as it involved 4 TNC offices and 6 states, requiring extensive cross-state coordination and collaborative effort. After the first iteration of the conservation portfolio was completed an intensive review was undertaken to fully assess the lessons learned regarding this first part of the process. The complete, unedited lessons learned document from this part of the project is included in Appendix 6. A summary of the findings is presented below.

Science

1. Regardless of the scale at which TNC works or plans, there is a clear benefit to be gained from articulating measurable conservation goals, so that the potential contribution of individual sites to those goals can be easily evaluated and compared. More effort could have been expended within the core team to communicate the basis behind some of the conservation goals.
2. Until the organization has experience with several ecoregional projects "under its belt," the guidelines articulated in the "Geography of Hope" should remain flexible, and creativity by individual teams should be strongly encouraged.
3. To facilitate evaluation and comparison of different approaches and methods across ecoregions, there is a need for consistent and accurate documentation of project goals, assumptions, data sources, methods and costs. Documentation was lacking in some of these aspects of the Columbia Plateau assessment project.
4. Geographic Information Systems provide a critical tool for assembling, managing and interpreting large, spatial datasets, but the technology is expensive and requires specialized training by its users. Currently only about four field offices in the West have some GIS capacity, and the regional office has only recently begun to develop the needed tools and staff to support ecoregional conservation efforts. While the GIS was invaluable in the planning project, there was a tendency to underestimate the effort required to ready data for the GIS as well as the effort required to use GIS to its full capacity.
5. Peer review of ecoregional conservation targets and site selection and portfolio methods by colleagues in TNC, the academic community, and other organizations will help to improve the quality of work products as well as to create a constituency for TNC's ecoregional approach to conservation.
6. Expert opinion and digital databases are complementary sources of information on the distribution and trends of ecoregional biodiversity. Convening workshops of ecoregional experts on the species and ecosystems of concern to TNC ensures the continued flow of new information into the Natural Heritage data network, and also develops support for the Conservancy's work in the ecoregion.

7. Viability analysis remains one of the most vexing problems in data driven site selection processes, both at the species or target level as well as at the site level.

Internal Capacity and Management Structure

1. TNC does not currently have the staff or technical capacity to implement ecoregional planning, let along ecoregional conservation, everywhere the organization works. The organization has to be realistic about the costs of working at an ecoregional scale, and must decide whether to forego existing commitments and projects or to increase capacity to meet the staffing and resource requirements for effective ecoregional planning and conservation. Most staff currently engaged in ecoregional efforts are doing so in addition to all of the responsibilities of their existing positions.
2. Enhancements to the wide area network and voicemail system are needed for maintaining efficient and regular communication among TNC field offices and Natural Heritage Programs, as well as with collaborators and contractors. At the inception of the Columbia Plateau project, there was no single mechanism that would allow rapid communication to all team members. Regular, biweekly communication among the core team is critical when there are high expectations of rapid product delivery.
3. The core team size and structure was adequate for the project except for the fact that there was minimal participation from two of the states within the ecoregion. In the future, it is recommended that all states have active members on the planning team. There could have been more sub-groups established at the beginning of the process to focus on specific aspects of the project including data gaps such as aquatics.
4. Developing and managing ecoregional datasets represents a significant investment, and there is not yet agreement as to who will be responsible for that management (e.g., regional offices, field offices, Heritage programs, or some combination), or what it will cost and who will pay for it.
5. New approaches and incentives are needed to facilitate management of diverse and geographically distributed ecoregional teams, and to improve accountability among team members who have many other competing priorities. Without volunteer assistance, which contributed nearly 700 hours of needed assistance, the project would not be completed.
6. The utilization of two teams, operating sequentially, to first develop the portfolio and then complete the threats assessment, strategies and implementation aspects of the assessment was somewhat problematic as the transition required more interaction between the teams than was at first perceived to be necessary. In the future, it is recommended that if the two-team approach is utilized then it is imperative that coordination between the teams be given a high priority in order to keep the planning process moving. It may be beneficial to have the strategies and implementation team begin meeting somewhat before the portfolio development team completes their task.

Project Budget

Columbia Plateau Project Costs

Columbia Plateau Phase 1 (July 1, 1996 - June 30, 1997): $185,000 (includes approximately $85,000 in direct costs and $100,000 of staff time; does not include $ 25,000 special allocation from TNC national office for additional research on ecoregional planning and analysis methods). Cost to the Washington Field Office (lead state): $80,000

Support to Heritage Programs

Nevada:	$3,000
Oregon:	5,000
Washington:	5,000
Idaho:	8,000
TOTAL	21,000

Experts Workshop Cost and Time Estimates

Meeting services:	$2,500
Travel, food, lodging:	3,000
Miscellaneous:	500
TOTAL	6,000

TNC Staff Time (planning/conducting the workshop): 310 hrs
Volunteer Time (assisting with preparations/follow-up): 100 hrs

Columbia Plateau Phase 2 (July 1, 1997 - March 31, 1998): $56,000. Indirect costs (staff time and travel) to field offices were $9600 each for Washington, Idaho and Nevada; indirect costs to Oregon, the lead state for phase 2, were $17,000. Direct costs, for GIS and support, assessed to each state were $2600.

REFERENCES

Bedward, M., Pressey, R.L. & D.A. Keith. 1992. A new approach to selecting fully representative reserve networks: Addressing efficiency, reserve design and land suitability with an iterative analysis. *Biol. Conserv*. **62**: 115-125.

Church, R.L., Stoms, D.M. & F.W. Davis. 1996. Reserve selection as a maximal covering location problem. *Biol. Conserv*. **76**: 105-112.

Cowling, R.M. and W.J. Bond. 1991. How small can reserves be? An empirical approach in the Cape Fynbos, South Africa. *Biol. Conserv*. **58**: 243-256.

Csuti, B. 1994. Gap analysis: Mapping biodiversity for conservation and management. *Endangered Species Update* **11(5):** 1-4.

Csuti, B., Polasky, S., Williams, P.H., Pressey, R.L., Camm, J.D., Kershaw, M., Kiester, A.R., Downs, B., Hamilton, R., Huso, M. and K. Sahr. 1997. A comparison of reserve selection algorithms using data on terrestrial vertebrates in Oregon. *Biol. Conserv*. **80**: 83-97.

Davis, F.W., Stoms, D.M., Church, R.L., Okin, W.J. and N.L. Johnson. 1996. Selecting biodiversity management areas. Pp. 1503-1528 in *Sierra Nevada Ecosystem Project: Final Report to Congress, Vol. II, Assessments and Scientific Basis for Management Options*. Davis: University of California, Centers for Water and Wildland Resources.

Freitag, S., Nicholls, A.O. & A.S. van Jaarsveld. 1996. Nature reserve selection in the Transvaal, South Africa: What data should we be using*? Biodiv. Conserv*. **5**: 685-698.

Goldsmith, F.B. 1987. Selection procedures for forest nature reserves in Nova Scotia, Canada. *Biol. Conserv*. **41**: 185-201.

Kershaw, M., Mace, G.M. & P.H. Williams. 1995. Threatened status, rarity and diversity as alternative selection measures for protected areas: A test using Afrotropical antelopes. *Conserv. Biol*. **9**: 324-334.

Kirkpatrick, J.B. 1983. An iterative method for establishing priorities for the selection of nature reserves: An example from Tasmania. *Biol. Conserv*. **25**: 127-134.

Kirkpatrick, J.B. & M.J. Brown. 1991. *Reservation analysis of Tasmanian forests*. Resource Assessment Commission Forest and Timber Inquiry Consultancy Series, Number FTC91/16. Canberra.

Lewis, A., Stein, J.L., Stein, J.A., Nix, H.A., Mackey, B.G. & J.K. Bowyer. 1991. *An assessment of regional conservation adequacy: Tasmania*. Resource Assessment Commission Forest and Timber Inquiry Consultancy Series, Number FTC91/17. Canberra.

Lombard, A.T., Nicholls, A.O. & P.V. August. 1995. Where should nature reserves be located in South Africa? A snake's perspective. *Conserv. Biol*. **9**: 363-372.

Lombard, A.T., Cowling, R.M., Pressey, R.L. & P.J. Mustart. *In press*. Reserve design on the Agulhas Plain, South Africa: A flexible tool for conservation in a species-rich and fragmented landscape. *Conserv. Biol.*

Margules, C.R. & A.O. Nicholls. 1987. Assessing the conservation value of remnant "islands": Mallee patches on the western Eyre Peninsula, South Australia. Pp. 89-102 in *Nature Conservation: The Role of Remnants of Native Vegetation*, ed. by. D.A. Saunders, G.W. Arnold, A.A. Burbridge & A.J.M. Hopkins. Sydney: Surrey Beatty and Sons.

Pennisi, E. 1993. Filling the gaps: Computer mapping finds unprotected species. *Science News* **144**: 248-251.

Pressey, R.L. and V.S. Logan. 19xx. Size of selection units for future reserves and its influence on actual vs. targeted representation of features: A case study in western New South Wales. *ms. in review*.

RACAC (Resource and Conservation Assessment Council). 1996. *Draft Interim Forestry Assessment Report*. Sydney: RACAC.

Rebelo, A.G. & W.R. Siegfried. 1990. Protection of Fynbos vegetation: Ideal and real world options. *Biol. Conserv*. **54**: 15-31.

Rebelo, A.G. & W.R. Siegfried. 1992. Where should nature reserves be located in the Cape Floristic Region, South Africa? - Models for the spatial configuration of a reserve network aimed at maximizing the protection of floral diversity. *Conserv. Biol.* **6**: 243-252.

Ryti, R.T. 1992. Effect of the focal taxon on the selection of nature reserves. *Ecol. Applic.* **2**: 404-410.

Saetersdal, M., Line, J.M. & H.J.B. Birks. 1993. How to maximize biological diversity in nature reserve selection: Vascular plants and breeding birds in deciduous woodlands, western Norway. *Biol. Conserv*. **66**: 131-138.

Stoms, D.M. 1994. Scale dependence of species richness maps. *Prof. Geogr*. **46**: 346-358.

Vane-Wright, Humphries, C.J. & P.H. Williams. 1991. What to protect? - Systematics and the agony of choice. *Biol. Conserv*. **55**: 235-254.

Williams, P., Gibbons, D., Margules, C. Rebelo, A., Humphries, C. & R. Pressey. 1996. A comparison of richness hotspots, rarity hotspots and complementary areas for conserving diversity using British birds. *Conserv. Biol*. **10**: 155-174.

Willis, C.K., Lombard, A.T., Cowling, R.M., Heydenrych, B.J. & C.J. Burgers. 1996. Reserve systems for lime limestone endemic flora of the Cape lowland fynbos: Iterative versus linear programming techniques. *Biol. Conserv*. **77**: 53-62.

APPENDIX 1

CONSERVATION TARGETS

APPENDIX 1

CONSERVATION TARGETS

1-A: Gathering the Pieces

1-B: Setting Goals for Vegetation Conservation Targets

1-C: Methods - Rare Plants

1-D: Zoological Methods

1-E: Zoological Methods - Fish

1-F: Conservation Targets - Invertebrates

1-G: Conservation Targets - Fish

1-H: Conservation Targets - Herptiles

1-I: Conservation Targets - Birds

1-J: Conservation Targets - Mammals

1-K: Conservation Targets - Plants

1-L: Conservation Targets - Plant Communities

1-M: Plant Associations Occurring in all Sections of the Columbia Plateau

1-N: Plant Associations Restricted to the Columbia Plateau Ecoregion

1-O: GAP Cover Types

GATHERING THE PIECES

Because of the tremendous Federal agency effort during the early 1990's to characterize the Interior Columbia River Basin (CRB) to satisfy the requirements for an EIS, there are numerous data layers available. The Columbia Plateau ecoregion is entirely contained within the CRB assessment area. We propose to use many of the CRB data layers for various components of the Columbia Plateau project.

A. Ecology Data

Data for plant communities in the Columbia Plateau ecoregion will come from several sources. The first is a floristic classification based on literature and field inventory data. The second two are spatially referenced data layers developed through different methodologies: one using remotely-sensed imagery to map vegetation patterns (GAP map); the other using a Digital Elevation Model (DEM) to stratify the physical environment along temperature and moisture gradients and then predict the occurrence of potential vegetation types.

1. **Floristic Classification:** The ecology program of The Nature Conservancy's Western Conservation Science Department has worked with the state Heritage Programs to develop a hierarchical classification of plant associations for the western United States (Bourgeron and Engelking 1994). The classification includes over 2000 associations for the west, of which approximately 400 are found in the Columbia Plateau ecoregion. Each association has been assigned global and state ranks following the ranking system developed by TNC and the Heritage Network. Additional information about each includes: state distribution, literature sources, and physiognomic structure.

Within the classification, plant associations are grouped into Alliances based upon floristic similarities. Alliances are placed into a hierarchy of physiognomic and structural characteristics of vegetation. This hierarchy of floristic, physiognomic and structural characteristics is a flexible system which is a necessary data layer to be used in characterizing ecosystem patterns found at different scales within geographic regions, themselves spatially nested hierarchies.

2. **GAP Existing Vegetation (Cover Type) Map:** The Biogeography Lab of the University of California at Santa Barbara (UCSB) is providing to the Columbia Plateau planning team a digital map of existing land cover for the ecoregion. This map is a composite of maps created by the Washington, Oregon, California, Nevada, Idaho and Utah GAP Analysis programs. The UCSB Biogeography Lab "clipped" the portions of these state maps found within the boundaries of the Columbia Plateau.

The land cover maps produced by the GAP Analysis programs classify land cover into 4 broad categories: Water, Naturally vegetated or scarcely vegetated, Agricultural, and Built environment. The naturally or scarsely vegetated category is mapped to a level of detail roughly corresponding to Alliances found in The Nature Conservancy's vegetation classification discussed in #1 above. The land cover types from each state GAP Analysis program were edge-matched by the UCSB Lab within the Columbia Plateau ecoregion. Then recently aquired AVHRR Satellite imagery was used to update the classification of the land cover types for the entire ecoregion in order to obtain consistency and currency in the classification of the types.

3. **Potential Vegetation Map:** The regional vegetation classification described in #1 above was used to derive potential vegetation (PV) classes along moisture and temperature gradients within the CRB. A matrix was developed for each of three broad physiognomic classes (forests, shrublands, and herbaceous types) for each section (see **Environmental Data** discussion for explanation of sections), resulting in the generation of a total of 48 PV types for each section. These PV types for each section were assigned to classes of elevation, slope and aspect, which in turn were used to assign each 1 km x 1 km pixel to the most probable PV class. The 1 km x 1 km pixels were derived from a Digital Elevation Model (DEM) for the entire CRB assessment area. Maps were produced using GIS technology and were reviewed several times for their general approximation of PV cover. The final map will be used for the Columbia Plateau project as one of the vegetation data layers.

Approximation of potential vegetation is important information for several reasons. First, it provides information on vegetation patterns that result from the relatively stable "template" of the physical environment (e.g. elevation, landforms, geologic substrate and soils). The physical environment over a geographic region has a controlling influence over ecological processes and disturbances occurring over shorter temporal scales. Second, since PV is the presumable "climax" vegetation in the absence of disturbance, the entire suite of successional vegetation types can be associated to the PV type. Third, the PV, as derived here, is directly linked to biophysical characteristics of the landscape. As such it is a suite of "semi-permanent" vegetation types we can expect to occur within a particular geographic area displaying these biophysical characteristics.

4. **Compilation of Ecological Data:** There are a very large number of plant associations found in the Columbia Plateau ecoregion (each of which is a conservation target), and element occurrence data is lacking for more than a few of these, most of them rare. Therefore, the potential vegetation types from the PV map and the GAP cover types from the GAP map will be attributed to each sampling unit. Additionally, a list will be generated for each PV type and each existing cover type of the plant associations that can be expected to be found. This will be done by crosswalking the plant association classification with each of the vegetation maps, a task that Heritage ecologists from appropriate states are well-qualified to undertake.

B. Environmental Data

There are many sources for data characterizing the environmental variation within the Columbia Plateau ecoregion, much of which has been compiled into GIS coverages and associated databases by the CRB project. Some of these will be used for TNC's planning efforts for the ecoregion, including: average annual temperature, solar radiation and precipitation; elevation, aspect and slope; presence of lakes, streams and river reaches; major lithology; and various data layers characterizing ecological processes such as fire regimes, erosion potential, and net primary productivity. Other kinds of environmental data layers will be used to assess the ecological condition ("quality") of each of the geographic areas we choose to use as sampling units. The condition or quality of the sampling unit will be used as part of an index of conservation suitability (described in **Human Use and Impacts Data** below). some of the data layers we may use include current fire regimes, historic fire regimes, stream recovery potential, and erosion transport coefficients.

In addition, there are GIS coverages from the CRB project which have classified the entire interior Columbia Basin into hierarchical (spatially nested) systems of watersheds and terrestrial ecological units. The watersheds have been delineated nationally by the USGS to a level of resolution called 8-digit Hydrologic Unit Codes (Seaber et al. 1987). The 8-digit watersheds are sometimes referred to as 4th-HUC watersheds. For the CRB project two finer scale watershed delineations were produced for research purposes, the 12-digit watersheds nested within 10-digit watersheds (also called 6th-HUC and 5th-HUC, respectively). For each 6th-HUC watershed in the CRB assessment area, many environmental variables have already been attributed (such as minimum and maximum elevation, average aspect and slope, dominant lithology, and annual precipitation). The terrestrial ecological units were also delineated for the CRB, using ECOMAP (1993) criteria, of which Bailey's (1994) provinces and sections are two levels in the hierarchy. For the CRB, finer scale subsections were also delineated and these smaller units may prove to be useful for the Columbia Plateau project.

C. Element Occurrence Data

D. Human Use and Impacts Data

In order to assess the value of any geographic area, however defined, for conservation of biological diversity, it is necessary to understand the human uses of, and impacts on, that area. Similarly, assessing threats to *particular elements* of biodiversity requires knowledge of human activities. Many data layers available from the CRB project will be used for these purposes during the Columbia Plateau project. Some of these include: locations of major dams and reservoirs; predicted road density; locations of roads and utility corridors; locations of populated places; mining claim density; mineral development interest areas; and grazing allotments. Some of these will be used primarily as components of the threats and strategies assessment, while others will be used as part of the site selection process, described in the *Designing the Portfolio.*

Using some of the above data layers, an index of conservation suitability will be developed for each of the sampling units. For example, each sampling unit within the Columbia Plateau ecoregion will receive a score for the following: predicited road density, fraction converted to agriculture, current fire regime, and stream recovery potential. In addition to the obvious value contained in each of these, they act as surrogates for other kinds of information (e.g. road density will be highly correlated with urban/suburban areas, and stream recovery is directly linked to the condition of surrounding terrestrial uplands). These scores might be ranked such that a high score indicates low conservation suitability. The scores for the 4 items would be combined into a suitability index. Should a choice be necessary between two geographic units with similar representation of conservation targets, the unit with a lower suitability index (e.g. no roads, little conversion to agriculture, and fire regimes within a normal range of variability) would be chosen over the unit with a higher suitability index. In this way, the suitability index provides a method of filtering possible sites to eliminate those likely to be in poor ecological condition due to human activities.

DESIGNING THE PORTFOLIO

B. Algorithmic Approach

Attribution of Data to the Sampling Units

Once sampling units have been chosen, as described in **Identifying Sampling Units**, the next step is to "attribute" data to each of the units, in this case the watersheds (5th-HUC) or subwatersheds (6th-HUC watersheds). What happens in this step is construction of one or more attribute tables that contain data for each sampling unit. Data stored in these tables would include such things as: environmental features, predominant vegetation patterns, the conservation suitability index (see **Human Use and Impacts Data** section), and disturbance regimes. For each of these major categories, more specific data would be stored. For example, predominant vegetation patterns could include assigning the most abundant existing vegetation type from the GAP map to each sampling unit. Additionally, the potential vegetation type found in each sampling unit would be in the table. These attributes for each sampling unit would be the values used by the algorithm for selecting a particular sampling unit as part of the portfolio.

A major advantage to choosing the 6th- or 5th-HUC watersheds as the sampling units for the algorithmic approach is that much of the environmental characterization of these units has already been completed by the CRB project. An attribute table already exists containing environmental data for each 6th code HUC, including: elevation range, average slope, average aspect, major lithology, major landform, annual precipitation, and predicted road density. The next steps required will be to construct similar attribute tables for the vegetation, conservation suitability, and disturbance regime components of the data layers. For the vegetation, this is a GIS exercise wherein the polygons representing the sampling units are intersected with the GIS coverages for the GAP and potential vegetation maps and assigning the predominant type to the sampling unit. For the suitability index, the GIS can be used to evalute each data layer contributing to the index and generate a combined index for each sampling unit.

References

Bailey, R. G. 1995. Description of the Ecoregions of the United States. USDA Forest Service, Washington, DC, USDA Forest Service Miscellaneous Publication Number 1391.

Bourgeron, P. S., and L. D. Engelking, editors. 1994. A Preliminary Vegetation Classification of the Western United States. The Nature Conservancy, Western Heritage Task Force, Boulder, CO.

ECOMAP. 1993. National Hierarchical Framework of Ecological Units. USDA Forest Service, Washington, D.C.

Seaber, P. R., F. P. Kapinos, and G. L. Knapp. 1987. Hydrologic Unit Maps. USDI Geological Survey, Corvallis, OR, Water-Supply Paper 2294.

Setting Goals for Vegetation Conservation Targets
Columbia Plateau Ecoregion
May 13, 1997

Issues:

1. We are using *surrogates* for plant associations to capture sites, but it's the associations we want to conserve. Each surrogate "contains" anywhere from 2 to 20 associations, but we don't know exactly which association is on which "site" until we go there.

2. For both surrogates and associations: some are rare, some common, some widespread, some limited to the CP ecoregion or adjacent ecoregions.

3. Our goals for these elements need to meet the following objectives:

First, to capture and represent in sites examples of *both the surrogates and the associations making up the surrogates*. This requires setting goals that capture / account for the range of variability of the surrogates both in their spatial and environmental distributions.

Second, to act as the *"coarse filters" for other biological diversity* in the broad sense of the term (i.e., if we can maintain sufficiently large or ecologically functional occurrences of these vegetation units, we also will maintain all of the common plants and animals with those units). This means some of the sites need to be large enough that large scale ecological processes or disturbances can be maintained or restored. The sites also should capture the kinds of structural features that are critical to some animals such as birds.

Third, to ensure that *vegetation types with limited distribution* (i.e. mostly confined to the CP ecoregion), most of which are also threatened*, are captured and protected* in sites chosen by this project. Without concerted action for these elements in this ecoregion, these types could be lost throughout their range.

Methods:

A. **Plant communities**

1. We split the community targets into 2 main groups: rare (G1, G2) and more common (G3, G4, G5).

2. For the group of rare associations, we will identify sites using EOR data from the NHP's. This means that for 39 of the 99 rare associations we have "data gaps", in that there are no EOR's. However, some of these will have been captured thru the experts workshop process.

3. For the group of more common associations, these have been crosswalked with the GAP cover type map at the section level. Although the Gap map is not at section level, we do have associations x Gap type x sections.

4. We have applied a ranking system to the Gap cover types in which we considered:

a. Overall regional distribution.
b. Value of the cover type & associations in it as “coarse filter”.
c. Relative rarity of the cover type & associations in it.
d. Pattern of distribution within the CP, primarily small patches or big areas.

5. This ranking system was used to group the cover types into 3 categories for assigning actual representation goals.

B. **Starting Condition.** There are several options here; the ones that seem most appropriate for vegetation/ecology are discussed below:

1. Start with plant & plant community sites delineated by the experts workshop (plants/plant communities were done together and can’t be separated). **Advantages**: provides some large, contiguous seed sites that will capture much of the vegetation diversity and many of the rare plant sites in this ecoregion. Also, these large areas, if managed properly, may help to maintain processes and disturbances necessary to maintainance of many vegetation types. **Disadvantages**: when the sites are delineated in GIS by “turning on” watersheds, some of them become quite large and may cover more area than desired. Also, they concentrate vegetation sites and therefore may not capture much of the range of variability of the vegetation types. Very few sites were delineated in Nevada.

2. Start with the “highest” two (or maybe 3) categories of land management areas, as delineated by the ICBEMP team. Then query the GIS for which surrogates & EO’s are not represented adequately and conduct further site selection to achieve goals established for targets. These categories of sites include: a) ecological processes operate relatively free of human influences, diversity resulting from natural processes/disturbances predominates, non-native vegetation rare; and b) conservation of representative or rare ecological settings, influences of humans generally non-intensive, areas often formally designated. **Advantages:** these seed sites select up-front for areas identified to be in relatively good ecological condition, and then seek to meet invidual target goals. If *viability* is important, then a criterion such as this may prove more useful than size. Up-front selection of these areas acknowledges the reality that large portiuons of the CP are not in very good shape. **Disadvantages:** these areas are concentrated in certain portions of the ecoregion and so concentrate sites for

vegetation and, as above, won't capture the range of variability desired. These categories were not applied to large parts of the Nevada portion of the ecoregion, where it could be expected to find good condition lands.

3. [Sandy this is from the memo you sent me last week] For some of the widespread "matrix" community types (e.g., sagebrush shrublands) we basically know of only one or a handful of sites that are large enough to sustain or restore large-scale ecological processes. For these places, we don't really need the model to find them. Perhaps by the next round of analysis someone can review the map(s) and delineate by hand all of those large "matrix" community sites (e.g., perhaps Hanford ALE and north slope; INEL in Idaho; Snake R. birds of prey refuge.....or whatever). We would then use this set of sites as our starting condition for the optimization model. This could be a combination of experts workshop and the ICBEMP Management Categories sites.
A thought: perhaps the GIS could be used to select all expert workshop sites that overlap with the ICBEMP categories we want to use.??

Results and Recommended Goals:
See Attached Table X for the assigned Coarse Filter Values (CFV's) and patterns, and the assigned goal. This is the hardest part to "define" and translate all of the above into some hard numbers.

General Principles: To meet the 3 objectives stated above, a balance must be achieved. Some of this may not prove to be doable via the GIS analysis and will have to be addressed during the review meeting scheduled for June 5. Also, I am assuming the numbers we set for % representation are **per section**.

1. For those G1 through G2 associations for which EOR's are available, it is desirable to include all those locations in the sites. There are some of these for which many EO's exist, but typically they are small, fragmented patches of once extensive vegetation types (e.g. Palouse grassland types). We will need to identify those rare associations for which we have no EO's and explicitly expect future inventory and protection efforts for those types.

2. For the more common associations, they will be treated as components of the Gap cover type surrogates. To assist with setting goals, the surrogates were ranked and grouped based upon the ranking into 4 large groups:

Group A: Those which have high (1) or medium (2) coarse filter value, and typically occur in small patches in the landscape. Most of these are restricted to unusual substrate or hydrologic conditions (or maybe even disturbance regimes), and/or are limited in their distribution and so need to be protected in the CP.

Goal A: This goal should center around capturing most of the area of these cover types in the CP, particularly if the total area in this ecoregion is small (say < 500 sq km). For those with small area, 50% might a reasonable starting point. Some of these cover types actually have largish area (>1000 sq km) and 50% would be too high, so for these it could be 25% or thereabouts.

Group B: Those which have medium coarse filter value (2) and occur in relatively small patches. This is an interesting group of alliances, and contains 2 different patterns of vegetation types: those that are "disjunctly peripheral" to this ecoregion, and yet cover large areas and are important; and some of the less common *Artemisia* alliances with limited ranges of distribution. Most of these have total areas of < 500 sq km.

Goal B: These should have fairly high representation (how about 20%), and for the woodland and forest cover types a minimum size on the order of 1000 ha (which = 10 sq km). This is a minimum size Jimmy suggested, which I think is maybe too small, so if you are comfortable we could try a min size of 20 sq km (which is 2000 ha or about 5000 acres). since they aren't widely distributed in the CP, stratification probably isn't important, although at least by section.

Group C: All those with high (1) to medium (2) coarse filter value and typically found in big patches. This includes the vegetation types that really "distinguish" the Columbia Plateau from surrounding mountainous ecoregions: *Juniper* Woodlands, *Artemisia* shrublands, big sage - low sage, *Atriplex* salt desert, perennial grasslands. Most of these are very heterogeneous containing many associations. Several of them cover >10,000 sq km and all are over 1000 sq km in area in the CP. Interestingly, most of these are very poorly represented in Status 1 or 2 management areas.

Goal C: these are the really difficult ones to set goal values for. I think we can approach these with a sort of double strategy: for the second analyses in 2 weeks pick starting seed sites that are large, contiguous and in good condition to capture some of these; then stratify the remaining sites selected by section and subsection to capture range of variability. Additionally, some minimum size values would be good, even thugh we will try to have some large areas represented.

In the meantime for this week's analysis, I think stratification is important. The subsection coverage is available and I think Chris sent it to UCSB in March, so I think selecting sites by section x subsection should be done for these. We could also set a minimum size for them (except maybe the perennial grasslands), using 20 sq km for the woodlands and maybe 5 sq km (1240 acres) for the grasslands. Since these are widespread, perhaps a 10% representation goal **for the entire ecoregion** would be adequate.

Group D: Those which have low (3) coarse filter value and which are mostly in small patches. These are primarily vegetation types which are only peripherally in the CP ecoregion because of the vagaries of the boundaries. Their primary range of distribution is outside of this ecoregion, and so most protection will not occur in the CP.

> **Goal D**: these are cover types for which there is low priority to capture much area. We could set something small like 5%, or say only if they are within a subwatershed selected for some other value (e.g. EO's or in one of the land management categories we use as a starting condition).

Appendix 1.C

METHODS - RARE PLANTS
COLUMBIA PLATEAU ECOREGION
Bob Moseley
December 13, 1996

Ecoregion Botany Team

Bob Moseley - ID CDC (leader)
John Gamon - WA NHP
Sue Vrilakas - OR NHP
[with some help from Jim Morefield - NV NHP and Ben Franklin - UT NHP]

Development of the Ecoregional Rare Plant List

1. Each state botanist provided a list of species tracked by their program that occur within the ecoregion.

2. These state lists were compiled into two master lists for the ecoregion:

  a) Globally rare taxa - G1 through G3 - 154 species

  b) State rare taxa - G4 and G5, S1 through S3 - 160 species

The lists were then reviewed again by the botanists for errors and, primarily, to add SRANK's to taxa that occur in their states, but weren't included on their initial lists because they aren't tracked in that state. This mostly related to state-rare species and it allowed us to determine the completeness of EO coverage for the species in the ecoregion.

3. Because the target list contained over 300 species, we thought it might be useful to assign an ecoregional rank (ERANK) to the species in order to prioritize species for analysis and interpretation of the portfolio design. Initially we did this for the globally rare species. As it turns out, ERANK's for most species were equal to the GRANK's, meaning that a majority of the 154 G1-G3 plant species are endemic or near endemic to the Columbia Plateau Ecoregion!

Designing the Portfolio

1. Lists used as "target lists" in experts workshop portfolio design.

2. EO's used in GIS algorithms for designing portfolio.

Appendix 1.D

ZOOLOGICAL METHODS
COLUMBIA PLATEAU ECOREGIONAL PROJECT
(Craig Groves and Dave Rolph)

Selection of vertebrate conservation targets

Regional Conservation Information Manager Audrey Godell worked with data managers from Heritage Programs in Nevada, Idaho, Oregon, and Washington to develop a complete list of all vertebrate species known to breed in the Columbia Plateau Ecoregion. This initial list of 609 species (9 G1s, 6 G2s, 15 G3s, 55 G4s, 524 G5s) was reviewed by Craig Groves (WRO), Dave Rolph (WAFO), Mark Stern and Eleanor Gaines (ORFO), Chuck Harris (Idaho CDC), and John Fleckenstein (WA Heritage) in a 1-day workshop held in the Oregon Field Office on October 17, 1996. The purpose of this workshop was to develop a draft list of those vertebrate species that would be considered conservation targets in the Columbia Plateau . project. Although we reviewed both terrestrial and aquatic species (fish) during this session, Trish Klahr (IDFO) was subsequently given the task of determining which fish species would be considered as targets of our conservation planning efforts.

In reviewing the complete list of vertebrates, we eliminated a number of species that were erroneously placed on the initial list and did not actually occur in the ecoregion. Species that were ranked G3-G5 and whose distributions were largely (>95%) outside of the ecoregion (e.g., kit fox, yellow-billed cuckoo) or whose habitat was present in very limited amounts (e.g., ruby-crowned kinglet - the ecoregion is dominated by shrub steppe with only sparse amounts of forest) were also eliminated from the potential list of target species.

Target species were then selected on the basis of G rank, documented population declines, endemism, and the existence of threats to a species throughout a substantial portion of its range. Although we noted several species whose G ranks are in need of revision, we decided that it was outside the realm of this first iteration of the ecoregional plan to work on such revisions. For Neotropical migrant bird species, we also examined the Partners in Flight (PIF) developed by PIF working groups in Oregon, Washington, Idaho, and Nevada to determine if any other migratory birds should be added as conservation targets that were not identified through application of the above criteria. Several species of migratory birds tracked by PIF were added to the list on the basis of recorded population declines from Breeding Bird Survey (BBS) data.

There were three taxonomic groups - bats, amphibians, and reptiles - for which we were unsure of the status of several species. Regional experts on these taxonomic groups, therefore, were contacted for advice on which species should be considered as conservation targets. As a result of consultations concerning these particular species groups, and also the input from experts attending the Columbia Plateau Conservation

Workshop in Portland (January 14-15, 1997), additional species were added or subtracted from the list of targets using the same criteria presented above.

In addition to selecting target species, we identified three types of data gaps for each target species in each state that it occurred. If a species occurred in a state but was not tracked by a Heritage program at the element occurrence (EO) level, then that was considered one type of data gap. Incomplete inventories and information that existed for a species but had not been incorporated in the Heritage program's databases were considered the other two types of data gaps. No attempts will be made in this round of planning to fill data gaps of any kind. However, a tabular survey will be sent to all Heritage Programs in the ecoregion to accurately document these data gaps.

Review and editing of vertebrate databases

Heritage programs submitted all EO vertebrate data to the Washington Field Office where it was analyzed together with a databases from the Washington Department of Fish and Wildlife. A geographic information system (GIS) was used to clip all vertebrate data to the Columbia Plateau ecoregion. Each EO or record within all databases was then examined to assess whether the record represented a target species, the usefulness of the record for further analyses, and the viability of the record. Records deemed inappropriate for further analyses were flagged with a "0" while good records were flagged with a "1" using the following criteria.

1. For all vertebrate data, "flag = 0" for records with no geographic (e.g., lat/long) coordinates.
2. For all vertebrate data, "flag = 0" for records with no species name.
3. For all vertebrate data, flag = 0 for species that are not conservation targets.
4. All vertebrate records without dates of observation were given "flag = 0".
5. All records for fish and invertebrates in the vertebrate databases were given "flag = 0".
6. For all vertebrate data, we decided to use only 1980+ data, pre-1980 data was given "flag = 0".

Editing criteria for specific databases include:

Oregon (939 records, 353 retained)

1. For Northern goshawks, "flag = 0" for all occurrences that did not represent breeding territories (i.e., sightings).
2. All sage grouse records were retained, recognizing that they represented a mix of wintering areas, migratory areas, and leks.
3. For bats, only EOs representing maternity roosts or hibernacula were used. Mist net or museum specimen data was given "flag = 0".
4. For all reptile species and many amphibians, data was entirely observational. We retained these records.

5. A problem was found with Lewis' woodpecker; 1 EO = 20 breeding birds while another EO = 1 nest. All of these records were, however, retained.

Nevada (368 records, 38 retained)

1. We eliminated all spotted bat records ("flag = 0") because they were only museum specimens.
2. The spotted frog data did not contain any EO quality data so we aren't using it ("flag = 0").

Idaho (949 records, 555 retained)

1. Excluded all bat records that were museum specimens, "flag = 0".
2. An exception was allowed to our 1980 rule for the disjunct but significant population of *Microdipodops megacephalus*.
3. For Long-billed curlew, we excluded "possible nesting areas" with "flag = 0".

Washington (4926 records, 1350 retained)

1. Excluded Burrowing owl records that were not for nesting birds; "flag = 0".
2. Excluded Ferriginous hawk records listed as old nest sites, damaged nest sites, or artificial nesting platforms; "flag = 0".
3. Excluded herptile occurrences that were described as "museum records"; "flag = 0".
4. Excluded historic Sage grouse and Sharp-tailed grouse sites; "flag = 0".
5. Excluded Forster's tern records that were not for nesting colonies; "flag = 0".
6. Excluded Washington ground squirrel records that represented revisits to historic colonies and no squirrels were seen; "flag = 0".
7. Records from a separate herptile database were added; however, no records were eliminated from the database based on descriptions in the comment field as no general site descriptions were provided.

Utah (4 records, 0 retained)

1. All records were of species that were not conservation targets or were from historic dates (pre-1980), "flag = 0".

California (139 records, 13 retained)

1. Records were flagged ("flag = 0") only for being earlier than 1980 or for species that are not targets.

Databases for all of the states were combined into a master Columbia Plateau vertebrate database that retained the following fields:

Id_num - a sequential number given after sorting on Source and Source_id

Source - the source database of records
Source_id - the ID number of record within its source database
Lastobs - the last observation date of record or date given for the record: note; many records do not have a date in this field or the date is illegible
Flag - "0" for records that should not be used in any analysis as they are bad records or they are for species that are not conservation targets
Sciname - scientific fame for the species
Comname - common name of the species
Grank - most recent G rank available
Long - longitude
Lat - latitude

Upon combining all records into a single master Columbia Plateau database, several inconsistencies were noted. The following corrections were made to these records:

1. Greater sandhill crane given a rank of G5T4 in Oregon and G5T2 in California - retained all records as G5T2
2. Northern sagebrush lizard subspecies in Oregon was retained without subspecies name.
3Townsend's big-eared bat records listed as *Plecotus townsendii* were changed to *Corynorhinus townsendii.*
4. Western gray squirrel in Oregon (*Sciurus griseus griseus*) kept as *Sciurus griseus*.
5. Records with no latitude or longitude were deleted.
6. Sagebrush vole listed as *Lagurus* were changed to *Lemmiscus*.
7. All Burrowing owl records were renamed as the western subspecies *S. c. hypugaea*
8. Sage grouse were all renamed as Western sage grouse.
9. We noted problems in inconsistent taxonomy from one state to another with regard to spotted frogs (*Rana pretiosa* and *Rana luteiventrus*). All spotted frogs were renamed as Columbia spotted frog (*Rana luteiventrus*) for this ecoregion.

Data analyses

Only EO data gathered from Heritage Programs or the Washington Department of Fish and Wildlife will be used at this stage in the ecoregional analysis. Other datasets may be incorporated at a later stage. Specifically, Gap Analysis digital distribution maps (1:500,000) or Interior Columbia Plateau Scientific Assessment data (1 km resolution) may be seen as beneficial to the analysis after further review. For example, Gap or Interior Columbia Basin distribution maps could provide additional information for species that are not consistently tracked at the EO level by Heritage programs (e.g., Brewer's sparrow, sage grouse, sagebrush vole).

For those declining or threatened species that are more widely distributed and not tracked at the EO level, we may take an additional step. The hypothesis that viable populations of these species will be captured or maintained by a coarse filter conservation strategy (conserving examples of representative vegetation types) remains untested and problematic at best for many animal species. This problem is especially significant for wide ranging or migratory species, habitat specialists, or species with large breeding territories. For these species (e.g., fringed myotis, MacGillivray's warbler) we could develop written habitat recommendations that can be used as ancillary information by ecologists in selecting representative examples of vegetation types as well as by biologists that are involved in more detailed site conservation planning at a later stage in the planning process.

Caveats

Due to the time constraints of the project, no formal viability analyses (e.g., PVA) will be conducted for any target species at the occurrence level. Likewise and for similar reasons, no efforts will be made to establish conservation goals (number and distribution of occurrences) for each target species.

Although inconsistencies were found in EO data from state to state, no effort will be made at this time to address these inconsistencies in EO specifications. EO data inconsistencies, however, will be noted in the plan.

Invertebrate databases

For all Invertebrate databases (6123 total, 143 retained):

1. Records with “lastobs” or “data” earlier than 1980 were excluded, “flag = 0”.
2. Records with no date were excluded, “flag = 0”; most were museum records.
3. Species that were not a conservation target were excluded, “flag = 0”.

Washington (6008 records, 53 retained)

1. All invertebrate records found in the Washington Department of Fish and Wildlife database were copied into the master Columbia Plateau invertebrate database.
2. Also used a lepidoptera database supplied by the Northwest Lepidoptera Society.
3. Excluded records that had a date which was greater than the date in which the database was received by TNC (i.e., 1998); “flag = 0”.
4. *Boloria selene astocostalis* was recorded and retained as *Clossonia s. a.*
5. Deleted records that were a duplicate of records in wildlife database.

Appendix 1E-I

Invertebrate Conservation Targets

SCIENTIFIC NAME	COMMON NAME
AMBLYSCIRTES VIALIS	ROADSIDE SKIPPER
AMERIGONISCUS MALHEURENSIS	MALHEUR ISOPOD
ANODONTA CALIFORNIENSES	CALIFORNIA FLOATER
APOCHTHONIUS MALHEURI	MALHEUR PSEUDOSCORPION
OLORIA SELENE ATROCOSTALIS	SILVER BORDERED BOG FRITILLARY
CAPNIA LACUSTRA	LAKE TAHOE BENTHIC STONEFLY
CICINDELA ARENICOLA	IDAHO DUNES TIGER BEETLE
CRYPTOMASTIX MAGNIDENTATA	MISSION CREEK OREGONIAN
EUPHILOTES RITA MATTONII	MATTONI'S BLUE
EUPHYDRYAS EDITHA MONOENSIS	MONO CHECKERSPOT
EVERES COMYNTAS COMYNTAS	EASTERN-TAILED BLUE
FISHEROLA NUTTALLI	SHORTFACE LANX
FLUMINICOLA COLUMBIANA	COLUMBIA PEBBLESNAIL
FORMICA MICROPHTHALMA	UNNAMED ANT
GLACICAVICOLA BATHYSCIOIDES	BLIND CAVE LEIODID BEETLE
JUGA BULBOSA	BULB JUGA (SNAIL)
JUGA HEMPHILLI MAUPINENSIS	DESHUTES JUGA (SNAIL)
KENKIA RHYNCHIDA	A FLATWORM (PLANARIAN)
LANX SP 1	BANBURY SPRINGS LIMPET
MONADENIA FIDELIS MINOR	OREGON SNAIL (DALLES SIDEBAND)
MYRMECOCYSTUS ARENARIUS	UNNAMED ANT
OCHROTRICHIA PHENOSA	DESCHUTES OCHROTRICHIAN MICRO
OREOHELIX VARIABILIS	DALLES MOUNTAIN SNAIL
PETROPHILA CONFUSALIS	AQUATIC MOTH
PHYSA NATRICINA	SNAKE RIVER PHYSA
PISIDIUM ULTRAMONTANUM	MONTANE PEACLAM
PLANORBELLA OREGONENSIS	BORAX LAKE RAMSHORN (SNAIL)
POLITES SABULETI SINEMACULATA	DENIO SANDHILL SKIPPER
PRISTINICOLA HEMPHILLI	PRISTINE SPRINGSNAIL
PYRGULOPSIS HENDERSONI	HARNEY LAKE SPRINGSNAIL
PYRGULOPSIS INTERMEDIA	CROOKED CREEK SPRINGSNAIL
PYRGULOPSIS BRUNEAUENSIS	BRUNEAU HOT SPRINGSNAIL
PYRGULOPSIS NEVADENSIS	PYRAMID LAKE PEBBLESNAIL
PYRGULOPSIS SP 1	FORMATION SPRINGSNAIL
PYRGULOPSIS IDAHOENSIS	IDAHO SPRINGSNAIL
SATYRIUM SYLVINUM SYLVINUM	SYLVAN HAIRSTREAK
SPEYERIA ATLANTIS ELKO	ATLANTIS FRITILLARY
SPEYERIA NOKOMIS SSP 1	CARSON VALLEY SILVERSPOT
STENAMMA WHEELERORUM	UNNAMED ANT
STYGOBROMUS HUBBSI	MALHEUR CAVE AMPHIPOD
TAYLORCONCHA SERPENTICOLA	BLISS RAPIDS SNAIL
THERMACARUS NEVADENSIS	WATER MITE
UNNAMED SNAIL SP 5	UNNAMED SNAIL SP 5
VALVATA UTAHENSIS	DESERT VALVATA
VESPERICOLA COLUMBIANUS	COLUMBIA GORGE HESPERIAN

Appendix 1F Fish Conservation Targets

SCIENTIFIC NAME	COMMON NAME
ACIPENSER TRANSMONTANUS	WHITE STURGEON
CATOSTOMUS CATOSTOMUS	LONGNOSE SUCKER
CATOSTOMUS COLUMBIANUS HUBBSI	WOOD RIVER SUCKER
CATOSTOMUS OCCIDENTALIS LACUSANSERINUS	GOOSE LAKE SUCKER
CATOSTOMUS PLATYRHYNCHUS	MOUNTAIN SUCKER
CATOSTOMUS SP 1	WALL CANYON SUCKER
CATOSTOMUS TAHOENSIS	TAHOE SUCKER
CATOSTOMUS WARNERENSIS	WARNER SUCKER
COTTUS BAIRDI SSP	MALHEUR MOTTLED SCULPIN
COTTUS BELDINGI	PAIUTE SCULPIN
COTTUS COGNATUS	SLIMY SCULPIN
COTTUS GREENEI	SHOSHONE SCULPIN
COTTUS LEIOPOMUS	WOOD RIVER SCULPIN
COTTUS MARGINATUS	MARGINED SCULPIN
COTTUS PITENSIS	PIT SCULPIN
EREMICHTHYS ACROS	DESERT DACE
GILA ALVORDENSIS	ALVORD CHUB
GILA BICOLOR SSP	CATLOW TUI CHUB
GILA BICOLOR SSP	HUTTON TUI CHUB
GILA BICOLOR SSP	SUMMER BASIN TUI CHUB
GILA BICOLOR SSP	WARNER BASIN TUI CHUB
GILA BICOLOR EURYSOMUS	SHELDON TUI CHUB
GILA BICOLOR OREGONENSIS	OREGON LAKES TUI CHUB
GILA BORAXOBIUS	BORAX LAKE CHUB
GILA COPEI	LEATHERSIDE CHUB
LAMPETRA TRIDENTATA	PACIFIC LAMPREY
LAMPETRA TRIDENTATA SSP	GOOSE LAKE LAMPREY
LAVINIA SYMMETRICUS MITRULUS	CALIFORNIA (PIT) ROACH
ONCORHYNCHUS CLARKI BOUVIERI	YELLOWSTONE CUTTHROAT TROUT
ONCORHYNCHUS CLARKI HENSHAWI	LAHONTAN CUTTHROAT TROUT
ONCORHYNCHUS CLARKI LEWISI	WESTSLOPE CUTTHROAT TROUT
ONCORHYNCHUS KISUTCH	COHO SALMON OR SILVER SALMON
ONCORHYNCHUS MYKISS GAIRDNERI	INLAND REDBAND TROUT
ONCORHYNCHUS MYKISS MYKISS	STEELHEAD
ONCORHYNCHUS MYKISS SSP	CATLOW VALLEY REDBAND TROUT
ONCORHYNCHUS MYKISS SSP	GOOSE LAKE REDBAND TROUT
ONCORHYNCHUS MYKISS SSP	WARNER VALLEY REDBAND TROUT
ONCORHYNCHUS NERKA	SOCKEYE SALMON OR KOKANEE
ONCORHYNCHUS TSHAWYTSCHA	CHINOOK SALMON OR KING SALMON
PERCOPSIS TRANSMONTANA	SAND ROLLER
RHINICHTHYS OSCULUS SSP	FOSKETT SPECKLED DACE
SALVELINUS CONFLUENTUS	BULL TROUT

Appendix 1G Herptile Conservation Targets

SCIENTIFIC NAME	COMMON NAME
BUFO BOREAS	WESTERN TOAD
BUFO WOODHOUSII	WOODHOUSE'S TOAD
CROTAPHYTUS BICINCTORES	MOJAVE BLACK-COLLARED LIZARD
GAMBELIA WISLIZENII	LONGNOSE LEOPARD LIZARD
MASTICOPHIS TAENIATUS	STRIPED WHIPSNAKE
PHRYNOSOMA DOUGLASI	SHORT-HORNED LIZARD
RANA LUDIOVENTRUS	SPOTTED FROG
RANA PIPIENS	NORTHERN LEOPARD FROG
RHINOCHEILUS LECONTEI	LONGNOSE SNAKE
SONORA SEMIANNULATA	GROUND SNAKE

Appendix 1H Bird Conservation Targets

SCIENTIFIC NAME	COMMON NAME
ACCIPITER GENTILIS	NORTHERN GOSHAWK
AMMODRAMUS SAVANNARUM	GRASSHOPPER SPARROW
AMPHISPIZA BELLI	SAGE SPARROW
BUTEO REGALIS	FERRUGINOUS HAWK
CATHARUS FUSCESCENS	VEERY
CENTROCERCUS UROPHASIANUS	SAGE GROUSE
CHARADRIUS ALEXANDRINUS	SNOWY PLOVER
CHLIDONIAS NIGER	BLACK TERN
CYGNUS BUCCINATOR	TRUMPETER SWAN
DOLICHONYX ORYZIVORUS	BOBOLINK
EGRETTA THULA	SNOWY EGRET
EMPIDONAX WRIGHTII	GRAY FLYCATCHER
FALCO PEREGRINUS	PEREGRINE FALCON
HALIAEETUS LEUCOCEPHALUS	BALD EAGLE
LANIUS LUDOVICIANUS	LOGGERHEAD SHRIKE
LARUS PIPIXCAN	FRANKLIN'S GULL
MELANERPES LEWIS	LEWIS WOODPECKER
NUMENIUS AMERICANUS	LONG-BILLED CURLEW
OPORORNIS TOLMIEI	MACGILLIVRAY'S WARBLER
PELECANUS ERYTHRORHYNCHOS	AMERICAN WHITE PELICAN
PIPILO CHLORURUS	GREEN-TAILED TOWHEE
SPEOTYTO CUNICULARIA	BURROWING OWL
SPIZELLA BREWERI	BREWER'S SPARROW
STERNA FORSTERI	FORSTER'S TERN
TYMPANUCHUS PHASIANELLUS	SHARP-TAILED GROUSE
VIREO SOLITARIUS	SOLITARY VIREO
WILSONIA PUSILLA	WILSON'S WARBLER

Appendix 1-I Mammal Conservation Targets

SCIENTIFIC NAME	COMMON NAME
ANTROZOUS PALLIDUS	PALLID BAT
BRACHYLAGUS IDAHOENSIS	PYGMY RABBIT
CORYNORHINUS TOWNSENDII	TOWNSEND'S BIG-EARED BAT
EUDERMA MACULATUM	SPOTTED BAT
LEMMISCUS CURTATUS	SAGEBRUSH VOLE
ONYCHOMYS LEUCOGASTE	NORTHERN GRASSHOPPER MOUSE
OVIS CANADENSIS	MOUNTAIN SHEEP
SOREX MERRIAMI	MERRIAM'S SHREW
SOREX PREBLEI	PREBLE'S SHREW
SPERMOPHILUS BRUNNEUS	IDAHO GROUND SQUIRREL
SPERMOPHILUS WASHINGTONI	WASHINGTON GROUND SQUIRREL
THOMOMYS TOWNSENDII	TOWNSEND'S POCKET GOPHER

Appendix 1-J

Plant Conservation Targets - Scientific Name

G1-G3

ARABIS FALCATORIA
ASTRAGALUS COLLINUS VAR LAURENTII
ASTRAGALUS SINUATUS
ASTRAGALUS TYGHENSIS
CASTILLEJA CHRISTII
CLEOMELLA HILLMANII
COLLOMIA RENACTA
ERIGERON BASALTICUS
ERIOGONUM CHRYSOPS
IVESIA BAILEYI VAR BAILEYI
IVESIA RHYPARA VAR RHYPARA
IVESIA RHYPARA VAR SHELLYI
LOPHOCHLAENA OREGONA
MENTZELIA PACKARDIAE
MIMULUS WASHINGTONENSIS SSP 1
OXYTROPIS CAMPESTRIS VAR WANAPUM
PENSTEMON IDAHOENSIS
POLEMONIUM PECTINATUM
POTENTILLA COTTAMII
PYRROCOMA UNIFLORA VAR 1
RUBUS NIGERRIMUS
SENECIO ERTTERAE
STEPHANOMERIA MALHEURENSIS
THELYPODIUM HOWELLII SSP SPECTABILIS
ALLIUM CONSTRICTUM
AMSINCKIA CARINATA
ARTEMISIA LUDOVICIANA SSP ESTESII
ASTER JESSICAE
ASTRAGALUS ANSERINUS
ASTRAGALUS ARRECTUS
ASTRAGALUS COLUMBIANUS
ASTRAGALUS DIAPHANUS VAR DIURNUS
ASTRAGALUS MULFORDIAE
ASTRAGALUS PULSIFERAE VAR PULSIFERAE
ASTRAGALUS RIPARIUS
CALOCHORTUS MACROCARPUS VAR MACULOSUS
CAREX IDAHOA
CREPIS BAKERI SSP IDAHOENSIS
CRYPTANTHA LEUCOPHAEA
CYMOPTERUS ACAULIS VAR GREELEYORUM
CYMOPTERUS DAVISII
DELPHINIUM VIRIDESCENS
ERIOGONUM CUSICKII
ERIOGONUM SHOCKLEYI VAR PACKARDIAE
GALIUM GLABRESCENS SSP MODOCENSE
GRATIOLA HETEROSEPALA
HACKELIA CRONQUISTII
HAPLOPAPPUS LIATRIFORMIS
HOWELLIA AQUATILIS
ILIAMNA LONGISEPALA
IVESIA WEBBERI
LEPIDIUM PAPILLIFERUM
LEPTODACTYLON GLABRUM
LEPTODACTYLON PUNGENS SSP HAZELIAE
LOMATIUM TUBEROSUM
LUPINUS CUSICKII
LUPINUS SERICEUS VAR EGGLESTONIANUS
MENTZELIA MOLLIS
MIMULUS JUNGERMANNIOIDES
MYOSURUS MINIMUS VAR SESSILIFLORUS
PENSTEMON DEUSTUS VAR VARIABILIS
PHACELIA INCONSPICUA
PHACELIA LENTA
PHACELIA LUTEA VAR CALVA
PINUS WASHOENSIS
POTAMOGETON FOLIOSUS VAR FIBRILLOSUS
PYRROCOMA LIATRIFORMIS
RANUNCULUS RECONDITUS
SILENE SPALDINGII
SPIRANTHES DILUVIALIS
TAUSCHIA HOOVERI
THELYPODIUM EUCOSMUM
TRIFOLIUM PLUMOSUM SSP AMPLIFOLIUM
TRIFOLIUM THOMPSONII
AGASTACHE CUSICKII
AGOSERIS LACKSCHEWITZII
ALLIUM AASEAE
ALLIUM ROBINSONII
ARTEMISIA PAPPOSA
ASTRAGALUS AQUILONIUS
ASTRAGALUS ATRATUS VAR INSEPTUS
ASTRAGALUS DIVERSIFOLIUS
ASTRAGALUS GEYERI
ASTRAGALUS MISELLUS VAR PAUPER
ASTRAGALUS ONICIFORMIS
ASTRAGALUS PECKII
ASTRAGALUS PULSIFERAE VAR SUKSDORFII
ASTRAGALUS PURSHII VAR OPHIOGENES
ASTRAGALUS STERILIS
ASTRAGALUS TEGETARIOIDES
ASTRAGALUS YODER-WILLIAMSII
CALOCHORTUS LONGEBARBATUS VAR LONGEBARBATUS
CALOCHORTUS NITIDUS
CAMISSONIA PALMERI
CAMISSONIA TANACETIFOLIA SSP QUADRIPERFORATA
CARDAMINE CONSTANCEI

CASTILLEJA CHLOROTICA
CASTILLEJA PILOSA VAR STEENENSIS
CHAENACTIS CUSICKII
COLLOMIA MACROCALYX
ERIGERON PIPERIANUS
ERIOGONUM CROSBYAE
ERIOGONUM DESERTORUM
ERIOGONUM OCHROCEPHALUM VAR CALCAREUM
ERIOGONUM PROCIDUUM
ERIOGONUM SALICORNIOIDES
HACKELIA HISPIDA VAR DISJUNCTA
HACKELIA OPHIOBIA
HYMENOXYS LEMMONII
LEPIDIUM DAVISII
LOMATIUM LAEVIGATUM
LOMATIUM ROLLINSII
LOMATIUM SALMONIFLORUM
LOMATIUM SUKSDORFII
MIMULUS PATULUS
OENOTHERA PSAMMOPHILA
OENOTHERA PYGMAEA
ORYZOPSIS HENDERSONII
PHACELIA MINUTISSIMA
PLAGIOBOTHRYS SALSUS
PRIMULA SP 1
PYRROCOMA HIRTA VAR SONCHIFOLIA
PYRROCOMA INSECTICRURIS
PYRROCOMA RADIATA
RIBES OXYACANTHOIDES SSP IRRIGUUM
RORIPPA COLUMBIAE
SCUTELLARIA HOLMGRENIORUM
SENECIO STREPTANTHIFOLIUS VAR LAETIFLORUS
STIPA HENDERSONII
TAUSCHIA TENUISSIMA
THELYPODIUM HOWELLII SSP HOWELLII
TRIFOLIUM DOUGLASII
TRIFOLIUM OWYHEENSE

G4-G5
ACHNATHERUM SPECIOSA
ALLENROLFEA OCCIDENTALIS
ALLIUM ANCEPS
ALLIUM BRANDEGEI
ALLIUM CAMPANULATUM
ANCISTROCARPHUS FILAGINEUS
ANTENNARIA PARVIFOLIA
ARABIS CRUCISETOSA
ARENARIA FENDLERI VAR. ACULEATA
ARGEMONE MUNITA SSP ROTUNDA
ASPICILIA FRUTICULOSA
ASTER SCOPULORUM
ASTRAGALUS ALPINUS
ASTRAGALUS ALVORDENSIS
ASTRAGALUS ARTHURI
ASTRAGALUS CALYCOSUS
ASTRAGALUS DIAPHANUS VAR DIAPHANUS
ASTRAGALUS DRUMMONDII
ASTRAGALUS FILIPES
ASTRAGALUS GEYERI
ASTRAGALUS HOODIANUS
ASTRAGALUS HOWELLII
ASTRAGALUS IODANTHUS
ASTRAGALUS MICROCYSTIS
ASTRAGALUS NEWBERRYI VAR CASTOREUS
ASTRAGALUS PURSHII VAR GLAREOSUS
ASTRAGALUS SALMONIS
ASTRAGALUS SOLITARIUS
ASTRAGALUS TETRAPTERUS
BALSAMORHIZA ROSEA
BLEPHARIDACHNE KINGII
BOTRYCHIUM LANCEOLATUM
BOTRYCHIUM MINGANENSE
BOTRYCHIUM PINNATUM
BOTRYCHIUM SIMPLEX
BOUTELOUA GRACILIS
CALOCHORTUS EURYCARPUS
CAMISSONIA SCAPOIDEA
CAREX BACKII
CAREX COMOSA
CAREX DENSA
CAREX HYSTERICINA
CAREX LIMNOPHILA
CAREX NOVA
CASTILLEJA XANTHOTRICHA
CHAENACTIS MACRANTHA
CHAENACTIS NEVII
CHAENACTIS STEVIOIDES
CHAENACTIS XANTIANA
CHELIANTHES FEEI
CLEOMELLA PLOCASPERMA
COLLINSIA SPARSIFLORA VAR BRUCEAE
CRYPTANTHA INTERRUPTA
CRYPTANTHA PROPRIA
CRYPTANTHA ROSTELLATA
CRYPTANTHA SPICULIFERA
CUSCUTA DENTICULATA
CYMOPTERUS NIVALIS
CYMOPTERUS PURPURASCENS
CYPERUS BIPARTITUS
CYPRIPEDIUM PARVIFLORUM
DAMASONIUM CALIFORNICUM
DIMERESIA HOWELLII
DOWNINGIA BACIGALUPII
DOWNINGIA INSIGNIS
DRABA DOUGLASII VAR DOUGLASII
DRABA INCERTA
DRABA SPHAEROIDES VAR CUSICKII
DRYOPTERIS FILIX-MAS
EATONELLA NIVEA
ELEOCHARIS ROSTELLATA

EPIPACTIS GIGANTEA
ERIGERON LINEARIS
ERIGERON NANUS
ERIOGONUM BRACHYANTHUM
ERIOGONUM SHOCKLEYI VAR SHOCKLEYI
ERIOPHYLLUM LANATUM
EUPATORIUM OCCIDENTALE
GENTIANA PROSTRATA
GENTIANELLA TENELLA
GITHOPSIS SPECULARIOIDES
GLYPTOPLEURA MARGINATA
HACKELIA CINEREA
HAPLOPAPPUS HIRTUS VAR HIRTUS
HYMENOXYS RICHARDSONII
HYPERICUM MAJUS
IPOMOPSIS POLYCLADON
ISOETES MUTTALLII
KOBRESIA BELLARDII
KOBRESIA SIMPLICIUSCULA
LIGUSTICUM GRAYI
LIMOSELLA ACAULIS
LINDERNIA DUBIA VAR ANAGALLIDEA
LOBELIA KALMII
LOMATIUM COUS
LOMATIUM DISSECTUM VAR DISSECTUM
LOMATIUM FARINOSUM VAR HAMBLENIAE
LOMATIUM RAVENII
LOMATIUM SERPENTINUM
LOMATIUM WATSONII
LUPINUS SABINIANUS
LUPINUS UNCIALIS
MELICA STRICTA
MIMULUS BREWERI
MIMULUS LATIDENS
MIMULUS PULSIFERAE
MIMULUS SUKSDORFII
MIMULUS WASHINGTONENSIS
WASHINGTONENSIS
MUHLENBERGIA GLOMERATA
MUHLENBERGIA MINUTISSIMA
NEMACLADUS RIGIDUS
NICOTIANA ATTENUATA
OENOTHERA CESPITOSA
OENOTHERA FLAVA
OPHIOGLOSSUM PUSILLUM
OROBANACHE PINORUM
PAEONIA BROWNII
PECTOCARYA SETOSA
PEDICULARIS CONTORTA
PEDIOCACTUS SIMPSONII VAR ROBUSTIOR
PENTAGRAMMA TRIANGULARIS SSP
TRIANGULARIS
PENSTEMON DAVIDSONII VAR PRAETERITUS
PENSTEMON ERIANTHERUS VAR
ARGILLOSUS
PENSTEMON JANISHIAE
PERAPHYLLUM RAMOSISSIMUM
PETERIA THOMPSONIAE
PHLOX KELSEYI VAR KELSEYI
PHACELIA GYMNOCLADA
PHACELIA IVESIANA VAR GLANDULIFERA
PILULARIA AMERICANA
POLEMONIUM PULCHERRIMUM VAR.
PULCHERRIMUM
POLYGONUM AUSTINIAE
POLYSTICHUM KRUCKEBERGII
POTAMOGETON DIVERSIFOLIUS
POTAMOGETON FOLIOSUS VAR FIBRILLOSUS
PRIMULA INCANA
PSATHYROTES ANNUA
SALICORNIA RUBRA
SALIX BEBBIANA
SAXIFRAGA ADSCENDENS SSP
OREGONENSIS
SENECIO HYDROPHYLLOIDES
SCUTELLARIA NANA VAR NANA
SESUVIUM VERRUCOSUM
SPARTINA PECTINATA
SPHAEROMERIA POTENTILLOIDES
SPIRANTHES PORRIFOLIA
SPOROBOLOS ASPER
STANLEYA CONFERTIFLORA
STIPA THURBERIANA
STYLOCLINE PSILOCARPHOIDES
SYMPHORICARPOS LONGIFLORUS
SYMPHORICARPOS OREOPHILUS VAR.
PARISHII
TALINUM SPINESCENS
TEUCRIUM CANADENSE VAR OCCIDENTALE
TEUCRIUM CANADENSE VAR VISCIDUM
TOWNSENDIA SCAPIGERA

PLANT ASSOCIATIONS OCCURRING IN THE <u>WESTERN</u> NORTHWESTERN BASIN & RANGE SECTION (342B) OF THE COLUMBIA PL

GAP COVER TYPES; NUMBERED ON LEGEND;

X = one of main associations in the cover type; I = inclusion in small patches in the cover type

ELCODE	GNAME	3	5	6	8	12	15	16	17	18	19	20	22	23	24	25	27	28	30	31	32	33	34	35	GRANK
CEGL000988	ALLENROLFEA OCCIDENTALIS SHRUBLAND													X											G3
CEGL001142	ALNUS INCANA - BETULA OCCIDENTALIS / (SALIX SPP.) SHRUBLAND																								G3
CEGL001144	ALNUS INCANA / CAREX SPP. SHRUBLAND	I							I			I													G3
CEGL001145	ALNUS INCANA / CORNUS SERICEA SHRUBLAND	I							I			I													G3Q
CEGL001147	ALNUS INCANA / MESIC FORB SHRUBLAND	I							I			I													G3G4Q
CEGL001148	ALNUS INCANA / MESIC GRAMINOID SHRUBLAND	I							I			I													G2G3Q
CEGL001064	AMELANCHIER ALNIFOLIA / ARTEMISIA TRIDENTATA / FESTUCA IDAHOENSIS SHRUBLAND											X													G4Q
CEGL000957	ARCTOSTAPHYLOS PATULA / CEANOTHUS VELUTINUS - CEANOTHUS PROSTRATUS SHRUBLAND											X													G3
CEGL000958	ARCTOSTAPHYLOS PUNGENS SHRUBLAND											X													G4
CEGL001487	ARTEMISIA ARBUSCULA - CERCOCARPUS LEDIFOLIUS / PSEUDOROEGNERIA SPICATA - POA SECUNDA SHRUBLAND											X				I									G4Q
CEGL001518	ARTEMISIA ARBUSCULA - PURSHIA TRIDENTATA / PSEUDOROEGNERIA SPICATA - FESTUCA IDAHOENSIS DWARF - SHRUB HERBACEOUS VEGETATION							I	I	I		I				I									G2G3
CEGL001409	ARTEMISIA ARBUSCULA / FESTUCA IDAHOENSIS DWARF - SHRUB HERBACEOUS VEGETATION									X						X									G5
CEGL001411	ARTEMISIA ARBUSCULA / POA SECUNDA DWARF - SHRUB HERBACEOUS VEGETATION									X						X									G5
CEGL001412	ARTEMISIA ARBUSCULA / PSEUDOROEGNERIA SPICATA DWARF - SHRUB HERBACEOUS VEGETATION									X						X									G5
CEGL001413	ARTEMISIA ARBUSCULA / STIPA THURBERIANA DWARF - SHRUB HERBACEOUS VEGETATION									I						I									G4G5
CEGL001549	ARTEMISIA CANA - ARTEMISIA TRIDENTATA SSP. VASEYANA / POA FENDLERIANA SSP. FENDLERIANA SHRUB HERBACEOUS VEGETATION						X	I																	G2G3Q
CEGL001460	ARTEMISIA CANA / LEYMUS CINEREUS SHRUBLAND						X	I																	G1
CEGL001743	ARTEMISIA CANA / MUHLENBERGIA RICHARDSONIS SHRUB HERBACEOUS VEGETATION						X	I																	G3
CEGL001551	ARTEMISIA CANA / POA FENDLERIANA SSP.FENDLERIANA SHRUB HERBACEOUS VEGETATION						X	I																	G2
CEGL001548	ARTEMISIA CANA / POA SECUNDA SHRUBLAND						X	I																	G2
CEGL001417	ARTEMISIA NOVA DWARF - SHRUBLAND [PROVISIONAL]															X									G3G5
CEGL001418	ARTEMISIA NOVA / ELYMUS ELYMOIDES DWARF - SHRUBLAND															X									G4G5
CEGL001422	ARTEMISIA NOVA / ORYZOPSIS HYMENOIDES DWARF - SHRUBLAND															X									G4G5
CEGL001423	ARTEMISIA NOVA / POA SECUNDA DWARF - SHRUBLAND															X									G3Q
CEGL001424	ARTEMISIA NOVA / PSEUDOROEGNERIA SPICATA DWARF - SHRUBLAND															X									G4G5
CEGL001425	ARTEMISIA NOVA / STIPA COMATA DWARF - SHRUBLAND															X									G3?
CEGL001528	ARTEMISIA RIGIDA / POA SECUNDA DWARF - SHRUB HERBACEOUS VEGETATION																X								G4

GAP COVER TYPES; NUMBERED ON LEGEND;

X = one of main associations in the cover type; I = inclusion in small patches in the cover type

ELCODE	GNAME	3	5	6	8	12	15	16	17	18	19	20	22	23	24	25	27	28	30	31	32	33	34	35	GRANK
CEGL001529	ARTEMISIA RIGIDA / PSEUDOROEGNERIA SPICATA DWARF SHRUB HERBACEOUS VEGETATION																X								G3
CEGL001452	ARTEMISIA SPINESCENS DWARF - SHRUBLAND													X											G3Q
CEGL000991	ARTEMISIA TRIDENTATA SHRUBLAND [PROVISIONAL]							X																	G5
CEGL001014	ARTEMISIA TRIDENTATA SSP. TRIDENTATA / FESTUCA IDAHOENSIS SHRUBLAND							X																	G4?
CEGL001016	ARTEMISIA TRIDENTATA SSP. TRIDENTATA / LEYMUS CINEREUS SHRUBLAND							X																	G2
CEGL001018	ARTEMISIA TRIDENTATA SSP. TRIDENTATA / PSEUDOROEGNERIA SPICATA SHRUB HERBACEOUS VEGETATION							X																	G2G4
CEGL001032	ARTEMISIA TRIDENTATA SSP. VASEYANA - PURSHIA TRIDENTATA / PSEUDOROEGNERIA SPICATA SHRUBLAND								X																G5Q
CEGL001035	ARTEMISIA TRIDENTATA SSP. VASEYANA - SYMPHORICARPOS OREOPHILUS / BROMUS CARINATUS SHRUBLAND								X																G4Q
CEGL001034	ARTEMISIA TRIDENTATA SSP. VASEYANA - SYMPHORICARPOS OREOPHILUS / ELYMUS TRACHYCAULUS SSP. TRACHYCAULUS SHRUBLAND								X																G3G4
CEGL001036	ARTEMISIA TRIDENTATA SSP. VASEYANA - SYMPHORICARPOS OREOPHILUS / FESTUCA IDAHOENSIS SHRUBLAND								X																G4
CEGL001037	ARTEMISIA TRIDENTATA SSP. VASEYANA - SYMPHORICARPOS OREOPHILUS / POA SECUNDA SHRUBLAND								X																G5Q
CEGL001038	ARTEMISIA TRIDENTATA SSP. VASEYANA - SYMPHORICARPOS OREOPHILUS / PSEUDOROEGNERIA SPICATA SHRUBLAND								X																G5?
CEGL001039	ARTEMISIA TRIDENTATA SSP. VASEYANA - SYMPHORICARPOS OREOPHILUS / STIPA COMATA SHRUBLAND								X																G3?
CEGL001021	ARTEMISIA TRIDENTATA SSP. VASEYANA / BROMUS CARINATUS SHRUBLAND								X																G4?
CEGL001532	ARTEMISIA TRIDENTATA SSP. VASEYANA / CAREX GEYERI SHRUB HERBACEOUS VEGETATION								X																G3
CEGL001533	ARTEMISIA TRIDENTATA SSP. VASEYANA / FESTUCA IDAHOENSIS SHRUB HERBACEOUS VEGETATION								X																G5
CEGL001023	ARTEMISIA TRIDENTATA SSP. VASEYANA / FESTUCA IDAHOENSIS - BROMUS CARINATUS SHRUBLAND								X																G4Q
CEGL001026	ARTEMISIA TRIDENTATA SSP. VASEYANA / FESTUCA KINGII - KOELERIA MACRANTHA SHRUBLAND								X																G4
CEGL001027	ARTEMISIA TRIDENTATA SSP. VASEYANA / LEYMUS CINEREUS SHRUBLAND								X																G4?
CEGL001029	ARTEMISIA TRIDENTATA SSP. VASEYANA / POA SECUNDA SHRUBLAND								X																G3?
CEGL001030	ARTEMISIA TRIDENTATA SSP. VASEYANA / PSEUDOROEGNERIA SPICATA SHRUBLAND								X																G5

PLANT ASSOCIATIONS OCCURRING IN THE WESTERN NORTHWESTERN BASIN & RANGE SECTION (342B) OF THE COLUMBIA PL

GAP COVER TYPES; NUMBERED ON LEGEND;

X = one of main associations in the cover type; I = inclusion in small patches in the cover type

ELCODE	GNAME	3	5	6	8	12	15	16	17	18	19	20	22	23	24	25	27	28	30	31	32	33	34	35	GRANK
CEGL001031	ARTEMISIA TRIDENTATA SSP. VASEYANA / PSEUDOROEGNERIA SPICATA - POA FENDLERIANA SHRUBLAND								X																G5
CEGL001033	ARTEMISIA TRIDENTATA SSP. VASEYANA / STIPA OCCIDENTALIS SHRUBLAND								X																G2
CEGL001048	ARTEMISIA TRIDENTATA SSP. WYOMINGENSIS - PERAPHYLLUM RAMOSISSIMUM / FESTUCA IDAHOENSIS SHRUBLAND							X																	G2
CEGL001050	ARTEMISIA TRIDENTATA SSP. WYOMINGENSIS - PURSHIA TRIDENTATA / PSEUDOROEGNERIA SPICATA SHRUBLAND							X																	G3Q
CEGL001042	ARTEMISIA TRIDENTATA SSP. WYOMINGENSIS / CAREX FILIFOLIA SHRUBLAND							X																	G1Q
CEGL001043	ARTEMISIA TRIDENTATA SSP. WYOMINGENSIS / ELYMUS ELYMOIDES SHRUBLAND							X																	G4G5
CEGL001049	ARTEMISIA TRIDENTATA SSP. WYOMINGENSIS / POA SECUNDA SHRUBLAND							X																	G4
CEGL001535	ARTEMISIA TRIDENTATA SSP. WYOMINGENSIS / PSEUDOROEGNERIA SPICATA SHRUB HERBACEOUS VEGETATION							X																	G4
CEGL001051	ARTEMISIA TRIDENTATA SSP. WYOMINGENSIS / STIPA COMATA SHRUBLAND							X																	G2
CEGL001052	ARTEMISIA TRIDENTATA SSP. WYOMINGENSIS / STIPA THURBERIANA SHRUBLAND							X																	G3?
CEGL001355	ARTEMISIA TRIDENTATA - ATRIPLEX CANESCENS - SARCOBATUS VERMICULATUS / (ORYZOPSIS HYMENOIDES) SHRUBLAND													X											G2G3
CEGL001002	ARTEMISIA TRIDENTATA - EPHEDRA NEVADENSIS SHRUBLAND							X																	G5
CEGL001003	ARTEMISIA TRIDENTATA - EPHEDRA VIRIDIS SHRUBLAND							X																	G5
CEGL001004	ARTEMISIA TRIDENTATA - GRAYIA SPINOSA SHRUBLAND													X											G5
CEGL001491	ARTEMISIA TRIDENTATA - PURSHIA TRIDENTATA / ORYZOPSIS HYMENOIDES - STIPA COMATA SHRUB HERBACEOUS VEGETATION																						X		G1
CEGL000994	ARTEMISIA TRIDENTATA / BALSAMORHIZA SAGITTATA SHRUBLAND							X																	G5
CEGL000998	ARTEMISIA TRIDENTATA / CHRYSOTHAMNUS NAUSEOSUS SHRUBLAND							X																	G5
CEGL000999	ARTEMISIA TRIDENTATA / CHRYSOTHAMNUS VISCIDIFLORUS / POA SECUNDA SHRUBLAND							X																	G5
CEGL001000	ARTEMISIA TRIDENTATA / DISTICHLIS SPICATA SHRUBLAND							X																	G5
CEGL001001	ARTEMISIA TRIDENTATA / ELYMUS ELYMOIDES SHRUBLAND							X																	G5Q
CEGL001530	ARTEMISIA TRIDENTATA / FESTUCA IDAHOENSIS SHRUB HERBACEOUS VEGETATION							X																	G4Q
CEGL001005	ARTEMISIA TRIDENTATA / HILARIA JAMESII SHRUBLAND							X																	G5

GAP COVER TYPES; NUMBERED ON LEGEND;

X = one of main associations in the cover type; I = inclusion in small patches in the cover type

ELCODE	GNAME	3	5	6	8	12	15	16	17	18	19	20	22	23	24	25	27	28	30	31	32	33	34	35	GRANK
CEGL001458	ARTEMISIA TRIDENTATA / LEYMUS CINEREUS SHRUB HERBACEOUS VEGETATION							X																	G2G4
CEGL001006	ARTEMISIA TRIDENTATA / ORYZOPSIS HYMENOIDES SHRUBLAND							X																	G3G5
CEGL001007	ARTEMISIA TRIDENTATA / PASCOPYRUM SMITHII SHRUB HERBACEOUS VEGETATION							X																	G5
CEGL001008	ARTEMISIA TRIDENTATA / POA SECUNDA SHRUBLAND							X																	G3G5
CEGL001009	ARTEMISIA TRIDENTATA / PSEUDOROEGNERIA SPICATA SHRUBLAND							X																	G5Q
CEGL001010	ARTEMISIA TRIDENTATA / STIPA COMATA SHRUBLAND							X																	G4Q
CEGL001011	ARTEMISIA TRIDENTATA / STIPA LETTERMANII SHRUBLAND							X																	G5
CEGL001012	ARTEMISIA TRIDENTATA / SYMPHORICARPOS LONGIFLORUS SHRUBLAND							I	X																G5
CEGL001536	ARTEMISIA TRIPARTITA / FESTUCA IDAHOENSIS SHRUB HERBACEOUS VEGETATION										X														G3
CEGL001538	ARTEMISIA TRIPARTITA / PSEUDOROEGNERIA SPICATA SHRUB HERBACEOUS VEGETATION										X														G2G3
CEGL001281	ATRIPLEX CANESCENS SHRUBLAND													X											G5
CEGL001285	ATRIPLEX CANESCENS - KRASCHENINNIKOVIA LANATA SHRUBLAND													X											G5
CEGL001289	ATRIPLEX CANESCENS / ORYZOPSIS HYMENOIDES SHRUBLAND													X											G3G5
CEGL001294	ATRIPLEX CONFERTIFOLIA WEST SHRUBLAND													X											G5
CEGL001298	ATRIPLEX CONFERTIFOLIA - ARTEMISIA SPINESCENS - SARCOBATUS VERMICULATUS SHRUBLAND												X												G5Q
CEGL001303	ATRIPLEX CONFERTIFOLIA - EPHEDRA NEVADENSIS SHRUBLAND													X											G5
CEGL001301	ATRIPLEX CONFERTIFOLIA - KRASCHENINNIKOVIA LANATA SHRUBLAND													X											G3G5
CEGL001309	ATRIPLEX CONFERTIFOLIA - LYCIUM PALLIDUM / MIRABILIS PUDICA SHRUBLAND													X											G3G4Q
CEGL001310	ATRIPLEX CONFERTIFOLIA - LYCIUM SHOCKLEYI SHRUBLAND													X											G4
CEGL001295	ATRIPLEX CONFERTIFOLIA / ARTEMISIA SPINESCENS SHRUBLAND													X											G5
CEGL001296	ATRIPLEX CONFERTIFOLIA / ARTEMISIA SPINESCENS / KRASCHENINNIKOVIA LANATA SHRUBLAND													X											G5Q
CEGL001297	ATRIPLEX CONFERTIFOLIA / ARTEMISIA SPINESCENS / ORYZOPSIS HYMENOIDES SHRUBLAND													X											G5Q
CEGL001304	ATRIPLEX CONFERTIFOLIA / HILARIA JAMESII SHRUBLAND													X											G3G5
CEGL001311	ATRIPLEX CONFERTIFOLIA / ORYZOPSIS HYMENOIDES SHRUBLAND													X											G3?
CEGL001315	ATRIPLEX CONFERTIFOLIA / TETRADYMIA GLABRATA SHRUBLAND													X											G3G5
CEGL001438	ATRIPLEX GARDNERI DWARF - SHRUBLAND														X										G3G5

PLANT ASSOCIATIONS OCCURRING IN THE WESTERN NORTHWESTERN BASIN & RANGE SECTION (342B) OF THE COLUMBIA PL

GAP COVER TYPES; NUMBERED ON LEGEND;

X = one of main associations in the cover type; I = inclusion in small patches in the cover type

ELCODE	GNAME	3	5	6	8	12	15	16	17	18	19	20	22	23	24	25	27	28	30	31	32	33	34	35	GRANK
CEGL001444	ATRIPLEX GARDNERI / ORYZOPSIS HYMENOIDES DWARF - SHRUBLAND														X										G3
CEGL001161	BETULA OCCIDENTALIS / CORNUS SERICEA SHRUBLAND							I	I	I															G2G3
CEGL001162	BETULA OCCIDENTALIS / MESIC FORB SHRUBLAND							I	I	I															G3
CEGL001084	BETULA OCCIDENTALIS / PURSHIA TRIDENTATA / STIPA COMATA SHRUBLAND							I	I	I															G1?
CEGL001802	CAREX AQUATILIS HERBACEOUS VEGETATION																								G5
CEGL001768	CAREX DOUGLASII HERBACEOUS VEGETATION																								G4
CEGL001809	CAREX LANUGINOSA HERBACEOUS VEGETATION																								G3?
CEGL001810	CAREX LASIOCARPA HERBACEOUS VEGETATION																								G4
CEGL001792	CAREX MICROPTERA HERBACEOUS VEGETATION																								G4
CEGL001813	CAREX NEBRASCENSIS HERBACEOUS VEGETATION																								G4
CEGL001815	CAREX NEBRASCENSIS - CAREX MICROPTERA HERBACEOUS VEGETATION																								G3G4
CEGL001816	CAREX NIGRICANS HERBACEOUS VEGETATION																								G4
CEGL001562	CAREX ROSTRATA HERBACEOUS VEGETATION																								G5
CEGL001822	CAREX SCOPULORUM HERBACEOUS VEGETATION																								G5
CEGL001825	CAREX SIMULATA HERBACEOUS VEGETATION																								G4
CEGL001827	CAREX SPECTABILIS HERBACEOUS VEGETATION																								G5
CEGL003038	CERCOCARPUS LEDIFOLIUS WOODLAND [PROVISIONAL]											X													G4
CEGL001022	CERCOCARPUS LEDIFOLIUS / ARTEMISIA TRIDENTATA SSP VASEYANA WOODLAND											X													G3
CEGL000960	CERCOCARPUS LEDIFOLIUS / ARTEMISIA TRIDENTATA WOODLAND											X													G3G4
CEGL000961	CERCOCARPUS LEDIFOLIUS / CALAMAGROSTIS RUBESCENS WOODLAND											X													G2
CEGL000965	CERCOCARPUS LEDIFOLIUS / MAHONIA REPENS SHRUBLAND											X													G?
CEGL000966	CERCOCARPUS LEDIFOLIUS / PRUNUS VIRGINIANA SHRUBLAND											X													G4
CEGL000967	CERCOCARPUS LEDIFOLIUS / PSEUDOROEGNERIA SPICATA SHRUBLAND											X													G4Q
CEGL000968	CERCOCARPUS LEDIFOLIUS / PSEUDOROEGNERIA SPICATA FESTUCA IDAHOENSIS WOODLAND											X													G3G4
CEGL000969	CERCOCARPUS LEDIFOLIUS / SYMPHORICARPOS LONGIFLORUS SHRUBLAND											X													G4
CEGL000970	CERCOCARPUS LEDIFOLIUS / SYMPHORICARPOS OREOPHILUS WOODLAND																								G2
CEGL001783	DANTHONIA UNISPICATA - POA SECUNDA HERBACEOUS VEGETATION																	X							G3
CEGL001599	DESCHAMPSIA CESPITOSA HERBACEOUS VEGETATION								I																G4?
CEGL001770	DISTICHLIS SPICATA HERBACEOUS VEGETATION												I		I										G5
CEGL001773	DISTICHLIS SPICATA - (SCIRPUS NEVADENSIS) HERBACEOUS VEGETATION												I		I										G4
CEGL001833	ELEOCHARIS PALUSTRIS HERBACEOUS VEGETATION												I		I										G5
CEGL001834	ELEOCHARIS PALUSTRIS - DISTICHLIS SPICATA HERBACEOUS VEGETATION												I		I										G2G4

PLANT ASSOCIATIONS OCCURRING IN THE WESTERN NORTHWESTERN BASIN & RANGE SECTION (342B) OF THE COLUMBIA PL

GAP COVER TYPES; NUMBERED ON LEGEND;

X = one of main associations in the cover type; I = inclusion in small patches in the cover type

ELCODE	GNAME	3	5	6	8	12	15	16	17	18	19	20	22	23	24	25	27	28	30	31	32	33	34	35	GRANK
CEGL001835	ELEOCHARIS PALUSTRIS - JUNCUS BALTICUS HERBACEOUS VEGETATION												I		I										G2G4
CEGL001897	FESTUCA IDAHOENSIS HERBACEOUS VEGETATION																					X			G3Q
CEGL001346	GRAYIA SPINOSA - EPHEDRA VIRIDIS SHRUBLAND													X											G5
CEGL001347	GRAYIA SPINOSA - LYCIUM ANDERSONII SHRUBLAND													X											G5
CEGL001348	GRAYIA SPINOSA - LYCIUM PALLIDUM SHRUBLAND													X											G5
CEGL001349	GRAYIA SPINOSA - MENODORA SPINESCENS SHRUBLAND													X											G5
CEGL001352	GRAYIA SPINOSA - PRUNUS ANDERSONII SHRUBLAND													X											G4
CEGL001356	GRAYIA SPINOSA - SARCOBATUS VERMICULATUS / (ORYZOPSIS HYMENOIDES) SHRUBLAND												X	I											G2
CEGL001344	GRAYIA SPINOSA / ARTEMISIA NOVA / STIPA SPECIOSA SHRUBLAND													X											G4
CEGL001345	GRAYIA SPINOSA / ARTEMISIA SPINESCENS SHRUBLAND													X											G5
CEGL001350	GRAYIA SPINOSA / ORYZOPSIS HYMENOIDES SHRUBLAND													X											G4
CEGL001838	JUNCUS BALTICUS HERBACEOUS VEGETATION																			X					G5
CEGL001839	JUNCUS BALTICUS - CAREX ROSSII HERBACEOUS VEGETATION																			X					G2G4
CEGL001715	JUNIPERUS OCCIDENTALIS / ARTEMISIA ARBUSCULA / POA SECUNDA WOODED HERBACEOUS VEGETATION				X																				G2
CEGL001717	JUNIPERUS OCCIDENTALIS / ARTEMISIA ARBUSCULA / PSEUDOROEGNERIA SPICATA WOODED HERBACEOUS VEGETATION				X																				G3G4
CEGL001718	JUNIPERUS OCCIDENTALIS / ARTEMISIA RIGIDA / POA SECUNDA WOODED HERBACEOUS VEGETATION				X																				G2G3
CEGL000723	JUNIPERUS OCCIDENTALIS / ARTEMISIA TRIDENTATA SSP. VASEYANA WOODLAND				X																				G4
CEGL001722	JUNIPERUS OCCIDENTALIS / ARTEMISIA TRIDENTATA - PURSHIA TRIDENTATA WOODED HERBACEOUS VEGETATION				X																				G4Q
CEGL001720	JUNIPERUS OCCIDENTALIS / ARTEMISIA TRIDENTATA / FESTUCA IDAHOENSIS WOODED HERBACEOUS VEGETATION				X																				G3
CEGL001721	JUNIPERUS OCCIDENTALIS / ARTEMISIA TRIDENTATA / PSEUDOROEGNERIA SPICATA WOODED HERBACEOUS VEGETATION				X																				G3G4
CEGL000726	JUNIPERUS OCCIDENTALIS / CERCOCARPUS LEDIFOLIUS - SYMPHORICARPOS OREOPHILUS WOODLAND				X																				G2
CEGL000725	JUNIPERUS OCCIDENTALIS / CERCOCARPUS LEDIFOLIUS / PSEUDOROEGNERIA SPICATA WOODLAND				X																				G4
CEGL001724	JUNIPERUS OCCIDENTALIS / FESTUCA IDAHOENSIS WOODED HERBACEOUS VEGETATION				X																				G2
CEGL001728	JUNIPERUS OCCIDENTALIS / PSEUDOROEGNERIA SPICATA WOODED HERBACEOUS VEGETATION				X																				G3
CEGL002622	JUNIPERUS OCCIDENTALIS / PURSHIA TRIDENTATA WOODED HERBACEOUS VEGETATION				X																				G3
CEGL001326	KRASCHENINNIKOVIA LANATA / POA SECUNDA DWARF - SHRUBLAND													X									X		G3?

PLANT ASSOCIATIONS OCCURRING IN THE WESTERN NORTHWESTERN BASIN & RANGE SECTION (342B) OF THE COLUMBIA PL

GAP COVER TYPES; NUMBERED ON LEGEND;

X = one of main associations in the cover type; I = inclusion in small patches in the cover type

ELCODE	GNAME	3	5	6	8	12	15	16	17	18	19	20	22	23	24	25	27	28	30	31	32	33	34	35	GRANK
CEGL001480	LEYMUS CINEREUS BOTTOMLAND HERBACEOUS VEGETATION												I												G1Q
CEGL001479	LEYMUS CINEREUS HERBACEOUS VEGETATION [PROVISIONAL]												I												G2G3Q
CEGL001572	LEYMUS TRITICOIDES - POA SECUNDA HERBACEOUS VEGETATION																			I					G1Q
CEGL001105	PENTAPHYLLOIDES FLORIBUNDA SHRUBLAND [PROVISIONAL]																								G5Q
CEGL001475	PHRAGMITES AUSTRALIS HERBACEOUS VEGETATION																			X					G3G4
CEGL000825	PINUS MONOPHYLLA WOODLAND		X																						G5
CEGL000829	PINUS MONOPHYLLA - JUNIPERUS OSTEOSPERMA WOODLAND			X																					G5
CEGL000837	PINUS MONOPHYLLA - JUNIPERUS OSTEOSPERMA - QUERCUS GAMBELII / ARTEMISIA TRIDENTATA WOODLAND			X																					G4?
CEGL000830	PINUS MONOPHYLLA - JUNIPERUS OSTEOSPERMA / ARTEMISIA ARBUSCULA WOODLAND			X																					G5
CEGL000831	PINUS MONOPHYLLA - JUNIPERUS OSTEOSPERMA / ARTEMISIA NOVA WOODLAND			X																					G5?
CEGL000832	PINUS MONOPHYLLA - JUNIPERUS OSTEOSPERMA / ARTEMISIA TRIDENTATA WOODLAND			X																					G5
CEGL000834	PINUS MONOPHYLLA - JUNIPERUS OSTEOSPERMA / CERCOCARPUS LEDIFOLIUS / PSEUDOROEGNERIA SPICATA WOODLAND			X																					G1
CEGL000835	PINUS MONOPHYLLA - JUNIPERUS OSTEOSPERMA / LEYMUS CINEREUS WOODED HERBACEOUS VEGETATION			X																					G1Q
CEGL000836	PINUS MONOPHYLLA - JUNIPERUS OSTEOSPERMA / PRUNUS VIRGINIANA WOODLAND			X																					G1Q
CEGL000838	PINUS MONOPHYLLA - QUERCUS GAMBELII / ARTEMISIA TRIDENTATA WOODLAND	DONT KNOW IF IN 342B																							G4?
CEGL000826	PINUS MONOPHYLLA / AMELANCHIER ALNIFOLIA / ARCTOSTAPHYLOS PATULA WOODLAND		X																						G3G4
CEGL000827	PINUS MONOPHYLLA / ARTEMISIA TRIDENTATA WOODLAND		X																						G5
CEGL000828	PINUS MONOPHYLLA / CERCOCARPUS LEDIFOLIUS WOODLAND		X																						G5
CEGL000839	PINUS MONOPHYLLA / SYMPHORICARPOS OREOPHILUS - ARTEMISIA TRIDENTATA WOODLAND		X																						G5
CEGL000196	PINUS PONDEROSA / PURSHIA TRIDENTATA / ORYZOPSIS HYMENOIDES WOODLAND					X																			G1
CEGL003078	PINUS WASHOENSIS WOODLAND [PROVISIONAL]	DONT KNOW IF IN 342B																							G1
CEGL001657	POA SECUNDA HERBACEOUS VEGETATION																			X					G4?
CEGL001658	POA SECUNDA - PUCCINELLIA LEMMONII - ELYMUS ELYMOIDES HERBACEOUS VEGETATION																			X					G1Q
CEGL002002	POLYGONUM AMPHIBIUM HERBACEOUS VEGETATION																			X					G3
CEGL000649	POPULUS ANGUSTIFOLIA / CORNUS SERICEA WOODLAND																								G4

GAP COVER TYPES; NUMBERED ON LEGEND;

X = one of main associations in the cover type; I = inclusion in small patches in the cover type

ELCODE	GNAME	3	5	6	8	12	15	16	17	18	19	20	22	23	24	25	27	28	30	31	32	33	34	35	GRANK
CEGL000667	POPULUS BALSAMIFERA SSP. TRICHOCARPA / ALNUS INCANA FOREST																								G3
CEGL000675	POPULUS BALSAMIFERA SSP. TRICHOCARPA / GRASS - FORB FOREST																								G3?
CEGL000676	POPULUS BALSAMIFERA SSP. TRICHOCARPA / SALIX EXIGUA FOREST																								G1
CEGL000677	POPULUS BALSAMIFERA SSP. TRICHOCARPA / SYMPHORICARPOS ALBUS FOREST																								G3
CEGL000672	POPULUS BALSAMIFERA SSP.TRICHOCARPA / CORNUS SERICEA FOREST																								G3?
CEGL000522	POPULUS TREMULOIDES - ABIES CONCOLOR / ARCTOSTAPHYLOS PATULA FOREST	X																							G4
CEGL001150	POPULUS TREMULOIDES / ALNUS INCANA - CORNUS SERICEA FOREST	X																							G2
CEGL000567	POPULUS TREMULOIDES / AMELANCHIER ALNIFOLIA - SYMPHORICARPOS OREOPHILUS / CALAMAGROSTIS RUBESCENS FOREST	X																							G4
CEGL000568	POPULUS TREMULOIDES / AMELANCHIER ALNIFOLIA - SYMPHORICARPOS OREOPHILUS / TALL FORB FOREST	X																							G5
CEGL000569	POPULUS TREMULOIDES / AMELANCHIER ALNIFOLIA - SYMPHORICARPOS OREOPHILUS / THALICTRUM FENDLERI FOREST	X																							G5
CEGL000570	POPULUS TREMULOIDES / AMELANCHIER ALNIFOLIA / TALL FORB FOREST	X																							G3G5
CEGL000571	POPULUS TREMULOIDES / AMELANCHIER ALNIFOLIA / THALICTRUM FENDLERI FOREST	X																							G3G4
CEGL000572	POPULUS TREMULOIDES / ARTEMISIA TRIDENTATA FOREST	X																							G3G4
CEGL000573	POPULUS TREMULOIDES / BROMUS CARINATUS FOREST	X																							G5
CEGL000577	POPULUS TREMULOIDES / CAREX SPP. FOREST	X																							G2Q
CEGL000604	POPULUS TREMULOIDES / SALIX SCOULERIANA FOREST	X																							G4
CEGL000610	POPULUS TREMULOIDES / SYMPHORICARPOS OREOPHILUS FOREST	X																							G5Q
CEGL000611	POPULUS TREMULOIDES / SYMPHORICARPOS OREOPHILUS / BROMUS CARINATUS FOREST	X																							G5
CEGL000612	POPULUS TREMULOIDES / SYMPHORICARPOS OREOPHILUS / CALAMAGROSTIS RUBESCENS FOREST	X																							G3G5
CEGL000617	POPULUS TREMULOIDES / SYMPHORICARPOS OREOPHILUS / WYETHIA AMPLEXICAULIS FOREST	X																							G4Q
CEGL000621	POPULUS TREMULOIDES / VERATRUM CALIFORNICUM FOREST	X																							G2G3
CEGL000622	POPULUS TREMULOIDES / WYETHIA AMPLEXICAULIS FOREST	X																							G3
CEGL001353	PSOROTHAMNUS POLYDENIUS VAR. POLYDENIUS / ORYZOPSIS HYMENOIDES SHRUBLAND	DONT KNOW IF IN 342B																							G3G4
CEGL001493	PURSHIA TRIDENTATA / FESTUCA IDAHOENSIS SHRUB HERBACEOUS VEGETATION											X													G3G5

PLANT ASSOCIATIONS OCCURRING IN THE <u>WESTERN</u> NORTHWESTERN BASIN & RANGE SECTION (342B) OF THE COLUMBIA PL

GAP COVER TYPES; NUMBERED ON LEGEND;

X = one of main associations in the cover type; I = inclusion in small patches in the cover type

ELCODE	GNAME	3	5	6	8	12	15	16	17	18	19	20	22	23	24	25	27	28	30	31	32	33	34	35	GRANK
CEGL001495	PURSHIA TRIDENTATA / PSEUDOROEGNERIA SPICATA SHRUB HERBACEOUS VEGETATION											X													G3
CEGL001496	PURSHIA TRIDENTATA / (PSEUDOROEGNERIA SPICATA) - FESTUCA IDAHOENSIS SHRUB HERBACEOUS VEGETATION											X													G2Q
CEGL000947	SALIX AMYGDALOIDES WOODLAND																								G3
CEGL001186	SALIX BOOTHII - SALIX LEMMONII SHRUBLAND																								G3
CEGL001175	SALIX BOOTHII / CALAMAGROSTIS CANADENSIS SHRUBLAND																								G3G4Q
CEGL001176	SALIX BOOTHII / CAREX AQUATILIS SHRUBLAND																								G3
CEGL001178	SALIX BOOTHII / CAREX ROSTRATA SHRUBLAND																								G4
CEGL001180	SALIX BOOTHII / MESIC FORB SHRUBLAND																								G3
CEGL001181	SALIX BOOTHII / MESIC GRAMINOID SHRUBLAND																								G3?
CEGL001233	SALIX ERIOCEPHALA / RIBES AUREUM - ROSA WOODSII SHRUBLAND																								GQ
CEGL001197	SALIX EXIGUA SHRUBLAND [PROVISIONAL]																								G5Q
CEGL001204	SALIX EXIGUA - SALIX LUCIDA SSP. CAUDATA																								G2Q
CEGL001200	SALIX EXIGUA / BARREN SHRUBLAND																								G3?
CEGL001201	SALIX EXIGUA / EQUISETUM ARVENSE SHRUBLAND																								G3
CEGL001202	SALIX EXIGUA / MESIC FORB SHRUBLAND																								G2?
CEGL001213	SALIX GEYERIANA - SALIX ERIOCEPHALA SHRUBLAND																								GU
CEGL001212	SALIX GEYERIANA - SALIX LEMMONII SHRUBLAND																								G3
CEGL001207	SALIX GEYERIANA / CAREX ROSTRATA SHRUBLAND																								G5
CEGL001216	SALIX LASIOLEPIS / BARREN SHRUBLAND																								G2?
CEGL002621	SALIX LUCIDA SSP. CAUDATA / ROSA WOODSII																								G3
CEGL002624	SALIX LUTEA / ROSA WOODSII SHRUBLAND																								G3
CEGL001234	SALIX WOLFII / CAREX AQUATILIS SHRUBLAND																								G4
CEGL001453	SALVIA DORRII / PSEUDOROEGNERIA SPICATA DWARF - SHRUBLAND							I																	G4
CEGL001364	SARCOBATUS VERMICULATUS DUNE SHRUBLAND												X										X		G5Q
CEGL001357	SARCOBATUS VERMICULATUS SHRUBLAND												X												G5
CEGL001371	SARCOBATUS VERMICULATUS / ATRIPLEX CONFERTIFOLIA / ARTEMISIA SPINESCENS SHRUBLAND												X												G5Q
CEGL001362	SARCOBATUS VERMICULATUS / CHRYSOTHAMNUS NAUSEOSUS SHRUBLAND												X												G5
CEGL001372	SARCOBATUS VERMICULATUS / ELYMUS ELYMOIDES SHRUBLAND												X												G4
CEGL001366	SARCOBATUS VERMICULATUS / LEYMUS CINEREUS SHRUBLAND												X												G3
CEGL001369	SARCOBATUS VERMICULATUS / NITROPHILA OCCIDENTALIS - SUAEDA MOQUINII SHRUBLAND												X												G5Q
CEGL001373	SARCOBATUS VERMICULATUS / ORYZOPSIS HYMENOIDES SHRUBLAND												X												G4
CEGL001840	SCIRPUS ACUTUS HERBACEOUS VEGETATION																			X					G5
CEGL001841	SCIRPUS AMERICANUS HERBACEOUS VEGETATION [PROVISIONAL]																			X					G1Q

GAP COVER TYPES; NUMBERED ON LEGEND;

X = one of main associations in the cover type; I = inclusion in small patches in the cover type

ELCODE	GNAME	3	5	6	8	12	15	16	17	18	19	20	22	23	24	25	27	28	30	31	32	33	34	35	GRANK
CEGL001843	SCIRPUS MARITIMUS HERBACEOUS VEGETATION																			X					G4
CEGL002623	SCIRPUS TABERNAEMONTANI HERBACEOUS VEGETATION																			X					G4
CEGL001989	SENECIO TRIANGULARIS - VERATRUM CALIFORNICUM HERBACEOUS VEGETATION								I																G4
CEGL001991	SUAEDA MOQUINII SHRUBLAND													X											G5

Plant Associations Restricted to the Columbia Plateau Ecoregion:

ELCODE	GNAME	GLOBAL RANK	ID EOR's	OR EOR's	WA EOR's	STATE DISTRIBUTION	331A	342B-E	342B-W	342C	342D	342H	342I
CEGL000629	ALNUS RHOMBIFOLIA FOREST [PROVISIONAL]:ALRH2	G2Q		1	1	WA²CA	X						X
CEGL001460	ARTEMISIA CANA/LEYMUS CINEREUS SHRUBLAND:ARCA13/LECI4	G1		1		OR²CA²NV			X				
CEGL001019	ARTEMISIA TRIDENTATA SSP. TRIDENTATA/PSEUDOROEGNERIA SPICATA-POA SECUNDA SHRUBLAND:ARTRT/PSSP6-POSE	G1		1		OR							X
CEGL001491	ARTEMISIA TRIDENTATA-PURSHIA TRIDENTATA/ORYZOPSIS HYMENOIDES-STIPA COMATA SHRUB HERBACEOUS VEGETATION:ARTR2-PUTR2/ORHY-STCO4	G1		1		OR²CA			X				X
CEGL001539	ARTEMISIA TRIPARTITA/STIPA COMATA SHRUB HERBACEOUS VEGETATION:ARTR4/STCO4	G1Q			2	ID²WA							X
CEGL001084	BETULA OCCIDENTALIS/PURSHIA TRIDENTATA/STIPA COMATA SHRUBLAND:BEOC2/PUTR2/STCO4	G1?	1			ID		X	X				
CEGL001329	CHRYSOTHAMNUS NAUSEOSUS/LEYMUS FLAVESCENS/PSORALIDIUM LANCEOLATUM SHRUBLAND:CHNA2/LEFL4/PSLA3	G1?	1			ID					X		
CEGL001746	ELYMUS LANCEOLATUS-STIPA COMATA HERBACEOUS VEGETATION:ELLA3-STCO4	G1				OR²WA							X
CEGL001401	ERIOGONUM OVALIFOLIUM VAR. DEPRESSUM DWARF-SHRUBLAND:EROVD	G1				ID					X		
CEGL001619	FESTUCA IDAHOENSIS-HIERACIUM CYNOGLOSSOIDES HERBACEOUS VEGETATION:FEID-HICY	G1			5	OR²WA							X
CEGL001356	GRAYIA SPINOSA-SARCOBATUS VERMICULATUS/(ORYZOPSIS HYMENOIDES) SHRUBLAND:GRSP-SAVE4/(ORHY)	G2		1		OR²CA²NV			X				
CEGL001351	GRAYIA SPINOSA/POA SECUNDA SHRUBLAND:GRSP/POSE	G2?			5	WA							X
CEGL001719	JUNIPERUS OCCIDENTALIS/ARTEMISIA TRIDENTATA/CAREX FILIFOLIA WOODED HERBACEOUS VEGETATION:JUOC/ARTR2/CAFI	G1		1		OR					?	X	
CEGL001723	JUNIPERUS OCCIDENTALIS/CERCOCARPUS LEDIFOLIUS/LEYMUS CINEREUS WOODED TALL HERBACEOUS VEGETATION:JUOC/CELE3/LECI4	G1Q				OR				X			
CEGL001481	LEYMUS CINEREUS-DISTICHLIS SPICATA HERBACEOUS VEGETATION:LECI4-DISP	G1			2	ID²WA²CA	X						X
CEGL001563	LEYMUS FLAVESCENS HERBACEOUS VEGETATION:LEFL4	G2				ID				X	X		

CEGL001170	PHILADELPHUS LEWISII SHRUBLAND:PHLE4	G2Q	1		2	WA²ID				X			X
CEGL000814	PINUS FLEXILIS/PURSHIA TRIDENTATA WOODLAND:PIFL2/PUTR2	G1?	1			ID					X		
CEGL000835	PINUS MONOPHYLLA-JUNIPERUS OSTEOSPERMA/LEYMUS CINEREUS WOODED HERBACEOUS VEGETATION:PIMO-JUOS/LECI4	G1Q	1			ID		X	X				
CEGL000836	PINUS MONOPHYLLA-JUNIPERUS OSTEOSPERMA/PRUNUS VIRGINIANA WOODLAND:PIMO-JUOS/PRVI	G1Q	1			ID²CA		X	X				
CEGL000866	PINUS PONDEROSA-PSEUDOTSUGA MENZIESII RIPARIAN WOODLAND:PIPO-PSME	G1			1	WA							X
CEGL000196	PINUS PONDEROSA/PURSHIA TRIDENTATA/ORYZOPSIS HYMENOIDES WOODLAND:PIPO/PUTR2/ORHY	G1				OR²CA			X				
CEGL000879	PINUS PONDEROSA/STIPA COMATA WOODLAND:PIPO/STCO4	G1			2	ID²WA							X
CEGL000671	POPULUS BALSAMIFERA SSP. TRICHOCARPA/CICUTA DOUGLASII FOREST:POTR15/CIDO	G1			1	ID²OR²WA	X						X
CEGL001670	PSEUDOROEGNERIA SPICATA-FESTUCA IDAHOENSIS PALOUSE HERBACEOUS VEGETATION:PSSP6-FEID (PALOUSE)	G1		3	17	ID²OR²WA	X						X
CEGL001054	PURSHIA TRIDENTATA-ARTEMISIA TRIDENTATA SSP. TRIDENTATA SHRUBLAND:PUTR2-ARTRT	G1	1			ID				X	X		
CEGL001056	PURSHIA TRIDENTATA-CHRYSOTHAMNUS NAUSEOSUS SHRUBLAND:PUTR2-CHNA2	G1	1		1?	ID					X		X
CEGL001058	PURSHIA TRIDENTATA/ORYZOPSIS HYMENOIDES SHRUBLAND:PUTR2/ORHY	G1			7	ID²OR²WA				X			X
CEGL001059	PURSHIA TRIDENTATA/POA SECUNDA SHRUBLAND:PUTR2/POSE	G1?Q	1	1		ID, OR			X				X
CEGL001060	PURSHIA TRIDENTATA/PRUNUS VIRGINIANA SHRUBLAND:PUTR2/PRVI	G1?Q	1			ID					X		
CEGL001497	PURSHIA TRIDENTATA/PSEUDOROEGNERIA SPICATA-LEYMUS CINEREUS SHRUB HERBACEOUS VEGETATION:PUTR2/PSSP6-LECI4	G1?	1			ID					X		
CEGL001626	ROSA NUTKANA-FESTUCA IDAHOENSIS HERBACEOUS VEGETATION:RONU-FEID	G1	5		1	ID²OR²WA	X						X

	Number*	Class	Formation	Cover Types	Area (km2)	Status 1 (%) *	Status 2 (%)	Coarse Filter Value	Patch Size	Distribution in Relation to CP (see key at bottom)
			GAP Cover Types							
sorter	* assigned during January 97 meeting in Portland					* Gap protection categories				
Conservation Goal Group A:										
8	4	Forest	Seasonally/Temporarily flooded cold-deciduous	Riparian Forest, incl ALRH, POBAT, SAAM, POAN,	365	0.1	29.0	1	small	L (except for POAN/COSE & /RHTR = W)
16	12	Woodland	Rounded-crowned,needle-leaved	Pinus ponderosa Woodland	7388	0.1	3.0	1	small	P / D
18	14	Woodland	Cold-deciduous	Populus tremuloides Woodland	205	8.1	0.0	2	small	P
19	14	Woodland		Quercus garryana Woodland	643	0.0	3.0	1	small	L (really restricted to CP & East Cascades; so little of it need to get all)
25	20	Shrublands	Temperate Cold-deciduous	Mountain brush	3278	3.5	1.9	1	big	L
26	20			Cercocarpus ledifolius or C. montanus	535	2.1	2.4	1	small	L (except CELE/PSSP)
27	20			Quercus gambelii	0			0		N/A
28	20			Purshia tridentata	1042	0.0	0.3	1	small	L
29	21	Shrublands	Seasonally/Temporarily flooded cold-deciduous	Riparian shrub (Crateagus, Salix spp, Betula, Acer)	1302	3.8	18.3	1	small	L (most types)
30	22	Shrublands	Extremely xeromorphic deciduous subdesert	Sarcobatus vermiculatus	3370	0.4	6.9	1	small	L (subregional dist'n)
36	27	Dwarf-shrublands	Miscellaneous dwarf-shrubland	Artemisia rigida	881	0.3	0.2	1	small	L
40	31	Herbaceous	Temperate or subpolar hydromorphic rooted	Marsh & wetland (Typha, Scirpus, Eleocharis, Juncus, Phragmites, Carex spp.)	475	0.2	39.5	1	small	W (but localized in small areas)
44	34	Sand flats	Seasonally/Temporarily flooded sand flats	Seasonally/Temporarily flooded sand flats	2273	0.0	0.1	2	small	L (most p.a.'s included are very rare or patchy in dist'n)
45	34	Sand dunes	Sparsely vegetated sand dunes	Sparsely vegetated sand dunes	336	1.3	38.1	1	small	L (most p.a.'s included are very rare or patchy in dist'n)
46	35	Sparsely vegetated	Sparsely vege'd boulder, gravel, cobble; or talus	Sparsely vege'd boulder, gravel, cobble; or talus	46	2.6	0.2	1	small	no types ID'd for this
Conservation Goal Group B:										
4	2	Forest	Conical-crowned, needle-leaved	Abies spp (A. concolor, A. grandis, A. magnifica) Forest	183	0.0	2.3	2	small	P, but D in 342B-E, 342C
5	2	Forest		Picea engelmannii a/o Abies lasiocarpa Forest	156	18.1	1.0	2	small	P, but D in 342B-E, 342C
6	2	Forest		Pseudotsuga menziesii Forest	3130	1.1	1.0	2	small	P, but D in 342B-E, 342C
7	3	Forest	Montane, cold-deciduous	Populus tremuloides Forest	731	8.0	5.1	2	small	P/D
9	5	Woodland	Rounded-crowned,needle-leaved	Pinus monophylla or Pinus edulis Woodland	316	0.0	0.1	2	small	P

GAP Cover Types

sorter	Number*	Class	Formation	Cover Types	Area (km2)	Status 1 (%) *	Status 2 (%)	Coarse Filter Value	Patch Size	Distribution in Relation to CP (see key at bottom)
	* assigned during January 97 meeting in Portland					* Gap protection categories				
10	6	Woodland	Rounded-crowned,needle-leaved	Pinyon-Juniper Woodland, various spp	306	14.2	0.0	2	small	P / D
17	13	Woodland	Conical-crowned, needle-leaved	Pseudotsuga menziesii Woodland	410	0.9	0.0	2	small	P
20	15	Shrublands	Microphyllous evergreen	Artemisia cana	532	14.3	0.9	2	small	L
24	19	Shrublands	Microphyllous evergreen	Artemisia tripartita	3494	0.0	1.4	2	small	L (subregional dist'n)
34	26	Dwarf-shrublands	Miscellaneous dwarf-shrubland	Artemisia arbuscula ssp longiloba	0			0		(must have been lumped into ARAR-ARNO
35	26			Artemisia nova	179	0.0	0.1	2	small	??
Conservation Goal Group C:										
11	7	Woodland	Rounded-crowned,needle-leaved	Juniperus osteosperma or J. scopulorum Woodland	2341	0.1	3.9	2	big	W
12	8	Woodland	Rounded-crowned,needle-leaved	Juniperus occidentalis Woodland	17609	1.1	2.0	2	big	L
21	16	Shrublands	Microphyllous evergreen	Artemisia tridentata	59758	2.1	5.0	1	big	W
22	17	Shrublands	Microphyllous evergreen	Artemisia tridentata ssp vaseyana	18020	1.0	2.7	2	big	W
23	18	Shrublands	Microphyllous evergreen	Artemisia tridentata - Artemisia arbuscula	46047	0.6	4.8	1	big	W
31	23	Shrublands	Facultatively deciduous extremely xeromorphic subdesert	Mixed salt desert scrub (Atriplex spp)	12902	1.0	1.2	1	big	L (subregional dist'n)
32	24	Shrublands	Facultatively deciduous extremely xeromorphic subdesert	Atriplex gardneri	0			0		N/A
33	25	Dwarf-shrublands	Miscellaneous dwarf-shrubland	Artemisia arbuscula - Artemisia nova	1813	0.0	8.4	1	big	W
37	28	Herbaceous	Temperate or subpolar perennial grassland	Dry perennial grassland: Pseudoroegneria - Poa	14024	0.2	6.4	1	big	W
38	29	Herbaceous	Temperate or subpolar perennial grassland	Moist perennial grassland (Festuca idahoensis, F. campestris, Leymus cinereus, Carex hoodii)	1926	0.0	3.1	1	big & small	L (most types in this are Palouse grasslands & LECI)
39	30	Herbaceous	Temperate or subpolar perennial grassland: Cultivated	Agropyron cristatum seedings; Poa pratensis, hayfields, etc	8267	N/A	N/A	0		N/A
41	32	Herbaceous	Temperate or subpolar annual	Annual grasslands (BROTEC)	11522	N/A	N/A	0		N/A

			GAP Cover Types							
	Number*	**Class**	**Formation**	**Cover Types**	**Area (km2)**	**Status 1 (%) ***	**Status 2 (%)**	**Coarse Filter Value**	**Patch Size**	**Distribution in Relation to CP (see key at bottom)**
sorter	* assigned during January 97 meeting in Portland					* Gap protection categories				
Conservation Goal Group D:										
1	1	Forest	Rounded-crowned,needle-leaved	Pinus contorta Forest	1350	3.3	7.5	3	small	P
2	1	Forest		Pinus ponderosa Forest	37	0.0	0.0	3	small	P
3	1	Forest		Pinus ponderosa - Pseudotsuga menziesii Forest	1350	0.0	0.4	3	small	P
13	9	Woodland	Rounded-crowned,needle-leaved	Pinus flexilis or P. albicaulis Woodland	122	67.0	0.0	3	small	L or P/D (get comment)
14	10	Woodland	Rounded-crowned,needle-leaved	Pinus contorta Woodland	55	0.0	0.0	3	small	P
15	11	Woodland	Rounded-crowned,needle-leaved	Pinus jeffreyi Woodland	181	0.0	0.0	3	small	P
42	33	Herbaceous	Alpine & subalpine meadows	Alpine tundra	3	0.0	0.0	3	small	P/D
43	33	Herbaceous	Alpine & subalpine meadows	Wet or dry meadow	91	36.8	4.1	3	small	? no types identified for this cover type

Plant Associations Restricted to the Columbia Plateau Ecoregion:

ELCODE	GNAME	GLOBAL RANK	ID EOR's	OR EOR's	WA EOR's	STATE DISTRIBUTION	331A	342B-E	342B-W	342C	342D	342H	342I
CEGL000629	ALNUS RHOMBIFOLIA FOREST [PROVISIONAL]:ALRH2	G2Q		1	1	WA²CA	X						X
CEGL001460	ARTEMISIA CANA/LEYMUS CINEREUS SHRUBLAND:ARCA13/LECI4	G1		1		OR²CA²NV			X				
CEGL001019	ARTEMISIA TRIDENTATA SSP. TRIDENTATA/PSEUDOROEGNERIA SPICATA-POA SECUNDA SHRUBLAND:ARTRT/PSSP6-POSE	G1		1		OR							X
CEGL001491	ARTEMISIA TRIDENTATA-PURSHIA TRIDENTATA/ORYZOPSIS HYMENOIDES-STIPA COMATA SHRUB HERBACEOUS VEGETATION:ARTR2-PUTR2/ORHY-STCO4	G1		1		OR²CA			X				X
CEGL001539	ARTEMISIA TRIPARTITA/STIPA COMATA SHRUB HERBACEOUS VEGETATION:ARTR4/STCO4	G1Q			2	ID²WA							X
CEGL001084	BETULA OCCIDENTALIS/PURSHIA TRIDENTATA/STIPA COMATA SHRUBLAND:BEOC2/PUTR2/STCO4	G1?	1			ID		X	X				
CEGL001329	CHRYSOTHAMNUS NAUSEOSUS/LEYMUS FLAVESCENS/PSORALIDIUM LANCEOLATUM SHRUBLAND:CHNA2/LEFL4/PSLA3	G1?	1			ID					X		
CEGL001746	ELYMUS LANCEOLATUS-STIPA COMATA HERBACEOUS VEGETATION:ELLA3-STCO4	G1				OR²WA							X
CEGL001401	ERIOGONUM OVALIFOLIUM VAR. DEPRESSUM DWARF-SHRUBLAND:EROVD	G1				ID					X		
CEGL001619	FESTUCA IDAHOENSIS-HIERACIUM CYNOGLOSSOIDES HERBACEOUS VEGETATION:FEID-HICY	G1			5	OR²WA							X
CEGL001356	GRAYIA SPINOSA-SARCOBATUS VERMICULATUS/(ORYZOPSIS HYMENOIDES) SHRUBLAND:GRSP-SAVE4/(ORHY)	G2		1		OR²CA²NV			X				
CEGL001351	GRAYIA SPINOSA/POA SECUNDA SHRUBLAND:GRSP/POSE	G2?			5	WA							X
CEGL001719	JUNIPERUS OCCIDENTALIS/ARTEMISIA TRIDENTATA/CAREX FILIFOLIA WOODED HERBACEOUS VEGETATION:JUOC/ARTR2/CAFI	G1		1		OR					?	X	
CEGL001723	JUNIPERUS OCCIDENTALIS/CERCOCARPUS LEDIFOLIUS/LEYMUS CINEREUS WOODED TALL HERBACEOUS VEGETATION:JUOC/CELE3/LECI4	G1Q				OR				X			
CEGL001481	LEYMUS CINEREUS-DISTICHLIS SPICATA HERBACEOUS VEGETATION:LECI4-DISP	G1			2	ID²WA²CA	X						X
CEGL001563	LEYMUS FLAVESCENS HERBACEOUS VEGETATION:LEFL4	G2				ID				X	X		

CEGL001170	PHILADELPHUS LEWISII SHRUBLAND:PHLE4	G2Q	1		2	WA²ID				X			X
CEGL000814	PINUS FLEXILIS/PURSHIA TRIDENTATA WOODLAND:PIFL2/PUTR2	G1?	1			ID					X		
CEGL000835	PINUS MONOPHYLLA-JUNIPERUS OSTEOSPERMA/LEYMUS CINEREUS WOODED HERBACEOUS VEGETATION:PIMO-JUOS/LECI4	G1Q	1			ID		X	X				
CEGL000836	PINUS MONOPHYLLA-JUNIPERUS OSTEOSPERMA/PRUNUS VIRGINIANA WOODLAND:PIMO-JUOS/PRVI	G1Q	1			ID²CA		X	X				
CEGL000866	PINUS PONDEROSA-PSEUDOTSUGA MENZIESII RIPARIAN WOODLAND:PIPO-PSME	G1			1	WA							X
CEGL000196	PINUS PONDEROSA/PURSHIA TRIDENTATA/ORYZOPSIS HYMENOIDES WOODLAND:PIPO/PUTR2/ORHY	G1				OR²CA			X				
CEGL000879	PINUS PONDEROSA/STIPA COMATA WOODLAND:PIPO/STCO4	G1			2	ID²WA							X
CEGL000671	POPULUS BALSAMIFERA SSP. TRICHOCARPA/CICUTA DOUGLASII FOREST:POTR15/CIDO	G1			1	ID²OR²WA	X						X
CEGL001670	PSEUDOROEGNERIA SPICATA-FESTUCA IDAHOENSIS PALOUSE HERBACEOUS VEGETATION:PSSP6-FEID (PALOUSE)	G1		3	17	ID²OR²WA	X						X
CEGL001054	PURSHIA TRIDENTATA-ARTEMISIA TRIDENTATA SSP. TRIDENTATA SHRUBLAND:PUTR2-ARTRT	G1	1			ID				X	X		
CEGL001056	PURSHIA TRIDENTATA-CHRYSOTHAMNUS NAUSEOSUS SHRUBLAND:PUTR2-CHNA2	G1	1		1?	ID					X		X
CEGL001058	PURSHIA TRIDENTATA/ORYZOPSIS HYMENOIDES SHRUBLAND:PUTR2/ORHY	G1			7	ID²OR²WA				X			X
CEGL001059	PURSHIA TRIDENTATA/POA SECUNDA SHRUBLAND:PUTR2/POSE	G1?Q	1	1		ID, OR			X				X
CEGL001060	PURSHIA TRIDENTATA/PRUNUS VIRGINIANA SHRUBLAND:PUTR2/PRVI	G1?Q	1			ID					X		
CEGL001497	PURSHIA TRIDENTATA/PSEUDOROEGNERIA SPICATA-LEYMUS CINEREUS SHRUB HERBACEOUS VEGETATION:PUTR2/PSSP6-LECI4	G1?	1			ID					X		
CEGL001626	ROSA NUTKANA-FESTUCA IDAHOENSIS HERBACEOUS VEGETATION:RONU-FEID	G1	5		1	ID²OR²WA	X						X

APPENDIX 2

2-A: Memo to Sandy Andelman from John Humke and Chris Hansen – Procedures Used to Create an Existing Conservation Areas Data Layer for the Columbia Plateau

2-B: Level 1 and 2 Managed Areas in the Columbia Plateau

Appendix 2.B

Level 1 and 2 Managed Areas in the Columbia Plateau Ecoregion.
Note: duplicate areas for one designated site denotes multiple units for site.

Site Designation and Site Name	Level	Size (Sq Km)	State	Sect
TNC: Seaton Canyon	1	1.27	WA	342I
ACEC: Colockum Creek	2	0.65	WA	342I
ACEC: Rock Island	2	8.76	WA	342I
ACEC: Coal Creek	2	3.28	WA	342I
FWS: Turnbull NWR	2	64.00	WA	342I
TNC: Marcellus Shrub Steppe	1	1.10	WA	342I
IDSTP: McCloskey State Park	2	21.73	ID, WA	331A
FWS: Columbia NWR	2	111.90	WA	342I
WSR: Yakima River Canyon WSR/ACEC	2	2.79	WA	342I
WSA: Yakima River Canyon/Yakima River Cliff-Umtanum Ridge ACEC	2	0.37	WA	342I
FWS: Columbia NWR	2	2.24	WA	342I
ACEC: Sentinel Slope	2	0.96	WA	342I
ACEC: Mccoy Canyon	2	0.65	WA	342I
TNC: Yakima River Canyon	1	0.51	WA	342I
WSR: Yakima River Canyon WSR/ACEC	2	17.58	WA	342I
WSA: Yakima River Canyon/Yakima River Cliff-Umtanum Ridge ACEC	2	0.77	WA	342I
FWS: Mcnary NWR	2	1.87	WA	342I
WILD: Juniper Dunes	1	29.64	WA	342I
ACEC: Juniper Forest	2	48.58	WA	342I
TNC: Klickitat Oaks	1	1.31	WA	342I
TNC: Lindsay Prairie Preserve	1	1.87	OR	342I
FWS: Umatilla NWR	2	3.14	OR	342I
RNA: Boardman RNA	1	20.33	OR	342I
WSR: Lower Deschutes River	2	0.21	WA, OR	342I
ACEC: Horn Butte	2	22.24	OR	342I
FWS: Mckay Creek NWR	2	2.87	OR	342I
WSR: White River	1	26.17	OR	342I
WSR: Lower Deschutes River	2	158.04	OR	342I
ACEC: ACEC Substation Tract	2	1.76	ID	342D
TNC: Lawrence Memorial Grassland Preserve	1	1.47	OR	342I
NPS: John Day Fossil Beds NM	1	7.67	OR	342H
WSA: Lower John Day	2	49.05	OR	342H
WSA: Spring Basin	2	1.39	OR	342H
WSA: Thirtymile	2	12.34	OR	342H
WSA: North Pole Ridge	2	8.92	OR	342H
WSR: John Day (Main Stem) River	2	110.40	OR	342H

WSR: Lower Deschutes River	2	0.60	OR	342I
WSR: John Day (Main Stem) River	2	16.34	OR	342H
WSR: John Day (Main Stem) River	2	11.27	OR	342H
NPS: John Day Fossil Beds NM	1	10.24	OR	342H
WSA: Aldrich Mountain	1	2.61	OR	342H
WSR: South Fork John Day River	1	14.46	OR	342H
NPS: John Day Fossil Beds NM	1	23.31	OR	342H
WILD: Black Canyon	1	0.92	OR	342H
SIA: Steelhead Falls SIS	2	0.51	OR	342H
WSR: Middle Deschutes River	2	13.60	OR	342H
WSA: Deschutes Canyon-Steelhead Falls	2	8.40	OR	342H
WSA: Badlands	2	58.24	OR	342H
ACEC: "Peck"s Milkvetch"	1	14.37	OR	342H
RNA: Rebecca Sand Hill RNA	1	1.37	ID	324C
WSA: North Fork	1	1.00	OR	342H
WSA: North Fork	2	8.59	OR	342H
WSR: North Fork Crooked River WSR/ACEC	2	13.47	OR	342H
WSR: North Fork Crooked River	1	20.96	OR	342H
ACEC: North Fork Crooked River	1	1.06	OR	342H
RNA: Forest Creeks ACEC/RNA	1	1.12	OR	342H
WSR: Snake River WSR/ACEC	2	2.47	ID	342D
WSA: Sands WSA	2	76.11	ID	342D
RNA: Saint Anthony Sand Dunes RNA	2	7.39	ID	342D
ACEC: ACEC North Menan Butte	1	4.48	ID	342D
RNA: Powell Butte ACEC/RNA	1	1.68	OR	342H
ACEC: Horse Ridge	1	2.01	OR	342H
ACEC: ACEC Cedar Butte (Proposed)	2	18.50	ID	342D
RNA: Big Southern Butte PRNA	2	2.38	ID	342D
RNA: China Cup Butte PRNA	2	0.82	ID	342D
ACEC: ACEC Sand Hollow	2	2.33	ID	324C
ACEC: ACEC Sand-capped Knob	2	0.16	ID	324C
ACEC: ACEC Willow Creek	2	2.94	ID	324C
ACEC: ACEC Woods Gulch	2	0.16	ID	324C
RNA: Sun Peak PRNA	1	1.59	ID	324C
WSA: Honeycombs	2	137.67	OR, ID	324C
WSR: EREC	2	0.69	OR, ID	324C
ACEC: Jump Creek Canyon RNA/ACEC	1	1.44	OR, ID	324C
ACEC: Leslie Gulch	1	4.49	OR, ID	324C
ACEC: Mahogany Mountain	2	0.55	OR, ID	324C
RNA: Jordan Craters ACEC/RNA	1	12.78	OR, ID	324C
RNA: Mahogany Ridge ACEC/RNA	2	0.92	OR, ID	324C
WSA: Clarks Butte	1	24.08	OR, ID	324C
WSA: Honeycombs	1	15.56	OR, ID	324C
WSR: EWLD	2	4.21	OR, ID	324C
WSA: Jordan Craters	1	112.90	OR, ID	324C

WSA: Null	1	0.18	OR, ID	324C
WSA: Owyhee Breaks	1	1.99	OR, ID	324C
WSA: Slocum Creek	1	16.78	OR, ID	324C
ACEC: Cinnabar Mountain PRNA/ACEC	2	1.06	OR, ID	324C
WSA: Slocum Creek	2	13.60	OR, ID	324C
WSA: Devils Garden Lava Bed	1	114.51	OR	324B-W
WSA: Squaw Ridge Lava Bed	2	104.88	OR	324B-W
WSA: Honeycombs	2	0.44	OR	324C
NPS: Craters NM	1	5.32	ID	342D
RNA: Brass Cap Kipuka PRNA	2	3.47	ID	342D
RNA: Carey Kipuka PRNA	1	0.69	ID	342D
NPS: Craters of the Moon NM/Wilderness Area	1	173.14	ID	342D
WSA: Four Craters Lava Bed	2	47.06	OR	324B-W
WSA: Sand Dunes	1	62.74	OR	324B-W
RNA: Lost Forest ACEC/RNA	1	36.42	OR	324B-W
ACEC: Lost Forest Sand Dunes Fossil Lake	1	38.40	OR	324B-W
WSA: Winter Range	1	0.31	OR, NV	324B-W
RNA: Serrano Point PACEC/RNA	2	4.82	OR, NV	324B-W
WSA: Pueblo Mountains	2	9.99	OR, NV	324B-W
WSA: Null	1	10.03	OR, NV	324B-W
WSA: Little Blitzen Gorge	1	29.55	OR, NV	324B-W
WSA: High Steens	2	268.65	OR, NV	324B-W
WSA: High Steens	1	28.21	OR, NV	324B-W
WSA: East Alvord	2	25.24	OR, NV	324B-W
WSA: East Alvord	1	1.92	OR, NV	324B-W
WSA: Bridge Creek	2	0.18	OR, NV	324B-W
WSA: Blitzen River	1	16.74	OR, NV	324B-W
WSA: Alvord Peak	2	61.27	OR, NV	324B-W
WSA: Alvord Desert	2	41.75	OR, NV	324B-W
TNC: Borax Lake Preserve/ACEC	1	2.07	OR, NV	324B-W
RNA: Tum Tum Lake ACEC/RNA	2	6.48	OR, NV	324B-W
RNA: Stinking Lake RNA	1	5.58	OR, NV	324B-W
RNA: South Fork Willow Creek	1	0.95	OR, NV	324B-W
WSA: South Fork Donner und Blitzen River	1	8.35	OR, NV	324B-W
RNA: Rooster Comb ACEC/RNA	1	2.75	OR, NV	324B-W
RNA: Little Blitzen ACEC/RNA	1	6.18	OR, NV	324B-W
RNA: Harney Lake RNA	1	135.56	OR, NV	324B-W
FWS: Malheur NWR	2	543.80	OR, NV	324B-W
ACEC: South Narrows	1	0.63	OR, NV	324B-W
ACEC: Pickett Rim	2	7.73	OR, NV	324B-W
ACEC: Kiger Mustang	2	1.78	OR, NV	324B-W
ACEC: Diamond Craters	1	66.83	OR, NV	324B-W
WSR: Donner und Blitzen River	1	3.30	OR, NV	324B-W

WSR: Fish Creek	1	11.07	OR, NV	324B-W
ACEC: Borax Lake	1	0.79	OR, NV	324B-W
ACEC: Alvord Desert	2	0.62	OR, NV	324B-W
RNA: Connley Hills PACEC/RNA	1	11.68	OR	324B-W
ACEC: Saddle Butte Lava Flow	1	3.88	OR	324C
WSA: Saddle Butte	1	20.63	OR	324C
WSA: Saddle Butte	2	325.89	OR	324C
WSR: Owyhee River WSR/ACEC	2	72.43	OR	324C
TNC: Birds of Prey Tract "A"	2	0.53	ID	324C
TNC: Birds of Prey Tract "C"	2	1.45	ID	324C
RNA: Travertine Park RNA	1	0.13	ID	342B-E
ACEC: ACEC Travertine Park	1	3.76	ID	342B-E
WSR: SWLD	2	2.37	ID	324C
ACEC: ACEC Bruneau/Jarbidge River	2	10.42	ID	324C
ACEC: Mud Flat Oolite RNA/ACEC	2	0.84	ID	324C
RNA: Sugar Valley Badlands PRNA	2	0.86	ID	324C
WSA: ID-111-006	2	7.78	ID	324C
WSA: ID-111-017	2	41.92	ID	324C
WSR: Bruneau/Jarbridge River WSR/ACEC	2	13.26	ID	324C
ORWA: Summer Lake Wildlife Management Area	2	62.97	OR	324B-W
ACEC: Box Canyon/Blueheart Springs A	1	0.18	ID	342D
WSR: Box Canyon WSR/ACEC	1	0.33	ID	342D
WSR: Box Canyon	2	1.63	ID	342D
WSR: ESCN	2	1.30	ID	342D
WSR: Snake River	2	3.02	ID	342D
WSR: Vineyard Creek	2	0.41	ID	342D
WSR: Vinyard Creek WSR/ACEC	2	0.47	ID	342D
TNC: Thousands Springs Ranch Preserve	1	1.85	ID	342D
WSR: Owyhee River WSR/ACEC	2	3.63	OR	324C
WSA: Saddle Butte	2	7.91	OR	324C
WSR: Owyhee River Canyon WSR/ACEC	2	1.45	OR	324C
ACEC: Formation Cave RNA/ACEC	2	0.19	ID	342-BE
TNC: Formation Springs Preserve	1	0.17	ID	342-BE
WSA: Guano Creek	2	9.31	OR, CA	324B-W
WSA: Fish Creek Rim	2	0.50	OR, CA	324B-W
WSR: Honey Creek	2	2.82	OR, CA	324B-W
RNA: Poker Jim RNA	1	2.44	OR, CA	324B-W
RNA: Fish Creek Rim PACEC/RNA	2	0.05	OR, CA	324B-W
FWS: Hart Mountain National Antelope Range	1	940.96	OR, CA	324B-W
ACEC: Warner Wetlands	1	229.47	OR, CA	324B-W
WSR: Deep Creek	2	0.49	OR, CA	324B-W
WSR: West Little Owyhee River	2	0.16	ID, OR, NV	324C
WSA: ID-16-48b	2	1.03	ID, OR, NV	324C

WSR: Owyhee River Canyon WSR/ACEC	2	32.55	ID, OR, NV	324C
WSR: Null	2	1.22	ID, OR, NV	324C
WSR: North Fork Owyhee River	2	13.10	ID, OR, NV	324C
WSR: EWLD	2	49.12	ID, OR, NV	324C
WSR: ESCN	2	1.43	ID, OR, NV	324C
WSA: Upper West Little Owyhee	2	14.84	ID, OR, NV	324C
WSA: Owyhee River Canyon	2	34.49	ID, OR, NV	324C
WSA: Owyhee River Bighorn Sheep WSA/ACEC	2	146.29	ID, OR, NV	324C
WSA: Null	2	2.00	ID, OR, NV	324C
WSA: ID-16-49a	2	4.96	ID, OR, NV	324C
WSA: ID-16-48c	2	4.83	ID, OR, NV	324C
WSR: SWLD	2	0.39	ID, OR, NV	324C
WSA: ID-16-047	2	0.36	ID, OR, NV	324C
WSA: ID-16-042	2	1.10	ID, OR, NV	324C
WSA: ID-111-044	2	12.78	ID, OR, NV	324C
WSA: ID-111-040	2	47.62	ID, OR, NV	324C
RNA: Pleasant Valley Table PRNA	2	1.51	ID, OR, NV	324C
ACEC: The Badlands PRNA/ACEC	2	2.06	ID, OR, NV	324C
RNA: Fall Creek Natural Area	1	18.15	NV, ID	342B-E
WILD: Jarbidge	1	330.90	NV, ID	342B-E
WSA: ID-111-017	2	25.62	NV, ID	342B-E
ACEC: ACEC Bruneau/Jarbidge River	2	46.86	NV, ID	342B-E
WSA: ID-17-011	2	64.55	NV, ID	342B-E
WSA: Null	2	2.29	NV, ID	342B-E
WSR: Bruneau/Jarbridge River WSR/ACEC	2	39.39	NV, ID	342B-E
RNA: Mount Harrison PRNA	1	1.52	ID, UT	342B-E
WSR: Deep Creek	2	3.76	OR	324B-W
WSA: Fifteenmile Creek	2	1.51	OR, NV	324B-W
ACEC: ACEC Goose Creek Meza	1	0.42	ID, UT, NV	342B-E
RNA: Goose Creek Mesa RNA	1	0.30	ID, UT, NV	342B-E
FWS: Sheldon NWR	2	2.31	NV, OR	324B-W
FWS: Sheldon National Antelope Range	2	2172.24	NV, OR	324B-W
WSA: Hawk Mountain	2	1.81	OR	324B-W
WILD: South Warner	1	2.18	CA, NV	324B-W
CAWA: Willow Creek Wildlife Area	1	0.35	CA, NV	324B-W
CAWA: Honey Lake Wildlife Area - Fleming Unit	2	3.72	CA, NV	324B-W
CAWA: Honey Lake Wildlife Area - Dakin Unit	2	0.05	CA, NV	324B-W
CAWA: Doyle Wildlife Area	2	57.10	CA, NV	324B-W
NVWA: Anaho Island Wildlife Refuge	1	2.56	NV	324B-W
WSU: Washington State University Study Area	2	0.10	WA	331A
TNC: Magnusson Butte	1	0.05	WA	342I

RNA: Foster Flat PACEC/RNA	1	8.14	OR	324B-W
ACEC: Foster Flat	1	2.32	OR	324B-W
WSR: Snake River WSR/ACEC	2	23.25	ID	342D
RNA: Reid Canal Island RNA	1	0.15	ID	342D
WSR: Salmon Falls Creek Canyon WSR/ACEC	2	14.79	ID	324C
WSR: ESCN	2	13.22	ID	324C
WSA: ID-17-010	2	2.60	ID	324C
RNA: Pole Canyon PRNA	1	0.68	ID	342B-E
RNA: Big Juniper Kipuka RNA/ACEC	2	1.31	ID	342D
RNA: Sand Kipuka RNA/ACEC	2	1.30	ID	342D
TNC: Stapp-Soldier Creek Preserve	1	0.36	ID	342C
WSR: Dry Creek WSR/RNA	2	4.42	ID	342C
WSR: Big Wood	2	2.46	ID	342C
TNC: Silver Creek Preserve	1	7.52	ID	342C
WSA: ID-33-015	2	2.99	ID	342D
WSR: Clearwater River, Middle Fork	2	7.98	ID	331A
WSR: Middle Fork Clearwater Wild River	2	10.44	ID	331A
ACEC: Cowiche Canyon	2	2.26	WA	342I
TNC: Rose Creek	1	0.07	WA	331A
RNA: Trapper Creek PRNA	1	1.86	ID	342B-E
IDWA: Tex Creek Wildlife Management Area	2	68.54	ID	342B-E
RNA: Benjamin Pasture ACEC/RNA	1	2.68	OR	342B-W
RNA: Stockade Mountain ACEC/RNA	1	2.99	OR	342C

MEMORANDUM

TO:	Sandy Andelman
CC:	Craig Groves, Nicole Silk, Bob Moseley, Dick Vander Schaaf, and Curt Soper
FROM:	John Humke and Chris Hansen
DATE:	April 30, 1997
SUBJECT:	Procedures Used to Create an Existing Conservation Areas Data Layer for the Columbia Plateau Ecoregion

On April 29-30, 1997 John Humke and Chris Hansen created an Existing Conservation Areas GIS file and map for the Columbia Plateau Ecoregion. The principal sources of information and instruction utilized in this exercise were:

1. Consultations with Sandy Andelman

2. GAP Management Status (GIS Data Layer provided by the Biogeography Lab - University of California at Santa Barbara)

3. Natural Areas GIS data layer clipped to the TNC Columbia Plateau Ecoregion from the BVBNAT GIS Data Layer provided by Angela Evenden, US Forest Service, Missoula, MT.

4. "Evaluating the Contribution of Existing Conservation Areas," draft chapter for TNC's Geography of Hope guidelines - Written by Nicole Silk and edited by John Humke and Craig Groves.

5. Management level (1-4) rankings for the natural areas listed in item 3. (above) provided by: Idaho - Bob Moseley, Nevada - Steve Hobbs, Oregon - Dick Vander Schaaf, and Washington - Curt Soper. (Note: some of these rankings were changed as noted below by John Humke)

<u>Procedures Followed</u>

Hansen and Humke did most of the work on-line at a GIS workstation. Initially Hansen called up the GAP Management Status coverage, which only consist of polygons coded 1 - 4 with no names or other descriptions. By cross referencing the GAP coverage with the Natural Areas coverage most polygons were common to both and therefore could be identified by name and designation. Those GAP polygons that did not occur in the Natural Areas coverage were marked with a question mark (?) on a printed copy of the GAP coverage. A few large areas not shown in the Natural Areas coverage, like the Sheldon National Antelope Range, were known.

It became obvious that the richer, and more current, information on existing conservation areas was in the Natural Areas coverage. As a first step, each polygon in the Natural Areas coverage was coded for status one to three. By definition there were no status four “natural areas.” Previously, Moseley, Vander Schaaf, and Soper had manually coded the status on the Natural Area polygons in their states based on their expert knowledge. This was done on a list of printed names and designations. These codes were reviewed by Humke and some were changed based on the definitions developed for levels 1 - 4 in “Evaluating the Contribution of Existing Conservation Areas,” and discussions with Sandy Andelman on standards to be used. The following changes were made:

Idaho: All polygons that had Research Natural Area (RNA) and Wild and Scenic River (WSR) designations that Moseley had coded 3 were upgraded to 2 because category 3 is for lands without natural area designations. Some WSR’s may be “scenic” rivers and may not be managed for biodiversity values but this was unknown to Humke. Moseley was unavailable for consultation. These errors, which are minor in consequence, can be corrected later if necessary. A few ACEC’s had been coded as 4 by Moseley and these were upgraded to 3 by Humke because all public land, not totally altered, is at least a level 3. There were a few cases where Moseley was inconsistent in ranking multiple polygons for the same natural area. In these cases Humke upgraded the polygons which were in the same natural area to the highest code that Moseley had assigned to any polygon in the natural area. For example, Moseley initially coded polygons in the Bruneau/Jarbridge ACEC as a 2 but, on another page, coded polygons in the same natural area as 3’s. Humke coded this, and other similar situations, all 2.

Nevada: Hobbs had not coded 3 wild and scenic river (WSR) polygons. To avoid them becoming zeros Humke coded them as 2’s.

Oregon: Fortunately Vander Schaaf was available for telephone consultation as changes were made. When asked about several RNA’s coded as 3’s the answer was, “these are proposed RNA’s” so they remained 3’s. Note: there may be other “proposed” RNA’s in Idaho that Moseley had coded 3 but Humke changed to 2 because it could not be determined that they were only “proposed” from the data layer. Vander Schaaf agreed that all WSR’s should be coded 2, because of their designation, even if a few had not undergone management changes (livestock grazing). One ACEC was upgraded from 3 to 2 with Vander Schaaf’s agreement.

Washington: Soper had not coded 58 polygons. Humke therefore coded these, “other USFWS” as 2, “Yakima River Canyon WSR” as 2, and “TNC: nap” as 3 (this may be too low). Humke also changed the “Juniper Dunes Wilderness” from 2 to 1.

Note: Moseley’s and Vander Schaaf’s codes for ACEC’s ranged from 1 to 4. While the 4’s were changed to 3’s, the remainder were left unchanged because the ACEC designation is used by BLM in a broad range of situations not all of which pertain to natural areas.

A next step will be for Hansen to add, to the emerging Existing Conservation Areas data layer, the known and obvious polygons that were only on the GAP layer like the Sheldon

National Antelope Range in Nevada which GAP coded as 2. The Hart Mountain National Antelope Range just to the north in Oregon was coded as 1 by GAP, and agreed to by Vander Schaaf, so these two USFWS areas have different codes. The Hanford Nuclear Reservation in Washington and the Idaho Nuclear Reservation will be downgraded from GAP level 2 to level 3 and will show as polygons in the final Existing Conservation Areas data layer. There are a number of additional level 2 polygons in the GAP layer for which we could not find name or designation information in the Natural Areas data layer. These were all circled and marked with question marks on printed maps and will be referred to experts. If they can be determined to be conservation areas of level 1 or 2 status they, with their names, will be added to the Existing Conservation Areas data layer by Hansen. If not, they will be downgraded to level 3 and show as polygons frequently adjacent to other level 3 polygons and therefore somewhat indistinguishable on a colored map. Note: On April 30, 1997 Hansen obtained a new version of the GAP Management Status data layer that contained ownership information. This will also be used to help determine the ownership and designation of the unknown GAP level 2 polygons. (See notes below.)

An additional step for Hansen will be to enhance the Existing Conservation Areas data layer by adding in level 3 and 4 information from the GAP layer. This will generally distinguish the non-natural area public land from non-natural area private land. All GAP polygon lines for levels 3 and 4 will be displayed.

Note for future analysis: Areas that are currently "proposed" like proposed RNA's and wilderness study areas only show as level 3 and are not readily discernible on the printed maps. Therefore, when the portfolio of sites for the ecoregion is emerging, or is selected, those portfolio sites that have background map colors indicating level 3 should be checked closely in the Natural Areas data layer because it would be valuable for strategy planning to know if they have been proposed for wilderness, RNA, or other designation status.

Notes

(1) Knowledgeable experts in the five states identified, by site name, most of the additional level 2 GAP polygons and recommended level 1-3 existing conservation status codes. This information was provided to Chris Hansen.

(2) At the December 15-17, 1997 Implementation Team meeting in Boise, ID, sixteen existing managed area sites were added to the portfolio (including several TNC sites) and the boundaries of fifteen sites were amended to include portions of existing managed areas.

APPENDIX 3

EXPERTS WORKSHOP

3-A: Columbia Plateau Experts Workshop Summary

3-B: **Expert Workshop Summaries by Panels:**

- **Terrestrial Invertebrates**
- **Fish and Aquatic Communities**
- **Birds**
- **Mammals**
- **Plants and Plant Communities**

3-C: Expert Workshop Participants List

Columbia Plateau Conservation Workshop
14-15 January 1997

Bird Experts Panel	
John Humke (facilitator) The Nature Conservancy, Western Region	Dave Marshall Private Consultant
Eleanor Gaines (recorder) Oregon Nat. Heritage Program	Gary Ivey Malheur National Wildlife Refuge
Andy Stepniewski Private Consultant	Jim Ramakka Bureau of Land Management, Nevada
Chris Chappell Washington Heritage Program	
Terrestrial Invertebrate Experts Panel	
Cathy Macdonald (facilitator) The Nature Conservancy, Oregon	Jim LaBonte Oregon Department of Agriculture
Debbie Pickering (recorder) The Nature Conservancy, Oregon	Paul Hammond Oregon State University
Melody Allen Xerces Society	Bill Stephen Oregon State University
Andy Moldenke Oregon State University	Joe Furnish Bureau of Land Management, Oregon
Herptiles Expert Panel	
Bill Leonard (facilitator) Washington Natural Heritage Program	Chuck Peterson Idaho State University
Linda Kramme (recorder) The Nature Conservancy, Washington	Bob Storm Oregon State University
Marc Hayes Consultant	
Mammals	
Blair Csuti (facilitator) US Fish and Wildlife Service, Oregon	Chuck Harris Idaho Department of Fish and Game
Connie Levesque (recorder) Oregon Natural Heritage Program	Verne Marr Consulting Biologist
Jim Hallett Washington State University	Eric Yensen Albertson College of Idaho
Plants and Plant Communities	
Dennis Grossman (facilitator) The Nature Conservancy	Richard Easterly SEE Botanical
Sue Vrilakas (recorder) Oregon Natural Heritage Program	Don Mansfield Albertson College of Idaho
John Christy Oregon Natural Heritage Program	Bob Moseley Conservation Data Center, Idaho
Rex Crawford Washington Natural Heritage Program	Jan Nachlinger The Nature Conservancy, Nevada
John Gamon Washington Natural Heritage Program	Debra Salstrom SEE Botanical
Judy Harpel Clark Community College, Washington	Reid Schuller The Nature Conservancy, Oregon
Jimmy Kagan Oregon Natural Heritage Program	Berta Youtie The Nature Conservancy, Oregon

Fish and Aquatic Communities Expert Panel	
Marc Liverman (Facilitator) National Marine Fisheries Service	Wayne Minshall Idaho State University
Trish Klahr (recorder) The Nature Conservancy, Idaho	Ron Rhew US Fish and Wildlife Service, Oregon
Chris Allen The Nature Conservancy, Oregon	Don Sada Private Consultant
Ed Johannes DEIXIX Consultants	Amy Stock Washington Natural Heritage Program
Terrence Frest DEIXIS Consultants	Gary Vinyard University of Nevada
Danny Lee US Forest Service, Idaho	Jack Williams Bureau of Land Management, Idaho
Other Participants	
Sandy Andelman The Nature Conservancy, Washington	Chris Hansen The Nature Conservancy, Washington
Michelle Coad The Nature Conservancy, Washington	Elliot Marks The Nature Conservancy, Washington
Chris DeForest The Nature Conservancy, Washington	Will Murray The Nature Conservancy, Western Region
Dennis Donald The Nature Conservancy, Western Region	Dick Vander Schaaf The Nature Conservancy, Oregon
Kit Gillem The Nature Conservancy, Oregon	

COLUMBIA PLATEAU ECOREGIONAL PLANNING PROJECT
EXPERTS WORKSHOP SUMMARY
JANUARY 14-15, 1997, PORTLAND, OR

WORKSHOP GOAL: Develop a list of sites in the Columbia Plateau ecoregion that, if managed for conservation, will protect the full range of biodiversity in the ecoregion.

COORDINATOR: Dick Vander Schaaf, ORFO
FACILITATOR: Will Murray, WRO

WORKSHOP ATTENDEES

Over fifty experts attended from diverse organizations such as Natural Heritage programs, BLM, USF&WS, State Fish and Wildlife Programs, universities, private consulting firms, and TNC. Members of the Columbia Plateau Core Planning Team, other TNC staff and volunteers served as panel facilitators, recorders, and mapping coordinators.

PROCESS

DAY 1: Sandy Andelman, Dennis Donald and Cathy Macdonald briefly described TNC's ecoregional planning efforts, the Columbia Plateau project goals and workshop goals. They also explained the differences between this effort and the federal Interior Columbia Basin Ecosystem Management Project (ICBEMP). Will Murray reviewed the workshop agenda.

Participants then divided into panels organized around the following six topics: plants and plant communities; mammals; birds; herptiles; terrestrial invertebrates; and fish and aquatic communities.

Each panel had both a facilitator and recorder. Will Murray had led a useful training session prior to the workshop for facilitators and recorders to make the panel sessions as smooth and productive as possible. Facilitators kept panels on task and ensured equal opportunity for participants to discuss sites. Recorders took notes on site selection rationale, discussion of specific species and communities, threats, data gaps, and other issues.

Experts had been asked to come prepared to nominate and map the most important sites in the ecoregion, both for conservation "targets" (i.e., G3 and above species and communities) and for representative sites (i.e., excellent examples of more common plant/animal communities). Lists of conservation targets were provided to panel members for each of the six categories. Experts were asked to bring maps and complete a Site Nomination Form describing the significance and threats for each nominated site (see attached form).

Each panel accomplished the following:

--reviewed and modified conservation targets lists
--mapped approximate boundaries of nominated sites on mylar overlay of 1:500,000 scale map of the ecoregion
--labeled each mapped site to match its corresponding Site Nomination Form
--discussed threats and opportunities at sites
--discussed data gaps
--suggested other experts to contact

After each panel finished mapping sites, their task for the day was complete. That evening, several Core Team members and colleagues consolidated the sites onto one mylar overlay, using different colors to distinguish the six categories. Three copies of this consolidated mylar were made for use during the Day 2 sessions.

DAY 2: All participants convened to look at the composite map of nominated sites. The experts were eager to see the combined results of the panels' work. Will invited participants to offer comments on the previous day's effort. A lively discussion followed about how to tackle the next step: synthesizing the site information. There was much discussion of whether and how to consolidate overlapping site boundaries, and about whether to group concentrations of smaller sites into larger macrosites. There was also a suggestion to reach consensus on "crown jewel" sites in the ecoregion.

Finally the participants agreed to split into three groups, each with a mixture of expertise. Each group evaluated a different portion of the ecoregion and attempted to identify the following: common threats and processes for sites; "crown jewel" sites; resources available to help with biodiversity protection; and data gaps. But as members of the Core Team and workshop facilitators recognized the difficulty the groups were having with this task, they refined the question to ask, "With the sites now mapped, can we say we have captured the full range of biodiversity within the ecoregion?" This question allowed experts to better apply the information they had provided the day before, but it still proved difficult for groups to address.

The three groups interpreted even these more specific instructions quite differently. One group consolidated and expanded some sites to create macrosites. Another group did not create macrosites but focused more on the data gaps that must be filled before they could answer the "have we done it?" question. All groups recognized this portion of the workshop as important but were somewhat frustrated with their end product.

PRODUCTS/FOLLOW UP

--Over 250 sites were nominated by workshop panels that, after eliminating duplications, resulted in approximately 120 discrete areas.
--Each site was digitized into GIS, and separate data layers were created for each of the panel categories.
--Panel minutes and list of workshop participants were sent to each panel member for edits/corrections
--Panel minutes were summarized and distributed to the Core Team.

NEXT STEPS

Chris Hansen, WAFO GIS Coordinator, is creating a database to link Site Nomination Form information with all the sites mapped in GIS. This will allow the Team to query the GIS database, and eventually to compare the nominated sites developed through the experts workshop process with sites that result from the data-driven approach.

BENEFITS OF THE EXPERTS WORKSHOP PROCESS

There were numerous benefits to the workshop identified by both TNC staff and the experts who attended.

- Experts complimented workshop coordinators on the diverse pool of experts invited. They also appreciated the opportunity to engage in interdisciplinary discussions with other experts.
- By inviting many academic experts, TNC initiated discussions which could lead to more TNC/university partnerships in the future.
- Experts provided critical information on species, threats, social/economic factors and other topics that could not be captured if Heritage data alone were used to identify sites.

LESSONS LEARNED/DRAWBACKS/SUGGESTIONS

- Although the Core Team clearly described the workshop goals at the outset, throughout the workshop experts asked for clarification about how their information would be used.

  Suggestion: Core Teams should reiterate throughout experts workshops the purpose of the workshop and how it fits into TNC's larger ecoregional planning picture--show a diagram that explains the process at the outset and keep it visible. One Core Team member should participate in every experts panel and every breakout group session to answer questions and redirect the panels if necessary.
- Despite the broad geographic and biological knowledge base at the workshop, significant data gaps were still identified. This included information known by other experts not attending the workshop (and thus not included in the product) as well as lack of knowledge about certain species and locales. Workshop products are obviously biased based on the experts attending. Many experts noted the difficulty of answering the Day 2 "have we done it?" question given these gaps.

  Suggestion: During the panel discussions, identify on the map the geographic areas that experts at the workshop do not know about, and clarify whether or not information exists on these areas. Make sure recorders list other data gaps and suggestions for filling them.
- It takes significant follow-up work after the workshop to really create a useable product.

  Suggestion: Make sure that planning teams budget appropriately for necessary post-workshop effort.
- The scale at which different panels operated varied widely; for example, the aquatics group obviously mapped watersheds, not sites.

  Suggestion: Review with the group the definition of "site" for mapping purposes before breaking into panel sessions so all panels are working at similar scales.
- It was beneficial to mix experts on Day 2 and divide the ecoregion among three groups; however, the instructions were not specific enough to really focus the Day 2 discussion consistently among the three groups.

  Suggestion: Provide clearer instructions on Day 2, including asking groups to create macrosites from the separately mapped sites. Groups should look for patterns, draw macrosite boundaries (with naming conventions), then ask the question "is this a viable site?" If group is unsure, make sure that the full range of plant communities at the site is represented to serve as a coarse filter.
- Several experts questioned the value of such site-based thinking, given that TNC claims to be moving more toward protecting key natural <u>processes</u>. They also felt it was not made clear enough that they should give equal attention to mapping representative sites as well as conservation target sites, so fewer of these sites for more common communities were mapped.

  Suggestion: Also specify that experts should map sites for <u>both</u> conservation targets and representative natural communities.
- It was difficult to assess connectivity between nominated sites (except for the aquatics group, which identified entire watersheds.

  Suggestion: Include this issue in Day 2 group discussions of macrosites.

WORKSHOP TIME & COST ESTIMATES

MEETING FACILITY: $2500
TNC STAFF TIME (planning/conducting the workshop): 310 hrs
VOLUNTEER TIME (assisting with preparations/follow-up): 100 hrs

Summary of

TERRESTIAL INVERTEBRATES EXPERT PANEL

January 14 - 15, 1997

Panel.

Cathy Macdonald (facilitator), TNC, Portland, Oregon
Debbie Pickering (recorder), TNC, TIS, OR
Melody Allen, Xerces Society, Portland, OR
Jim LaBonte, Dept. of Entomology, Oregon State University, Corvallis, OR
Paul Hammond, Dept. of Entomology, Oregon State University, Corvallis, OR
Bill Stephen, Dept. of Entomology, Oregon State University, Corvallis, OR
Andy Moldenke, Dept. of Entomology, Oregon State University, Corvallis, OR
Joe Furnish, Bureau of Land Management, Salem, Oregon
Terry Frest, Deixis Consultants, Seattle, WA
Reid Schuller, TNC, Bend, Oregon

Process/Product.

Information/data gaps overwhelmed the panel, in general. There are (estimated) 15,000 terrestrial invertebrates in the CP ecoregion, about which there is very little knowledge. However, there was on the panel very good butterfly and beetle expertise. Very little information on the other orders was available.

The sites selected were chosen for their bio-diversity. Regarding the effectiveness of a coarse filter system based on community plant systems, it was decided that such a system would be a good way to capture unidentified invertebrates in the CP ecoregion.

Species dropped from the list, because though rare in a particular state, are widespread elsewhere:

Amblyscirtes vialis
Boloria selene atrocostalis
Euphydryas editha monoensis
Everes comyntas
Petrophila confusalis

Suggested additions to the list are:

Euphydryas anicia macyi
Ochlodes yuma
Parnassius clodius shepardi
Scaphinotus mannii
Nebria jeffreyi
Nebria steensensis
Oncopedura mala

Sites.

Twenty six sites were nominated and mapped.

Documentation.

The site nomination forms provide the documentation. **[But, note, Vince Stefanino has additional site nominations for bees - see gap info, supra.]**

Information Gaps:

Stefanino (Xerces Society the contact?), has bee site information.

Whole groups of invertebrates are not studied, and data is not available.

Additional contacts to be made to fill in gaps:

Dave Livermore, New Mexico
Jim McIver - ants
Ellen Benedict - Malheur Cave
Dave Lightfoot - Orthoptera
Paul Opler - Orthoptera
Rick Miller
Rod Crawford - spiders

Also, OSU is currently looking at restructuring the (biology?) department, and bio-diversity and conservation are proposed as themes. TNC, BLM, and other stakeholders or key constituents which use the University, should write to the President and the Dean of Science to let them know what is needed in this area of science.

Summary of

FISH AND AQUATIC COMMUNITIES EXPERT PANEL

January 14-15, 1997

Panel.

Marc Liverman (facilitator), Oregon Dept. of Fish & Wildlife, Portland, OR
Chris DeForest (recorder)
Jack Williams, BLM, Boise, Idaho
Danny Lee, USFS, Boise, Idaho
Ed Johannes, Deixis Consultants, Seattle, WA
Amy Stock, Washington Natural Heritage Program, Olympia, WA
Ron Rhew, US Fish & Wildlife Service, Portland, Oregon
Wayne Minshall, Dept. Biology, Idaho State University, Pocotello, ID
Terrence Frest, Deixis Consultants, Seattle, WA
Trish Klahr, TNC , Sun Valley, Idaho
Don Sada, Bishop, California
Gary Vinyard, U. of Nevada, Reno

Process/Product.

The initial problem facing the panel was that aquatic systems link across the boundaries of the CP ecoregion, and the CP leaves out many of the uplands that are critical to the preservation of bio-diversity. The Bailey map's plant-driven boundaries miss the upland contributing areas, as well as Canada.

The panel divided the region into four areas: Upper Snake basin; Middle Snake basin; Great Basin; and the northern Columbia. It was agreed that a drainage basin system of analysis makes more sense for aquatic bio-diversity preservation/restoration. The panel, in general, preferred the identification of sites by watersheds and reference sites (pristine, diverse, intact habitat). Accordingly, the polygons were at times expanded over the drawn boundaries of the CP ecoregion.

In general, in all of the four areas, irrigation, agriculture, and mining have a negative impact on biodiversity. Restoration of river areas, and the removal of impediments to the flow of water (draw downs, dams, irrigation, sedimentation, ground water diversion) should be worked on in all areas.

Sites.

Two hundred and fifty eight (258) sites were nominated.

Documentation.

The site nomination forms document the mapped sites.

Information Gaps.

More experts were needed, as well as more information on introduced species and aquatic invertebrates other than mollusks.

Summary of
BIRD EXPERT PANEL
January 14-15, 1997

Panel.

John Humke (facilitator), TNC WRO, Boulder, Colorado
Eleanor Gaines (recorder), Oregon Natural Heritage Program, Portland, OR
Jim Ramakka, BLM, Carson City, Nevada
Andy Stephniewski, Wapato, WA
Chris Chappell, Washington Natural Heritage Program, Olympia, WA
Gary Ivey, Malheur National Wildlife Refuge
Dave Marshall, Portland, OR, Malheur National Wildlife Refuge, Princeton, OR

Process/Product.

Sites were selected primarily to preserve the birds listed by TNC. The focus was on the primary species of the shrub-steppe habitat. High quality riparian areas were also considered for the passerines.

The *veery* was thought to be peripheral to the CP ecoregion, and **probably should be removed from the list.**

Seven species were added to the list, with the recommendation that they be tracked of conservation purposes: **Yellow breasted chat, Virginia's warbler, Black rosy finch, Black-throated sparrow, Greater sandhill crane, Yellow rail, and Sage Thrasher.**

Sites.

Seventy three sites were nominated and mapped, based on the list of birds given.

Documentation.

Site nomination forms document the mapped sites.

Data Gaps.

Further **information is needed on Asotin and Garfield Counties, WA areas.** There were **significant gaps in Nevada data.** The **sage grouse was not fully covered,** and the panel believed that perhaps a landscape approach would be more appropriate for the preservation of this bird.

Contacts suggested: Gary Schoolcraft, the district botanist out of Susanville; **Lew Oring**, who has been working with shore birds in the Honey Lake area (California); **Chuck Trost** should be contacted about any sites the panel may have missed; and **Chuck Harris**, about the site summary forms.

Summary of
MAMMALS EXPERT PANEL
January 14-15. 1997

Panel.

Blair Csuti (facilitator), USFWS, Portland, OR
Connie Levesque (recorder), Oregon Natural Heritage Program, Portland, OR
Eric Yensen, Biology Department, Albertson College of Idaho, Caldwell, ID
Jim Hallett, Department of Zoology, WSU, Pullman, WA
Chuck Harris, Idaho Dept. Fish & Game, Boise, Idaho
Verne Marr, Washington Dept. of Wildlife, LaGrande, Oregon

Process/Product.

Sites were selected on the basis of known presence of the species listed by TNC. The focus of the panel was on species of immediate conservation concern. Species on the periphery of the CP ecoregion were not considered in the mapping of sites. Because forested and high elevation areas are not in the CP ecoregion, the charismatic mega-vertebrates are missing.

One species was added to the list: Townsend's ground squirrel (***Spermophilus towsendi***) has a subspecies, genetically distinct ***(Townsendi townsendi)***

Sites.

Twenty-one (21) sites were selected.

Documentation.

Site nomination forms document the mapped polygons.

Information Gaps.

The panel **lacked first-hand information on most of the Oregon portion** of the CP ecoregion, especially for the eastern Cascades, the high lava plains, and for the Warner Basin. In addition the panel **lacked a mammalogist with knowledge of northern Nevada and California.** White tailed jackrabbit sites could not be mapped because **there was not sufficient information available to do so. A survey of the white-tailed jackrabbit would be valuable.**

Summary of

PLANTS AND PLANT COMMUNITIES EXPERT PANEL

January 14 - 15, 1997

Panel:

Dennis Grossman (facilitator), TNC, Arlington, VA
Sue Vrilakas (recorder), Oregon Natural Heritage Program, Portland, OR 503-
John Christy, ONHP, Portland, OR
Judy Harpel, PO Box 490. Brush Prairie, WA 98606
Jan Nachlinger, TNC - Nevada, 443 Marsh Avenue, Reno, NV 89509
John Gamon, Washington Natural Heritage Program, Olympia, WA
Rex Crawford, WNHP, Olympia WA
Debra Salstrom, SEE Botanical, PO Box 4027, Tenino WA 98539,
Richard Easterly, SEE Botanical, PO Box 4027, Tenino, WA,
Reid Schuller, TNC - Oregon, Bend, Oregon
Jimmy Kagen, ONHP, Portland, OR
Don Mansfield, Biology Dept., Albertson College of Idaho, Caldwell, ID
Berta Youtie, TNC, PO Box 1188, LaGrande, OR
Bob Moseley, Conservation Data Center, Idaho Fish and Game, Boise, Idaho

Process/Product:

After mapping all nominated sites, the panel broke the Columbia Plateau Ecoregion (CP hereafter), into sub areas, as follows:

Palouse Grasslands (*missing*: Purshia-Stipa, though a little in WA, none in OR; Elymus bottom lands; white alder riparian (only 1 site in WA); birch riparian; hawthorne riparian; willow riparian; potholes; salt flats; dune system; cottonwood; Aster jessicae (small pop. in WA, but not viable); Rosa-Festuca; Stipa; Elymus).

High lava plains (juniper landscape) (*missing*: low sage brush; representative common juniper community; riparian, plateau grasslands).

Northern basin and range (sagebrush, salt desert shrub, mountain ranges, wetlands) (*missing*: alkai bottom lands; bitterbrush bunchgrass; northern Nevada plant community classification and inventory; crust sites in OR, NV, and CA; Wyoming big sagebrush and low sagebrush (all states); inventory for bryophytes in general; Utah juniper and Juoc community; inventory in general for northern Nevada.

Owyee uplands/Snake River plains (*missing*: western snake river plain habitat (includes crust); riparian)

NE great basin (*missing*: sub-alpine forest; Utah juniper; low elevation communities (includes Artrtr); riparian; unknown crusts)

Number of Sites: Ninety seven (97) sites were mapped, which sites included 36 rare plant communities, and 47 uncommon plant communities. One hundred (100) species of vascular plants (G1, G2, G3), out of 140, were captured in the sites; and of the 39 bryophytes, 50-75% were believed to have been captured.

Documentation: Site nomination forms document the sites (87 forms).

Information Gaps: The panel **lacked information on lichens.** There were "many caveats" regarding sufficiency and quality of the sites. Information was **lacking on non-rare plant communities, and the riparian communities, and those of northern Nevada.** Although rare and uncommon plants were well represented, the "middle and local variations", Rex Crawford noted, would have to be looked at later. Reid Schuller noted **the botany sites drawn were not the end product.**

COLUMBIA PLATEAU CONSERVATION WORKSHOP
Day 2--SYNTHESIS GROUP DISCUSSION
NORTHERN PORTION OF ECOREGION

Facilitator: Chris DeForest
Recorder: Linda Kramme

Participants (partial list):
Chris Chappell, Rex Crawford, Terry Frest, Andy Stepniewski, Amy Stock, Berta Youtie, John Gamon, Jimmy Kagan, Marc Hayes, Judy Harpel

ISSUES:
This group agreed that the instructions given to each panel the previous day focused on rare species, and not much at all on common/representative communities--this is definitely reflected in the way lines were drawn and makes answering the question asked of breakout groups very difficult. Common communities were captured in some states and for some species, and not for others.

MOST SIGNIFICANT BIODIVERSITY SITES IN THIS NORTHERN PORTION OF ECOREGION (and justification):
--Hanford/Yakima Training Site--Rarity, Richness, Representativeness
--Boardman/Boeing Site--Richness, Representativeness
--Palouse Canyonlands--Rarity, Richness
--John Day Canyonlands--Richness, Representativeness, Rarity
--Waterville Plateau--Richness, Rarity, Representativeness
--Klickitat/Rock Creek--Rarity, Richness

PROCESS:
The group split the northern portion of the ecoregion into four rough areas based both on geography and on physical characteristics; in general, we worked from the northeastern portion of the ecoregion west, and then south. The group assigned a name for each area and asked the following questions:
1. Have we captured the range of biodiversity w/in this area with these mapped sites?
2. What are the main processes, threats, and strategies affecting sites in this area?
3. Where are the DATA GAPS (i.e., existing info not yet incorporated) for this area?
4. What are the INFO NEEDS (i.e., info not yet known or collected) for this area?

AREAS EVALUATED WITHIN NORTHERN PORTION OF ECOREGION:

Palouse Prairie
<u>Have we captured biodiversity in this area with this list of sites?</u>
Group: NO
<u>Processes:</u>
--communities: climate/soil development--geologic process
--terrestrial Invertebrates--several areas of endemism for terrestrial molluscs
<u>Threats:</u>

--communities: grazing, non-native species
--terrestrial invertebrates: logging, conversion, erosion
--aquatics: sediment-choked streams

Strategies:

--for plant communities, protect known sites (still site-driven process)
--restoration is a possibility for deep soil upland palouse prairie

Data Gaps:

--info on terrestrial invert "hot spots" should to be added--Terry offered to map later in the day
--existing fish data from fish expert in WA (Paul Mongillo)--WDFW
--fishery/aquatic invert data from Univ. of ID--Fred Robbie
--sites do not represent the deep soil upland palouse prairie (none left)

Info Needs:

--cryptogamic surveys would be invaluable
--need more mammal data from this area

Northern glaciated area

Have we captured biodiversity in this area with this list of sites?

Rex--qualified yes
Andy--this is all that's left
Chris--qualified yes, w/caveat of terrestrial inverts
Consensus: Need verification

Processes:

--Communities: Rain shadow effects; microrelief, rivers flowing off mountains to the west. Was glaciated (southern terminus of glaciation on the plateau), resulting in mosaic of different land uses. Glaciated areas not readily farmable, so habitat still in fairly good condition. Fire played a role. Squirrels closely tied to plant communities and soil factors. Most important area for sharp-tailed grouse in ecoregion.

Threats:

--large-scale hydrologic alteration
--land conversion to intensive ag
--aquatic molluscs: damming, impoundments
--mammals--fragmentation has adversely affected squirrels, s-t grouse
--non-native species
--degradation of grasslands also has impacted s-t grouse.

Strategies:

--protect winter foraging sites for s-t grouse; also riparian restoration
--connecting fragments of native communities might help grouse.
--reduction (not necessarily exclusion) of grazing would help many species in uplands; in riparian zones exclusion of grazing would be best.
--freshwater mussels: protect areas outside the ecoregion that have not yet been impounded (north of the ecoregion)

Data Gaps:

--probably mammal info that is out there but not yet incorporated
--terrestrial invert sites that haven't yet been included (Terry may have added later)

Info Needs:

--cryptogam info
--need for more mammal survey work

--need to collect more info on diversity of annual vascular plants
--need more info on common community types

Yakima Fold-Morrow County

Have we captured biodiversity in this area with this list of sites?

Yes--Berta

Andy--covered but needs to be verified

Processes:

--historically fire, but now different fire impacts. Fire also has impact on birds, inverts the shrub layer.

Threats:

--noxious weeds, development, ag conversion, water diversion, alteration (some places have more water than historically due to diversion, ditching)

Strategies:

--restoration
--must address rural residential development/zoning
--better grassland/grazing management

Data Gaps:

--some existing info on terrestrial invertebrates
--get existing info on fish

Info Needs:

--more survey work for terrestrial invert
--more data on cryptogamic flora

John Day/Deschutes/Klickitat Drainages and Columbia River Gorge

Have we captured biodiversity in this area with this list of sites?

Group: At alliance level for plant communities, yes, but at association level, NO

Processes:

--glacial, volcanic areas, fire regime

Threats:

--impacts to riparian areas; logging, road-building in uplands; large-scale water withdrawal in Deschutes and John Day; grazing in both areas. Klickitat and around Bend: development

Strategy:

--reintroducing fire
--many strategies that apply to other areas

Data Gaps:

--need to add entire John Day system, which was not included in initial aquatics mapping.
--missing key areas outside the ecoregion boundary (many fish spawning areas)
--high elevation grasslands (more common community that wasn't sufficiently addressed)
--common species
--get existing BLM plant info and existing plant community maps (GAP, etc.), w/ground-truthing

Info Needs:

--surveys for non-salmonid fishes should be done
--need more veg. survey work
--surveys for vascular cryptogams
--inferring plant community information for private lands

APPENDIX 4

BIODIVERSITY MANAGEMENT AREA SELECTION (BMAS) MODEL

PRESERVE SELECTION MODELING IN THE COLUMBIA PLATEAU

Page last updated undefined

INTRODUCTION

Statement of the Problem

The Nature Conservancy (TNC) identifies portfolios of sites and strategies that will maintain viable native species and representative plant communities. TNC wants to modify its approach such that it can produce a conservation plan that will provide guidance for TNC field offices and agency and non-governmental partners on how to pursue protection of this portfolio of sites, and how to integrate various conservation strategies (which might include actions such as influencing particular policies, zoning, and identifying key influences on critical ecological processes) with land acquisition and/or management designation of particular sites. Further, TNC needs recommendations for how they should implement this ecoregional conservation planning approach throughout the organization, in contrast to its current state or national scope of planning.

TNC contracted with the UCSB Biogeography Lab to assist in developing a prototype planning process for the Columbia Plateau ecoregion. The prototype was to integrate the spatial analysis functions of a geographic information system (GIS) with an optimization model for designing alternative portfolios. Three questions were germane to the development of this prototype application:

1. What set of site selection rules provides the most efficient method for designing and assembling a portfolio of sites to maintain all viable native species and community types within a target ecoregion (i.e., how can TNC maximize the amount of biodiversity protected relative to the given number of conservation sites or amount of land area)?
2. How sensitive is the portfolio to the way in which biodiversity is measured (e.g., what are the effects of using a coarse-filter (alliances from Gap Analysis) or fine-filter (rare element occurrences for species and plant community associations from Natural Heritage programs)?
3. How can TNC integrate programmatic, economic and socio-political factors into the portfolio design process without sacrificing its biodiversity goals?

Reserve system planning over large regions can be somewhat artificially divided into three stages: 1) setting of goals and priorities, 2) site selection, and 3) reserve design. The first two stages are generally undertaken using relatively coarse survey information, whereas the final stage requires very detailed analyses of the biotic composition, size, shape, connectedness, and cost of alternative reserve plans (Shafer 1990). When the geographic area is relatively small and the remaining natural area limited to isolated patches in a matrix of cultivated or intensively managed landscapes, the task of setting priorities can be done through direct means such as rating the habitat islands and selecting those with the highest ranking. TNC is faced with setting priorities in some regions of the country that make the problem more challenging, such as in the Columbia Plateau, which is of large extent and is largely in natural or semi-natural condition. The potential number of combinations of sites to represent all natural communities in such a region is too large for simple ranking. In addition, alternative sets of potential reserves need to be identified that achieve a range of objectives. More sophisticated computer models are required to find the sets of sites that meet the multiple objectives involved.

Of the three phases of reserve planning mentioned above, UCSB Biogeography Lab (UCSB) has addressed the site selection task. TNC, as the decision maker in this process, set its own goals and conservation targets. The preserve design phase will require extensive field inventories, detailed land use and economic analyses, land owner participation, etc. and thus was beyond the scope of this project. A preserve selection model originally developed for the Sierra Nevada Ecosystem Project (Davis et al. 1996) was adapted to the task of selecting sites to achieve alternative conservation strategies in the Columbia Plateau ecoregion. It should be emphasized at the outset of the report that the model is intended solely as an exploratory tool to evaluate the implications of various policies and assembly rules. It does not make the decisions. The TNC planning team developed all the assembly rules and designed its recommended portfolio on conservation sites. Our modeling activity only facilitated the rapid generation and evaluation of alternatives and with identifying likely sites to be considered for the portfolio.

As this is a prototype of a new planning process, it is essential to leave detailed tracks of the procedures used so that others may emulate it elsewhere. This report attempts to document the portion of the planning process undertaken in this research project. We begin with a literature review of reserve selection models to convey the innovative aspects of the approach used for the Columbia Plateau project. The report continues with a thorough discussion of the process and of the alternatives considered. The report then concludes with a set of recommendations to TNC about implementing this approach in other ecoregions.

Reserve selection approaches

Conserving species and ecosystems in human-dominated environments requires the maintenance of effective, *representative* systems of biological reserves, combined with the judicious and sustainable use of unreserved lands (Quinn and Karr 1993). Unfortunately, existing reserves do not represent the full suite of native species and ecosystems, most having been established on an *ad hoc* basis for reasons other than their overall biotic composition (Pressey et al. 1993). Selecting new reserve sites to improve biotic representation is a complex process that must address multiple and often conflicting biological, economic, and political goals. Biological goals include adequate representation of environmental and biotic diversity, protection of sensitive taxa or ecosystems, and conservation and restoration of endangered taxa and habitats (Kershaw et al. 1995). The biological value of candidate areas must be weighed against their cost in terms of foregone economic opportunities, purchase, restoration and management costs (Faith and Walker 1996). Similarly, there may be administrative, regulatory, and other political considerations that favor some areas over others (e.g., Reid and Murphy 1995).

In this report we are concerned with the site selection stage as it might be practiced over thousands to tens of thousands of square kilometers to satisfy conservation goals at the region, state, or country level. Reserve planners have developed increasingly sophisticated algorithms to provide more consistency and objectivity to the selection process. One approach is to rate all candidate sites based on one or more criteria and select those that score the highest (e.g., Lo et al. 1989). Scoring approaches are relatively straightforward to implement using map weighting and overlay functions of Geographic Information Systems (GIS). However, they cannot guarantee that all biodiversity elements will be adequately represented, nor will they guarantee and efficient allocation of resources (Pressey and Nicholls 1989). These goals are better addressed using "covering" algorithms formulated to identify a minimal set of sites such that each biological element is represented in at least one or more sites (Pressey and Nicholls 1989, Underhill 1994). A related approach that is also based on optimization theory maximizes biodiversity representation in the set of sites that can be selected given a fixed financial budget or total area (Kirkpatrick 1983, Margules et al. 1988, Bedward et al. 1992, Church et al. 1996).

These site selection procedures implicitly address economic and political costs by prioritizing sites, minimizing area, or maximizing biodiversity representation. The optimization procedures in particular seek to find efficient solutions for representing biological diversity in a comprehensive reserve system (e.g., Kirkpatrick 1983, Margules et al. 1988, Pressey and Nicholls 1989, Church et al. 1996), where *efficiency* can be defined as the proportional number or area of sites selected to represent all biotic elements to some required level (Pressey et al. 1994). Optimization algorithms designed to maximize efficiency alone provide solutions that are useful as benchmarks for evaluating alternative proposals or existing *ad hoc* reserve systems, but which are somewhat naive due to their single-minded approach (Pressey et al. 1996). These algorithms may select a set of sites that prove inferior once environmental, economic, and political criteria are considered. Therefore, more complex models that explicitly account for social or economic factors are needed to explore trade-offs in planning to meet biodiversity conservation versus other social goals or constraints.

THE COLUMBIA PLATEAU ECOREGION

The Columbia Plateau ecoregion (as delineated by The Nature Conservancy from the map produced by the U. S. Forest Service [Bailey 1995]) encompasses approximately 300,000 km² in portions of Washington, Oregon, Idaho, Nevada, California, Utah, and Wyoming (Figure 1). The combination of soils and climate generates a characteristic vegetation called "sagebrush steppe", dominated by *Artemisia* spp. or *Atriplex confertifolia* (shadscale) with short bunchgrasses (e.g., *Festuca* spp., *Pseudoroegneria* spp.).

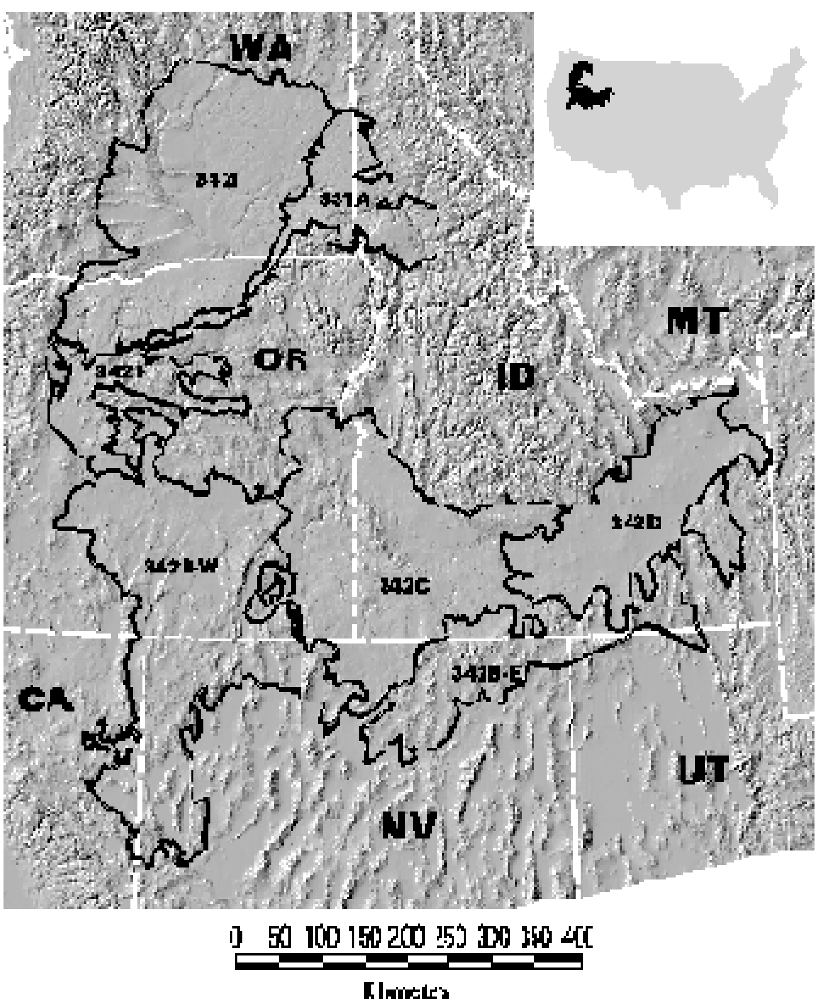


Figure 1. Location of the Columbia Plateau Ecoregion

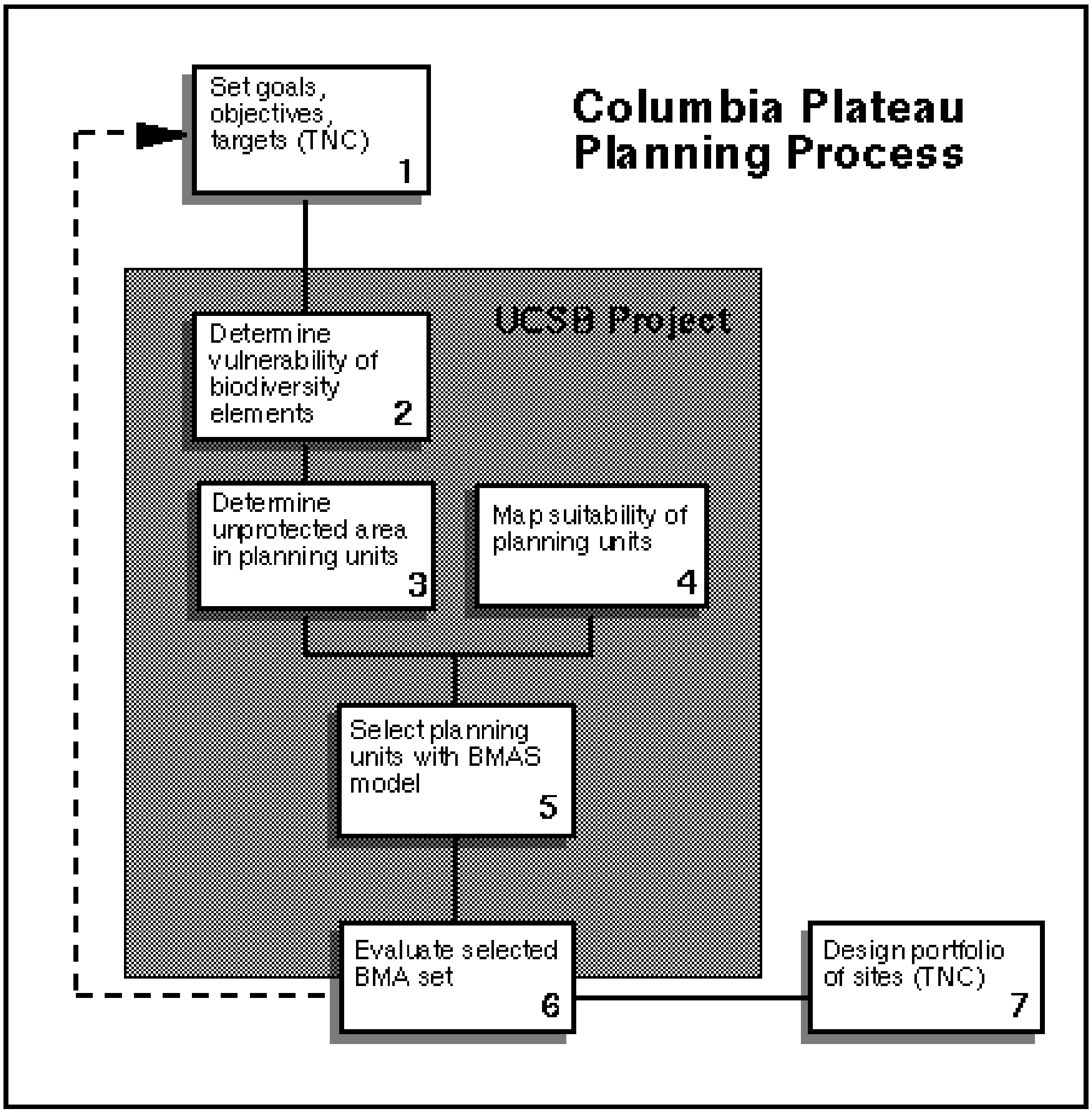
This ecoregion was selected for development of a prototype ecoregional plan by The Nature Conservancy for both practical and conservation reasons. From a practical standpoint, the ecoregion was among the first for which the requisite land-cover and land management mapping were completed by the individual state-level GAP projects (Stoms et al. in press, see also the GAP web site for the Intermountain Semi-Desert Ecoregion). Very little land in the ecoregion has been designated for maintenance of biodiversity, while potentially conflicting land uses such as grazing and cultivation are extensive. Enough undeveloped habitat remains, however, for pro-active conservation action to be effective. Thus the ecoregion makes a representative case study that could be applied to other regions, particularly throughout the western U. S. Planning for conservation and ecosystem management within this ecoregion is also underway by the Oregon Biodiversity Project

(Vickerman 1996), and the Interior Columbia Basin Ecosystem Management Project (ICBEMP, a joint effort by the U. S. Forest Service and Bureau of Land Management, Quigley et al. 1996). Proposals for new wilderness areas (Merrill et al. 1995), national parks (Wright et al. 1994), and other core reserves (DellaSala et al. 1996) are being discussed.

METHODS

Overview of the planning process

Figure 2. Flowchart of the planning process.



The planning process is outlined in graphic form in seven steps in Figure 2. The first step is to identify conservation goals, objectives, and targets, which was done by the TNC planning team. UCSB conducted steps 2-5 and assisted with part of the evaluation in step 6. In step 2, the spatial data for the distribution of biodiversity elements is summarized to determine which are already represented at or above the predetermined goals of the alternative and which are still vulnerable. For those that are underrepresented, the third step is to quantify the area that is not currently protected for each element in each planning unit. This task identifies the set of planning units that are available to meet the representation goals. Step 4 calculates a suitability index for each planning unit based on precomputed attributes and a set of weights selected for each alternative. These three steps are performed within a GIS, and the results are exported as ASCII files which can be reformatted as input into an external optimal site selection model at step 5. This model, described in more detail in section 3.3 and Appendix 8.1, selects a set of planning units that satisfies the representation goals with the best balance of efficiency (least area) and suitability (best quality or most manageable sites). Data generated by the model is returned to the GIS environment for further analysis and visualization. The arrow from step 6 to step 1 emphasizes that this evaluation can lead to refinements in the assembly rule specifications or to fine-tune an alternative. Similarly, the process can be repeated to test the sensitivity to different parameters such as the choice of goals or the suitability factors. TNC then used the results of the analysis to evaluate the set of sites of the preferred alternative and adjusted the set of sites to design its recommended portfolio as the final step. The process is described in greater detail through the remainder of this section.

Planning steps

Identify conservation goals, objectives and targets

The planning process begins by setting conservation goals, objectives, and targets for the plan. These can be stated as a set of preliminary decision rules. Specifically, TNC decided what areas to consider currently protected, what sites if any to be "core areas" that must be in all alternative portfolio designs, what biodiversity elements to represent in each alternative (i.e., the targets), and what representation goals must be met for each target element. While this step in the process was conducted by TNC, it is described here to clarify the data used in the analysis and to define terms and concepts.

The first choice is to determine what lands are already managed to protect biodiversity and are thus a baseline in every alternative. Maps of land management status were compiled for the Gap Analysis of the Intermountain Semi-Desert Province (Stoms et al. in press), which contains the Columbia Plateau ecoregion. TNC's definitions are slightly different from GAP's, so the TNC team revised the original GAP land management status map and updated missing or recently designated management areas (Figure 3). All portfolio alternatives analyzed in this report considered category I and II lands as existing biodiversity management areas.

Category I: Lands owned by private entities and managed for biodiversity conservation or administered by public agencies and specially designated for biodiversity conservation through legislative action where natural disturbance events proceed without interference. Examples include many TNC preserves and other private preserves committed to biodiversity conservation and dedicated as state preserves or natural areas, some national parks, some national wildlife refuges, federal wilderness areas, some state parks and nature preserves.

Category II: Lands generally managed for their natural values, but which may receive use (e.g., habitat manipulation for game species) that degrades the quality of natural communities. Also includes public lands for with administrative designations for biodiversity conservation. Examples include many national wildlife refuges, state wildlife management areas, private preserves managed for game species, Bureau of Land Management Areas of Critical Environmental Concern, federal Research Natural Areas, etc.

Category III: Lands maintained for multiple uses including consumptive or recreational values and not specifically or wholly dedicated to biodiversity conservation and lands with restricted development rights. Examples include Department of Agriculture Forest Service and BLM, Department of Defense buffer lands, state forests, regional and large local parks and open space, private lands protected from subdivision by conservation easements or other title restrictions, etc.

Category IV: Lands with no known protection, including lands used for intensive human activity, and agricultural, residential, and urban lands, public buildings and grounds, transportation corridors, etc.

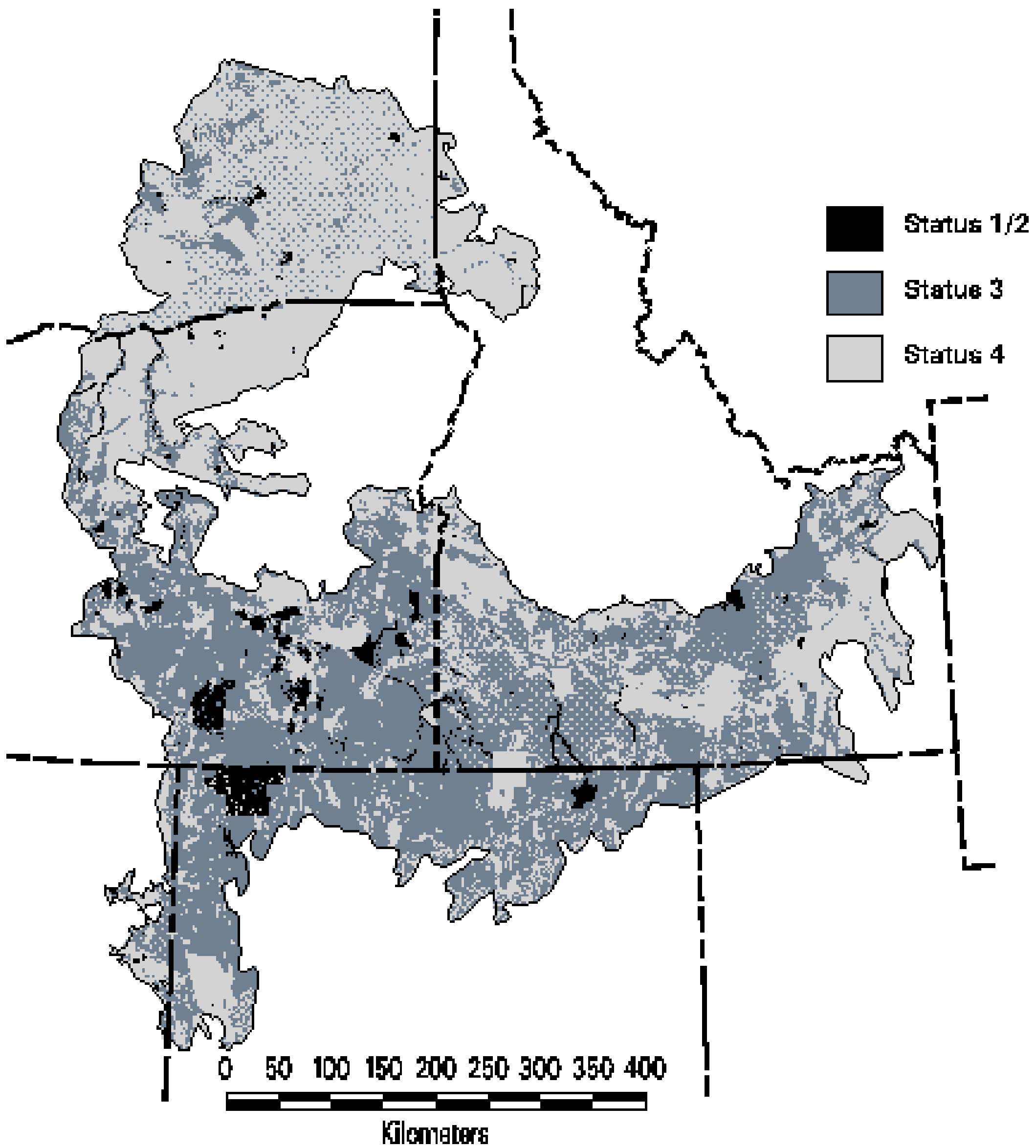


Figure 3. Management status in the Columbia Plateau Ecoregion

In conservation planning, some sites may be so obviously valuable for protection that they can be considered as core areas in any alternative. One popular means of doing this is to convene a workshop of experts to identify the best remaining examples of rare elements. TNC held a workshop, organized along taxonomic lines, in January, 1997. Six panels developed their own set of priority sites. TNC then identified the corresponding subwatersheds that contained these sites and summed the number of workshops that concurred on its importance. The TNC planning team decided that, as a second decision rule, the 105 subwatersheds identified by at least four expert workshops would be allocated as core biodiversity management areas in all portfolio alternatives. (The maximum number of workshops that identified any subwatershed was five). Core areas were combined with existing BMAs to determine remaining vulnerability.

Once the decision rules are established for what lands are or must be protected, the next rule determines what elements of biodiversity should the portfolio represent. The TNC team identified two classes of target elements: vegetation alliances (coarse-filter) and rare elements (fine-filter) from the Natural Heritage databases. Alliances had been mapped for each of the states in the ecoregion using Landsat satellite imagery from 1990 (+/- 2 yrs) and then combined into a regional land-cover map for the gap analysis of the Intermountain Semi-Desert Province (Stoms et al. in press). The smallest land-cover feature mapped is 100 hectares or one square kilometer. Land-cover was classified by alliances (characterized by a diagnostic species of the uppermost stratum of the canopy) or to groups of closely related alliances.

The TNC core team used rare element occurrence data from the various state Natural Heritage programs and state fish and wildlife departments as the fine-filter targets. For vertebrates and invertebrates, the team flagged occurrences to be considered for representation. All plants with global ranking of G1, G2, or G3 were to be represented. For plant associations, only for G1 and G2 communities were picked as targets.

Representation goals for the target biodiversity elements were set as the minimum area or number of occurrences that alternatives must achieve. These goals are estimates of the importance of each element and the amount needed to maintain viable populations. As the TNC core planning team developed representation goals for the coarse-filter alliances as surrogates for other biodiversity elements, they had two implicit goals: to capture not only the cover types but also their range of environmental variability, and to ensure that rare types endemic to this ecoregion were give special attention. Based on these goals, they ranked the cover types by their overall regional distribution, their value as a coarse-filter to cover the plant associations within them, their relative rarity, and their pattern of distribution (i.e., primarily large or small patches). Five groups of cover types were categorized as follows (assignment of cover types to representation goals are shown in Table 1):

Group A: Those which have high or medium coarse filter value, and typically occur in small patches in the landscape. Most of these are restricted to unusual substrate or hydrologic conditions (or maybe even disturbance regimes), and/or are limited in their distribution and so need to be protected in the Columbia Plateau ecoregion. The representation goal should center around capturing 50% of the area of these cover types within each section in the ecoregion if the total area in this ecoregion is small (i.e., < 500 km^2). For cover types of greater extent, the goal was set at 25%.

Group B: Those which have medium coarse filter value and occur in relatively small patches. This is an interesting group of alliances, and contains two different patterns of vegetation types: those that are more characteristic of neighboring ecoregions but nevertheless have relatively large disjunct areas and are important within the Columbia Plateau (e.g., some of the forest types on isolated mountain ranges); and some of the less common *Artemisia* alliances with limited ranges of distribution. Most of these have total areas of < 500 km^2. The goal for this group was set at 20% representation within each section the type occurs in.

Group C: All those with high to medium coarse filter value and typically found in big patches. This includes the vegetation types that really "distinguish" the Columbia Plateau from surrounding mountainous ecoregions: *Juniperus* Woodlands, *Artemisia* shrublands, big sage - low sage, *Atriplex* salt desert, perennial grasslands. Most of these are very heterogeneous containing many associations. Several of them cover >10,000 km^2 and all are over 1000 km^2 in size within the ecoregion. The representation goal was set at 10% within each section.

Group D: Those which have low coarse filter value and which are mostly in small patches. These are primarily vegetation types which are only peripherally in the ecoregion because of the vagaries of the boundaries. Their primary range of distribution is outside of this ecoregion, and so most protection will not occur in the Columbia Plateau. These cover types were assigned no representation goal.

Group E: Cover types or land uses of no conservation interest, such as developed and cultivated lands and exotic or planted grasslands. Water bodies were included only because aquatic features are not well mapped at the regional scale of Gap Analysis. This group also had no representation goal.

Table 1. Representation goals for land-cover types

Land-cover type	Mapped distribution (km²)
Group A - coarse-filter < 500 km² (50% goal)	
Seasonally/temporarily flooded cold-deciduous forest	382
Populus tremuloides woodland	184
Quercus garryana woodland	463
Non-tidal temperate or subpolar hydromorphic rooted vegetation (marsh and wetland)	482
Sparsely vegetated sand dunes	345
Sparsely vegetated boulder, gravel, cobble, talus rock	69
Group A - coarse-filter > 500 km² (50% goal)	
Pinus ponderosa woodland	5,804
Artemisia rigida dwarf shrubland	700
Temperate deciduous shrub types--Mountain brush	2,027
Cercocarpus ledifolius or *C. montanus* shrubland	516
Purshia tridentata shrubland	1,140
Seasonally/temporarily flooded cold-deciduous shrubland	1,279
Sarcobatus vermiculatus shrubland	3,576
Seasonally/temporarily flooded sand flats	1,670
Group B - small patch communities (20% goal)	
Abies species (*A. concolor, A. grandis* or *A. magnifica*) forest or woodland	1,397
Picea engelmannii and/or *Abies lasiocarpa* forest or woodland	83
Pseudotsuga menziesii forest	2,149
Populus tremuloides forest	740
Pinyon woodland (*Pinus edulis* or *P. monophylla*)	165

Pinyon-juniper woodland (*Pinus edulis* or *P. monophylla* with *Juniperus osteosperma* or *J. scopulorum*)	193
Pseudotsuga menziesii woodland	27
Artemisia cana shrubland	536
Artemisia tripartita shrubland	3,696
Artemisia nova dwarf-shrubland	164
Group C - large patch communities (10% goal)	
Juniper woodland (*Juniperus osteosperma* or *J. scopulorum*)	2,101
Juniperus occidentalis woodland	18,380
Artemisia tridentata ssp. vaseyana shrubland	17,181
Artemisia arbuscula-A. nova dwarf-shrubland	1,816
Artemisia tridentata-A. arbuscula shrubland	45,144
Artemisia tridentata shrubland	64,574
Mixed salt desert shrub (*Atriplex* spp.)	11,304
Dry grassland - *Pseudoroegneria* (*Agropyron*)-*Poa*	15,671
Moist grassland - *Festuca*	2,671
Group D - peripheral communities (0% goal)	
Pinus contorta forest	176
Pinus ponderosa forest	153
Pinus ponderosa-Pseudotsuga menziesii forest	784
Pinus monticola-Thuja plicata forest	20
Pinus flexilis or *P. albicaulis* woodland	104
Pinus contorta woodland	22
Pinus jeffreyi forest and woodland	2
Alpine tundra	3
Wet or dry meadow	30

Group E - cultivated, developed types and water (0% goal)	
Agropyron cristatum seedings, *Poa pratensis*, hayfields, and Conservation Reserve Program lands	8,169
Annual grasses - *Bromus tectorum*, etc.	10.177
Urban or human settlements and mining	1,201
Agriculture	69,820
Water	3,568

The TNC core team also set representation goals for the rare element occurrences. For every rare vertebrate and invertebrate, the team set a goal of five representations (i.e., subwatersheds) for each in every section it occurred in. If there were less than five mapped occurrences in a section, then the goal was to represent all occurrences for that species. The goal for plant species was similar with three exceptions. Plants in the Palouse section (331A in Figure 1) were to have up to seven representations because this particular section has been the most heavily impacted by cultivation. Third, plants identified by the core team as endemic to a single section were also given a goal of up to seven representations. For plant associations, the goal was for up to five representations per section. For modeling purposes, an area of 1000 ha was arbitrarily assigned to each subwatershed in which target elements occurred, and the goal was set to 1000 times the number of required occurrences. In essence this amounts to adapting the BMAS model to a covering problem where each element needs to be covered *n* times.

Determining remaining vulnerability and unprotected area

Vulnerability was determined by comparing the spatial extent of each target element within existing BMAs (category I and II lands) plus core areas with the area required to meet the representation goal within each section of the ecoregion (step 2 in Figure 2). If an element falls short of the representation goal, its remaining vulnerability is calculated as the difference in area. For vulnerable elements, data are summarized on the extent of the element for each planning unit (i.e., subwatershed) in the section (Step 3 in Figure 2). These two steps are performed by GIS overlay of the maps of land management and subwatersheds with the maps of the target elements. (See also Appendix 8.3 for the ARC/INFO AML used to process the GIS files to measure vulnerability and generate the data files for the BMAS model.

Map suitability of planning units

TNC needed a means of integrating programmatic, economic, and socio-political factors into the portfolio design process (Question #3 in the Introduction, McKendry and Machlis 1991). These factors can be collectively termed as "suitability." Mapping the suitability of landscapes for various uses has been a cornerstone of planning since the technique was popularized by Ian McHarg (1969). Factors known to constrain or facilitate a specific land use are overlaid to derive a site suitability map. Therefore, a set of attributes were generated for each planning unit (i.e., the HUC6 subwatersheds) to provide measures of habitat condition, site manageability, and spatial factors (Table 2). The index is scaled such that high values are the least suitable, which is required to maintain the minimization objective of the BMAS model.

Table 2. Suitability factors used in evaluating and selecting alternative portfolios of sites

---

Habitat Condition

- Roadedness as % of area affected by roads
- Human population density in # of people km²
- Expert opinion based on six workshops
- Aquatic integrity index

Site Manageability

- Percentage of land in private ownership
- Percentage of land converted to human uses

Spatial Factors

- Distance from existing biodiversity management areas and core areas

---

Roadedness: The presence of roads creates negative impacts on many species, including fragmentation, noise, edge effects, hunting pressure, predation by pets, spread of disease, and invasion of exotic pests. An index of roadedness can provide a useful indicator of habitat condition. Road data were obtained from the ICBEMP project, which had processed the 1990 census TIGER files. Additional 1:100,000 scale data for some Nevada counties outside the ICBEMP study area were obtained directly from the TIGER CD-ROMs and processed in a similar manner. The road arcs were buffered with a buffer width related to the class of road. This buffer operation was used to estimate the area of land actually impacted by the presence of each road, where freeways were assumed to affect a greater spatial extent than dirt roads. This operation also accounted for the spatial distribution of roads which a simple measure of road density (i.e., km of road length per km^2 of area) does not. For instance, urban streets could total a long length but because they are so closely spaced, they do not affect as large an area of habitat as a similar length of road spread uniformly across a subwatershed. The roadedness index was calculated by summing the total area of buffered roads per subwatershed and converting the area to a percentage of subwatershed area. Values ranged from roadless (i.e., index = 0) to fully roaded (index = 100), with a mean value of 15.95%.

Human Population Density: The presence of large numbers of people represents similar impacts as roadedness and may also indicate higher land values. Population data from the 1990 census data were obtained from CIESIN [ftp://ftp.ciesin.org/pub/census/usa/grid/pall/us/]. CIESIN had interpolated block group data to a 1 km lattice of the United States. We converted this lattice into a grid and cropped it to the ecoregion. By summing population from all the cells in a subwatershed and dividing by subwatershed area, an estimate of population density was derived. Values ranged from 0 to 1710.5 people per km2 (regional mean of 5.2), with high values indicating urbanized subwatersheds that would generally be unsuitable for protection of most forms of native biodiversity.

Expert Opinion: In addition to their use in picking core areas, the number of concurring expert workshops for the remaining subwatersheds (i.e., values from 0-3) was used as another suitability factor, where higher values were presumed to be more suitable. The mean value for these non-core areas was 0.8.

Aquatic Integrity Index: As most of the suitability factors addressed terrestrial habitats, the planning team chose this index developed by the ICBEMP project to represent suitability of aquatic habitats. The index was computed for the HUC5 watersheds (one level above subwatersheds in the hierarchy) as a mean of three component indices of fish community integrity. The three components were a relative index of strong populations of key salmonids, a relative index of the ratio of native species diversity to total species diversity multiplied by native species evenness, and a relative index of species richness within the parent subbasin. The minimum value of this index was 0 for very poor sites and 0.883 for the best watersheds, with a regional mean of 0.326.

Percent of Land in Private Ownership: The cost of changing land management to better protect the long-term viability of native biodiversity is partly a function of current land ownership and management. Therefore we have included an index of the proportion of land in a subwatershed that is in private ownership (either individuals or corporations), derived from the land ownership/management coverage developed for Gap Analysis (Stoms et al. in press). Values ranged from 0 to 100 percent (regional mean of 46.3), with high values indicating watersheds with high probable costs for management of biodiversity.

Percent of Land Converted to Human Uses: As landscapes become more modified by human actions, it becomes more difficult to maintain large-scale ecological processes needed to sustain ecosystems. The GAP land-cover map was reclassified into native communities and human modified cover types. The latter included developed and agricultural lands, exotic annual grasslands, and seedings of crested wheatgrass. The areal extent of human land use types was summed by subwatershed and then divided by its area to convert to a percentage. Values ranged from 0 to 100 (mean of 29.6), with high values of the index indicating highly modified landscapes.

Distance from Existing BMA or Core Area: The current BMAS model has no explicit mechanism for considering spatial relations in selecting a set of planning units. To satisfy the core team's desire to achieve some level of clustering of selected units, the distance from "seed areas", which were the existing BMAs and the core areas (which were identified by at least four expert panels), was added as another suitability factor. Thus planning units nearer these seed areas had a lower factor score and hence were considered more suitable than those farther away. An ARC/INFO GRID was created with the existing BMAs plus the core areas with a 1 km cell size. A distance grid was generated using the EUCDISTANCE command in GRID, assigning a value to each cell. Then the ZONALSTATS command with the MIN option was used to determine the minimum distance value among the cells in each planning unit to the nearest seed area. The distance values range from 0 (adjacent planning units) to 109.55 km, with a regional mean of 18.18 km.

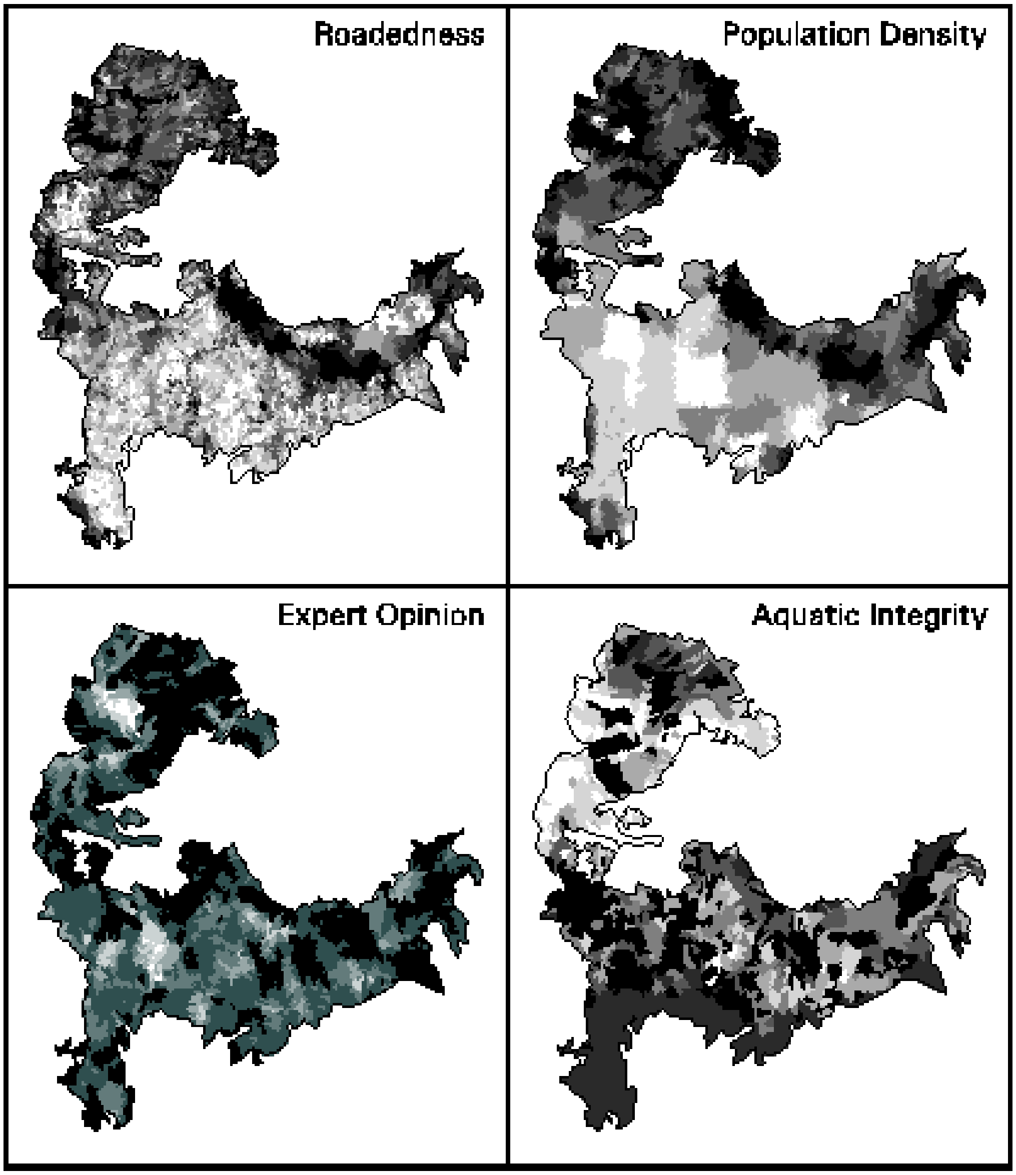


Figure 4. Map of individual suitability factors (Darker areas are least suitable)

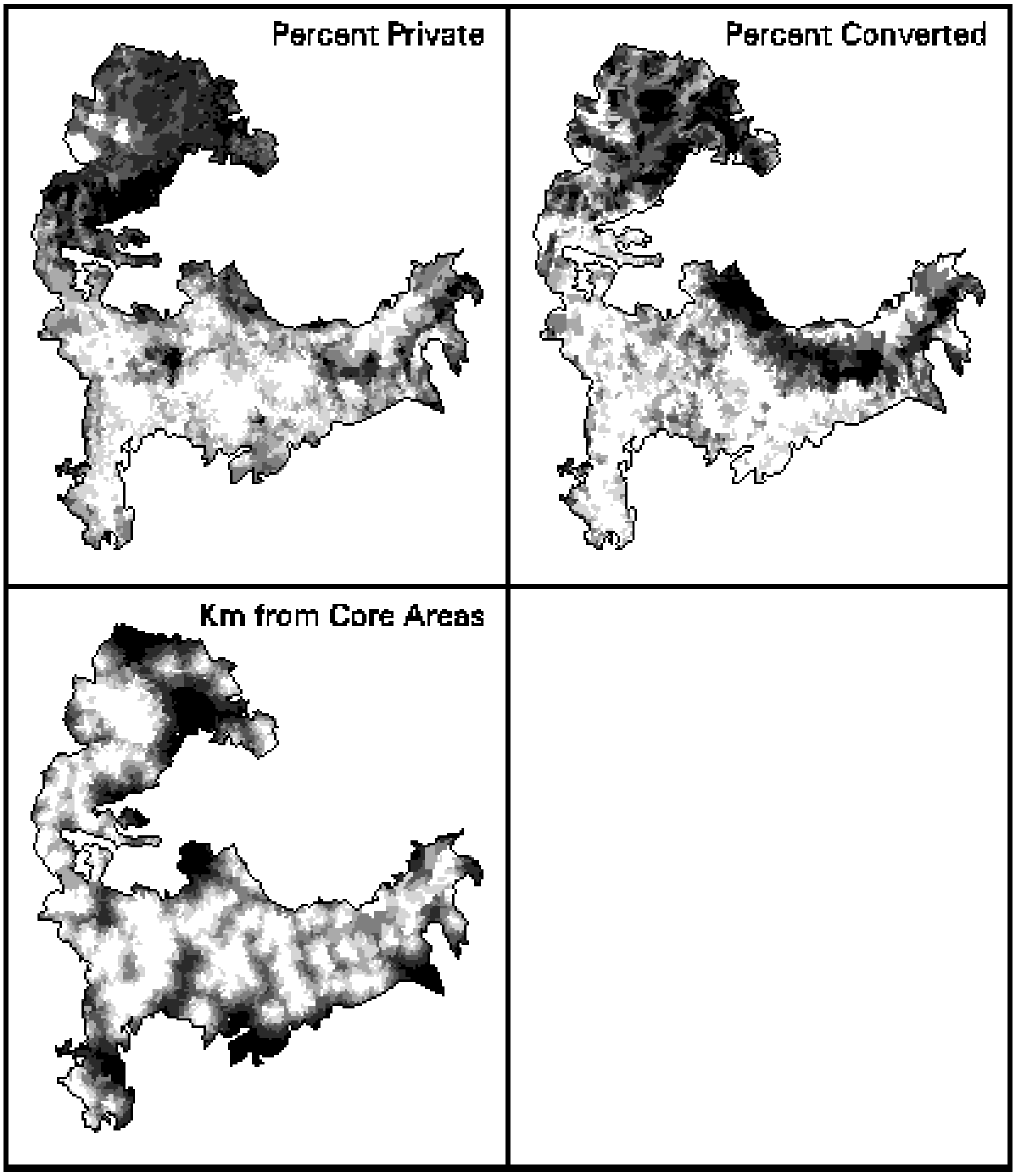


Figure 4. Map of individual suitability factors (continued) (Darker areas are least suitable)

The suitability factors may seem redundant, representing similar positive and negative socio-political, economic, or environmental aspects of planning units. Nevertheless they are generally not highly correlated (Table 3). The highest correlation between pairs of factors was 0.52 between percent private land and percent converted land. Roadedness and percent converted had a correlation of 0.41, while that for roadedness and percent private was 0.37. Population density was not as correlated with roadedness as one might expect, with a correlation value of only 0.27. The aquatic integrity index and the number of expert panels generally had small negative correlations with the socio-political factors. Distance from core area was extremely correlated with the overall suitability index because the distance index was weighted so highly in calculating suitability.

Table 3. Correlation matrix and weights of suitability factors

	Default Weight	Population Density	# Expert Panels	Aquatic Integrity	% Private Land	% Converted	Distance from Core	Overall Suitability

Roadedness	0.2	0.27	-0.15	-0.06	0.37	0.41	-0.01	0.12
Population Density	0.2		-0.04	0.04	0.12	0.17	0.01	0.30
# Expert Panels	0.2			0.04	-0.17	-0.19	-0.32	-0.37
Aquatic Integrity	0.2				-0.12	0.004	-0.12	-0.11
% Private Land	0.2					0.52	0.16	0.24
% Converted	0.2						0.08	0.20
Distance from Core	5.0							0.95

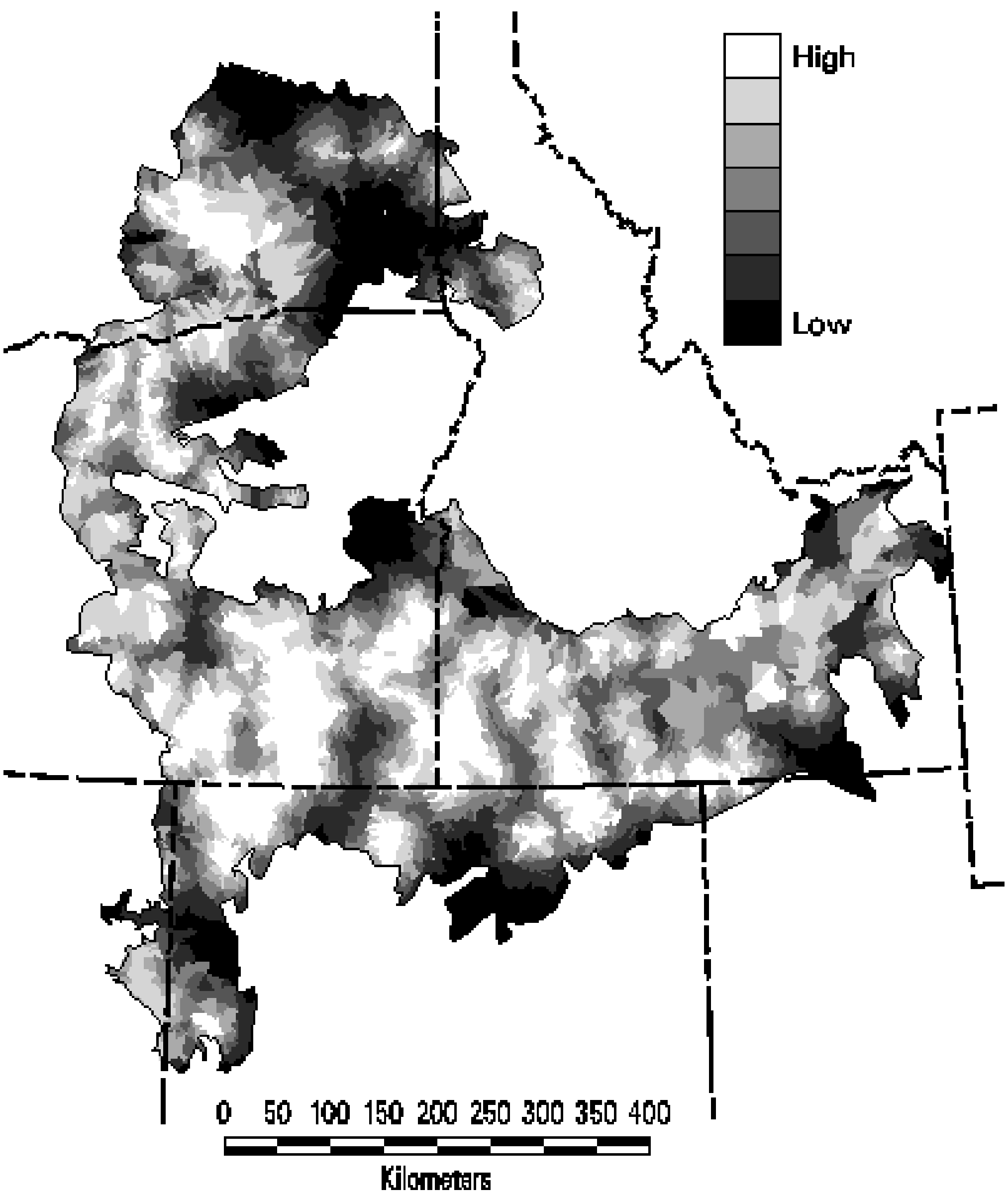


Figure 5. Map of the overall suitability index based on default weights

For each alternative, an overall suitability index would be computed as the weighted sum of the individual factor values. Weighting was a two-step process. First each factor was divided by its regional mean value to normalize the values. Then a set of weights were chosen to emphasize specific factors. A weight could be set to zero if the factor was to be ignored in a particular alternative. The default set of weights, shown in Table 3, gave greatest emphasis on the distance to core areas, which had the effect of clustering selected sites near these core areas. The suitability factors are displayed individually in Figure 4 and as an integrated suitability index

Kilometers

based on the default weights in Figure 5.

Sites with low suitability (i.e., a high index value) were not automatically excluded from consideration in selecting alternative portfolios. Such sites may contain irreplaceable biodiversity elements that must be in the portfolio in order to achieve representation goals. If there is a choice of sites to represent the same element, those that are most suitable will be selected.

Select planning units with the BMAS model

It is necessary to select enough area for biodiversity management options that we keep elements from being considered vulnerable. Since we might consider hundreds of elements to be vulnerable and we can select from among hundreds of planning units for targeted action, the problem is relatively complex. We can represent this decision problem as an integer-linear programming model where the objective is to optimize the selection of suitable areas for biodiversity management such that enough area is selected for each element to keep it from being considered vulnerable. We have formulated an optimal siting model that addresses trade-offs between the efficiency and the overall suitability of reserve systems. Each planning unit is described by its area, its biological properties, and by non-biological properties that make it more or less suitable for conservation management. Our multi-objective model, which we have dubbed the Biodiversity Management Area Selection (BMAS) model, selects sites to meet the predefined representation goals while balancing the dual objectives of efficiency and suitability. Either a planning unit is selected as a BMA or it is isn't. This is enforced by the definition of the integer decision variables and is formalized in constraints. Further details about the formulation of the model can be found in Davis et al. (1996) and in Appendix 8.1.

Unfortunately, the BMAS model is related to the class of n-p hard problems that can be found in the integer programming literature (like the travelling salesman problem). Basically, worst-case instances of large n-p hard problems may require an inordinate amount of computer time to solve optimally. Consequently, much of our past research has been focused on the design of a robust heuristic to solve the BMAS problem. Our heuristic is based on the combination of several well-known methods including greedy, interchange, and multiple drops and adds (which represents a form of strategic oscillation). In testing the heuristic against known bounded solutions for selected problems, heuristic performance was consistently within 2% of optimality. The details of the approach are given in Okin (1997).

Evaluate selected set of planning units

The BMAS model operates independently from the GIS database so the output report (see an example in Appendix 8.4.1) can only contain information about which planning units were selected and some summary information about total area and cumulative suitability. The identity of selected sites is therefore imported back into the GIS environment for additional spatial analysis and visualization. (The ARC/INFO AML and awk scripts are listed in Appendix 8.4). Once in the GIS environment, the BMAS solution for the alternative can be portrayed as a map, making it easier for analysts to evaluate the sites in relation to other GIS data (e.g., land ownership or management) or with their personal knowledge about individual sites. To facilitate the evaluation, another program (Appendix 8.5) was written to summarize all GIS data about any individual subwatershed, i.e., target elements it contains, its management and ownership, and its suitability factors. This evaluation can lead to modification of the initial decision rules and generation of new alternatives or to refinement of the set of sites in the recommended portfolio (step 7). The TNC planning team conducted this part of the evaluation.

Another aspect of evaluation is to determine how efficient an alternative is, based on one set of biodiversity elements, at meeting the representation goals for another set. This coincidental representation of one set of targets by another has been termed "sweep analysis" (Kiester et al. 1995). We used sweep analysis to evaluate how many of the vegetation alliances and rare elements would be swept, or represented by, the set of conservation planning units identified in the expert workshops. The planning units picked by five workshops were assigned as core areas and the number of elements not swept by them was determined by repeating planning step 2 to calculate their remaining vulnerability. This process was repeated for planning units identified by at least four workshops, three, two, and one.

TNC was also interested in a policy question about the role of public and private lands in a potential portfolio. Given that conservation strategy is often more feasible to implement on public land, TNC asked whether the region was flexible enough to allocate a greater share of the sites in the BMAS solution from public lands. And if this were possible, what was the trade-off in efficiency? To answer this questions, the suitability index was modified from the baseline alternative by giving much greater weight (5.0 vs. 0.2) to the percentage of private lands in a subwatershed. The BMAS model was run for this variation (with all other parameters held the same) and the spatial pattern of the two alternatives were compared, along with their respective proportions of public and private lands. Because the suitability index is calculated differently in the two alternatives, it is not possible to compare cumulative suitability.

Alternatives considered

By modifying the set of conservation targets, representation goals, existing biodiversity management areas, and suitability weights, any number of alternative portfolios can be generated. As this modeling approach is exploratory and since there were no requirements for a full range of alternatives as would be the case for a federal land management decision, a relatively small set of alternatives were generated in this study by varying the decision rules. Alternatives were generated for the land-cover types alone (coarse-filter), rare elements alone (fine-filter), and both cover types and rare elements together (integrated coarse- and fine-filters). The representation goals were fixed as described in section 3.2.1, with the default suitability weights. These goals applied to each of the seven sections of the ecoregion. Managed areas in categories I and II were assumed to be protected in all alternatives. All subwatersheds identified by at least four of the six expert workshops were automatically included in every alternative as core areas. Thus for each alternative, there were three types of site in the portfolio: existing reserves, core areas from the experts, and additional subwatersheds selected in the BMAS model to achieve the representation targets.

Next Section

Return to Table of Contents

Biogeography Lab Home Page

APPENDIX 5

FIRST ITERATION CONSERVATION PORTFOLIO (JANUARY 1998)

5-A: Site Size and Ownership Information

5-B: Site Information and targets

5-C: GRANK Target Numbers per Portfolio Site

5-D: Conservation Target Occurrences and Goals Met in Final Portfolio

5-E: Documentation of Site-Based Changes including Managed Areas (Chris Hansen memos)

POLY_ID	SITE_NAME	STATE	KILOMETERS	BLM	BOR	DOD	DOE	PRIV	STATE	TNC	TRIBAL	USFS	USFWS	WATER
1	Dyer Haystacks	WA	162.15	4.22	0.00	0.49	0.00	147.72	8.43	0.00	1.30	0.00	0.00	0.00
2	Grand Creek	WA	706.32	31.78	25.43	0.00	0.00	549.52	93.23	1.41	0.00	0.00	4.94	0.00
3	Waterville Plateau	WA	307.63	15.38	0.00	0.00	0.00	274.71	17.84	0.00	0.00	0.00	0.00	0.00
4	Sinking Creek	WA	616.27	0.62	0.00	0.00	0.00	584.22	31.43	0.00	0.00	0.00	0.00	0.00
5	Wilson Creek	WA	34.77	1.53	0.00	0.00	0.00	31.01	2.23	0.00	0.00	0.00	0.00	0.00
6	Rock Island Creek	WA	630.09	24.57	0.00	0.00	0.00	538.73	66.79	0.00	0.00	0.00	0.00	0.00
7	Sagebrush Flat	WA	177.54	2.31	0.00	0.00	0.00	85.57	89.66	0.00	0.00	0.00	0.00	0.00
8	Douglas Creek	WA	104.74	31.00	0.00	0.00	0.00	67.14	6.49	0.00	0.00	0.00	0.00	0.00
9	Upper Crab Creek	WA	23.26	0.00	0.00	0.00	0.00	23.26	0.00	0.00	0.00	0.00	0.00	0.00
10	Crab Creek	WA	933.41	24.27	0.00	0.00	0.00	881.14	28.00	0.00	0.00	0.00	0.00	0.00
11	Turnbull NWR	WA	75.19	0.00	0.00	0.00	0.00	11.20	0.00	0.00	0.00	0.00	63.99	0.00
12	Beezley Hills	WA	305.11	21.05	3.97	0.00	0.00	256.90	23.49	0.00	0.00	0.00	0.00	0.00
13	Hog Lake	WA	27.24	0.00	0.00	0.00	0.00	27.24	0.00	0.00	0.00	0.00	0.00	0.00
14	Rock and Bonnie Lakes	WA	72.73	0.00	0.00	0.00	0.00	70.47	2.25	0.00	0.00	0.00	0.00	0.00
15	Marcellus (Rocky Coulee)	WA	100.66	0.00	0.00	0.00	0.00	94.32	5.23	1.11	0.00	0.00	0.00	0.00
16	Rising Trout Meadows	WA	85.67	0.00	0.00	0.00	0.00	70.85	14.82	0.00	0.00	0.00	0.00	0.00
17	Upper Dry Gulch	WA	133.97	1.61	0.00	0.00	0.00	6.70	125.53	0.00	0.00	0.00	0.00	0.00
18	Liberty Butte	ID, WA	52.25	0.00	0.00	0.00	0.00	31.71	20.22	0.00	0.00	0.00	0.00	0.00
19	Potholes Reservoir	WA	808.29	20.21	203.69	0.00	0.00	324.12	116.39	0.00	0.00	0.00	112.35	31.52
20	Steptoe point sites (2)	WA	148.91	0.00	0.00	0.00	0.00	146.38	2.53	0.00	0.00	0.00	0.00	0.00
21	Hanford/Yakima TC	WA	3588.08	139.94	229.64	771.44	1478.29	771.44	193.76	0.00	0.00	0.00	3.59	0.00
22	L.T. Murray	WA	398.31	15.53	0.00	0.00	0.00	164.50	217.48	0.40	0.00	0.00	0.00	0.00
23	Kahlotus	WA	221.49	1.11	0.00	0.00	0.00	211.31	8.86	0.00	0.00	0.00	0.00	0.00
24	Esquatzel Coulee	WA	837.92	10.06	284.05	0.00	8.38	513.64	22.62	0.00	0.00	0.00	0.00	0.00
25	Paradise Ridge	ID	109.43	0.00	0.00	0.00	0.00	109.43	0.00	0.00	0.00	0.00	0.00	0.00
26	Snake Breaks	WA	370.34	1.11	0.00	1.11	0.00	357.00	11.11	0.00	0.00	0.00	0.00	0.00
27	Alpowa	WA	102.40	0.20	0.00	0.00	0.00	100.25	1.95	0.00	0.00	0.00	0.00	0.00
28	Camas Prairie	ID	432.43	3.46	0.00	0.00	0.00	383.13	1.30	0.00	44.54	0.00	0.00	0.00
29	Horse Heaven Hills	WA	779.03	40.51	3.90	0.00	0.00	693.34	36.61	0.00	0.00	0.00	1.56	0.00
30	Upper Touchet Creek	WA	29.61	0.00	0.00	0.00	0.00	29.61	0.00	0.00	0.00	0.00	0.00	0.00
31	Juniper Dunes	WA	168.19	66.60	0.00	0.00	0.00	94.69	6.73	0.00	0.00	0.00	0.00	0.00
32	Walla Walla	WA	144.50	0.00	0.00	2.46	0.00	138.28	3.18	0.00	0.00	0.00	0.00	0.00
33	Alder Creek Ridge	WA	156.25	2.66	0.00	0.00	0.00	144.84	8.75	0.00	0.00	0.00	0.00	0.00
34	Rock Creek	WA	229.67	3.67	0.00	0.00	0.00	214.75	7.81	1.38	0.00	0.00	0.00	0.00
35	Boardman	OR	679.99	0.00	0.00	192.44	0.00	469.87	6.80	2.04	0.00	0.00	3.40	0.00

36	Columbia Hills	WA, OR	468.89	0.47	0.00	0.00	0.00	406.53	10.78	0.00	11.25	3.28	0.00	0.00
37	Willow Creek	OR	146.69	24.20	0.00	0.00	0.00	112.95	0.00	0.00	0.00	0.00	0.00	0.00
38	Umatilla River	OR	479.50	0.00	0.00	0.00	0.00	476.14	0.00	0.00	0.48	0.00	2.88	0.00
39	Deschutes River	OR	665.12	134.35	0.00	0.00	0.00	484.21	2.66	0.00	29.27	13.97	0.00	0.00
40	Birch Creek	OR	212.61	0.21	0.00	0.00	0.00	212.39	0.00	0.00	0.00	0.00	0.00	0.00
41	Substation Tract ACEC	ID	1.76	1.64	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00
42	Butter Creek	OR	84.41	0.00	0.00	0.00	0.00	84.41	0.00	0.00	0.00	0.00	0.00	0.00
43	Lawrence Grasslands	OR	248.52	28.08	0.00	0.00	0.00	217.21	1.74	1.49	0.00	0.00	0.00	0.00
44	Clarno Canyon	OR	757.20	327.87	0.00	0.00	0.00	419.49	2.27	0.00	0.00	0.00	0.00	0.00
45	Mutton Mountains	OR	110.64	0.00	0.00	0.00	0.00	15.82	0.00	0.00	94.81	0.00	0.00	0.00
46	Middle - North Fork John Day	OR	505.79	53.61	0.00	0.00	0.00	446.11	6.07	0.00	0.00	0.00	0.00	0.00
47	Painted Hills/Sutton Mtn	OR	238.64	177.55	0.00	0.00	0.00	50.35	0.24	0.00	0.00	0.00	0.00	0.00
48	S Fork /Main stem John Day	OR	350.94	115.11	0.00	0.00	0.00	216.53	2.11	0.00	0.00	17.20	0.00	0.00
49	Metolius Bench	OR	32.91	1.02	0.00	0.00	0.00	27.90	0.00	0.00	0.00	3.95	0.00	0.00
50	Cline Buttes	OR	1018.51	485.83	0.00	0.00	0.00	514.35	6.11	0.00	0.00	13.24	0.00	0.00
51	Weiser Sand Hills	ID	508.10	62.50	0.00	0.00	0.00	431.38	14.23	0.00	0.00	0.00	0.00	0.00
52	North Fork Crooked River	OR	225.51	65.62	0.00	0.00	0.00	35.63	0.90	0.00	0.00	123.58	0.00	0.00
53	St. Anthony Dunes	ID	1463.56	499.07	0.00	0.00	0.00	777.15	175.63	0.00	0.00	0.00	0.00	11.71
54	Powell Butte	OR	3.14	1.89	0.00	0.00	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.00
55	Cottonwood Mtn	OR	413.46	258.41	0.00	0.00	0.00	151.74	3.31	0.00	0.00	0.00	0.00	0.00
56	Bear Creek	OR	107.14	60.64	0.00	0.00	0.00	46.50	0.00	0.00	0.00	0.00	0.00	0.00
57	E. cusickii pt. site #2	OR	0.40	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
58	Camas Mud Lake	ID	549.57	140.69	0.00	0.00	4.40	308.86	37.37	0.00	0.00	0.00	43.42	14.84
59	Castle Rock	OR	66.62	44.37	0.00	0.00	0.00	21.98	0.00	0.00	0.00	0.00	0.00	0.20
60	Teton Marsh	ID, WY	739.93	2.96	0.00	0.00	0.00	638.56	4.44	0.00	0.00	68.81	0.00	0.00
61	Horse Ridge	OR	4.75	4.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
62	Big Desert (INEL)	ID	2385.68	963.81	0.00	0.00	1273.95	83.50	64.41	0.00	0.00	0.00	0.00	0.00
63	Harper	OR	308.14	248.36	2.77	0.00	0.00	51.46	5.55	0.00	0.00	0.00	0.00	0.00
64	Boise Front	ID	372.14	23.82	0.00	0.00	0.00	332.32	12.28	0.00	0.00	0.00	0.00	0.37
65	Succor Creek	OR, ID	2770.49	2041.85	38.79	0.00	0.00	556.87	130.21	0.00	0.00	0.00	0.00	0.00
66	Idaho Falls Dunes	ID	157.15	0.31	0.00	0.00	0.00	156.05	0.00	0.00	0.00	0.00	0.00	0.63
67	Devils Garden ACEC	OR	131.69	116.94	0.00	0.00	0.00	12.91	0.00	0.00	0.00	1.84	0.00	0.00
68	Snow Ridge WSA	OR	111.62	104.36	0.00	0.00	0.00	7.26	0.00	0.00	0.00	0.00	0.00	0.00
69	Dry Creek	OR	404.76	363.88	21.45	0.00	0.00	18.62	1.21	0.00	0.00	0.00	0.00	0.00
70	Craters of the Moon	ID	1617.04	1164.27	0.00	0.00	0.00	197.28	77.62	0.00	0.00	0.00	0.00	0.00
71	Four Craters WSA	OR	61.19	57.15	0.00	0.00	0.00	4.04	0.00	0.00	0.00	0.00	0.00	0.00
72	Lost Forest	OR	173.46	155.94	0.00	0.00	0.00	17.52	0.00	0.00	0.00	0.00	0.00	0.00

73	Steens/Alvord/Malheur	OR, NV	5352.23	3489.65	0.00	0.00	0.00	1279.18	10.70	0.00	0.00	0.00	561.98	0.00
74	Connley Hills	OR	21.71	15.76	0.00	0.00	0.00	5.95	0.00	0.00	0.00	0.00	0.00	0.00
75	Saddle Butte	OR	677.37	628.60	8.13	0.00	0.00	12.87	27.77	0.00	0.00	0.00	0.00	0.00
76	Birds of Prey NCA	ID	658.20	350.82	113.21	0.00	0.00	171.79	10.53	1.97	0.00	0.00	0.00	9.87
77	Blackfoot wetlands	ID	634.94	67.94	0.00	0.00	0.00	303.50	193.66	0.00	0.00	0.00	0.00	69.84
78	American Falls	ID	312.75	4.69	14.39	0.00	0.00	103.83	0.00	0.00	130.42	0.00	0.00	59.74
79	Bruneau-Jacks Creek	ID	2140.87	1445.09	59.94	98.48	0.00	408.91	94.20	0.00	0.00	0.00	0.00	36.39
80	Summer Lake	OR	423.82	184.36	0.00	0.00	0.00	214.45	1.27	0.00	0.00	23.73	0.00	0.00
81	Middle Snake River Corridor	ID	1984.88	506.14	13.89	0.00	0.00	1308.03	27.79	1.98	0.00	0.00	45.65	79.40
82	Dietrich Dunes	ID	57.52	54.24	0.00	0.00	0.00	0.98	2.30	0.00	0.00	0.00	0.00	0.00
83	Crooked Creek	OR	194.29	106.86	0.00	0.00	0.00	85.10	2.33	0.00	0.00	0.00	0.00	0.00
84	Lake Abert	OR	380.84	308.86	0.00	0.00	0.00	33.51	38.46	0.00	0.00	0.00	0.00	0.00
85	Formation Spring	ID	6.93	0.21	0.00	0.00	0.00	6.54	0.00	0.17	0.00	0.00	0.00	0.00
86	Hart Mtn/Warner Basin	OR, CA	2394.47	888.35	0.00	0.00	0.00	462.13	81.41	0.00	0.00	14.37	948.21	0.00
87	Owyhee Canyon Lands	D, OR, N\	4121.77	3491.14	0.00	0.00	0.00	214.33	408.06	0.00	4.12	0.00	0.00	0.00
88	Guano Slough	OR	18.09	14.51	0.00	0.00	0.00	3.58	0.00	0.00	0.00	0.00	0.00	0.00
89	Jarbidge Creek	NV, ID	1357.46	504.98	0.00	0.00	0.00	105.88	21.72	0.00	0.00	724.88	0.00	0.00
90	Albion Mtns	ID, UT	433.56	72.40	0.00	0.00	0.00	114.89	17.78	0.00	0.00	228.49	0.00	0.00
91	Deep Creek	OR	110.20	38.57	0.00	0.00	0.00	42.87	1.43	0.00	0.00	27.33	0.00	0.00
92	Oregon Canyon Mtns	OR, NV	301.89	290.11	0.00	0.00	0.00	10.57	0.30	0.00	0.00	0.00	0.00	0.00
93	Goose Creek	ID, UT, N\	741.09	326.08	0.00	0.00	0.00	243.82	40.02	0.00	0.00	128.95	0.00	0.74
94	Piute Creek/Sheldon	NV, OR	2795.85	377.44	0.00	0.00	0.00	114.63	95.06	0.00	0.00	0.00	2175.17	13.98
95	Duck Valley	ID, NV	344.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	342.38	0.00	0.00	1.72
96	Hawk Mtn	OR	97.23	96.74	0.00	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.00	0.00
97	Raft River Mountains	UT	185.02	2.59	0.00	0.00	0.00	56.99	4.26	0.00	0.00	121.19	0.00	0.00
98	Santa Rosa Mtn	NV	594.18	143.20	0.00	0.00	0.00	188.35	0.00	0.00	0.00	262.63	0.00	0.00
99	Upper Suprise Valley	CA, NV	256.98	58.08	0.00	0.00	0.00	197.36	0.77	0.00	0.00	0.51	0.00	0.00
100	Lower Suprise Valley	CA, NV	274.89	191.60	0.00	0.00	0.00	75.87	2.47	0.00	0.00	2.20	0.00	2.20
101	Madeline Plains	CA, NV	220.76	110.16	0.00	0.00	0.00	107.51	2.87	0.00	0.00	0.00	0.00	0.00
102	Honey Lake Valley	CA, NV	1600.50	685.01	0.00	312.10	0.00	427.33	174.45	0.00	0.00	1.60	0.00	0.00
103	Pyramid Lake	NV	1854.36	534.06	0.00	0.00	0.00	18.54	0.00	0.00	854.86	0.00	1.85	443.19
104	Five Spring Mtn	CA	20.07	20.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	Upper Long Valley	CA, NV	87.30	43.48	0.00	0.00	0.00	42.52	0.00	0.00	0.00	1.22	0.00	0.00
106	Alkali Gulch	OR	279.40	134.67	0.28	0.00	0.00	141.66	3.07	0.00	0.00	0.00	0.00	0.00
107	Palouse pot. restore pt site	WA	9.51	0.00	0.00	0.00	0.00	8.35	1.16	0.00	0.00	0.00	0.00	0.00
108	Palouse pot. restore pt site	WA	1.01	0.00	0.00	0.00	0.00	1.01	0.00	0.00	0.00	0.00	0.00	0.00
109	Eureka Flats point sites	WA	1.21	0.00	0.00	0.00	0.00	1.21	0.00	0.00	0.00	0.00	0.00	0.00

110	Palouse pot. restore pt site	ID	0.20	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00
111	P. ponderosa comm pt. sites	WA	0.20	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00
112	Magnusson Butte	WA	0.20	0.00	0.00	0.00	0.00	0.15	0.00	0.05	0.00	0.00	0.00	0.00
113	Mousetail	OR	0.20	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00
114	Venator Canyon	OR	0.20	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
115	Juniper Mountain	OR	0.20	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
116	Malheur Cave	OR	0.20	0.00	0.00	0.00	0.00	0.13	0.07	0.00	0.00	0.00	0.00	0.00
117	Barren Valley	OR	0.20	0.00	0.00	0.00	0.00	0.20	0.20	0.00	0.00	0.00	0.00	0.00
117	Barren Valley	OR	0.20	0.00	0.00	0.00	0.00	0.20	0.20	0.00	0.00	0.00	0.00	0.00
118	Curlew Natl Grsslnd pt sites	ID	1.41	0.35	0.00	0.00	0.00	0.68	0.00	0.00	0.00	0.39	0.00	0.00
119	P. ponderosa comm pt. sites	WA	0.20	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00
120	E. cusickii pt. site #1	OR	0.20	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
121	Foster Flat RNA	OR	27.78	27.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
122	S. Fork Snake River	ID	340.26	11.57	0.00	0.00	0.00	264.72	47.30	0.00	0.00	14.63	0.00	2.04
123	Salmon Falls Creek	ID	747.87	589.32	0.00	0.00	0.00	114.42	35.90	0.00	0.00	0.00	0.00	8.23
124	Black Pine Crest	ID	24.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.35	0.00	0.00
125	E. chrysops point sites	OR	0.61	0.58	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00
126	Big Juniper Kipuka RNA/ACE	ID	1.31	1.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
127	Sand Kipuka RNA/ACEC	ID	1.30	1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
128	TNC Stapp-Soldier Creek Pre	ID	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.00	0.00	0.00	0.00
129	Dry Creek WSR/RNA	ID	4.42	4.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
130	Big Wood WSR	ID	2.46	2.16	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00
131	TNC Silver Creek Preserve	ID	7.52	0.00	0.00	0.00	0.00	0.00	0.00	7.52	0.00	0.00	0.00	0.00
132	ID-33-015 WSA	ID	2.99	2.96	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00
133	Middle Frk Clearwater WSR	ID	18.41	0.24	0.00	0.00	0.00	11.84	0.66	0.00	1.38	1.99	0.00	2.30
134	Cowiche Canyon ACEC	WA	2.26	2.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135	TNC Rose Creek Preserve	WA	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00
136	Trapper Creek PRNA	ID	1.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.86	0.00	0.00
137	Tex Creek Wildlife Mgmt Area	ID	68.68	12.84	0.00	1.92	0.00	52.27	0.00	0.00	0.00	0.00	0.00	1.72
138	Benjamin Pasture ACEC/RNA	OR	2.68	2.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
139	Stockade Mountain ACEC/RN	OR	2.99	2.94	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00
	TOTAL AREA SITES (KM2)	63860.9		24045.13	1023.53	1380.43	2765.02	23114.55	3089.06	19.96	1514.81	1826.18	3969.00	790.63
	PERCENT TOTAL AREA SITES			37.65	1.60	2.16	4.33	36.20	4.84	0.03	2.37	2.86	6.22	1.24

Site Information

Site No.	Site Name	State	Section	Size (Sq Km)	Size (Acres)	Targets
1	Dyer Haystac	WA	342I	162.1470	40050.31	communities
2	Grand Creek	WA	342I	706.3220	174461.53	inverts;plants;animals
3	Waterville Pla	WA	342I	307.6300	75984.61	rare animals
4	Sinking Creek	WA	342I	616.2680	152218.20	sharptail grouse
5	Wilson Creek	WA	342I	34.7690	8587.94	rare plants
6	Rock Island C	WA	342I	630.0920	155632.72	plants
7	Sagebrush Fl	WA	342I	177.5400	43852.38	animals, comm
8	Douglas Cree	WA	342I	104.7410	25871.03	rare plants
9	Upper Crab C	WA	342I	23.2560	5744.23	rare plants
10	Crab Creek	WA	342I	933.4100	230552.27	comm; plants
11	Turnbull NWF	WA	342I	75.1930	18572.67	rare plants
12	Beezley Hills	WA	342I	305.1120	75362.66	animals - verts
13	Hog Lake	WA	342I	27.2370	6727.54	comm
14	Rock and Bor	WA	342I	72.7260	17963.32	comm
15	Marcellus (Rc	WA	342I	100.6600	24863.02	rare plants, comm
16	Rising Trout M	WA	342I	85.6670	21159.75	verts; inverts
17	Upper Dry Gu	WA	342I	133.9650	33089.36	rare plants
18	Liberty Butte	ID, WA	331A	52.2480	12905.26	community
19	Potholes Res	WA	342I	808.2890	199647.38	water birds, comm
20	Steptoe point	WA	331A	148.9140	36781.76	rare plant
21	Hanford/Yakir	WA	342I	3588.0830	886256.50	rare plants, comm
22	L.T. Murray	WA	342I	398.3120	98383.06	fish; riparian; plants
23	Kahlotus	WA	342I	221.4940	54709.02	comm
24	Esquatzel Co	WA	342I	837.9190	206965.99	t&e animals, birds
25	Paradise Ridg	ID	331A	109.4250	27027.98	rare plant; comm
26	Snake Breaks	WA	331A	370.3370	91473.24	rare plants; comm
27	Alpowa	WA	331A	102.4030	25293.54	cover
28	Camas Prairie	ID	331A	432.4280	106809.72	rare plants, comm
29	Horse Heaver	WA	342I	779.0320	192420.90	plants; b. owls; hawks
30	Upper Touche	WA	331A	29.6130	7314.41	riparian communities
31	Juniper Dunes	WA	342I	168.1850	41541.70	t&e animals, birds
32	Walla Walla	WA	342I	144.4950	35690.27	fish; butterfly; plant
33	Alder Creek F	WA	342I	156.2470	38593.01	t&e plants, b. owls
34	Rock Creek	WA	342I	229.6740	56729.48	comm; cover; animals
35	Boardman	OR	342I	679.9860	167956.54	comm, t&e animals
36	Columbia Hills	WA	342I	468.8900	115815.83	plants, inverts, comm
37	Willow Creek	OR	342I	146.6880	36231.94	riparian
38	Umatilla River	OR	342I	479.4980	118436.01	t&e plants; riparian; fish
39	Deschutes Ri	OR	342I	665.1210	164284.89	rare snails; chinook
40	Birch Creek	OR	342I	212.6050	52513.44	rare plants
41	Substation Tr	ID	342D	1.7620	435.21	
42	Butter Creek	OR	331A	84.4140	20850.26	fish
43	Lawrence Gra	OR	342I	248.5240	61385.43	communities
44	Clarno Canyo	OR	342H	757.2010	187028.65	communities
45	Mutton Mount	OR	342I	110.6350	27326.85	rare snails; chinook
46	Middle - North	OR	342H	505.7940	124931.12	fish, comm
47	Painted Hills/S	OR	342H	238.6380	58943.59	rare plants;comm
48	S Fork /Main s	OR	342H	350.9350	86680.95	rare plants/fish
49	Metolius Benc	OR	342H	32.9050	8127.54	riparian
50	Cline Buttes	OR	342H	1018.5110	251572.22	comm

51	Weiser Sand	ID	342C	508.1010	125500.95	plants/animals/comm
52	North Fork Cr	OR	342H	225.5110	55701.22	riparian comm
53	St. Anthony D	ID	342D	1463.5550	361498.09	tiger beetle; cover
54	Powell Butte	OR	342H	3.1430	776.32	comm
55	Cottonwood M	OR	342C	413.4560	102123.63	comm
56	Bear Creek	OR	342H	107.1370	26462.84	comm
57	E. cusickii pt.	OR	342B-W	0.2020	49.89	rare plants
58	Camas Mud L	ID	342D	549.5710	135744.04	t&e species
59	Castle Rock	OR	342C	66.6200	16455.14	comm
60	Teton Marsh	ID, WY	342D	739.9310	182762.96	birds, cover
61	Horse Ridge	OR	342H	4.7540	1174.24	comm
62	Big Desert (IN	ID	342D	2385.6760	589261.97	t&e species, cover
63	Harper	OR	342C	308.1440	76111.57	rare plants, comm
64	Boise Front	ID	342C	372.1400	91918.58	end plants
65	Succor Creek	OR, ID	342C	2770.4880	684310.54	rare plants, comm
66	Idaho Falls Du	ID	342D	157.1480	38815.56	tiger beetle
67	Devils Garden	OR	342B-W	131.6870	32526.69	comm
68	Squaw Ridge	OR	342B-W	111.6190	27569.89	comm
69	Dry Creek	OR	342C	404.7610	99975.97	comm/plants
70	Craters of the	ID	342D	1617.0440	399409.87	t&e birds, plants, cover
71	Four Craters \	OR	342B-W	61.1880	15113.44	comm
72	Lost Forest	OR	342B-W	173.4640	42845.61	comm
73	Steens/Alvorc	OR, NV	342B-W	5352.2250	1321999.58	t&e species
74	Connley Hills	OR	342B-W	21.7140	5363.36	comm
75	Saddle Butte	OR	342C	677.3720	167310.88	bats, comm
76	Birds of Prey	ID	342C	658.2040	162576.39	bird/comm/sturgeon
77	Blackfoot wet	ID	342B-E	634.9390	156829.93	wetlands, birds
78	American Fall	ID	342D	312.7520	77249.74	shorebirds, t&e species
79	Bruneau-Jack	ID	342C	2140.8740	528795.88	snails
80	Summer Lake	OR	342B-W	423.8220	104684.03	fish, comm
81	Middle Snake	ID	342D	1984.8760	490264.37	fish, snails, waterbirds
82	Dietrich Dune	ID	342D	57.5180	14206.95	tiger beetle
83	Crooked Cree	OR	342C	194.2910	47989.88	t&e plants, comm
84	Lake Abert	OR	342B-W	380.8400	94067.48	shorebirds; comm
85	Formation Sp	ID	342-BE	6.9310	1711.96	aquatic values, comm
86	Hart Mtn/War	OR, CA	342B-W	2394.4670	591433.35	t&e species, comm
87	Owyhee Cany	ID, OR, NV	342C	4121.7740	1018078.18	comm, animals
88	Guano Sloug	OR	342B-W	18.0890	4467.98	comm
89	Jarbidge Cree	NV, ID	342B-E	1357.4620	335293.11	fish; bighorn; plants
90	Albion Mtns	ID, UT	342B-E	433.5610	107089.57	t&e plants; fish;comm
91	Deep Creek	OR	342B-W	110.1960	27218.41	fish/rare plants/
92	Oregon Cany	OR, NV	342B-W	301.8850	74565.60	t&e plants, comm
93	Goose Creek	ID, UT, NV	342B-E	741.0850	183048.00	endemc plants;comm
94	Piute Creek/S	NV, OR	342B-W	2795.8520	690575.44	t&e plants/fish
95	Duck Valley	ID, NV	342C	344.4430	85077.42	wetlands
96	Hawk Mtn	OR	342B-W	97.2250	24014.58	t&e comm
97	Raft River Mo	UT	342B-E	185.0180	45699.45	t&e plant
98	Santa Rosa M	NV	342B-W	594.1760	146761.47	comm
99	Upper Suprise	CA, NV	342B-W	256.9770	63473.32	
100	Lower Suprise	CA, NV	342B-W	274.8890	67897.58	
101	Madeline Plai	CA, NV	342B-W	220.7600	54527.72	
102	Honey Lake \	CA, NV	342B-W	1600.4990	395323.25	

103	Pyramid Lake	NV	342B-W	1854.3640	458027.91	rare fish
104	Five Spring M	CA	342B-W	20.0660	4956.30	
105	Upper Long V	CA, NV	342B-W	87.3010	21563.35	
106	Alkali Gulch	OR	342C	279.4010	69012.05	t&e plants
107	Palouse pot. r	WA	331A	3.0410	751.13	plants, comm
108	Palouse pot. r	WA	331A	0.2020	49.89	plants, comm
109	Eureka Flats p	WA	342I	0.2020	49.89	
110	Palouse pot. r	ID	331A	0.2020	49.89	
111	P. ponderosa	WA	342I	0.2020	49.89	
112	Magnusson B	WA	342I	0.2020	49.89	
113	Mousetail	OR	342I	0.2020	49.89	t&e plants
114	Venator Cany	OR	342B-W	0.2020	49.89	t&e plants
115	Juniper Moun	OR	342B-W	0.2020	49.89	comm
116	Malheur Cave	OR	342B-W	0.2020	49.89	rare inverts
117	Barren Valley	OR	342B-W	0.4040	99.79	t&e plants
118	Curlew Natl G	ID	342B-E	0.2020	49.89	
119	P. ponderosa	WA	342I	0.2020	49.89	
120	E. cusickii pt.	OR	342B-W	0.2020	49.89	rare plants
121	Foster Flat RN	OR	342B-W	27.7800	6861.66	comm
122	S. Fork Snake	ID	342D	340.2610	84044.47	
123	Salmon Falls	ID	342C	747.8720	184724.38	
124	Black Pine Cr	ID	342B-E	24.3450	6013.22	
125	E. chrysops p	OR	342C	0.2020	49.89	t&e plants
126	Big Juniper K	ID	342D	1.3070	322.83	comm
127	Sand Kipuka	ID	342D	1.3020	321.59	comm
128	TNC Stapp-S	ID	342C	0.3640	89.91	comm
129	Dry Creek WS	ID	342C	4.4190	1091.49	comm
130	Big Wood WS	ID	342C	2.4600	607.62	riparian
131	TNC Silver Cr	ID	342C	7.5170	1856.70	riparian
132	ID-33-015 WS	ID	342D	2.9900	738.53	comm
133	Middle Frk Cl	ID	331A	18.4130	4548.01	riparian
134	Cowiche Can	WA	342I	2.2590	557.97	
135	TNC Rose Cr	WA	331A	0.0700	17.29	
136	Trapper Creel	ID	342B-E	1.8550	458.19	
137	Tex Creek Wi	ID	342B-E	68.6820	16964.45	
138	Benjamin Pas	OR	342B-W	2.6810	662.21	comm
139	Stockade Mou	OR	342C	2.9860	737.54	comm

G RANKED TARGET NUMBERS PER PORTFOLIO SITE

Poly ID	Site Name	State	Sect	Size (Sq K	G1	G2	G3	G4	G5	G?	Sum G1,G2s	Sum EOs
1	Dyer Haystacks	WA	342I	162.147	0	4	0	0	1	0	4	5
2	Grand Creek	WA	342I	706.322	5	15	7	13	17	0	20	57
3	Waterville Plateau	WA	342I	307.63	0	1	15	5	14	0	1	35
4	Sinking Creek	WA	342I	616.268	0	14	1	3	3	0	14	21
5	Wilson Creek	WA	342I	34.769	14	0	0	0	0	0	14	14
6	Rock Island Creek	WA	342I	630.092	9	25	7	2	1	0	34	44
7	Sagebrush Flat	WA	342I	177.54	0	3	1	7	19	0	3	30
8	Douglas Creek	WA	342I	104.741	0	2	10	0	0	0	2	12
9	Upper Crab Creek	WA	342I	23.256	4	0	0	0	0	0	4	4
10	Crab Creek	WA	342I	933.41	7	11	5	11	4	0	18	38
11	Turnbull NWR	WA	342I	75.193	0	20	0	0	0	0	20	20
12	Beezley Hills	WA	342I	305.112	0	1	0	19	13	0	1	33
13	Hog Lake	WA	342I	27.237	0	13	4	0	0	0	13	17
14	Rock and Bonnie Lakes	WA	342I	72.726	3	0	0	0	0	0	3	3
15	Marcellus (Rocky Coule	WA	342I	100.66	2	0	0	2	1	0	2	5
16	Rising Trout Meadows	WA	342I	85.667	0	0	2	1	0	0	0	3
17	Upper Dry Gulch	WA	342I	133.965	0	1	16	0	0	0	1	17
18	Liberty Butte	ID, WA	331A	52.248	1	3	0	0	0	0	4	4
19	Potholes Reservoir	WA	342I	808.289	0	9	5	40	6	0	9	60
20	Steptoe point sites (:	WA	331A	148.914	1	0	0	0	0	0	1	1
21	Hanford/Yakima TC	WA	342I	3588.083	10	99	54	370	17	0	109	550
22	L.T. Murray	WA	342I	398.312	7	9	6	11	1	0	16	34
23	Kahlotus	WA	342I	221.494	5	0	3	1	0	0	5	9
24	Esquatzel Coulee	WA	342I	837.919	0	6	5	85	2	0	6	98
25	Paradise Ridge	ID	331A	109.425	2	4	2	0	0	0	6	8
26	Snake Breaks	WA	331A	370.337	17	15	1	0	1	0	32	34
27	Alpowa	WA	331A	102.403	0	0	0	0	0	0	0	0
28	Camas Prairie	ID	331A	432.428	8	24	5	0	0	0	32	37
29	Horse Heaven Hills	WA	342I	779.032	0	3	7	72	2	0	3	84
30	Upper Touchet Creek	WA	331A	29.613	1	2	1	0	0	0	3	4
31	Juniper Dunes	WA	342I	168.185	0	4	0	73	0	0	4	77
32	Walla Walla	WA	342I	144.495	0	0	6	0	1	0	0	7
33	Alder Creek Ridge	WA	342I	156.247	0	1	5	4	0	0	1	10
34	Rock Creek	WA	342I	229.674	2	0	0	0	0	0	2	2
35	Boardman	OR	342I	679.986	4	12	1	1	0	0	16	18

36	Columbia Hills	WA, OR	342I	468.89	3	15	11	0	1	1	18	31
37	Willow Creek	OR	342I	146.688	0	0	0	1	0	0	0	1
38	Umatilla River	OR	342I	479.498	2	2	2	0	0	0	4	6
39	Deschutes River	OR	342I	665.121	15	23	0	1	0	3	38	42
40	Birch Creek	OR	342I	212.605	4	0	0	0	0	0	4	4
41	Substation Tract ACEC	ID	342D	1.762	0	1	0	0	0	0	1	1
42	Butter Creek	OR	331A	84.414	0	0	2	0	0	0	0	2
43	Lawrence Grasslands	OR	342I	248.524	0	0	1	0	0	0	0	1
44	Clarno Canyon	OR	342H	757.201	0	2	0	1	0	0	2	3
45	Mutton Mountains	OR	342I	110.635	0	0	0	0	0	0	0	0
46	Middle - North Fork Jo	OR	342H	505.794	0	4	0	1	0	0	4	5
47	Painted Hills/Sutton M	OR	342H	238.638	0	15	0	0	0	0	15	15
48	S Fork /Main stem Johr	OR	342H	350.935	0	7	0	6	0	0	7	13
49	Metolius Bench	OR	342H	32.905	0	0	0	1	0	0	0	1
50	Cline Buttes	OR	342H	1018.511	0	4	22	0	0	0	4	26
51	Weiser Sand Hills	ID	324C	508.101	0	17	12	0	1	0	17	30
52	North Fork Crooked Riv	OR	342H	225.511	0	1	0	0	0	0	1	1
53	St. Anthony Dunes	ID	342D	1463.555	6	43	4	14	5	0	49	72
54	Powell Butte	OR	342H	3.143	0	0	0	0	0	0	0	0
55	Cottonwood Mtn	OR	324C	413.456	0	0	6	0	0	0	0	6
56	Bear Creek	OR	342H	107.137	0	1	0	0	0	0	1	1
57	E. cusickii pt. site #	OR	324B-W	0.404	0	2	0	0	0	0	2	2
58	Camas Mud Lake	ID	342D	549.571	0	0	0	7	11	0	0	18
59	Castle Rock	OR	324C	66.62	0	0	0	0	0	0	0	0
60	Teton Marsh	ID, WY	342D	739.931	1	4	1	7	0	0	5	13
61	Horse Ridge	OR	342H	4.754	1	0	0	0	0	0	1	1
62	Big Desert (INEL)	ID	342D	2385.676	0	5	10	1	4	0	5	20
63	Harper	OR	324C	308.144	0	5	4	0	0	0	5	9
64	Boise Front	ID	324C	372.14	0	37	61	1	0	0	37	99
65	Succor Creek	OR, ID	324C	2770.488	26	63	82	1	1	0	89	173
66	Idaho Falls Dunes	ID	342D	157.148	1	0	0	0	0	0	1	1
67	Devils Garden ACEC	OR	324B-W	131.687	0	0	1	0	0	0	0	1
68	Snow Ridge WSA	OR	324B-W	111.619	0	0	0	0	0	0	0	0
69	Dry Creek	OR	324C	404.761	0	0	11	0	5	0	0	16
70	Craters of the Moon	ID	342D	1617.044	2	0	22	0	1	0	2	25
71	Four Craters WSA	OR	324B-W	61.188	0	0	0	0	0	0	0	0
72	Lost Forest	OR	324B-W	173.464	0	3	0	0	0	0	3	3

73	Steens/Alvord/Malheur	OR, NV	324B-W	5352.225	2	7	48	5	29	1	9	92
74	Connley Hills	OR	324B-W	21.714	0	0	0	0	0	0	0	0
75	Saddle Butte	OR	324C	677.372	0	0	8	2	0	0	0	10
76	Birds of Prey NCA	ID	324C	658.204	0	7	15	15	5	0	7	42
77	Blackfoot wetlands	ID	342B-E	634.939	0	5	0	2	2	0	5	9
78	American Falls	ID	342D	312.752	1	0	1	6	2	0	1	10
79	Bruneau-Jacks Creek	ID	324C	2140.874	3	20	36	28	1	0	23	88
80	Summer Lake	OR	324B-W	423.822	0	1	3	1	1	0	1	6
81	Middle Snake River Co	ID	342D	1984.876	35	33	16	19	7	0	68	110
82	Dietrich Dunes	ID	342D	57.518	1	0	1	0	0	0	1	2
83	Crooked Creek	OR	324C	194.291	0	0	3	1	5	0	0	9
84	Lake Abert	OR	324B-W	380.84	0	2	1	0	0	0	2	3
85	Formation Spring	ID	342-BE	6.931	2	1	0	0	0	0	3	3
86	Hart Mtn/Warner Basin	OR, CA	324B-W	2394.467	2	3	18	2	5	0	5	30
87	Owyhee Canyon Lands	D, OR, N	324C	4121.774	2	3	49	6	1	0	5	61
88	Guano Slough	OR	324B-W	18.089	1	0	0	0	0	0	1	1
89	Jarbidge Creek	NV, ID	342B-E	1357.462	0	2	13	2	0	0	2	17
90	Albion Mtns	ID, UT	342B-E	433.561	4	5	1	4	0	0	9	14
91	Deep Creek	OR	324B-W	110.196	1	0	2	0	0	0	1	3
92	Oregon Canyon Mtns	OR, NV	324B-W	301.885	0	0	3	0	0	0	0	3
93	Goose Creek	D, UT, N	342B-E	741.085	13	15	1	0	0	0	28	29
94	Piute Creek/Sheldon	NV, OR	324B-W	2795.852	2	7	11	0	1	0	9	21
95	Duck Valley	ID, NV	324C	344.443	0	0	0	1	2	0	0	3
96	Hawk Mtn	OR	324B-W	97.225	0	1	0	0	0	0	1	1
97	Raft River Mountains	UT	342B-E	185.018	3	0	0	0	0	0	3	3
98	Santa Rosa Mtn	NV	324B-W	594.176	0	0	0	0	0	0	0	0
99	Upper Suprise Valley	CA, NV	324B-W	256.977	0	2	1	0	0	0	2	3
100	Lower Suprise Valley	CA, NV	324B-W	274.889	0	0	1	0	0	0	0	1
101	Madeline Plains	CA, NV	324B-W	220.76	1	2	0	1	0	0	3	4
102	Honey Lake Valley	CA, NV	324B-W	1600.499	5	1	25	0	0	0	6	31
103	Pyramid Lake	NV	324B-W	1854.364	0	0	2	0	0	0	0	2
104	Five Spring Mtn	CA	324B-W	20.066	1	0	0	0	0	0	1	1
105	Upper Long Valley	CA, NV	324B-W	87.301	0	0	1	0	0	0	0	1
106	Alkali Gulch	OR	324C	279.401	0	6	0	1	0	0	6	7
107	Palouse pot. restore p	WA	331A	9.505	12	47	8	0	0	0	59	67
108	Palouse pot. restore p	WA	331A	1.01	6	1	0	0	0	0	7	7
109	Eureka Flats point sit	WA	342I	1.212	6	0	0	0	0	0	6	6

110	Palouse pot. restore p	ID	331A	0.202	0	1	1	0	0	0	1	2
111	P. ponderosa comm pt.	WA	342I	0.202	1	0	0	0	0	0	1	1
112	Magnusson Butte	WA	342I	0.202	1	0	0	0	0	0	1	1
113	Mousetail	OR	342I	0.202	0	1	0	0	0	0	1	1
114	Venator Canyon	OR	324B-W	0.202	1	0	0	0	0	0	1	1
115	Juniper Mountain	OR	324B-W	0.202	1	0	0	0	0	0	1	1
116	Malheur Cave	OR	342B-W	0.202	2	0	0	0	0	0	2	2
117	Barren Valley	OR	324C	0.202	2	0	0	0	0	0	2	2
117	Barren Valley	OR	342B-W	0.202	2	0	0	0	0	0	2	2
118	Curlew Natl Grsslnd pt	ID	342B-E	1.414	0	7	0	0	0	0	7	7
119	P. ponderosa comm pt.	WA	342I	0.202	1	0	0	0	0	0	1	1
120	E. cusickii pt. site #	OR	324B-W	0.202	0	1	0	0	0	0	1	1
121	Foster Flat RNA	OR	324B-W	27.78	0	1	0	0	0	0	1	1
122	S. Fork Snake River	ID	342D	340.261	0	3	0	2	0	0	3	5
123	Salmon Falls Creek	ID	324C	747.872	0	0	4	8	0	0	0	12
124	Black Pine Crest	ID	342B-E	24.345	0	0	1	0	0	0	0	1
125	E. chrysops point site	OR	324C	0.606	3	0	0	0	0	0	3	3
126	Big Juniper Kipuka RNA	ID	342D	1.307	0	1	0	0	0	0	1	1
127	Sand Kipuka RNA/ACEC	ID	342D	1.302	0	1	0	0	0	0	1	1
128	TNC Stapp-Soldier Cree	ID	342C	0.364	0	0	1	0	0	0	0	1
129	Dry Creek WSR/RNA	ID	342C	4.419	0	1	0	0	0	0	1	1
130	Big Wood WSR	ID	342C	2.46	0	0	0	0	0	0	0	0
131	TNC Silver Creek Prese	ID	342C	7.517	0	0	0	0	0	0	0	0
132	ID-33-015 WSA	ID	342D	2.99	0	1	0	0	0	0	1	1
133	Middle Frk Clearwater	ID	331A	18.413	0	0	5	0	0	0	0	5
134	Cowiche Canyon ACEC	WA	342I	2.259	0	2	0	0	0	0	2	2
135	TNC Rose Creek Preserv	WA	331A	0.07	0	1	0	0	0	0	1	1
136	Trapper Creek PRNA	ID	342B-E	1.855	0	1	0	0	0	0	1	1
137	Tex Creek Wildlife Mgr	ID	342B-E	68.682	0	2	0	1	0	0	2	3
138	Benjamin Pasture ACEC/	OR	342B-W	2.681	0	1	0	0	0	0	1	1
139	Stockade Mountain ACEC	OR	342C	2.986	0	1	0	0	0	0	1	1

Conservation Target Occurrences and Goals Met in Final Portfolio

	GRANK	TTL EO's	Port EO's	TTL Sect	Sect that Met GLs	GLs calc	Port Sect
BIRDS							
TYMPANUCHUS PHASIANELLUS COLUMBIANUS	G2	83	62	3	3	1	3
CENTROCERCUS UROPHASIANUS PHAIOS	G3	132	45	4	3	2	3
CHARADRIUS ALEXANDRINUS NIVOSUS	G3	17	11	1	1	1	1
PELECANUS ERYTHRORHYNCHOS	G3	25	22	4	4	1	4
ACCIPITER GENTILIS	G4	24	6	3	1	2	2
AMMODRAMUS SAVANNARUM	G4	14	5	2	1	2	1
BUTEO REGALIS	G4	608	295	6	3	2	5
CHLIDONIAS NIGER	G4	12	10	4	2	1	4
CYGNUS BUCCINATOR	G4	17	10	3	1	2	2
FALCO PEREGRINUS ANATUM	G4	7	5	4	2	2	3
HALIAEETUS LEUCOCEPHALUS	G4	90	48	7	5	2	6
LANIUS LUDOVICIANUS	G4	371	343	3	2	1	3
MELANERPES LEWIS	G4	2	2	2	2	1	2
SPEOTYTO CUNICULARIA HYPUGAEA	G4	316	115	6	2	2	3
AMPHISPIZA BELLI	G5	8	6	1	1	1	1
AMPHISPIZA BILINEATA	G5	2	2	1	1	1	1
DOLICHONYX ORYZIVORUS	G5	3	3	1	1	1	1
EGRETTA THULA	G5	22	13	4	4	1	4
LARUS PIPIXCAN	G5	8	7	2	2	1	2
NUMENIUS AMERICANUS	G5	86	25	5	3	2	3
OREOSCOPTES MONTANUS	G5	40	27	1	1	1	1
PIPILO CHLORURUS	G5	1	0	1	0	2	0
STERNA FORSTERI	G5	15	10	4	4	1	4
FISH						1	
CATOSTOMUS WARNERENSIS	G1	1	1	1	1	1	1
GILA BICOLOR EURYSOMA	G1	2	2	1	1	1	1
COTTUS GREENEI	G2	26	26	1	1	1	1
GILA ALVORDENSIS	G2	11	7	1	1	1	1
GILA BICOLOR OREGONENSIS	G2	4	3	1	1	1	1
COTTUS BAIRDI SSP 1	G3	4	0	1	0	2	0
COTTUS MARGINATUS	G3	21	11	2	2	1	2
GILA COPEI	G3	3	3	2	2	1	2
ACIPENSER TRANSMONTANUS	G4	4	4	1	1	1	1

PERCOPSIS TRANSMONTANUS	G4	15	2	1	1	1	1
CATOSTOMUS COLUMBIANUS	G5	1	0	1	0	2	0
HERPS						1	
RANA LUTEIVENTRUS	G3	44	22	4	4	1	4
BUFO BOREAS	G4	12	6	3	2	2	2
BUFO WOODHOUSII	G5	6	3	1	1	1	1
CROTAPHYTUS BICINCTORES	G5	33	13	2	2	1	2
MASTICOPHIS TAENIATUS	G5	7	6	1	1	1	1
PHRYNOSOMA DOUGLASII	G5	1	1	1	1	1	1
PHRYNOSOMA PLATYRHINOS	G5	28	16	2	2	1	2
RANA PIPIENS	G5	9	2	2	1	1	2
RHINOCHEILUS LECONTEI	G5	3	3	1	1	1	1
SONORA SEMIANNULATA	G5	2	1	1	0	1	1
INVERTS						1	
MONADENIA FIDELIS MINOR	G?	3	2	1	0	1	1
PLANORBELLA OREGONENSIS	G?	1	1	1	1	1	1
VESPERICOLA COLUMBIANUS	G?	2	2	1	1	1	1
CICINDELA ARENICOLA	G1	7	4	2	1	1	2
LANX SP 1	G1	3	3	1	1	1	1
PHYSA NATRICINA	G1	5	4	2	2	1	2
PYRGULOPSIS BRUNEAUENSIS	G1	1	1	1	1	1	1
PYRGULOPSIS IDAHOENSIS	G1	7	6	1	1	1	1
STYGOBROMUS HUBBSI	G1	2	2	1	1	1	1
TAYLORCONCHA SERPENTICOLA	G1	11	11	2	2	1	2
VALVATA UTAHENSIS	G1	13	13	2	2	1	2
FISHEROLA NUTTALLI	G2	16	15	3	2	2	2
JUGA BULBOSA	G2	2	2	2	2	1	2
JUGA HEMPHILLI MAUPINENSIS	G2	2	2	2	2	1	2
OREOHELIX VARIABILIS	G2	2	1	1	0	1	1
ANODONTA CALIFORNIENSIS	G4	9	9	2	2	1	2
Clossiana selene atrocostalis	G4	9	1	1	0	1	1
Satyrium sylvinum	G4	14	4	1	0	1	1
Amblyscirtes vialis	G5	1	0	1	0	2	0
Ochlodes yuma	G5	16	16	1	1	1	1
Parnassius clodius shepardi	G5	1	1	1	1	1	1
Polites sabuleti	G5	13	4	2	1	2	1
FLUMINICOLA COLUMBIANA	GU	4	4	2	2	1	2

MAMMALS						1	
SPERMOPHILUS BRUNNEUS ENDEMICUS	G2	1	1	1	1	1	1
SPERMOPHILUS WASHINGTONI	G2	118	37	2	1	2	1
PLECOTUS TOWNSENDII TOWNSENDII	G3	35	17	5	3	2	3
OVIS CANADENSIS CALIFORNIANA	G4	5	4	3	2	2	2
SOREX PREBLEI	G4	2	0	1	0	2	0
ANTROZOUS PALLIDUS	G5	1	1	1	1	1	1
BRACHYLAGUS IDAHOENSIS	G5	44	24	4	2	2	2
LEMMISCUS CURTATUS	G5	3	3	1	1	1	1
MICRODIPODOPS MEGACEPHALUS	G5	1	1	1	1	1	1
ONYCHOMYS LEUCOGASTER	G5	1	1	1	1	1	1
SOREX MERRIAMI	G5	4	4	2	2	1	2
PLANT COMMUNITIES						1	
ARTEMISIA CANA/LEYMUS CINEREUS SPARSE SHRUBLAND:ARCA1	G1	1	1	1	1	1	1
ARTEMISIA TRIDENTATA SSP. TRIDENTATA/PSEUDOROEGNERIA S	G1	1	1	1	1	1	1
ARTEMISIA TRIDENTATA-PURSHIA TRIDENTATA/ORYZOPSIS HYME	G1	1	1	1	1	1	1
ARTEMISIA TRIPARTITA / STIPA COMATA ASSOCIATION	G1	2	2	1	1	1	1
BETULA OCCIDENTALIS/PURSHIA TRIDENTATA/STIPA COMATA SH	G1	1	1	1	1	1	1
CHRYSOTHAMNUS NAUSEOSUS/LEYMUS FLAVESCENS/PSORALID	G1	1	1	1	1	1	1
DANTHONIA CALIFORNICA-FESTUCA IDAHOENSIS HERBACEOUS V	G1	1	1	1	1	1	1
FESTUCA IDAHOENSIS - HIERACIUM CYNOGLOSSOIDES ASSOCIAT	G1	5	5	1	1	1	1
FESTUCA IDAHOENSIS-SYMPHORICARPOS ALBUS SPARSE SHRUB	G1	22	18	2	2	1	2
JUNIPERUS OCCIDENTALIS/ARTEMISIA TRIDENTATA/CAREX FILIFO	G1	1	1	1	1	1	1
LEYMUS CINEREUS - DISTICHLIS STRICTA ASSOCIATION	G1	2	1	2	1	2	1
LEYMUS CINEREUS (BOTTOMLANDS) HERBACEOUS VEGETATION:	G1	1	1	1	1	1	1
PINUS FLEXILIS/PURSHIA TRIDENTATA WOODLAND:PIFL2/PUTR2	G1	1	1	1	1	1	1
PINUS MONOPHYLLA-JUNIPERUS OSTEOSPERMA/ARTEMISIA TRID	G1	2	1	1	0	1	1
PINUS MONOPHYLLA-JUNIPERUS OSTEOSPERMA/LEYMUS CINERE	G1	1	1	1	1	1	1
PINUS MONOPHYLLA-JUNIPERUS OSTEOSPERMA/PRUNUS VIRGIN	G1	1	1	1	1	1	1
PINUS PONDEROSA - PSEUDOTSUGA MENZIESII RIPARIAN COMMU	G1	1	1	1	1	1	1
PINUS PONDEROSA / STIPA COMATA ASSOCIATION	G1	2	2	1	1	1	1
PINUS PONDEROSA DUNE FOREST	G1	1	1	1	1	1	1
POPULUS BALSAMIFERA SSP. TRICHOCARPA / CICUTA DOUGLASII	G1	1	1	1	1	1	1
POPULUS BALSAMIFERA SSP. TRICHOCARPA/CRATAEGUS DOUGL	G1	2	2	1	1	1	1
PSEUDOROEGNERIA SPICATA - FESTUCA IDAHOENSIS ASSOCIATI	G1	27	22	2	2	1	2
PSEUDOROEGNERIA SPICATA-FESTUCA IDAHOENSIS (PALOUSE) I	G1	3	2	2	1	2	1
PURSHIA TRIDENTATA / ORYZOPSIS HYMENOIDES COMMUNITY TY	G1	7	6	1	1	1	1

PURSHIA TRIDENTATA/POA SECUNDA SHRUBLAND:PUTR2/POSE	G1	2	2	2	2	1	2
PURSHIA TRIDENTATA/PRUNUS VIRGINIANA SHRUBLAND:PUTR2/F	G1	1	1	1	1	1	1
PURSHIA TRIDENTATA/PSEUDOROEGNERIA SPICATA-LEYMUS CIN	G1	1	1	1	1	1	1
PURSHIA TRIDENTATA-ARTEMISIA TRIDENTATA SSP. TRIDENTATA	G1	1	1	1	1	1	1
PURSHIA TRIDENTATA-CHRYSOTHAMNUS NAUSEOSUS SHRUBLA	G1	1	1	1	1	1	1
ROSA NUTKANA/FESTUCA IDAHOENSIS HERBACEOUS VEGETATIC	G1	6	3	1	0	1	1
(BALSAMORHIZA SERRATA)-POA SECUNDA HERBACEOUS VEGET	G2	1	0	1	0	2	0
ALNUS INCANA-POPULUS TREMULOIDES/CORNUS SERICEA SHRU	G2	1	1	1	1	1	1
ALNUS RHOMBIFOLIA FOREST:ALRH2	G2	1	1	1	1	1	1
ARISTIDA LONGISETA - POA SECUNDA ASSOCIATION	G2	1	0	1	0	2	0
ARTEMISIA ARBUSCULA SSP. THERMOPOLA/FESTUCA IDAHOENSI	G2	1	1	1	1	1	1
ARTEMISIA CANA SSP. VISCIDULA/DESCHAMPSIA CESPITOSA SHR	G2	1	0	1	0	2	0
ARTEMISIA CANA/POA SECUNDA SHRUBLAND:ARCA13/POSE	G2	4	3	2	1	1	2
ARTEMISIA NOVA/FESTUCA IDAHOENSIS SPARSE DWARF-SHRUBL	G2	1	1	1	1	1	1
ARTEMISIA TRIDENTATA SSP. TRIDENTATA/LEYMUS CINEREUS SH	G2	1	1	1	1	1	1
ARTEMISIA TRIDENTATA SSP. TRIDENTATA/PSEUDOROEGNERIA S	G2	6	5	2	2	1	2
ARTEMISIA TRIDENTATA SSP. WYOMINGENSIS/STIPA COMATA SH	G2	6	6	3	3	1	3
ARTEMISIA TRIDENTATA-ATRIPLEX CANESCENS-SARCOBATUS VE	G2	2	2	1	1	1	1
ARTEMISIA TRIPARTITA/PSEUDOROEGNERIA SPICATA SPARSE SH	G2	11	10	2	2	1	2
BETULA OCCIDENTALIS/CORNUS SERICEA SHRUBLAND:BEOC2/CO	G2	3	2	2	1	1	2
CERCOCARPUS LEDIFOLIUS/ CALAMAGROSTIS RUBESCENS SHRU	G2	1	1	1	1	1	1
CERCOCARPUS LEDIFOLIUS/CALAMAGROSTIS RUBESCENS SHRU	G2	1	1	1	1	1	1
CERCOCARPUS LEDIFOLIUS/SYMPHORICARPOS OREOPHILUS SH	G2	3	3	3	3	1	3
CRATAEGUS DOUGLASII / HERACLEUM MAXIMUM ASSOCIATION	G2	6	5	1	1	1	1
CRATAEGUS DOUGLASII/ROSA WOODSII SHRUBLAND:CRDO2/ROV	G2	3	3	1	1	1	1
CRATAEGUS DOUGLASII/SYMPHORICARPOS ALBUS SHRUBLAND:(	G2	4	3	2	1	1	2
ELAEAGNUS COMMUTATA COMMUNITY TYPE	G2	1	1	1	1	1	1
ERIOGONUM MICROTHECUM - PHYSARIA OREGANA ASSOCIATION	G2	1	1	1	1	1	1
ERIOGONUM SPHAEROCEPHALUM / POA SECUNDA ASSOCIATION	G2	6	5	1	1	1	1
FESTUCA IDAHOENSIS - ERIOGONUM HERACLEOIDES ASSOCIATI(	G2	2	0	1	0	2	0
GRAYIA SPINOSA / POA SECUNDA ASSOCIATION	G2	5	5	1	1	1	1
GRAYIA SPINOSA-SARCOBATUS VERMICULATUS/(ORYZOPSIS HYM	G2	1	1	1	1	1	1
JUNIPERUS OCCIDENTALIS/ARTEMISIA ARBUSCULA/DANTHONIA U	G2	1	1	1	1	1	1
JUNIPERUS OCCIDENTALIS/CERCOCARPUS LEDIFOLIUS/CAREX G	G2	1	1	1	1	1	1
JUNIPERUS OCCIDENTALIS/FESTUCA IDAHOENSIS SPARSE WOOD	G2	4	4	2	2	1	2
LEYMUS CINEREUS COVER TYPE	G2	1	0	1	0	2	0
LEYMUS CINEREUS HERBACEOUS VEGETATION:LECI4	G2	3	2	2	1	2	1

PHILADELPHUS LEWISII SHRUBLAND:PHLE4	G2	3	3	2	2	1	2
PINUS PONDEROSA / CALAMAGROSTIS RUBESCENS COMMUNITY	G2	1	1	1	1	1	1
PINUS PONDEROSA/PHYSOCARPUS MALVACEUS FOREST:PIPO/PH	G2	11	9	1	1	1	1
POPULUS ANGUSTIFOLIA/RHUS AROMATICA VAR.TRILOBATA	G2	1	1	1	1	1	1
POPULUS TREMULOIDES/VERATRUM CALIFORNICUM FOREST:PO	G2	1	1	1	1	1	1
PURSHIA TRIDENTATA/STIPA COMATA SPARSE SHRUBLAND:PUTR	G2	11	8	2	2	1	2
RHUS GLABRA / BUNCHGRASS ASSOCIATION	G2	0	0	0		1	0
SALIX EXIGUA/MESIC FORB SHRUBLAND:SAEX/MESIC FORB	G2	1	1	1	1	1	1
SALIX GEYERIANA/MESIC GRAMINOID SHRUBLAND:SAGE2/MESIC	G2	5	4	2	1	1	2
SALIX GEYERIANA/POA PALUSTRIS SHRUBLAND:SAGE2/POPA2	G2	1	1	1	1	1	1
SPOROBOLUS CRYPTANDRUS - POA SECUNDA ASSOCIATION	G2	4	4	2	2	1	2
PLANTS						1	
ARABIS FALCATORIA	G1	2	1	1	0	1	1
ASTRAGALUS COLLINUS VAR LAURENTII	G1	23	6	2	1	2	1
ASTRAGALUS SINUATUS	G1	9	9	1	1	1	1
ASTRAGALUS TYGHENSIS	G1	19	14	1	1	1	1
CASTILLEJA CHRISTII	G1	1	1	1	1	1	1
CLEOMELLA HILLMANII	G1	4	4	1	1	1	1
COLLOMIA RENACTA	G1	2	2	2	2	1	2
ERIGERON BASALTICUS	G1	9	8	1	1	1	1
ERIOGONUM CHRYSOPS	G1	3	3	1	1	1	1
IVESIA BAILEYI VAR BAILEYI	G1	2	2	1	1	1	1
IVESIA RHYPARA VAR RHYPARA	G1	4	4	2	1	1	2
IVESIA RHYPARA VAR SHELLYI	G1	2	2	1	1	1	1
LOPHOCHLAENA OREGONA	G1	1	1	1	1	1	1
MENTZELIA PACKARDIAE	G1	11	11	1	1	1	1
MIMULUS WASHINGTONENSIS SSP 1	G1	3	1	1	0	1	1
OXYTROPIS CAMPESTRIS VAR WANAPUM	G1	2	2	1	1	1	1
PENSTEMON IDAHOENSIS	G1	12	12	1	1	1	1
POLEMONIUM PECTINATUM	G1	40	28	2	1	1	2
POTENTILLA COTTAMII	G1	3	3	1	1	1	1
PYRROCOMA UNIFLORA VAR 1	G1	1	1	1	1	1	1
RUBUS NIGERRIMUS	G1	19	19	1	1	1	1
SENECIO ERTTERAE	G1	12	12	1	1	1	1
STEPHANOMERIA MALHEURENSIS	G1	1	1	1	1	1	1
THELYPODIUM HOWELLII SSP SPECTABILIS	G1	1	0	1	0	2	0
ALLIUM CONSTRICTUM	G2	13	10	1	1	1	1

AMSINCKIA CARINATA	G2	4	4	1	1	1	1
ARTEMISIA LUDOVICIANA SSP ESTESII	G2	5	5	1	1	1	1
ASTER JESSICAE	G2	65	11	1	1	1	1
ASTRAGALUS ANSERINUS	G2	15	15	1	1	1	1
ASTRAGALUS ARRECTUS	G2	10	7	2	1	1	2
ASTRAGALUS COLUMBIANUS	G2	32	30	1	1	1	1
ASTRAGALUS DIAPHANUS VAR DIURNUS	G2	7	7	1	1	1	1
ASTRAGALUS MULFORDIAE	G2	66	47	1	1	1	1
ASTRAGALUS PULSIFERAE VAR PULSIFERAE	G2	1	1	1	1	1	1
ASTRAGALUS RIPARIUS	G2	14	12	1	1	1	1
CALOCHORTUS MACROCARPUS VAR MACULOSUS	G2	4	0	1	0	2	0
CAREX IDAHOA	G2	1	0	1	0	2	0
CREPIS BAKERI SSP IDAHOENSIS	G2	11	4	2	2	1	2
CRYPTANTHA LEUCOPHAEA	G2	48	40	1	1	1	1
CYMOPTERUS ACAULIS VAR GREELEYORUM	G2	9	8	1	1	1	1
CYMOPTERUS DAVISII	G2	3	3	1	1	1	1
DELPHINIUM VIRIDESCENS	G2	1	1	1	1	1	1
ERIOGONUM CUSICKII	G2	3	3	1	1	1	1
ERIOGONUM SHOCKLEYI VAR PACKARDIAE	G2	14	11	1	1	1	1
GALIUM GLABRESCENS SSP MODOCENSE	G2	2	2	1	1	1	1
GRATIOLA HETEROSEPALA	G2	1	1	1	1	1	1
HACKELIA CRONQUISTII	G2	36	11	1	1	1	1
HAPLOPAPPUS LIATRIFORMIS	G2	27	13	2	1	2	1
HOWELLIA AQUATILIS	G2	32	21	2	2	1	2
ILIAMNA LONGISEPALA	G2	14	10	1	1	1	1
IVESIA WEBBERI	G2	1	0	1	0	2	0
LEPIDIUM PAPILLIFERUM	G2	61	17	1	1	1	1
LEPTODACTYLON GLABRUM	G2	4	3	1	0	1	1
LEPTODACTYLON PUNGENS SSP HAZELIAE	G2	1	0	1	0	2	0
LOMATIUM TUBEROSUM	G2	22	20	1	1	1	1
LUPINUS CUSICKII	G2	4	3	2	1	1	2
LUPINUS SERICEUS VAR EGGLESTONIANUS	G2	1	0	1	0	2	0
MENTZELIA MOLLIS	G2	30	28	1	1	1	1
MIMULUS JUNGERMANNIOIDES	G2	17	12	1	1	1	1
MYOSURUS MINIMUS VAR SESSILIFLORUS	G2	1	1	1	1	1	1
PENSTEMON DEUSTUS VAR VARIABILIS	G2	5	5	1	1	1	1
PHACELIA INCONSPICUA	G2	3	2	1	0	1	1

PHACELIA LENTA	G2	9	9	1	1	1	1
PHACELIA LUTEA VAR CALVA	G2	13	12	1	1	1	1
PINUS WASHOENSIS	G2	1	0	1	0	2	0
POTAMOGETON FOLIOSUS VAR FIBRILLOSUS	G2	3	2	1	0	1	1
PYRROCOMA LIATRIFORMIS	G2	34	13	1	1	1	1
RANUNCULUS RECONDITUS	G2	9	9	1	1	1	1
SILENE SPALDINGII	G2	52	30	2	2	1	2
SPIRANTHES DILUVIALIS	G2	1	1	1	1	1	1
TAUSCHIA HOOVERI	G2	35	15	1	1	1	1
THELYPODIUM EUCOSMUM	G2	36	19	1	1	1	1
TRIFOLIUM PLUMOSUM SSP AMPLIFOLIUM	G2	21	6	1	1	1	1
TRIFOLIUM THOMPSONII	G2	1	1	1	1	1	1
AGASTACHE CUSICKII	G3	7	7	1	1	1	1
AGOSERIS LACKSCHEWITZII	G3	1	0	1	0	2	0
ALLIUM AASEAE	G3	66	63	1	1	1	1
ALLIUM ROBINSONII	G3	4	1	1	0	1	1
ARTEMISIA PAPPOSA	G3	4	1	1	0	1	1
ASTRAGALUS AQUILONIUS	G3	1	0	1	0	2	0
ASTRAGALUS ATRATUS VAR INSEPTUS	G3	59	7	2	2	1	2
ASTRAGALUS DIVERSIFOLIUS	G3	2	1	1	0	1	1
ASTRAGALUS GEYERI	G3	7	7	1	1	1	1
ASTRAGALUS MISELLUS VAR PAUPER	G3	30	24	1	1	1	1
ASTRAGALUS ONICIFORMIS	G3	36	17	2	2	1	2
ASTRAGALUS PECKII	G3	21	21	1	1	1	1
ASTRAGALUS PULSIFERAE VAR SUKSDORFII	G3	12	12	1	1	1	1
ASTRAGALUS PURSHII VAR OPHIOGENES	G3	35	30	1	1	1	1
ASTRAGALUS STERILIS	G3	43	45	1	1	1	1
ASTRAGALUS TEGETARIOIDES	G3	1	0	1	0	2	0
ASTRAGALUS YODER-WILLIAMSII	G3	26	11	1	1	1	1
CALOCHORTUS LONGEBARBATUS VAR LONGEBARBATUS	G3	3	0	2	0	2	0
CALOCHORTUS NITIDUS	G3	58	11	1	1	1	1
CAMISSONIA PALMERI	G3	1	1	1	1	1	1
CAMISSONIA TANACETIFOLIA SSP QUADRIPERFORATA	G3	3	3	1	1	1	1
CARDAMINE CONSTANCEI	G3	8	0	1	0	2	0
CASTILLEJA CHLOROTICA	G3	1	0	1	0	2	0
CASTILLEJA PILOSA VAR STEENENSIS	G3	26	24	1	1	1	1
CHAENACTIS CUSICKII	G3	27	19	1	1	1	1

COLLOMIA MACROCALYX	G3	1	1	1	1	1	1
ERIGERON PIPERIANUS	G3	65	39	1	1	1	1
ERIOGONUM CROSBYAE	G3	7	7	1	1	1	1
ERIOGONUM DESERTORUM	G3	2	1	1	0	1	1
ERIOGONUM OCHROCEPHALUM VAR CALCAREUM	G3	2	2	1	1	1	1
ERIOGONUM PROCIDUUM	G3	6	5	1	1	1	1
ERIOGONUM SALICORNIOIDES	G3	23	16	2	2	1	2
HACKELIA HISPIDA VAR DISJUNCTA	G3	21	12	1	1	1	1
HACKELIA OPHIOBIA	G3	8	7	1	1	1	1
HYMENOXYS LEMMONII	G3	5	5	1	1	1	1
LEPIDIUM DAVISII	G3	174	59	2	1	2	1
LOMATIUM LAEVIGATUM	G3	10	9	1	1	1	1
LOMATIUM ROLLINSII	G3	1	1	1	1	1	1
LOMATIUM SALMONIFLORUM	G3	9	3	2	1	1	2
LOMATIUM SUKSDORFII	G3	1	1	1	1	1	1
MIMULUS PATULUS	G3	1	0	1	0	2	0
OENOTHERA PSAMMOPHILA	G3	4	4	1	1	1	1
OENOTHERA PYGMAEA	G3	21	20	1	1	1	1
ORYZOPSIS HENDERSONII	G3	14	6	1	1	1	1
PHACELIA MINUTISSIMA	G3	12	11	1	1	1	1
PLAGIOBOTHRYS SALSUS	G3	4	3	1	0	1	1
PRIMULA SP 1	G3	4	3	1	0	1	1
PYRROCOMA HIRTA VAR SONCHIFOLIA	G3	6	0	1	0	2	0
PYRROCOMA INSECTICRURIS	G3	56	1	1	0	1	1
PYRROCOMA RADIATA	G3	10	5	1	1	1	1
RIBES OXYACANTHOIDES SSP IRRIGUUM	G3	9	3	2	1	2	1
RORIPPA COLUMBIAE	G3	14	8	2	1	2	1
SCUTELLARIA HOLMGRENIORUM	G3	11	11	1	1	1	1
SENECIO STREPTANTHIFOLIUS VAR LAETIFLORUS	G3	2	2	2	2	1	2
STIPA HENDERSONII	G3	1	1	1	1	1	1
TAUSCHIA TENUISSIMA	G3	17	1	1	0	1	1
THELYPODIUM HOWELLII SSP HOWELLII	G3	3	4	2	2	1	2
TRIFOLIUM DOUGLASII	G3	3	2	2	1	2	1
TRIFOLIUM OWYHEENSE	G3	21	20	2	1	2	1

Contact Person: Chris Hansen, WAFO
(206) 343-4345 x343; chansen@tnc.org

Site-Based Changes
This document summarizes only the changes made to the Columbia Plateau site portfolio since its first release in June of 1997. In the months between June and October of 1997, various members of the original planning team assessed problems with the portfolio developed on June 5 of 1997 and documented changes to sites accordingly. The following information documents these changes for sites, citing the reason offered for the change.

Generally, two problems were identified with the June 5 portfolio, 1.) Sites that were intended to capture a particular species or community did not spatially intersect with the element occurrence point(s), thus reflecting problems with in the EO hit/miss tables, 2.) Sites were roughly drawn and captured excessive amounts of land that is converted or less-than-adequate for conservation work, 3.) Sites were roughly drawn and failed to include neighboring areas of high ecological value known to those reviewing the portfolio, and 4.) Areas that contain target species and/or communities were not identified as a site by the team on 6/5/97.

SECTION 331A
No Site Modifications
No Sites Deleted
No Sites Added

SECTION 342I
Modified Sites
Case#: 1
Site Name: Walla Walla
6/97 Portfolio ID: 32
10/97 Portfolio ID: 32
Responding State: Oregon
Contact Name: Dick Vander Schaaf
Documented Reason: Remove farmed area at southern portion of site.

Case#: 2
Site Name: Umatilla River
6/97 Portfolio ID: 38
10/97 Portfolio ID: 38
Responding State: Oregon
Contact Name: Dick Vander Schaaf
Documented Reason: Extend Umatilla River corridor east to ecoregion border; salmon.

Case#: 3
Site Name: Boardman
6/97 Portfolio ID: 35
10/97 Portfolio ID: 35
Responding State: Oregon
Contact Name: Dick Vander Schaaf
Documented Reason: Delete farmed lands near Boardman and add native grasslands AGSP-FGID types, burrowing owls, curlews, Washington ground squirrels.

Case#: 4
Site Name: Willow Creek
6/97 Portfolio ID: 37

10/97 Portfolio ID: 37
Responding State: Oregon
Contact Name: Dick Vander Schaaf
Documented Reason: Add native grassland AGSP-FGID types to the west of site.

Case#: 5
Site Name: Tygh Valley
6/97 Portfolio ID: 41
10/97 Portfolio ID: 41
Responding State: Oregon
Contact Name: Dick Vander Schaaf
Documented Reason: Add PIPO-QUGA woodland on Tygh Valley Wildlife Mgt. Area, west to ecoregion border.

Case#: 6
Site Name: Clarno
6/97 Portfolio ID: 44
10/97 Portfolio ID: 44
Responding State: Oregon
Contact Name: Dick Vander Schaaf
Documented Reason: Add Butte Creek and N. Pole Creek in John Day Canyon. Good AGSP grasslands, FGID grasslands, salmon habitat, WSAs.

Case#: 7
Site Name: Waterville Plateau
6/97 Portfolio ID: 3
10/97 Portfolio ID: 3
Responding State: Washington
Contact Name: David Rolph
Documented Reason: Site meant to capture Moses Coulee but did not. Boundary extended south to capture coulee.

Case#: 8
Site Name: Wilson Creek
6/97 Portfolio ID: 5
10/97 Portfolio ID: 5
Responding State: Washington
Contact Name: David Rolph
Documented Reason: Border adjusted north to capture all Washington Polemonium Eos (G1 plant).

Case#: 9
Site Name: Hog Lake
6/97 Portfolio ID: 13
10/97 Portfolio ID: 13
Responding State: Washington
Contact Name: David Rolph
Documented Reason: Border adjusted south and west to capture Spalding's Silene (G2 plant)

Case#: 10
Site Name: Esquatzel Coulee
6/97 Portfolio ID: 24
10/97 Portfolio ID: 24
Responding State: Washington
Contact Name: David Rolph

Documented Reason: Site adjusted slightly south to actually capture the coulee.

Case#: 11
Site Name: Alder Creek Ridge
6/97 Portfolio ID: 33
10/97 Portfolio ID: 33
Responding State: Washington
Contact Name: David Rolph
Documented Reason: Site expanded west to include Western Burrowing Owl, Piper's Daisy, and Pauper Milk-Vetch.

Case#: 12
Site Name: Beezley Hills
6/97 Portfolio ID: 12
10/97 Portfolio ID: 12
Responding State: Washington
Contact Name: David Rolph
Documented Reason: Slight border move south to capture grasshopper mouse EO.

Sites Deleted
Case#: 13
Site Name: Touchet
6/97 Portfolio ID: 31
Responding State: Washington
Contact Name: David Rolph
Documented Reason:

Sites Added
Case#: 14
Site Name: Juniper Dunes
10/97 Portfolio ID: 31
Responding State: Washington
Contact Name: David Rolph
Documented Reason: Unique site that includes high density of Washington Ground Squirrel. Also includes Ferruginous hawk, Loggerhead Shrike, and Gray Cryptantha (G2 plant).

SECTION 342H
Sites Modified
Case#: 15
Site Name: Cline Buttes & Badlands
6/97 Portfolio ID: 50 & 57
10/97 Portfolio ID: 50
Responding State: Oregon
Contact Name: Dick Vander Schaaf
Documented Reason: Add JUOC woodlands corridor between Cline Buttes and Badlands. Will include portions of Bend, however. These two sites from the 6/97 portfolio were combined into a single larger site for the 10/97 portfolio, and named "Cline Buttes."

Case#: 16
Site Name: North Fork Crooked River
6/97 Portfolio ID: 52
10/97 Portfolio ID: 52
Responding State: Oregon
Contact Name: Dick Vander Schaaf

Documented Reason: Extend border to the south to add river and adjacent canyons, including Forest Creeks RNA for riparian vegetation.

No Sites Deleted

No Sites Added

SECTION 342B-W
Sites Modified
Case#: 17
Site Name: Hart Mountain/Warner Basin
6/97 Portfolio ID: 86
10/97 Portfolio ID: 86
Responding State: Oregon
Contact Name: Dick Vander Schaaf
Documented Reason: Extend portion of Hart Mtn. Site south to connect with Sheldon, provide for antelope migration route plus Guano Valley, ARCA playas, bare playas, ARAR/FGID.

Case#: 18
Site Name: Piute Creek/Sheldon
6/97 Portfolio ID: 94
10/97 Portfolio ID: 94
Responding State: Oregon
Contact Name: Dick Vander Schaaf
Documented Reason: Extend portion of Piute Crk/Sheldon site east to connect to Steens/Alvord/Malheur site #73. Provide migration routes.

Case#: 19
Site Name: Steens/Alvord/Malheur
6/97 Portfolio ID: 73
10/97 Portfolio ID: 73
Responding State: Oregon
Contact Name: Dick Vander Schaaf
Documented Reason: Delete area in NE corner of site; protected area is for Mustang ACEC, NOT well protected. Lands there do not contain communities not represented elsewhere. Area at northern-most point expanded east to capture occurrences of Rorippa columbiae (Columbia Yellow-cress: G3 plant)

Case#: 20
Site Name: Lake Albert
6/97 Portfolio ID: 84
10/97 Portfolio ID: 84
Responding State: Oregon
Contact Name: Dick Vander Schaaf
Documented Reason: Expand boundary to pick up occurrences of Gila bicolor oregonensis (Oregon lakes tui chub).

Case#: 21
Site Name: Summer Lake
6/97 Portfolio ID: 80
10/97 Portfolio ID: 80
Responding State: Oregon
Contact Name: Dick Vander Schaaf
Documented Reason: Expand boundary to pick up occurrences of Gila bicolor oregonensis (Oregon lakes tui chub)

No Sites Deleted

Sites Added
Case#: 22
Site Name: E. Cusickii point site #1
10/97 Portfolio ID: 120
Responding State: Oregon
Contact Name: Dick Vander Schaaf
Documented Reason: 1 point site established specifically to capture an occurrence

Case#: 23
Site Name: E. Cusickii point site #2
10/97 Portfolio ID: 57
Responding State: Oregon
Contact Name: Dick Vander Schaaf
Documented Reason: 2 point sites established specifically to capture occurrences of Eriogonum cusickii (G2 plant).

Case#: 24
Site Name: Foster Flat RNA
10/97 Portfolio ID: 121
Responding State: Oregon
Contact Name: Dick Vander Schaaf
Documented Reason:

SECTION 342C
Sites Modified
Case#: 25
Site Name: Dry Creek
6/97 Portfolio ID: 69
10/97 Portfolio ID: 69
Responding State: Oregon
Contact Name: Dick Vander Schaaf
Documented Reason: Add to Owyhee Canyonlands: Astragalus sterilis, ashbed endemic plants, ATCO, salt desert scrub veg.

Case#: 26
Site Name: Succor Creek
6/97 Portfolio ID: 65
10/97 Portfolio ID: 65
Responding State: Idaho
Contact Name: Trish Klahr, Bob Moseley, Craig Groves
Documented Reason: Expand site south and east to capture Phacelia minutissima & Cercocarpus ledifolius, Symphoricarpos oreophilus shrubland.

Case#: 27
Site Name: Weiser Sand Hill
6/97 Portfolio ID: 51
10/97 Portfolio ID: 51
Responding State: Idaho
Contact Name: Trish Klahr, Bob Moseley, Craig Groves

Documented Reason: Expand site slightly south to capture occurrences of Eriogonum ochrocephalum (Ochre-flowered buckwheat), G3 plant.

No Sites Deleted

Sites Added
Case#: 28
Site Name: Salmon Falls Creek
10/97 Portfolio ID: 123
Responding State: Idaho
Contact Name: Trish Klahr, Bob Moseley, Craig Groves
Documented Reason: Site added to capture Lepidium davisii and other rare state species not tracked by Heritage.

SECTION 342B-E
Sites Modified
Case#: 29
Site Name: Jarbidge Creek
6/97 Portfolio ID: 89
10/97 Portfolio ID: 89
Responding State: Idaho
Contact Name: Trish Klahr
Documented Reason: Border extended south (in Nevada portion) to capture occurrences of Columbia Spotted Frog.

No Sites Deleted

Sites Added
Case#: 30
Site Name: Black Pine Crest
10/97 Portfolio ID: 124
Responding State: Idaho
Contact Name: Trish Klahr, Bob Moseley, Craig Groves
Documented Reason: Site added to capture Eriogonum desortorum (Desert Buckwheat, a G3 Plant).

SECTION 342D
Sites Modified
Case#: 31
Site Name: Craters of the Moon
6/97 Portfolio ID: 70
10/97 Portfolio ID: 70
Responding State: Idaho
Contact Name: Trish Klahr
Documented Reason: Southwest rim extended slightly west to capture Gila copeii (Leatherside Chub, G3 fish) occurrence.

Case#: 32
Site Name: Middle Snake River
6/97 Portfolio ID: 81
10/97 Portfolio ID: 81
Responding State: Idaho
Contact Name: Trish Klahr

Documented Reason: Site originally digitzed inaccurately. River corridor widened and centered on the river centerline. Original site missed a large number of element occurrences it was intended to capture, mostly aquatic invertebrates and fish, plus riparian species and communities, as well as migratory birds.

No Sites Deleted

Sites Added
Case#: 33
Site Name: South Fork Snake River
10/97 Portfolio ID: 122
Responding State: Idaho
Contact Name: Trish Klahr, Bob Moseley, Craig Groves
Documented Reason: Site added to capture Spiranthes diluvialis (Ute ladies' tresses, G2 plant), Elaeagnus commutata community type (American silverberry, G2 community), Narrow-leaf Cottonwood/Skunkbush sumac community type (G2 community). Connects to St. Anthony Dunes Site (Site #53) and extends south to ecoregion border.

Table 1: Decisions regarding Managed Areas that were not explicitly included in the October Portfolio. Revised by C. Hansen, 01/10/98 to Explain Changes Actually Made

Ref #	State/Site	Resolution	Results Based on GIS Info Dump, 01/10/98
	California		
1	CAWA: hallelujah junction wildlife area	Cathy to check with Cal Fish & Game	No Action
	Idaho		
2	ACEC: acec sand hollow	Append to Portfolio Site 84	Added to Site #84 (Boise Front), thus increasing site size by 8571 Acres
3	ACEC: acec substation tract	Add as separate site	New site: #41 (#41 was formerly Tygh Valley, but the # was
			freed up when Tygh was merged w/Deschutes River site #39)
4	ACEC: acec travertine park	Append to Portfolio Site 77	Added to Site #77 (Blackfoot Wetlands), thus increasing site size by 790 Acres
5	IDSTP: mccloskey state park	Append to Portfolio Site 18	Added to Site #18 (Liberty Butte), thus increasing site size by 4927 Acres
6	IDWA: centennial marsh wildlife mngmt area	Drop site? check with Mabel	No Action DROP
7	IDWA: tex creek wildlife mngmt area	Add to the portfolio as a separate site,	New Site: #137 (16971 Acres)
		site mostly in Utah Mountains Ecoregion	
8	RNA: big juniper kipuka rna/acec	Add as a separate site	New Site: #126 (323 Acres)
9	RNA: pot of gold cave rna	Drop site	No Action DROP
10	RNA: sand kipuka rna/acec	Add to the portfolio as a separate site	New Site: #127 (321 Acres)
11	RNA: trapper creek rna	Add to the portfolio as a separate site	New Site: #136 (458 Acres)
12	TNC: slapp-soldier creek preserve	Add to the portfolio as a separate site	New Site: #128 (90 Acres)
13	WSA: id-111-017	Drop site	No Action DROP
14	WSA: id-17-011	Drop site	No Action DROP
15	WSA: id-33-015	Add to the portfolio as a separate site	New Site: #132 (738 Acres)
16	WSR: bruneau/jarbridge river wsr/acec	Drop site	No Action DROP
17	WSR: clearwater r, middle fk		New Site: #133 (4550 Acres). Is merged w/Ref #20 (see 3 lines below)
18	WSR: dry creek wsr/rna		New Site: #129 (1092 Acres)
19	WSR: erec	Drop site	No Action DROP
20	WSR: mid. fork clearwater wild rive		New Site: #133 (4550 Acres). Is merged w/Ref #17 (see 3 lines above)
XX	TNC: Silver Creek Preserve	Add for Riparian Communities	New Site: #131 (1857 Acres)
XX	IDWSR: Big Woods	Add for Riparian Communities	New Site: #130 (607 Acres)
	Nevada		
21	NVWA: anaho island wildlife refuge	Append to Portfolio Site 100	Added to Site #103 (Pyramid Lake). Site 103 was stretched around
			the lake to capture the island and increasing site size by 35656 Acres
	Oregon		
22	ACEC: pickett_rim	Drop (Species not here)	No Action DROP
23	ACEC: saddle_butte_lava_flow	Append to Portfolio Site #75	Added to Site #75 (Saddle Butte), along with Ref #28 below,
			thus increasing site size by 11900 Acres
24	RNA: benjamin pasture acec/rna	Dick to review boundaries to determine resolution	New Site: #138 (862 Acres)
25	RNA: palomino lake acec/rna	Drop site	No Action DROP
26	RNA: stockade mountain acec/rna	Review needs	New Site: #139 (737 Acres)
27	WSA: devils garden lava bed	Append to Portfolio Site 68	Added to Site #67 (Devils Garden ACEC) thus increasing site size by 4735 Acres
28	WSA: saddle butte	Append to Portfolio Site 75	Added to Site #75 (Saddle Butte), along with Ref #23 above,
			thus increasing site size by 11900 Acres
29	WSR: john_day_(main_stem)_river	Append to Portfolio Site 44	Added to Site #44 (Clarno Canyon) increasing site size by 74684 Acres
30	WSR: lower_deschutes_river	Append to Portfolio Sites 50,41, Make them all	Added to connect former Sites #09 and #41
		one site from Dick/Cathy boundaries	to create one site: Site #39 (Deschutes River)
31	WSR: owyhee river wsr/acec	Drop site	No Action DROP
32	WSR: white_river	Append to Portfolio Sites 41	Added to New Site: #39 (Deschutes River)
	Washington		
33	ACEC: conche_canyon	Add as site – separate	New Site: #134 (558 Acres)
34	ACEC: sentinel_slope	Append to Portfolio Sites #21	Added to Site #21 (Hanford/YTC) thus increasing site size by 51 Acres
35	FWS: columbia nwr	Append to Portfolio Sites #19	Added to Site #19 (Potholes Reservoir) thus increasing site size 47846 Acres
36	FWS: mcnary nwr	Drop site	No Action DROP
37	FWS: turnbull nwr	Adjust boundaries of #11 to include	Added to Site #11 (Turnbull NWR) thus increasing site size by 2931 Acres
38	FWS: umatilla nwr	Drop site	No Action DROP
39	TNC: Marcellus Shrub Steppe	Append to Site Number 15 (number from	Added to Site #15 (Marcellus/Rocky Coulee) thus increasing site size by 8874 Acres
		portfolio map not this list)	
40	TNC: Rose Creek	Add to the portfolio as a separate site	New Site: #135 (17 Acres) that is interspersed with Palouse point Sites (#107)
41	TNC: Sealon Canyon	Append to Grande Creek Site #2	Added to Site #2 (Grand Coulee, formerly Grand Creek) increasing site size by 253 Acres

APPENDIX 6

LESSONS LEARNED

LESSONS LEARNED AND RECOMMENDATIONS FROM THE

COLUMBIA PLATEAU ECOREGIONAL PLANNING TEAM

Project Management and Accounting

1. Team size and structure: Was the core team about the right size or should it have been smaller or larger? Why? Was there any particular expertise or sets of expertise missing from the team? Should we have orgnied the planning team differently such as splitting it into more formal sub-teams or work groups?

- Team size was fine. Having sub-group assignments with the groups teleconferencing and/or meeting and reporting back to the main group would have been a good idea.

- Team size seemed pretty adequate with the exception of missing representation from NV.

- Core team was about the right size. Any larger would have become unwieldy for meetings. Any smaller and we wouldn't have had enough people to share assignments and to take the lead on subsets of the project.

- Should have upfront decided upon work groups to work on particular aspects of the project. We didn't bring in non-team members with expertise in particular areas to help us with some of the methods. CSP model might have helped us with some of the more difficult methodological aspects, and might have taken some of the work load off Sandy. I like the idea of having an "assessment" work group, an "assembly" group, and an "implementation", with a core team to be involved in one or more of these, but really to oversee and coordinate pieces of the work.

- We should have utilized HP staff from WA, OR, CA more. NV is a more difficult issue, given the problems with the HP overall, and the real lack of knowledge about the CP portion of the state. HP's that don't have staff as team members are being left out of the information loop (and not just in the CP ecoregion). They are viewed as only "experts" in the various ologies, and not given the credit they are due as conservation biologists and as people who have been thinking about "viable sites" for a long time.

- The team lacked significant expertise in aquatics. This could have been remedied by establishing an aquatics team, just as a plant community/botany team seems to have evolved out of the process.

- The core team size was about right and a good mix of persons except that we should have had a communications person on board from the start so we could be farther down the road on that issue. We should have had more sub-groups or at least another sub-group that dealt with threats and strategies. This group could have begun meeting right from the start assessing threats and exploring alternate strategies, possibly using some more creative techniques such as focus groups or a workshop. This probably would have also kept us on tract as to our project schedule as well. The data sub-group, which operated more or less informally, was really necessary and should be a part of future ecoregional planning efforts.

2. In some TNC regions, ecoregional planning efforts are being coordinated and led from regional offices. In the West, we have chosen to date to have the leadership for these efforts come from the Field Office. Do you have any thoughts about the advantages and disadvantages of team leadership coming from the field office versus a regional office?

- Given experiences to date, leading an ecoregional team is pretty much a full-time job for one person for close to a year. Some experienced/organized folks might be able to lead 2 such projects at once, but however you look at it the work is close to full-time. Are the FO's or RO's best suited?? Can't answer that easily. I'm convinced the RO staff have a much better perspective and perhaps in some ways a more "neutral" role (given the competitive nature of FO relationships, there can be some difficult relationships that RO staff could circumvent).

- The disadvantage to RO leading these is the lack of network, relationships, and knowledge within the ecoregion itself. But it seems to me, the job of the leader/coordinator is to organize, nag, identify and pull together the expertise for the components of the process; lack of experience in that particular ecoregion isn't necessarily limiting.

- Team leadership from field offices is fine and can build ownership in the process in a way that is not possible from the regional office. Also there is the positive aspect that the process is more bottoms up, including the results, and there is more ability for input from field office (and heritage) staff when the team is led from the states. The big problem with leadership from the field is that the work load comes on top of everything else (which means in no small part the dictates of state directors). Not many persons in field offices are in a position to dedicate enough time to leadership of projects of this magnitude.

- Involvement, leadership, and "ownership" of ecoregional plans by Field Offices is critical to implementation and the way WRO is doing it is far superior in this regard. WRO should provide more support in terms of suggested best practices so everyone doesn't have to re-invent things.

- There are pros and cons for both approaches. Team leadership based in the field office provides important training, learning opportunities, leadership opportunities and empowerment to the field office. Most importantly it provides critical buy-in of the final product from the field office.

- There are too many demands on field offices, especially during field season, to provide long-term continuity. Also, I would like to have easier access to data bases, maps, information, etc and, in my opinion, this would be facilitated by having it housed in the regional office. The region is geared up and more oriented to providing data requests and information to field offices. Maybe the solution is a process that starts in the field office and ultimately lands and is managed from the regional office . . .?

3. In any situation where team members are working with or for a project leader who is not in their direct line of supervision, there is always the potential for problems related to difficulties in holding team members accountable to completing assigned tasks in a timely manner. Do you feel that our team suffered any of these sorts of problems ? What sorts of incentives could

be created to enhance our ability to work more effectively as team members across state borders and across various hierarchies within TNC?

- I don't know of anyone dropping the ball regarding not fulfilling their responsibilities during the process. There was a falling off of momentum, though, when the final production of the portfolio was delayed and various data corrections had to be made and still more computer runs had to be completed. Most people in TNC who believe in ecoregional planning and have skills, interest and expertise to contribute towards it do not need any incentives to take part in these sorts of efforts. They do need to be reassured that their efforts will be rewarded by putting the plans into action, though! This is no small task given the internal roadblocks that TNC still has to the process. One of the best incentives for effective team work seems to be careful selection of the team such that they are compatible and not lopsided by overly strong personality types who desire to hear themselves preach more than listening and making earnest contributions.

- If we suffered these problems, and we did, it was more related to lack of clear, concise communication about products and results with sufficient lead time.

- The best way to create incentives is by establishing teams with a team goal. That way team members can prod and assist each other to meet deadlines and produce products. I would suggest a format that involves smaller work teams and an overall project leader who oversees the teams, coordinates between them, but does not get deeply involved in specific aspects or issues.

- I think most (all) TNC staff want to be responsible team players. It is a good practice for the team leader to make specific assignments, by name, and then at the next meeting ask each individual, by name, how they accomplished their assignment. Most people will only be embarrassed in front of the team once by having to admit that they did not complete their assignment.

- I don't know of direct problems like this, however I do have a sense that instances occurred. Some of these sorts of problems could be due to (or aggravated by) poor communications, and a lack of clearly articulated roles/responsibilities.

- There was definitely a certain amount of inter-office competition, pointing-the-finger-of-blame, denigration of others' work procedures, priorities, and expertise. Past history in inter-office relationships is potentially going to be a real problem for some teams, and may require outside (read RO) facilitation and coordination to work through.

- At the July conference, we learned of "team charters" and/or team member "job descriptions" being written and used. I think something like these would have been useful for our team. This doesn't necessarily help with the issues of accountability or line authority over someone, but does help to clarify roles and responsibilities. Such documents might require revision during the course of a planning effort, but would be a solid start towards acknowledging the work load for each member. In addition, they would be a conversation starter with supervisors, who may have assigned a staff person to work on a team, and then refuse to drop other objectives for that staff person. Lastly, these sorts of "job descriptions" would help staff to set annual objectives that include their ecoregional work, and could be provided to new teams to help them figure out the real workloads involved.

4. For many staff, serving on ecoregional planning team is an added responsibility on an already full plate. To what extent did your participation on this team stretch the staff capacity in your office or program? Did you forego certain commitments to participate on this team, or did your participation result in adding hours to your work week? Do you think TNC needs to or should increase its staff capacity in order to engage in effective ecoregional conservation?

- I put off completing several federal contracts in a timely manner and I certainly called in more than a few favors with regards to pulling off the experts workshop. I also did less follow up on several public planning projects than I traditionally have done because I just did not have the time. Regarding staffing for planning, I think some offices more than others may need to add persons to deal with ecoregional planning but this will not be the case everywhere.

- As for increasing staff capacity, yes, I think so. In particular, having the team leaders AKA project managers be able to work full-time on these projects is critical. That means someone needs to take over their other responsibilities for the interim. This is perhaps where the RO's have a role to play that could be more than facilitating.

- The project generally added hours to my work week. Unfortunately it seemed there were periods when I had time in my work day or work week to put into the project, but had not received an assignment or task to work on. It generally seemed that when an assignment came in, it was last minute and on top of an already busy schedule.

- I included this work in my annual objectives and schedule so it was not a problem.

5. Do you think that the funds raised for this project were sufficient? Do you have suggestions on how we could have improved our fund-raising efforts? Were the funds that we did have adequately managed? Do you have suggestions for you we could have improved the management of funds? Did we spend the funds as effectively as possible (i.e., on the "right" things)?

- Fund raising could have been targeted more but I don't have real specifics. I think ecoregional planning certainly could have been used more as a focus for fund raising efforts in an effort to seek more support from both current and potential donors.

- Have not seen an accounting of expenditures, and have no idea of how and where the money was spent. My only reference to funds is our initial budget that listed five large categories of expenses. I think all project finances and accounting should be shared with the whole team as the costs were spread to the whole team.

- Would recommend establishing a finance/fundraising team as one of the project teams to track and report on these issues to the larger team. Budget updates and reports should be brief but routine parts of every meeting to keep the team abreast of costs.

- Regarding fundraising, even though State Directors agreed to fundraise together it turned out to be "everyone for themselves." It would be nice to have had more cross-state cooperation on this part of the project.

6. Were deadlines or milestones in the project clear? Were they reasonable? Were we realistic about the total amount of time needed to complete the project or should our timeline have been different?

- Deadlines were clear but not altogether realistic due prinicipally to our naive view that we had all the data we needed and it would be easy to assimilate into our project. I think a 1 year timeline for these projects is reasonable and that to extend that out too long risks team members straying and staff loosing interest. We could have made better use of our time especially if we would have begun Phase II--Threats and strategies, much earlier.

- We were close to realistic about time, we just didn't really get started on the work until December!! The one area we didn't do well in estimating time was the data collation/management area. My sense is this was true for all the other ecoregional teams.

- Deadlines and milestones were not clear, with rare exceptions. Even after Michelle started helping, it still seemed deadlines weren't clearly set (or maybe the date was clear but the product to go with the date wasn't).

- Many deadlines and milestones were driven by artificial factors, such as Board of Governor's meetings. This pilot project suffered some from keen oversight and curiosity it generated. Thus it seemed that many deadlines became unreasonable at the last minute or even changed at the last minute.

- It was not a realistic timeline.

7. We have now handed the implementation of this plan off to a different group of people. Do you have any thoughts on how the process of transitioning into an implementation team could be improved? Are you satisfied with the membership of the implementation team?

- The hand off that was initiated at Sleeping Lady was indelicately handled, to say the least. It would have been better to plan for this earlier in the process and then make the transition after the portfolio was completed. As it now stands, the portfolio is not finished in even a draft form and the Phase II process is still waiting to be jump started. A sub-group could have begun Phase II earlier on, sparing us the abrupt change we had. I am less convinced that we have the correct persons on the implementation team when compared to the persons on the portfolio assembly team.

- The transition was decided upon at the Sleeping Lady meeting and since then there has been NO communication about what that team is doing or how things are going or anything else. Any kind of transition like this for an ecoregional team needs to be followed up with communications about the overall project and the work of the 2nd or 3rd group of folks.

- At this point I'm not even sure who the membership is. At Sleeping Lady I was satisfied, but if there have been changes there has been no communication about them. In many ways I trust the team leader to make good decisions on who should be on the implementation team, but as in the science portion of the project I'm concerned that the expertise of the HP's will not be utilized or even acknowledged.

- Unfortunately implementation was handed off prematurely. The second team cannot proceed effectively until the first team finalizes the product and disseminates critical information to the implementation team.

- Too early to see how well chosen the implementation team is.   Teams like this should contain more, if not be lead by, protection staff (the implementors).

<u>Science Methods</u>

1. The Geography of Hope document outlines several important steps in ecoregional planning: 1) identifying conservation targets, 2) setting conservation goals, 3) collecting, mapping, and managing information, 4) evaluating existing conservation lands, 5) assessing viability, 6) assembling the portfolio of sites, and 7) conducting a preliminary threats & feasibility assessment. Using these steps as a rough guideline, please comment on the degree to which you think we did an adequate job of covering these steps. For those of you who were involved in-depth in a particular step (e.g., data management/GIS or evaluating existing conservation lands), please take this opportunity to comment extensively on what you thought we did well and where we could have improved.

- Few of these steps were clearly articulated as part of our assessment & planning process. I think that's why the project took so long to really get started. Each step was bogged down by discussions of what to do with other steps; either a "lead person" wasn't clearly assigned or the actual task at hand wasn't articulated. The project would have benefited from a more clearly articulated "process" with major task broken into subtasks and assigned to individuals or sub-groups; with this in hand, each team member would have had a better sense of where their work fit into the overall project and who-was-doing-what. The project management Gant chart started by Will would have provided a starting point for this (if simplified somewhat), and it could have been modified once or twice thru the project to reflect changes in assignments or methods.

- Geography of Hope suggests that rangewide conservation assessments are the best vehicle to determine "best and "viable" occurrences. From the onset, we considered these assessments unrealistic (in terms of time and money) for the globally rare plants in the Columbia Plateau. For the state rare plant species, we assumed that the coarse filter would capture these species (G4-G5, S1-S2).

- It is clear from the CP project and the Design for the Future project (WRO with western NHPs) that rare species and community occurrence data are not sufficient for biodiversity conservation planning. We need meso- and borad-scale data as well as basic data on the distribution of common species. Aquatic data, at any scale, are woefully inadequate in Heritage programs.

- Heritage programs need to better anticipate the data needs of ecoregional planning teams and have much of the important data ready up-front, at the first meeting of the team. Ideally, future ecoregional planning teams should not have to spend much time with data acquisition.

- For each "step", a relatively good job was done in the final analysis, although the viability issues are still not well-addressed.

- The lesson here is that these ecoregional efforts are going to be data driven and will rely heavily on one or more people who have the technical skills required. The one thing to reassess how we did it has to do with the BCD-generated EO data, and to think further about feedback loops into the appropriate HP's to update their databases. The CSP team may be a good model for us to look at.

- A good job was done to evaluate existing conservation lands, which proved to be more complex than originally envisioned. Hopefully the experience gained in the effort for this project will help future teams figure out their evaluations.

- "Assessing viability" is a step where the original thinking on the methods got diluted sufficiently that I am sure it was not adequately addressed. The original idea was to assess whether or not the proposed "conservation areas" (in this case subwatersheds) were within their historic range of variability in regards to disturbance regimes and ecosystem functioning. This was intended to be the final check on the proposed portfolio, and was replaced completely with the "conservation suitability index" in the algorithm, which is not the same thing. Similarly, viability of EO's, as expressed in the EO-ranks, doesn't get at the landscape-scale viability questions, particularly when we are trying to successfully capture and protect plant communities using surrogates. I know the reason that this was not implemented was due to shortness of time, but the issue remains of how to deal with viability, and our portfolio doesn't do that very well.

- The team as a whole didn't have much sufficient input into methodology, especially towards the end as some of the decisions were implemented by the UCSB work and the details of the methods were not conveyed to the team. In addition, there is still work going on, and there have been no communications about this, particularly in regards to revising the portfolio and getting further input from the original core team

- This is a very large question but an important one so I will try to address several of the issues you identified. **Conservation targets**: We tended to stay too specific to Heritage identified targets when we should have heeded or at least considered some of the taxa that were recommended by the experts in the workshop, such as molluscs. **Conservation goals**: We were quite arbitrary in determinining levels of protection for each element (like 5 occurrences per section); it would have been good to discuss this more widely among ourselves. **Information management**: no question that we underestimated that task and were lulled into ecstasy with the abundant GIS layers from the Interior Columbia Basin project. We finally managed OK in terms of data but as we continued to see the surprises in the data that came up as we were finalizing the portfolio I think there is little argument for getting your data squared up before you start the process would be ideal. We were saved in this issue by having a TNC employee handling our GIS work, we could never have survived with a contractor. **Existing conservation lands**: it was shocking how bad we were at this, except for Idaho Heritage which was the envy of us all. We should use ecoregional planning as an excuse to get our files and begin seeking contracts or actual GIS data files from agencies again before the process begins. This was an embarassment. **Viability**: a pretty stream of consciousness approach but fairly effective. It points to the utter reliance on experts who know the ecoregion. **Portfolio assembly**: it would have been instructive and fun to have this part of the process more interactive and to have more of the team involved. We needed to have better rationale given for the assembly rules we created and again we needed to discuss these as a group (even though time was very tight at this point). **Prelim. threats assessment**: didn't do it, and have generally given this very little time. This is a major failing of our process and splitting the process in two phases has the potential to not have this critical issue addressed in a team format.

- It felt like we did a poor and last minute rushed job in identifying aquatic conservation targets. Also, we didn't establish conservation goals specific to aquatics with the degree of thought and discussion that were given to plants and plant communities.

- In retrospect, we now know we should have been more precise in our documentation of our site selection at the June 5 meeting in Seattle. On one hand, I felt it was an effective process that combined the best of Heritage data/information + computer modeling/site selection + individual expertise and knowledge. But in our rush to get it done we did not document why sites were eliminated nor why sites were expanded. This needs to be done, but I have not heard of a plan or approach to deal with this unfinished task.

- To my knowledge we have not conducted a preliminary threats & feasibility assessment for the sites beyond a very broad overview at the ecoregional scale. We have talked about this process at great length and are still waiting for information on the sites to do this.

- We have not yet done a preliminary threats and feasibility assessment but the other steps seemed to go just fine. The most important lessons learned about existing conservation areas were to use GAP managed area ranks with caution, use the 1-4 definitions in Geography of Hope as general guidelines, have a knowledgeable person in each state review and give a "TNC" rank to each conservation site, and then have an informed generalist insure that these "TNC" ranks are consistent across the ecoregion.

Data Conversion/Data Development

Using Map Scales, Projections, and Coordinate Systems

The finest source map scale of data assumed for the CP was about 1:250K. For most ecoregions, a scale finer than this may offer large and unwieldy file sizes. Map projections that are most useable over large geographic regions (minimize area and shape distortion) will be most useful.

The chosen projection will differ depending on the geographic location of the project area. In most cases, teams will want to avoid state plane and UTM systems.

Processing Interstate Element Occurrence Data - The Great Challenge

In the case of the CP, EO data came from various sources. In some cases, the data was already in Arc/Info format, and in other cases, was in a BCD export format. This posed numerous challenges in appending the attribute tables due to differences in content, field names, and inconsistent information on species names, granks, etc.

The successful uploading of the data into one or a few usable GIS coverages requires the skilled hand of a GIS analyst in coordination with one or more scientists familiar with the species and communities of the ecoregion. In brief, the process involves identifying attribute fields of importance, cross-walking similar but non-matching fields in the database, smoothing inconsistencies in names and granks, sorting by type (plants, animals, etc.) and then uploading into a spatial format. A technical support group within TNC for dealing with this issue would be extremely useful.

Developing Base Data from States

Expect base data coming from states (e.g. roads, hydrography) to not edgematch perfectly at the statelines, nor have compatible attribute fields, when creating interstate base layers. Many of the traditional rubber sheeting tricks in GIS will work, but, make an effort to find regional data sources first. The USGS data center has some course scale base data available on their Web site. The Arc/USA or Digital Chart of the World (available through ESRI) is also helpful.

Management Status and Existing Protected Areas

In most cases, existing data is the least expensive data. When dealing with management status and assessing existing natural areas from external sources, expect the coding of protection level to differ significantly from the Geography of Hope. GAP analysis is a good example. Expect to spend time recoding sites to conform with TNC internal guidelines. Furthermore, don't expect to find federal and state protected areas in the same layer.

<u>Data Management</u>

Storage Capacity

It is better to overestimate the amount of hard drive space needed to maintain an ecoregional database. The CP project, in addition to the GIS software and documentation, consume about 90% of a 4 gigabyte drive.

Metadata and Documentation

A standard or system for documenting the coverages and databases being imported and used is optimal. But expect thorough documentation of everything in a 2 or 3 gigabyte database to be a huge task. Most importantly, a date stamp on everything (coverages, databases, tables, charts, and maps) is critical. If there's more than one system user, a user stamp should be implemented as well. For Arc/Info users, make sure LOGGING is ON.

Database Flexibility

Development of Macros that link and update related coverages, tables, and maps is time well spent. For instance, if a single site in a portfolio undergoes a border modification, area summary tables, ownership calculations, element occurrence tallies, and site map macros (to name a few) must be updated. A system that can automatically make changes to all related elements in a single sweep, including the documentation of edit dates, would be invaluable. If this system is not developed, it is up the GIS analyst or information manager to keep careful track of tables and maps that need updating once a critical spatial feature is edited. File management becomes very complex. This leaves a lot of information at the mercy of human error.

<u>Analysis and Mapping</u>

Spatial Analysis

The GIS should provide powerful spatial analysis using overlay; although, other software may be better for manipulating tables of results, and creating charts and graphs. Microsoft Excel, Access, and Powerpoint can be superior tools for creating tables and easy to read presentation graphics.

Mapping

Maps are probably the most efficient communication tool when using spatial data. Arcplot for workstation Arc/Info creates arguably more professional looking maps than ArcView. If planning to get involved with high end mapping, allow for plenty of time.

2. Experts Workshop. Was the purpose of the experts workshop clear? Was the timing of it appropriate or might it have been better placed at another time in the planning process? Were the materials sent to participants prior to the meeting adequate, and how could they have been improved? Was the workshop itself well-coordinated and facilitated? How could it have been improved? Has there been adequate follow-up for participants? Did we do a sufficient and efficient job of capturing information generated by the workshop? Did the workshop serve our purpose well and was it worth the investment in time and money?

- I don't think we really knew what to expect or what we may get out of it but I think it really did exceed our expectations. I don't think it mattered when we did it in the process but it was fortuitous it occurred when it did as we could get quite a few people to attend. I think materials were adequate as we received no negative feedback on them and generally the workshop was pretty well coordinated except for our less than well thought out goals for the second day when we broke up into three quasi-regional groups to discuss sites (with all disciplines represented). It was a good tactic but we did not have great facilitation then. We did a good job of capturing information during the workshop but did not budget enough time for compiling the info into a GIS useful database that could be crossed with our model portfolio when it was developed. The workshop was well worth our cash outlay and time outlay but I still think that we have not done a great job using the info we collected and we certainly haven't begun to tap the experts who all wanted to be kept abreast of what is going to happen with the info. We owe them a follow up letter with real results, ie, a map of our portfolio that at least shows sites as points.

- For the materials sent to participants, I think that the plant association "target" list should have been organized differently .The associations should have been grouped into larger ecological/functional groupings of some sort, such as dry montane coniferous forests or riparian shrubland/wetland complexes or salt-desert, then listed the associations within these. This would have reduced the number of entities to deal with while still listing all associations, as well as providing coarser-scaled ecosystem units which participants would understand and work with if they so desired.

- Information generated by the workshop has not been captured or incorporated very well. "Sites" picked by 4 or more panels are part of the portfolio, but we don't know what those sites really represent of our targets and/or goals. Getting the info captured into some sort of database would be the ideal, but for as many sites as came out of the workshop this is a large task: doable but looking overwhelming.

- I think it was worth the investment in time and money, but how well it served its purpose(s) I don't know. To compare the expert and GIS portfolios was one objective and I don't think we've really done that.

- It seems the experts workshop could have happened anytime and might have distracted from progress on assembling the portfolio by happening when it did. However, overall it was a very educational, well organized and productive effort. But field offices have nothing to show from this effort: no maps, no master conservation target lists, no products except brief minutes of each panel. It would be nice to have products from this effort including all the expert information, maps, and detailed site notes developed and submitted during the workshop.

- We underestimated the time and cost associated with follow-up on the workshop: the cost of data entry, and deciphering and transferring longhand notes into something useable.

- The only thing we tangibly utilized in our portfolio assembly was using sites selected by four or more experts panels as a weighting factor. We gained much in terms of contacts, potential partners, fostering relationships, etc. but at what cost? I don't know what the final cost was for the workshop.

- Given that this was our first experts workshop for ecoregion planning in the Western Region and I think that it went quite well. Day two was not sufficiently anticipated but we learned a lot from that experience.

3. Have the goals, assumptions, and methods we used in this project been clear to the core team members and adequately documented? Do you feel that you had sufficient input into these methods?

- We did a pretty good job of discussing goals and methods, although we probably didn't get the compilation of the methods out to all of those who contributed to them. We did not have adequate time to discuss the assumptions we have made during the process and I am a believer that assumptions are critical to state up front and to play through various scenarios what may occur given specific assumptions. I felt that I had adequate input into these items but as usual there just was not enough time to fully discuss them or to revisit them.

- The goals, assumptions and methods for this project were never clearly explained to team members. Some team members felt out of the loop on these decisions and never had a clear concept of what the project was attempting to do. The documentation I've seen has always been in fairly general terms, and the details of the methods can't be explained in general terms. The team leader didn't adequately involve others in developoing many of the methods. The communications on the methods being applied was one of the worst components of the project. Every time it was on the agenda for a meeting, we pushed it off and kept it to a subgroup. This is fine once everyone has a basic understanding, so work can be done, but I'm not sure the basic understanding was ever there for some members (except by osmosis over the course of the project).

- Not really. Occasionally it felt like "outside forces" were at play and decisions made by the team would be altered by the State Director or Home Office personnel.

- Yes. I can only speak to existing conservation areas and this was documented.

4. Have we adequately documented new data or data sets that we collected during this project? Do we have sufficient plans for storing, maintaining, and updating ecoregional data sets for a future iteration of the plan? Did we do an adequate job of identifying different types of data gaps?

- Data gaps were identified during the experts workshop but we have not done much with them since then. I think we need to insure that they are well documented in the final report and portfolio so as to realize what the portfolio is missing.

- We have no plans for storing, maintaining, etc. ecoregional data sets.

- They have probably been pretty well-documented as between Sandy and Chris there was a lot of cataloguing of the data sets and their content, format.

- I have no idea and would like to know exactly what new data sets were developed for the project, to have a list of the data sets available, as well as a list of the GIS layers available.

- I think these issues have not yet been adequately addressed.

5. The methods (algorithms) we used to assemble the portfolio of sites are relatively sophisticated. Have you understood and generally agreed with the portfolio assembly approach that we used? Any suggestions for how we might have improved this approach?

- The portfolio assembly rules were crafted by persons who are good ecologists and by persons who have had experience with the computer algorithms that were used. I have some basic blind faith in what was done but I would have liked to been involved in this aspect of the planning more so that I could learn from it and possibly contribute some of my own ecological knowledge to the process.

- I liked the approach (of course) but overall was disappointed in the way it was implemented. Some of the original thinking of the methodology (as a test/pilot) got left out or very watered down. I am concerned that we never adequately addressed viability issues, and that the surrogates for the plant communities were not utilized in an ecologically meaningful way. Since I have not yet seen any sort of report from the GIS that analyzes the results of the portfolio selection, I don't know what the final results are.

- It really was a testing of ways to use GIS-driven analyses in combination with a wide variety of data sets. In this regard I don't have suggestions to improve it, as Sandy was/is the person who knows the entire process in its details. The pitfall with this methodology is to think that the final pretty map is ecologically meaningful. If the underlying data sets, assumptions, and details of methods aren't carefully documented and meaningful for our purposes, then the map is useless. Without the "final analysis" we can't really answer the question of whether this was a good way to assemble our portfolio

- I frankly can't say I understood the approach that we used beyond the goals we established for specific targets. Even this process seemed erratic such as going from 1 EO per section to 5 EOs/section: who decided this and why 5? why not 3? It did not feel like the team was utilized to make these types of decisions.

- The people with implementing responsibility may not relate to the portfolio assembly process. I hope I'm wrong for TNC. We sure don't want 60+ high tech plans that sit on the shelf because of a lack of ownership or hands on participation. Also, the the last "portfolio" selection meeting in Seattle was, in my view, very rushed and insufficient. A few people from each state essentially decided if a site was in or out with little discussion/debate of why. That was all that time permitted so it was either a problem of not enough time being allocated for this task, or, it was not a goal for this to be a "team" action. I think that the whole team should have felt really good about why each site was in the final portfolio.

Internal Communication

1. Was communication among core team members sufficient during this process? If not, what were the obstacles to good communication? How could we have improved communication among team members? Was communication better or worse during certain aspects of the project?

- One problem that made our work that much more difficult was the lack of clear communication. Any one of the steps, and the options for completing them, would have been facilitated by better follow-up communications both between team members and the team leader. No one on the team knew what was going on during any stage of the process: who was responsible for what, who was doing what, what data did we have in hand or not have, who was thinking about the assembly rules, what decisions were being made.

- We did pretty good at communicating during the first phase of the process. We learned a lot about the massive needs of communication and developed some good tools, such as the twice a month email info sharing newletter we all contributed to and the use of an outsider (Michelle Coad) to prod us along and keep us on track. The only times we seemed to fail at communication was when there were real crunch sort of deadlines (such as before the Sleeping Lady meeting and at the end of Phase I).

2. Meetings. Did the core team meet often enough? Were the meetings reasonably productive and efficient? How could they have been improved?

- All things considered, the meetings were pretty good. Sometimes they were not run tightly enough and other times they were too tight (not enough time to brainstorm or discuss topics) and of course, we seemed burdened by having to do all the housekeeping stuff that is required when you have so many people involved from different offices. Possibly more sub-group meetings would have made things go faster or smoother in a few meetings but generally the meeting schedule was just about right.

- We met often enough, and the last few were productive. A few meetings of work groups would have been useful. For example, we never had enough time to discuss the science side of the process; in most of the meetings those discussions got pushed off the agenda and squeezed into hotel lobbies or rooms meetings. Those folks who needed to work thru some of the science and technical issues should have scheduled extra time to meet or separate meetings to focus on those components (sort of like a work group).

- In my mind, fewer people resulted in better meetings. The problem is to make sure that the participants are the "right" ones, e.g. have decision-making authority, are key to a part of the process that is on the agenda, and have the support of their supervisor(s) to work as much as needed on the project.

- Too many agenda items in some cases resulted in less productive meetings. It's important to be careful choosing what needs to be done face-to-face and what can be conducted via other media, such as conference calls or memos.

- There was a lot of time spent in debate and discussion at team meetings that was not effective. We had little time and it needed to be productively used. Tighter adherence to agendas would have helped. We spent hours at a meeting devising an agenda for the Sleeping Lady retreat. It was a good discussion and a lot of ideas were generated. Ultimately, however, the final meeting at Sleeping Lady in no way looked like the agenda the team had developed.

3. Many of you communicated with others involved in the project who were not on the core team. Did you run into any particular obstacles in these communications? How might they have been improved?

- There were no problems in communications with others outside the core team except that Nevada was not involved in the core team during Phase I which required some catching up on their parts at the portfolio time of the project. I would not recommend that being allowed to happen again, all states must have active representatives on core teams. It certainly helped paying the Heritage Programs to participate as they remained active throughout the process, even if their actual fees had already been spent.

4. Communicating with TNC staff involved in ecoregional planning projects elsewhere proved to take a considerable amount of time, particularly for our team leader. Do you have any suggestions on how TNC could improve communications among ecoregional planning teams? Did you identify any specific problems?

- Part of the undue communications demands were a result of being one of the first plans attempted entirely under the new paradigm. Hopefully that will not continue for all future ecoregional plans. Probably sharing lessons learned among ecoregional planning efforts with core team contacts, other than the team leader, identified as persons to call for more information may be a way to unburdent the team leaders from most general inquisitions.

- A regional ecoregional newsletter? Ecoregional Innovation Reports? Each ecoregional team put together documentation on their process (as they envision it, sort of a project plan), share it with other ecoregionally-inclined staff, including other active teams. We tried to pull together such a document for the CP, but it was never finalized or distributed- a mistake in my mind. Acknowledge that the project methods will continue to be in flux and just send it out!! Get comments, suggestions etc.

- The recent Park City meeting was great for meeting this need. I think it is important that people in the regional and perhaps home office become recognized as the "experts" on accumulated ER planning experience and they are sought out for advice by new and ongoing team leaders as opposed to one or two team leaders being called by everyone in the country.

<u>External Communications</u>

1. In January 1997, Kit Gillem drafted a communication plan for the Columbia Plateau team. Did we adequately implement this plan? If not, where did we fall short? What have been or what might be the consequences of us falling short in our external communication efforts?

- We did not implement the plan. We did bring a communications person on board at that time, which was one specific recommendation, and we still have not done much planning for press releases both internal, external and to our partners which includes the scientific experts. In short, we still are relatively unprepared for media leaks and we don't have a strategy for outside communication of the results.

- We talked about communications a lot as a team and agreed it was an issue. We crafted a set of statements or principles that we were operating under that tied pretty closely to concepts from Conservation by Design. We tried to get a communications member on the team, but we were not successful.

- Timing to communications is essential. Clearly it needs to be very strategic and thoughtful when we are disseminating information to the public, stakeholders and others. But we were not disseminating information to the public during portfolio assembly and development. It seems communications will be a bigger issue for the next phase with respect to implementation.

- Kit's plan wasn't really implemented. The problem is that various people in TNC have very mixed views on the issue of how public we should go with ER planning and the plans. Until there is a clear commitment and direction on this topic we can write communication plans but I doubt if anyone will go too far out on a limb to implement them. One outcome of this is that TNC leadership, at various levels, could choose not to implement the plans with little external consequences because we never told the world enough about the plans to be held accountable for their implementation.

2. Did we adequately identify potential partners? Did we distinguish these partners from stakeholders? Are you satisfied with the extent to which we involved partners? What would you have done differently?

- We may have identified the partners, although I don't profess to having seen a comprehensive list, and I would assume that all partners are stakeholders. I think we can always do more with partners by way of involving them but this being the first effort I think it was prudent to keep most partners at arms length as we struggled with the scope of the work outlined for ourselves.

- We prematurely with USFWS and BLM directors during the early part of this process and it was not an especially productive or important meeting. We needed to have more specifics, more information, or even maps to share with them to really engage their support. And we really need to met with line officers and managers, resource area managers, district rangers etc. when we want their support for specifc sites.

- This needs to be done in connection with developing strategies, multi-site strategies and site conservation plans.

- This was somewhat inadequate but I think it is also a consequence of some uncertainty about TNC's capability/commitment to implementing the plan. That is, we don't want to go very public with something that we might not be able to deliver on. Our experience with implementing some recent state wide plans may justify these reservations. I don't think that people in TNC have thought much about the prospect that our "successful" conservation strategies/capabilities may not be entirely appropriate/adequate for the huge job of implementing one, much less 60+, ER plans in any reasonable length of time. Until we successfully address, "organization by design," and "measures of success" in terms of the results of ER plans, the actual portfolio sites and their cumulative conservation needs, all of this is going to remain pretty fuzzy.

3. Was our communication with external audiences such as state chapter trustees or key federal agency contacts sufficient? Was it timely? What steps could we have taken to improve our communication with external audiences? Did we use the right communication vehicles? How else might we have chosen to communicate with external audiences?

- We failed in our external communications, mostly with chapter trustees as they still don't really have any appreciation for what the Geography of Hope is all about or what TNCs Conservation by Design really means and ecoregional planning is actually the first real tangible evidence that we are serious with our newly laid out path for the next 5-10 years. Communication vehicles about this stuff should be straight forward and simple, maps, briefings, and face to face talk about the results and the problems and pitfalls with the trustees.

- The Sawhill video is a good communication vehicle for state trustees. We started discussing ecoregional planning and the Columbia Plateau project early with trustees. By about the third or fourth time they heard the story, I think they comprehended the project.

- The regional trustees meeting was great. We should have had key trustees from all the states at the Sleeping Lady meeting. We did okay with the feds under the circumstances. The experts workshop helped in this regard.

Columbia Plateau Ecoregional Planning
Lessons Learned

Bob Moseley
May 27, 1997

Botany - Conservation Targets and Portfolio Assembly

I got an excellent and timely response from Heritage botanists in the ecoregion (Utah, Nevada, Oregon, Washington, and, obviously, Idaho) to my requests for ecoregional rare plant conservation targets.

154 species ranked G1-G3 (globally rare) were identified in the ecoregion. Many are endemic to the ecoregion, the rest have a significant portion of their range in the ecoregion. It is suggested in the *Designing a Geography of Hope* guidelines that rangewide conservation assessments are the best vehicle to determine the "best and viable" occurrences. While rangewide assessments have been completed for some high priority species, as part of other state or regional efforts, most do not. From the outset, rangewide assessments for globally rare plants on the Columbia Plateau was considered unrealistic.

There are many other plants that are endemic to the Columbia Plateau Ecoregion that are not tracked by the heritage programs (usually ranked G3 or mostly G4). These species were not considered in the portfolio design.

160 "state-rare" species (G4-G5, S1-S3) were identified in the ecoregion. These were not used in the portfolio design, largely due to time and complexity. We had to assume that the coarse filter will take care of these.

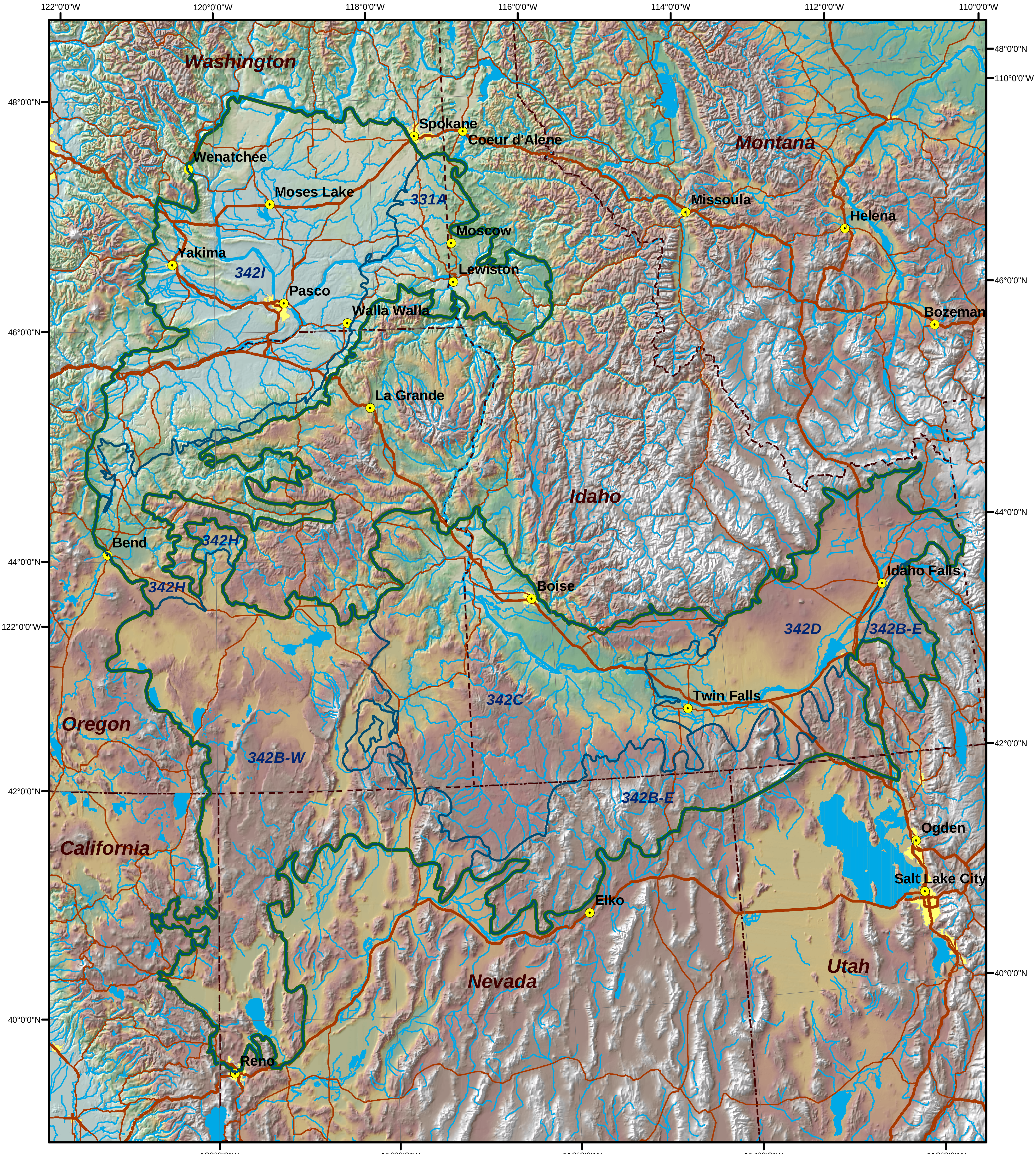
At the beginning of the process, we began to assign Ecoregional Ranks (similar definitions to G and S ranks) for the globally rare species. We backed off of this after a couple of states had done it because for most species, the "E" rank equaled the G rank and initially it was unclear how this would be used in the portfolio design. We probably should have followed through with this exercise. I think it would have been more useful than simply knowing whether that species was endemic to the ecoregion or not. It would have helped identify those non-endemics for which conservation on the Columbia Plateau was critical, at least.

Data Acquisition/Information Management

We (the Heritage network and TNC) need to expand the definition of "Heritage data." It is very clear from this pilot exercise and the *Design for the Future Project* just completed by the WRO that for biodiversity conservation planning, in particular, and land management planning, in general, rare species and community occurrence data alone are not enough. We need meso- and broad scale biodiversity data, as well as basic distribution data for common species. Also painfully obvious is that aquatic data, at all scales, is woefully inadequate in Heritage and other data systems. These types of data are available either publicly (e.g., CRB data) or through partnerships with other institutions (e.g., Gap Analysis). They should become standard Heritage information.

An important lesson I learned is that we (data wonks) should be able to anticipate the data needs of ecoregional planning teams and have (nearly) all the important data ready up front -- at the first meeting of the team. Ideally, future ecoregional planning teams should not have to deal with the data acquisition tasks, instead jump right in and use the data in developing the portfolio. Hopefully, someday this task can easily be filled by the Heritage Programs (see above). Realizing that this "someday" may be a ways off, an advance team of data people (including GIS) should be assembled to compile as much as possible before the core planning team actually starts.

Figure 1: The Columbia Plateau Ecoregion



Legend

Columbia Plateau Ecoregion

Subsections

Roads

Interstates

Highways

Cities

Urban Areas

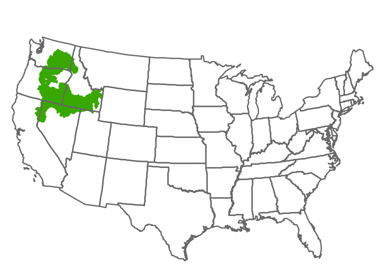
Rivers

States

Elevation

4249 m

6 m



Projection:
Albers Conic Equal Area
Central_Meridian: -120.5
Standard_Parallel_1: 46.00
Standard_Parallel_2: 48.00
Latitude_Of_Origin: 42.00
GCS_North_American_1983

Data Sources:
Interior Columbia Basin Ecosystems Management Project 1996
Environmental Systems Research Institute
World Wildlife / Baily Ecoregions
The Nature Conservancy

0 25 50 100 150 Miles

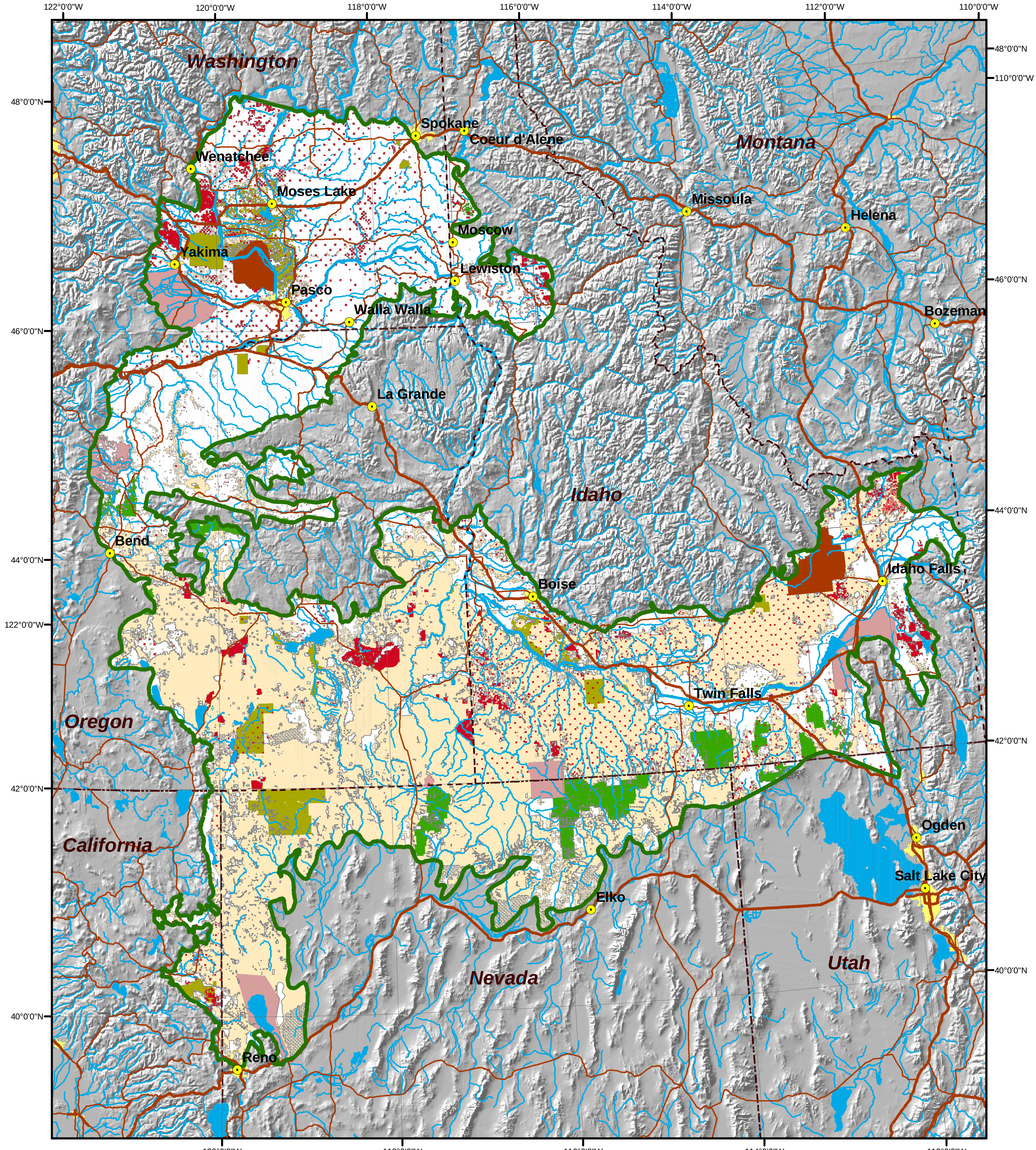
0 25 50 100 150 200 kms

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Map Produced:March 31, 2003

Cartography: Andrew Weiss, Ecoregional Data Management Team, NW Division

Figure 2: Ownership Patterns in the Ecoregion



Legend

- Columbia Plateau Ecoregion

Roads

- Interstates
- Highways
- Cities
- Urban Areas
- Rivers
- States

Ownership

- Private
- State
- Tribal
- DOD/Other Federal
- BLM
- USFS
- DOE

Projection:
Albers Conic Equal Area
Central_Meridian: -120.5
Standard_Parallel_1: 46.00
Standard_Parallel_2: 48.00
Latitude_Of_Origin: 42.00
GCS_North_American_1983

Data Sources:
Interior Columbia Basin Ecosystems Management Project 1996
Environmental Systems Research Institute
World Wildlife / Baily Ecoregions
The Nature Conservancy

0 25 50 100 150 Miles

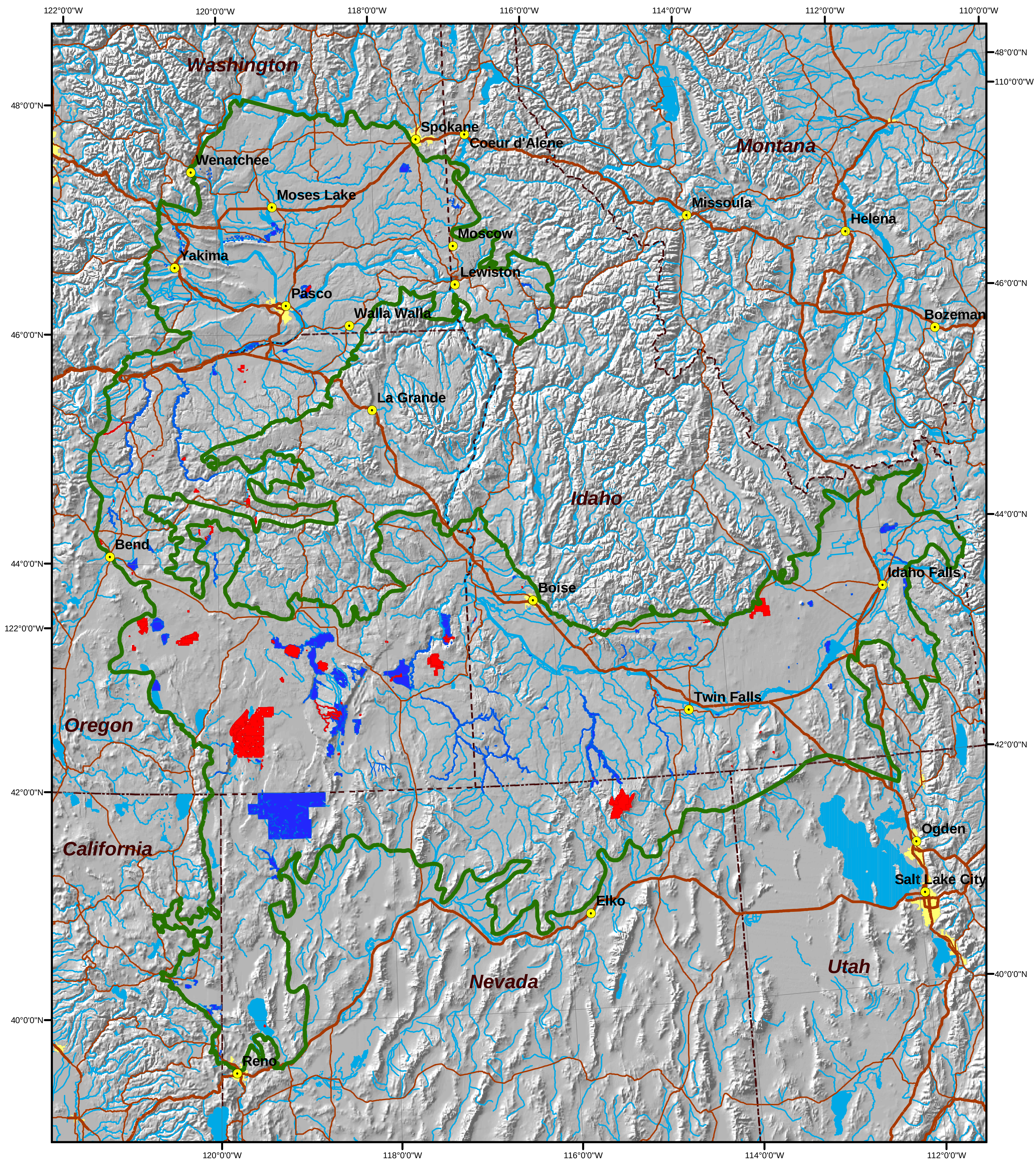
0 25 50 100 150 200 kms

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Map Produced: March 31, 2003

Cartography: Andrew Weiss, Ecoregional Data Management Team, NW Division

Figure 4: Existing Conservation Areas in the Ecoregion



Legend

Columbia Plateau Ecoregion

Roads

Interstates

Highways

Cities

Urban Areas

Rivers

States

Protected Areas

Existing Conservation Areas

GAP Level 1

GAP Level 2

Projection:
Albers Conic Equal Area
Central_Meridian: -120.5
Standard_Parallel_1: 46.00
Standard_Parallel_2: 48.00
Latitude_Of_Origin: 42.00
GCS_North_American_1983

Data Sources:
Interior Columbia Basin Ecosystems Management Project 1996
Environmental Systems Research Institute
World Wildlife / Baily Ecoregions
The Nature Conservancy

0 25 50 100 150 Miles

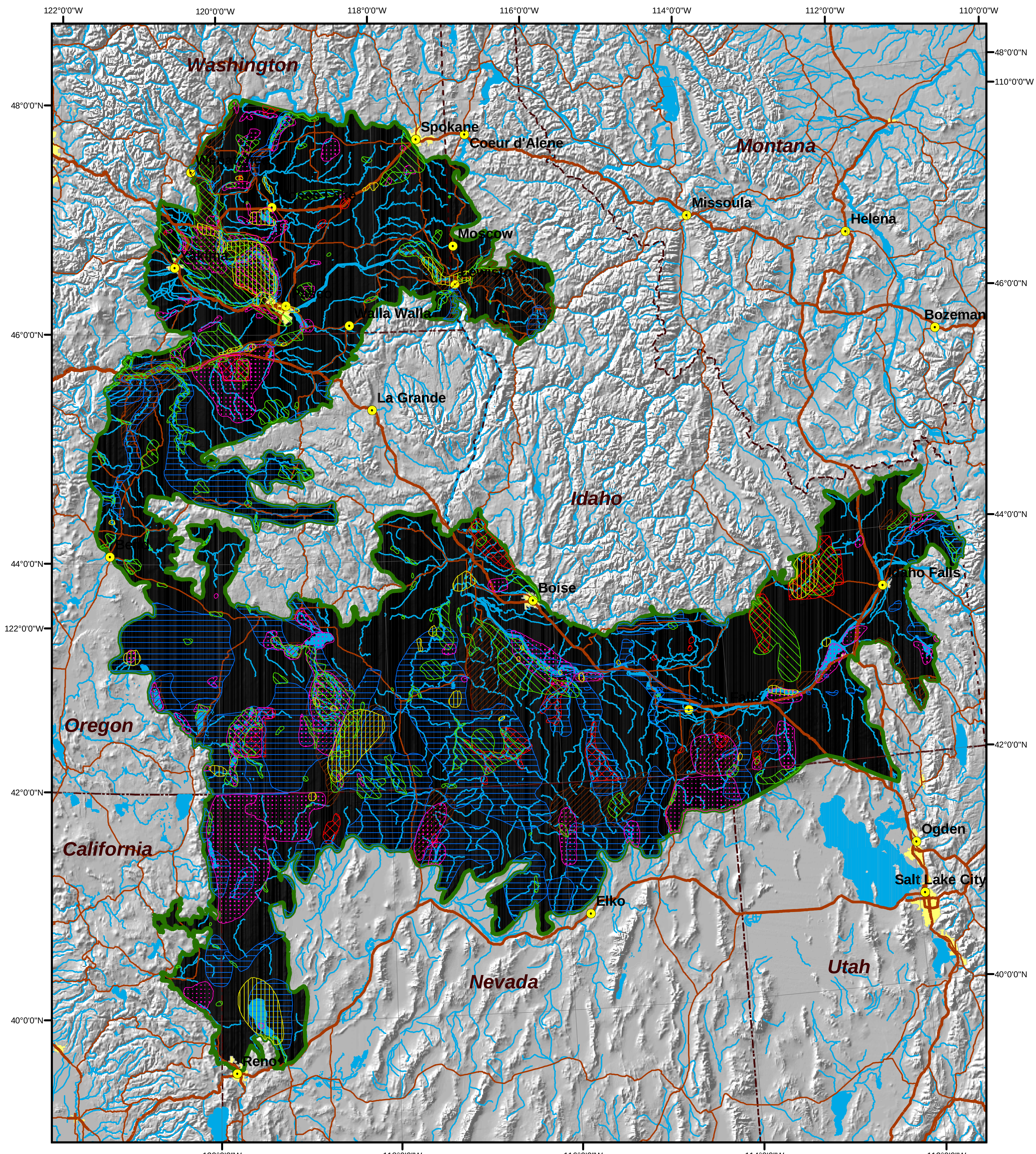
0 25 50 100 150 200 kms

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Map Produced:March 31, 2003

Cartography: Andrew Weiss, Ecoregional Data Management Team, NW Division

Figure 5: Expert Delineations of Key Biodiversity Areas



Legend

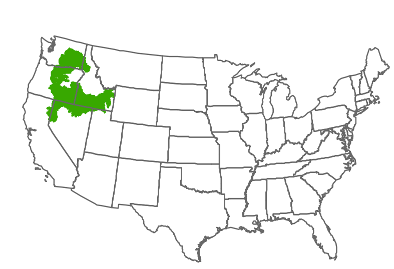
Columbia Plateau Ecoregion

Roads

- Interstates
- Highways
- Cities
- Urban Areas
- Rivers
- States

Expert Delineated Areas of Significant Biodiversity

- Terrestrial
- Mammals
- Birds
- Herps
- Plants
- Aquatics



Projection:
Albers Conic Equal Area
Central_Meridian: -120.5
Standard_Parallel_1: 46.00
Standard_Parallel_2: 48.00
Latitude_Of_Origin: 42.00
GCS_North_American_1983

Data Sources:
Interior Columbia Basin Ecosystems Management Project 1996
Environmental Systems Research Institute
World Wildlife / Baily Ecoregions
The Nature Conservancy

0 25 50 100 150 Miles

0 25 50 100 150 200 kms

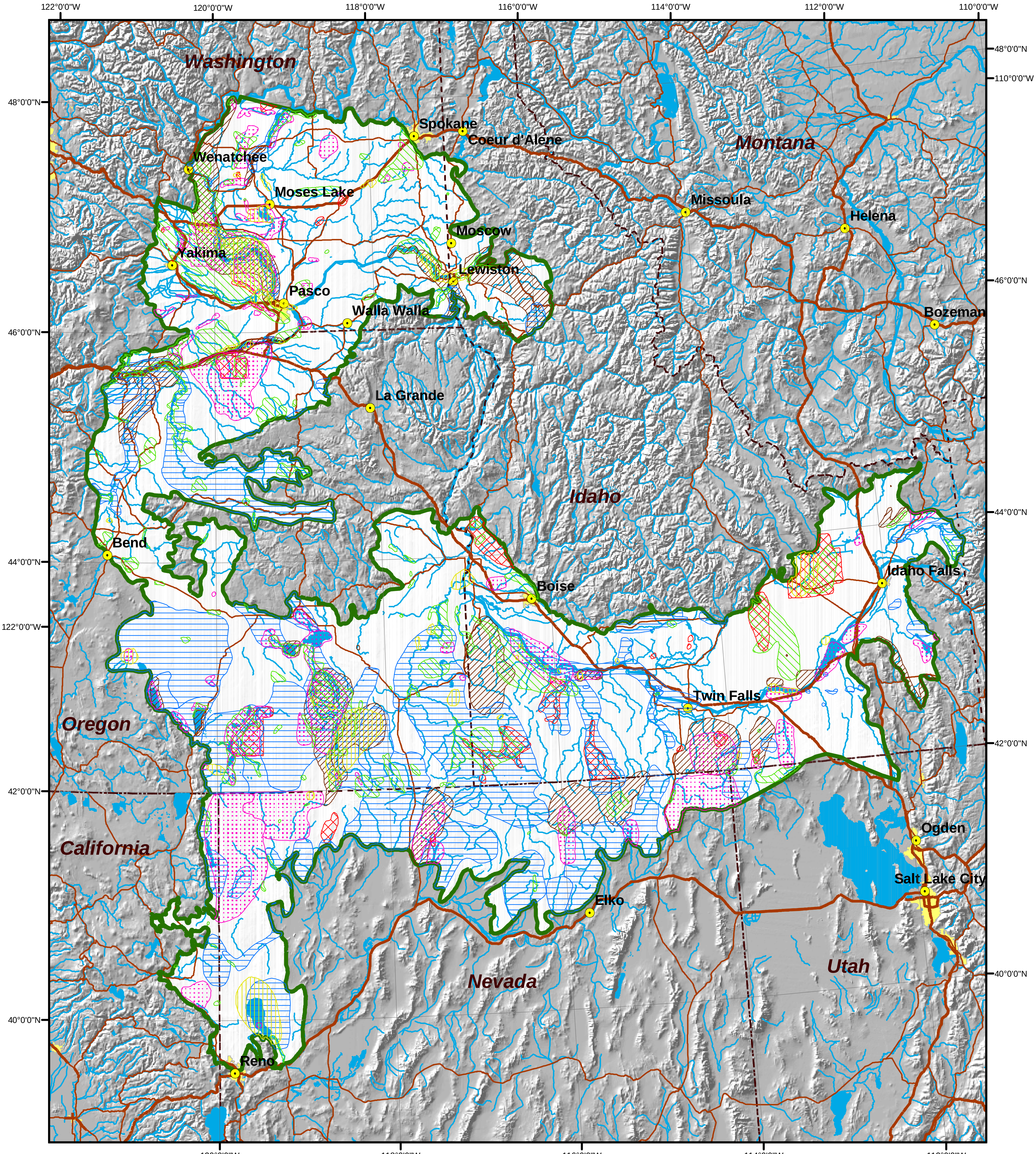
N W E S

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Map Produced:March 31, 2003

Cartography: Andrew Weiss, Ecoregional Data Management Team, NW Division

Figure 5: Expert Delineations of Key Biodiversity Areas



Legend

Columbia Plateau Ecoregion

Roads

Interstates

Highways

Cities

Urban Areas

Rivers

States

Expert Delineated Areas of Significant Biodiversity

Terrestrial

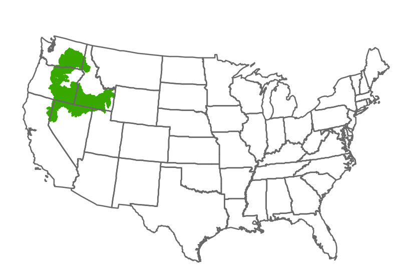
Mammals

Birds

Herps

Plants

Aquatics



Projection:
Albers Conic Equal Area
Central_Meridian: -120.5
Standard_Parallel_1: 46.00
Standard_Parallel_2: 48.00
Latitude_Of_Origin: 42.00
GCS_North_American_1983

Data Sources:
Interior Columbia Basin Ecosystems Management Project 1996
Environmental Systems Research Institute
World Wildlife / Baily Ecoregions
The Nature Conservancy

0 25 50 100 150 Miles

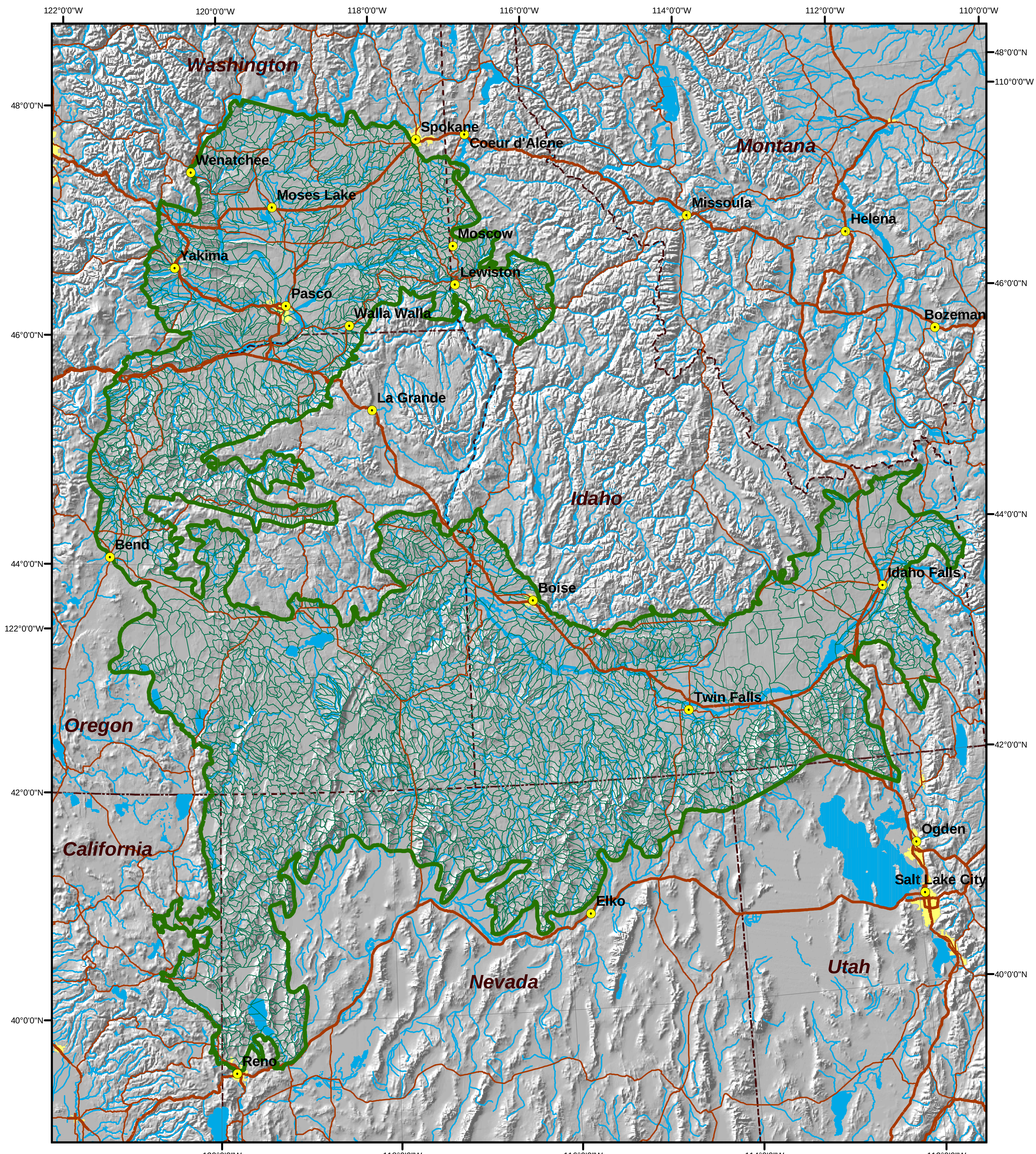
0 25 50 100 150 200 kms

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Map Produced: March 31, 2003

Cartography: Andrew Weiss, Ecoregional Data Management Team, NW Division

Figure 6: Sixth Field HUC Subwatersheds in the Ecoregion



Legend

Columbia Plateau Ecoregion

6th Field Watersheds

Roads

Interstates

Highways

Cities

Urban Areas

Rivers

States

Projection:
Albers Conic Equal Area
Central_Meridian: -120.5
Standard_Parallel_1: 46.00
Standard_Parallel_2: 48.00
Latitude_Of_Origin: 42.00
GCS_North_American_1983

Data Sources:
Interior Columbia Basin Ecosystems Management Project 1996
Environmental Systems Research Institute
World Wildlife / Baily Ecoregions
The Nature Conservancy

0 25 50 100 150 Miles

0 25 50 100 150 200 kms

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Map Produced:March 31, 2003

Cartography: Andrew Weiss, Ecoregional Data Management Team, NW Division

Figure 7: BMAS Model Portfolio

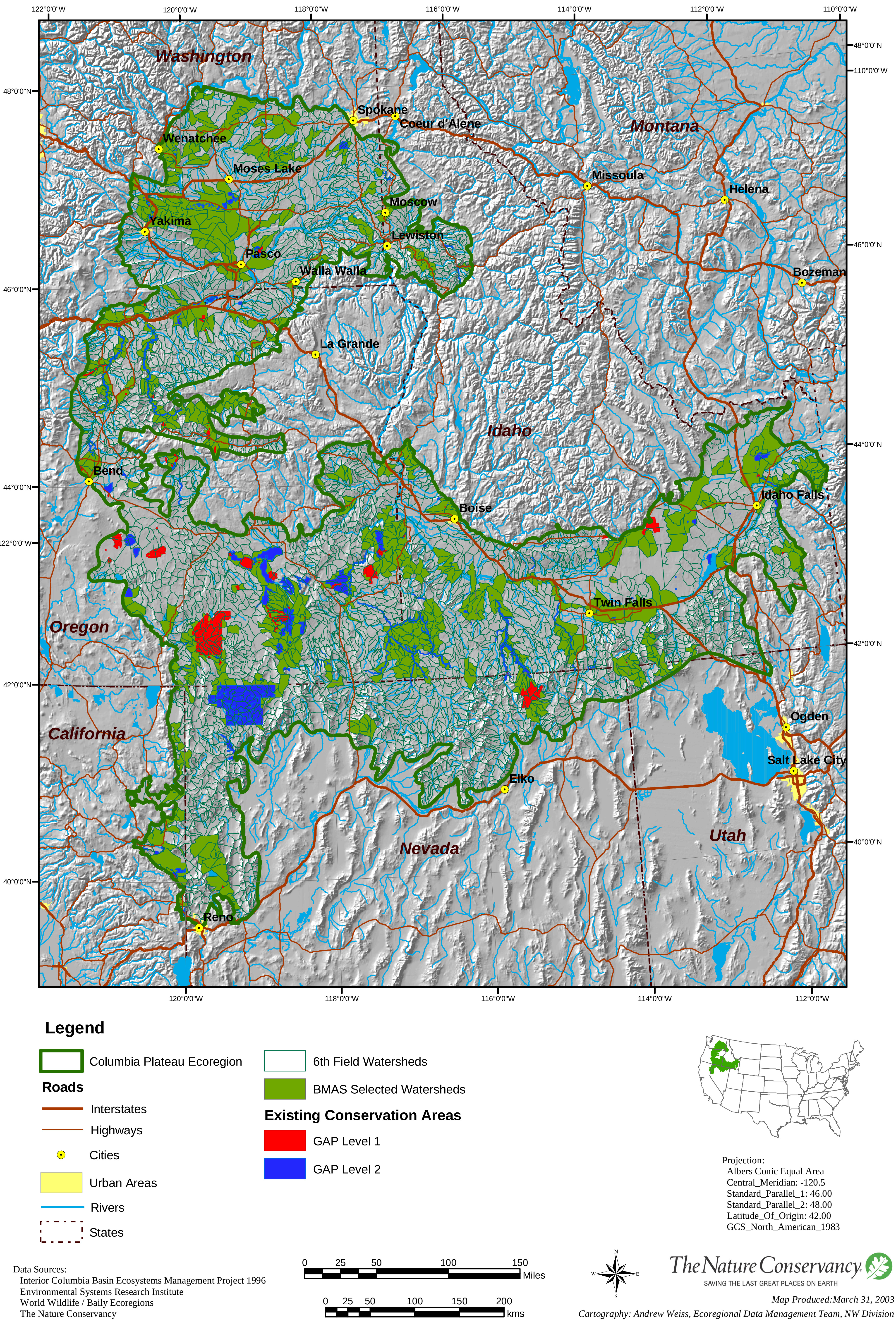
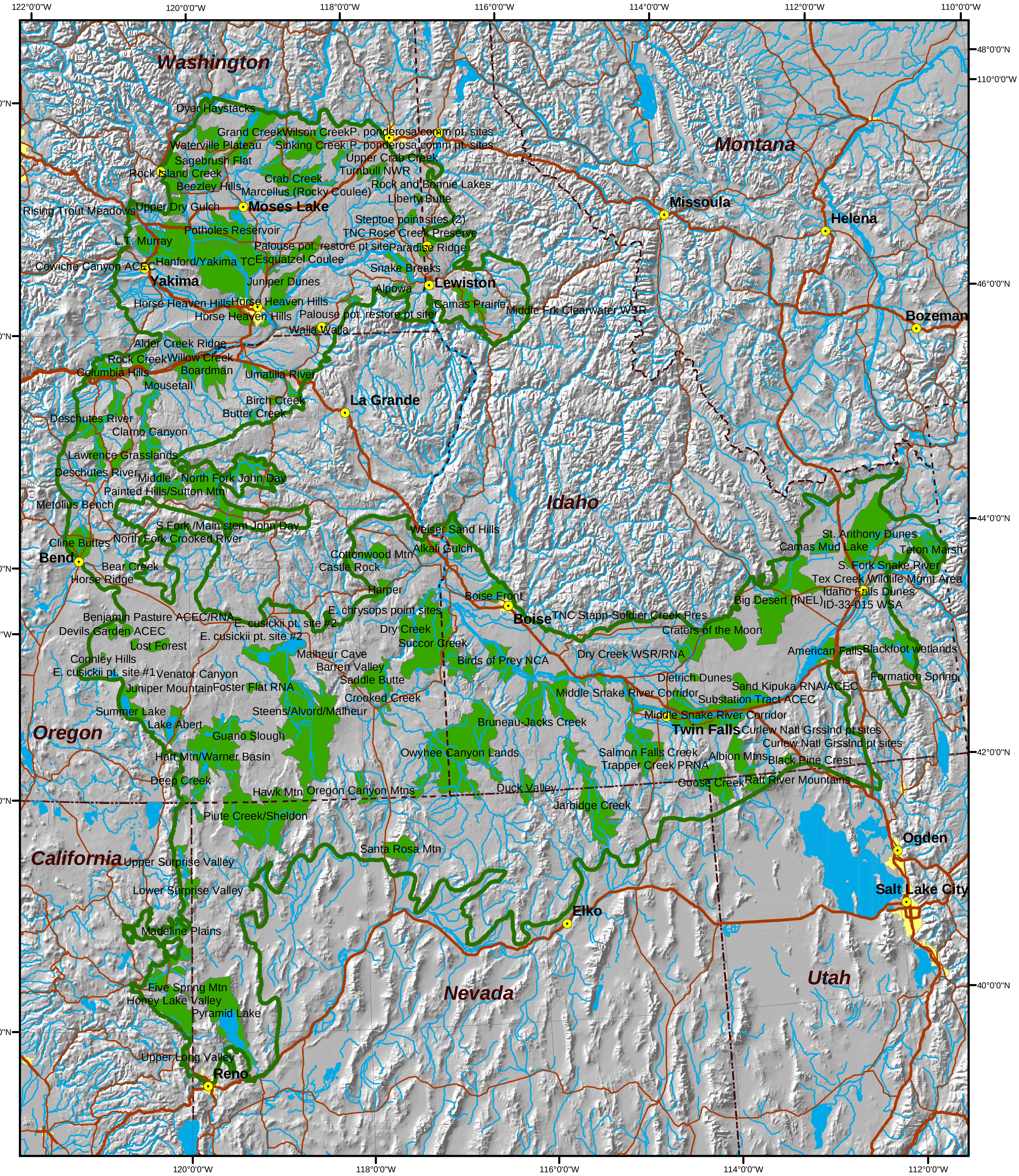


Figure 8: First Iteration Conservation Portfolio



Legend

Columbia Plateau Ecoregion
Conservation Sites

Roads

Interstates
Highways
Cities
Urban Areas
Rivers
States

Projection:
Albers Conic Equal Area
Central_Meridian: -120.5
Standard_Parallel_1: 46.00
Standard_Parallel_2: 48.00
Latitude_Of_Origin: 42.00
GCS_North_American_1983

Data Sources:
Interior Columbia Basin Ecosystems Management Project 1996
Environmental Systems Research Institute
World Wildlife / Baily Ecoregions
The Nature Conservancy

0 25 50 100 150 Miles

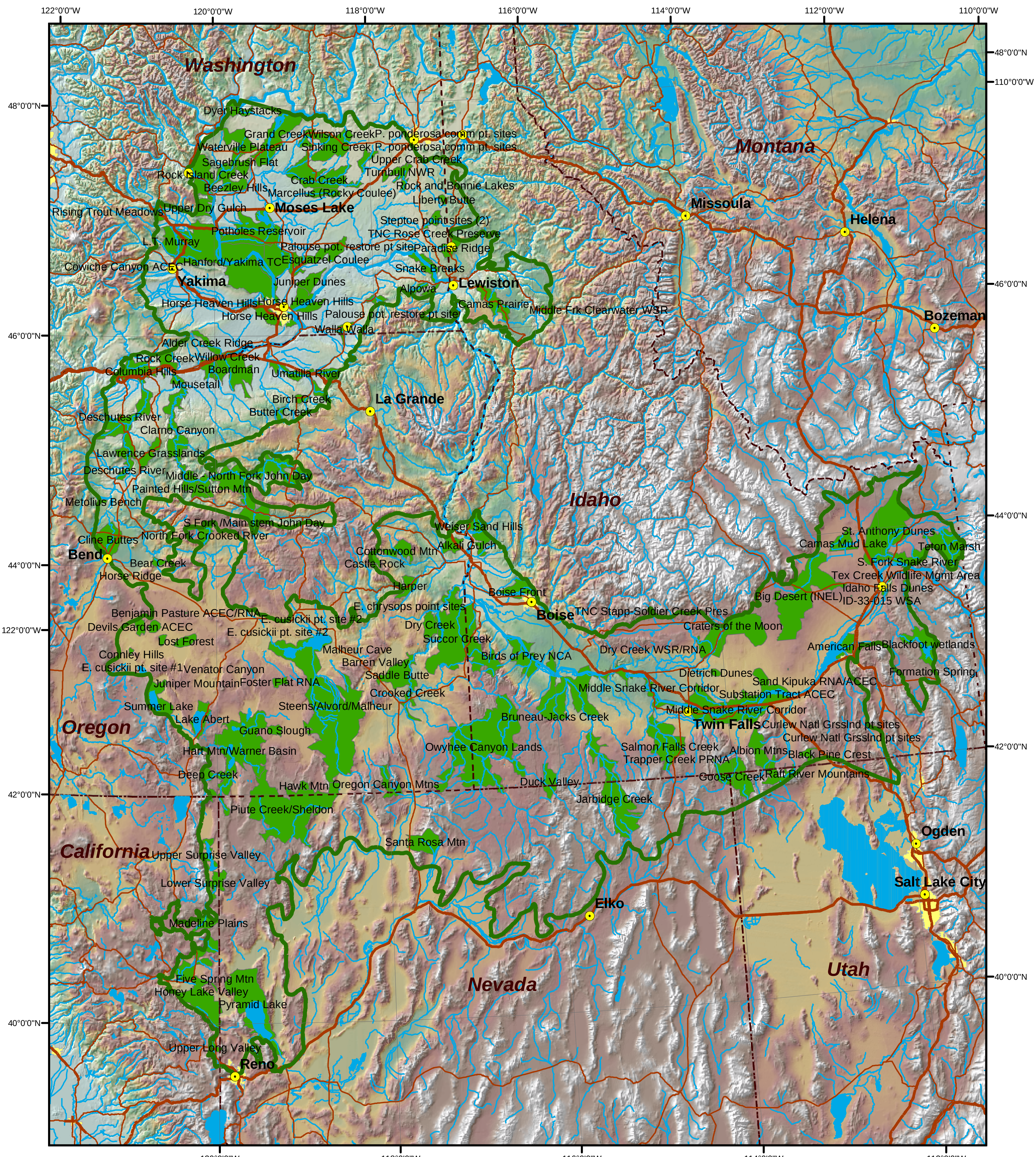
0 25 50 100 150 200 kms

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Map Produced:March 31, 2003

Cartography: Andrew Weiss, Ecoregional Data Management Team, NW Division

Figure 8: First Iteration Conservation Portfolio



Legend

- Columbia Plateau Ecoregion
- Conservation Sites

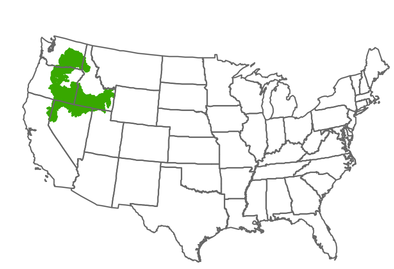
Roads

- Interstates
- Highways
- Cities
- Urban Areas
- Rivers
- States

Elevation

4249 m

6 m



Projection:
Albers Conic Equal Area
Central_Meridian: -120.5
Standard_Parallel_1: 46.00
Standard_Parallel_2: 48.00
Latitude_Of_Origin: 42.00
GCS_North_American_1983

Data Sources:
Interior Columbia Basin Ecosystems Management Project 1996
Environmental Systems Research Institute
World Wildlife / Baily Ecoregions
The Nature Conservancy

0 25 50 100 150 Miles

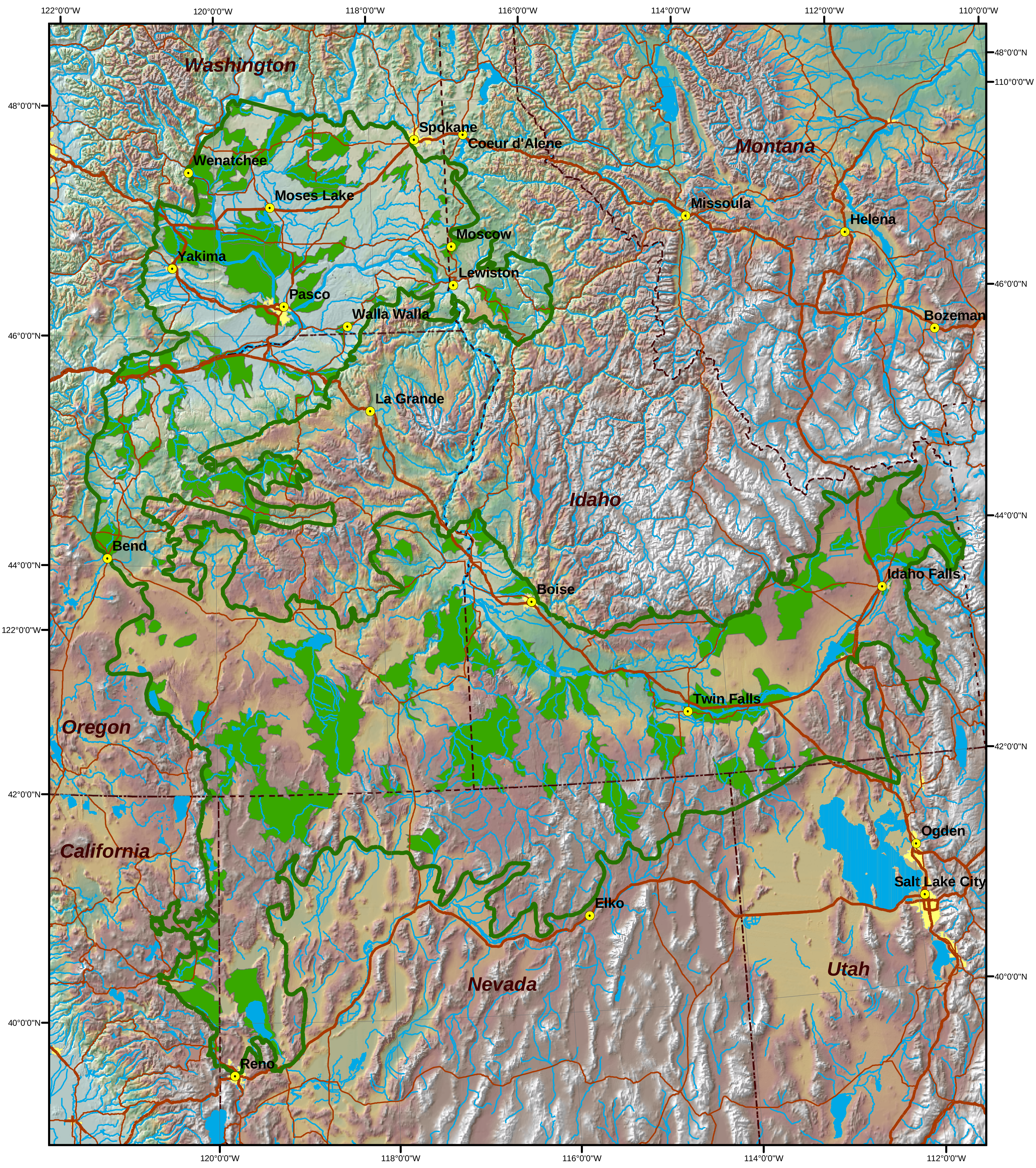
0 25 50 100 150 200 kms

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Map Produced:March 31, 2003

Cartography: Andrew Weiss, Ecoregional Data Management Team, NW Division

Figure 8: First Iteration Conservation Portfolio



Legend

Columbia Plateau Ecoregion

Conservation Sites

Roads

Interstates

Highways

Cities

Urban Areas

Rivers

States

Elevation

4249 m

6 m

Projection:
Albers Conic Equal Area
Central_Meridian: -120.5
Standard_Parallel_1: 46.00
Standard_Parallel_2: 48.00
Latitude_Of_Origin: 42.00
GCS_North_American_1983

Data Sources:
Interior Columbia Basin Ecosystems Management Project 1996
Environmental Systems Research Institute
World Wildlife / Baily Ecoregions
The Nature Conservancy

0 25 50 100 150 Miles

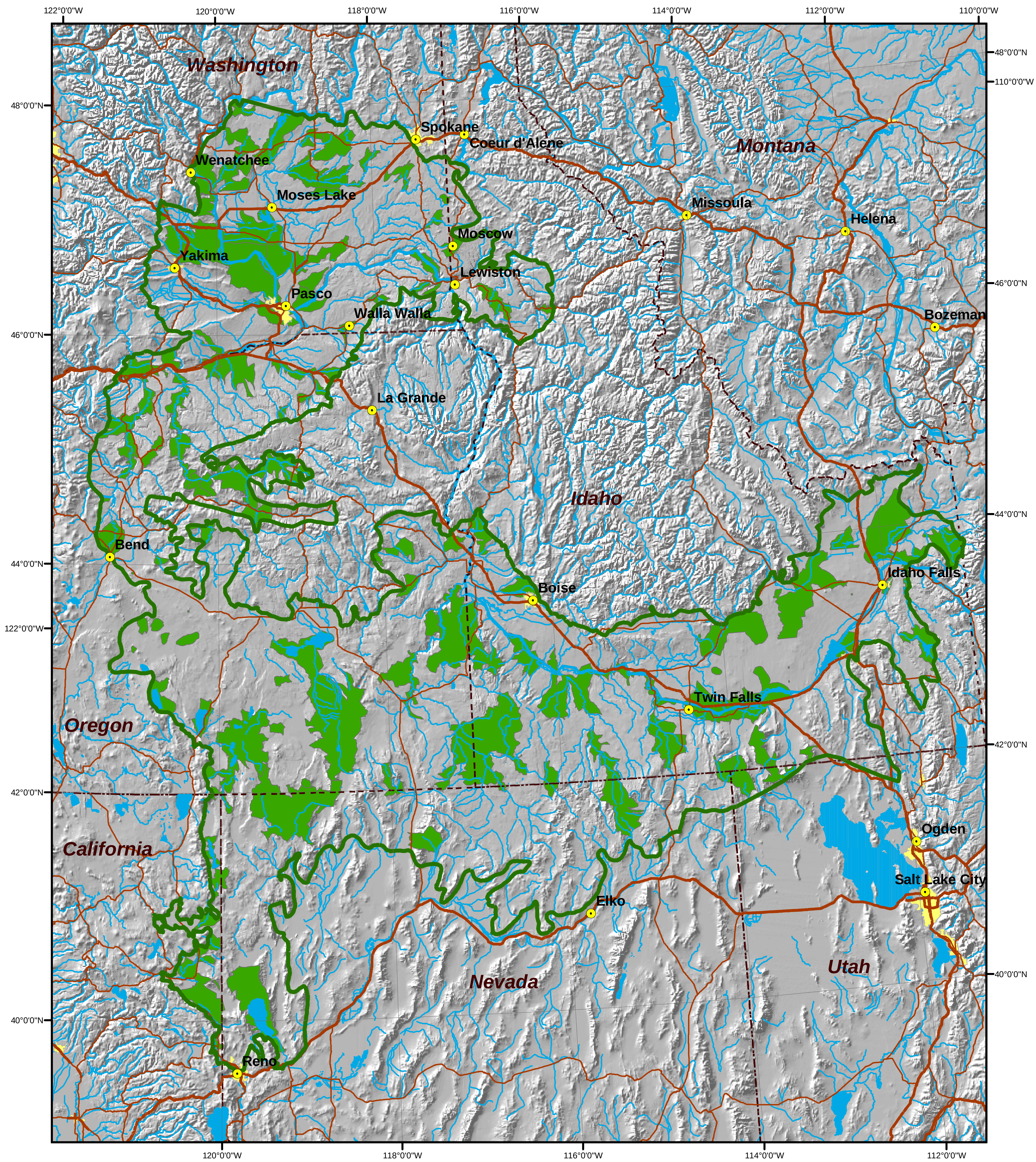
0 25 50 100 150 200 kms

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Map Produced:March 31, 2003

Cartography: Andrew Weiss, Ecoregional Data Management Team, NW Division

Figure 8: First Iteration Conservation Portfolio



Legend

Columbia Plateau Ecoregion

Conservation Sites

Roads

Interstates

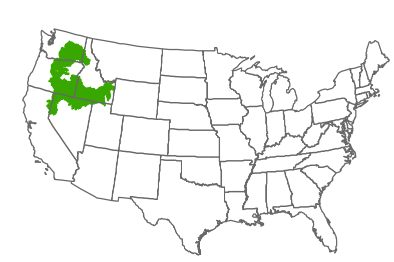
Highways

Cities

Urban Areas

Rivers

States



Projection:
Albers Conic Equal Area
Central_Meridian: -120.5
Standard_Parallel_1: 46.00
Standard_Parallel_2: 48.00
Latitude_Of_Origin: 42.00
GCS_North_American_1983

Data Sources:
Interior Columbia Basin Ecosystems Management Project 1996
Environmental Systems Research Institute
World Wildlife / Baily Ecoregions
The Nature Conservancy

0 25 50 100 150 Miles

0 25 50 100 150 200 kms

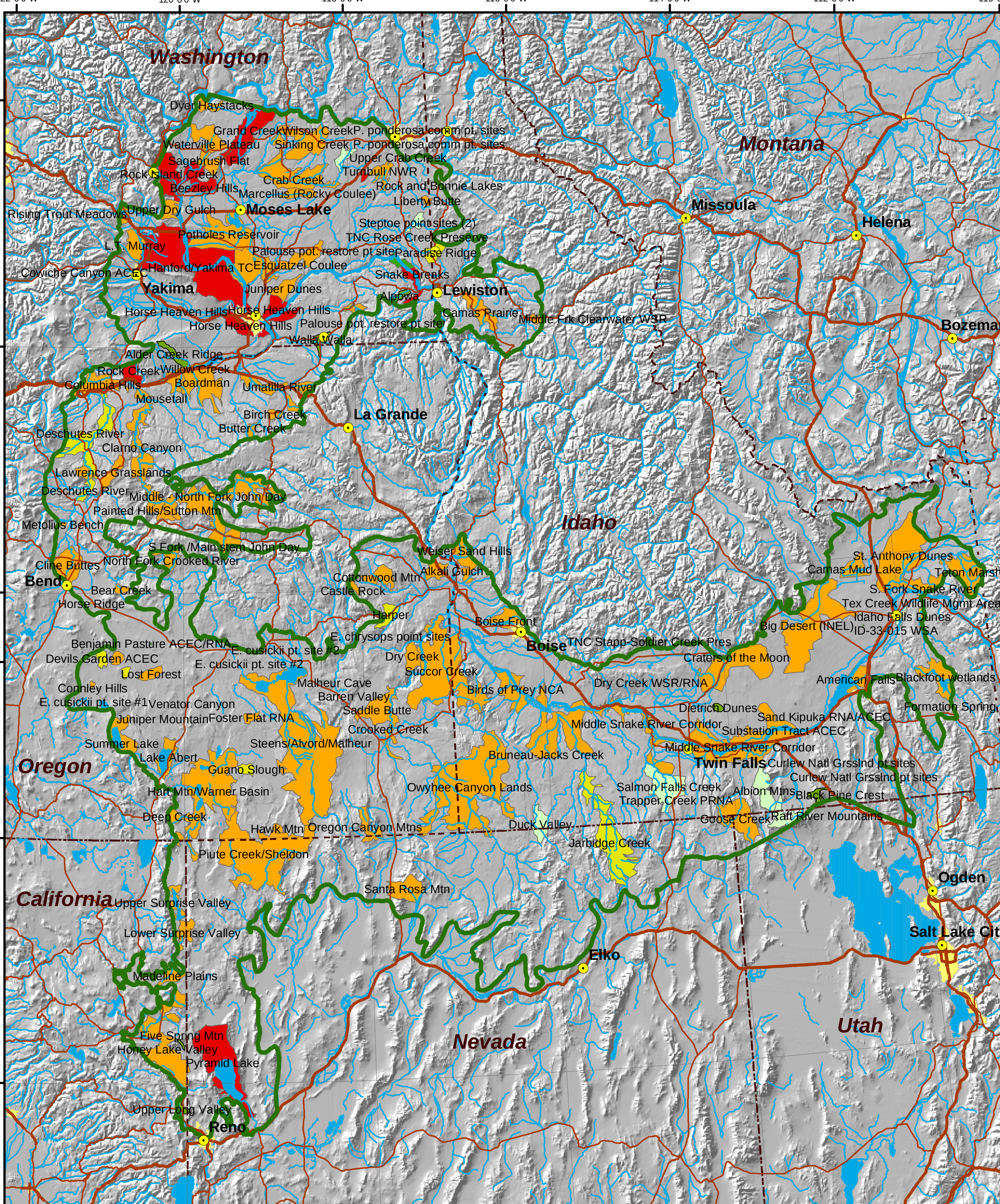
N W E S

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Map Produced:March 31, 2003

Cartography: Andrew Weiss, Ecoregional Data Management Team, NW Division

Figure 9: Scope of Threats at Portfolio Sites



Legend

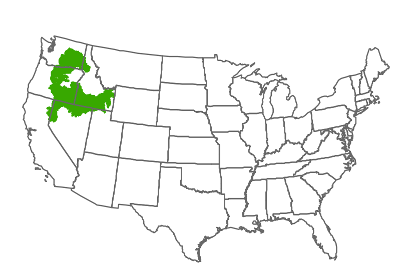
Columbia Plateau Ecoregion

Roads

- Interstates
- Highways
- Cities
- Urban Areas
- Rivers
- States

Scope of Threats

- Unknown
- None
- Minor
- Significant
- Loss Likely



Projection:
Albers Conic Equal Area
Central_Meridian: -120.5
Standard_Parallel_1: 46.00
Standard_Parallel_2: 48.00
Latitude_Of_Origin: 42.00
GCS_North_American_1983

Data Sources:
Interior Columbia Basin Ecosystems Management Project 1996
Environmental Systems Research Institute
World Wildlife / Baily Ecoregions
The Nature Conservancy

0 25 50 100 150 Miles

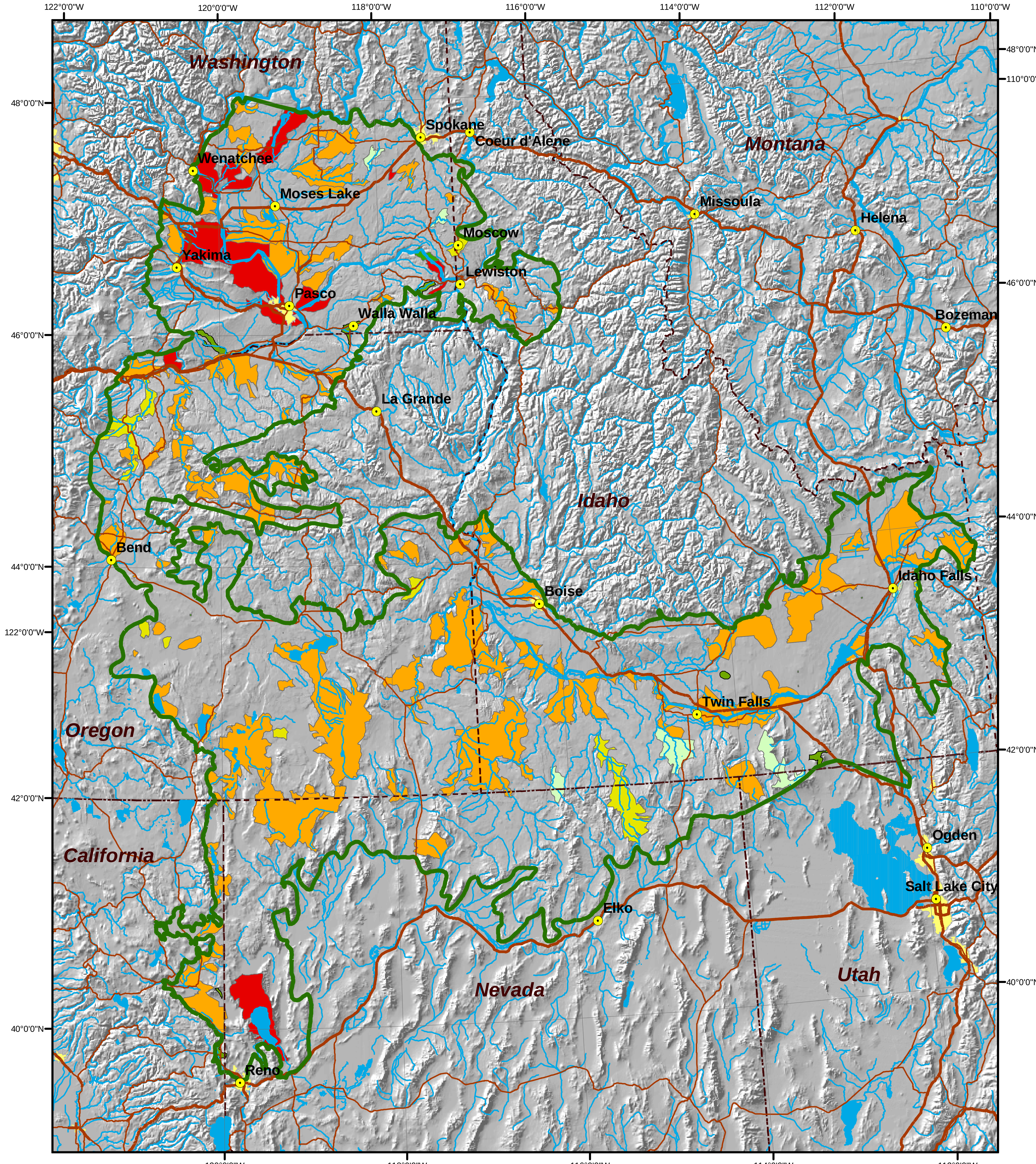
0 25 50 100 150 200 kms

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Map Produced: March 31, 2003

Cartography: Andrew Weiss, Ecoregional Data Management Team, NW Division

Figure 9: Scope of Threats at Portfolio Sites



Legend

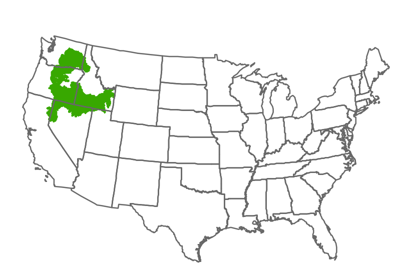
Columbia Plateau Ecoregion

Roads

- Interstates
- Highways
- Cities
- Urban Areas
- Rivers
- States

Scope of Threats

- Unknown
- None
- Minor
- Significant
- Loss Likely



Projection:
Albers Conic Equal Area
Central_Meridian: -120.5
Standard_Parallel_1: 46.00
Standard_Parallel_2: 48.00
Latitude_Of_Origin: 42.00
GCS_North_American_1983

Data Sources:
Interior Columbia Basin Ecosystems Management Project 1996
Environmental Systems Research Institute
World Wildlife / Baily Ecoregions
The Nature Conservancy

0 25 50 100 150 Miles

0 25 50 100 150 200 kms

N W E S

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

Map Produced: March 31, 2003

Cartography: Andrew Weiss, Ecoregional Data Management Team, NW Division