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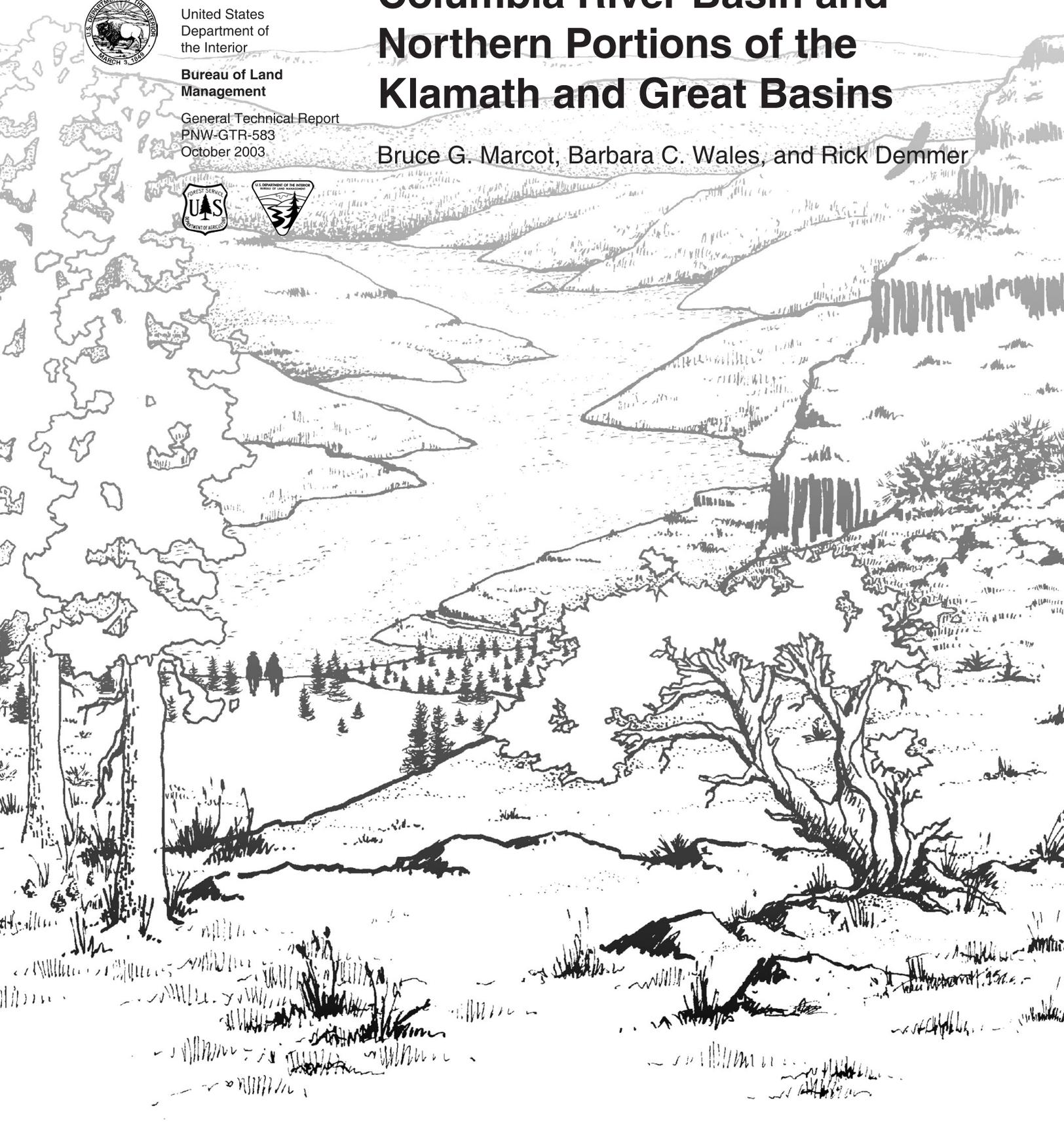
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Range Maps of Terrestrial Species in the Interior Columbia River Basin and Northern Portions of the Klamath and Great Basins

Bruce G. Marcot, Barbara C. Wales, and Rick Demmer



Authors

Bruce G. Marcot is a wildlife biologist, U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Forestry Sciences Laboratory, 620 SW Main St., Suite 400, Portland, Oregon 97205; **Barbara C. Wales** is a wildlife biologist, U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Forestry and Range Sciences Laboratory, 1401 Gekeler Lane, La Grande, Oregon 97850; **Rick Demmer** is a natural resource specialist, U.S. Department of the Interior, Bureau of Land Management, Prineville District, P.O. Box 550, 3050 NE 3rd St., Prineville, Oregon 97754.



Range Maps of Terrestrial Species in the Interior Columbia River Basin and Northern Portions of the Klamath and Great Basins

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**Interior Columbia Basin Ecosystem Management Project:
Scientific Assessment**

Thomas M. Quigley, Editor

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Abstract

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Current range distribution maps are presented for 14 invertebrate, 26 amphibian, 26 reptile, 339 bird, and 125 mammal species and selected subspecies (530 total taxa) of the interior Columbia River basin and northern portions of the Klamath and Great Basins in the United States. Also presented are maps of historical ranges of 3 bird and 10 mammal species, and 6 maps of natural areas designated by federal agencies and other organizations. The species range maps were derived from a variety of publications and from expert review and unpublished data, and thus differ in degree of accuracy and resolution. The species maps are available in computer versions and are indexed herein by common and scientific names.

Keywords: Maps, species range, species distribution, wildlife, invertebrates, arthropods, amphibians, reptiles, birds, mammals, bats, biodiversity, endemism, natural areas, interior Columbia River basin, Klamath Basin, Great Basin.

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Interior Columbia
Basin Ecosystem
Management Project

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Introduction

During 1993–96, a major assessment—the Interior Columbia Basin Ecosystem Management Project (ICBEMP)—was undertaken to develop ecological, economic, and social science information for broad-scale, federal land management planning in the interior Columbia River basin (CRB) of the United States. The study area (hereafter, CRB assessment area) included lands within the Columbia River basin south of Canada and east of the Cascade Range crest, as well as northern portions of the Great Basin and the Klamath Basin in southern Oregon.

The technical assessment team assembled for this task was named the Science Integration Team (SIT). Its charge was to produce (a) a framework for ecosystem management; (b) an ecological, economic, and social assessment of past and current conditions within the CRB assessment area; (c) an integrated assessment discussing overall ecological integrity goals and conditions within the CRB assessment area; and (d) an analysis of planning alternatives for ecosystem management on USDI Bureau of Land Management (BLM) and USDA Forest Service (FS) lands within the CRB assessment area, as part of an environmental impact statement (EIS). Additionally, many ancillary products were to result from the SIT efforts, including new databases for species information, simulation models, science reports presenting supporting analyses, new concepts and methods of assessing conditions and effects of management, and maps of environmental, economic, and social conditions within the CRB assessment area.

This report presents maps of terrestrial species and communities of the CRB assessment area as one part of the results from the terrestrial ecology staff of SIT. The maps were used in many ways to produce some of the SIT products listed above, particularly the terrestrial ecology portions of the ecological assessment and EIS analysis. They also have been used in ongoing analyses to aid forest and land management planning.

Geographic Area Description

Area and Ownerships

The CRB assessment area covers 58 465 400 ha and includes portions of seven Western States in the United States. It extends to the Canadian border on the north, the Cascade Range crest on the west, the Continental Divide on the east, and the southern Oregon border and Columbia River basin drainage boundary on the south. In southern Oregon, the CRB assessment area includes portions of the northern Klamath Basin (1.5 million ha of which occur within the CRB assessment area) and the northern Great Basin (4.2 million ha). About half (52 percent) of the CRB assessment area is in BLM and FS lands, and the rest is in private (38 percent), state and other federal (6 percent), tribal (4 percent), and other wilderness and national park (1 percent) lands.

Diversity of Landforms and Vegetation

The CRB assessment area is “landlocked” in a continental setting of great topographic and geographic diversity. It contains nine major landforms including bottom-land plains, till plains, valleys, plateaus, intermontane basins, breaks, foothills, unglaciated mountains, and glaciated mountains (see Marcot et al. 1998 for further descriptions). A wide variety of vegetation and other communities historically and currently exist within the CRB assessment area, including herblands, grasslands, sagebrush steppe; riparian herblands, shrublands, and woodlands; lower elevation pine and mixed-conifer forests, as well as a variety of montane and subalpine forests; alpine tundra and barren (rock and ice) lands; open water (lakes and rivers); and (currently) agricultural land interspersed with growing urban areas. There have been many changes in the vegetation of the CRB assessment area since historical times (see Marcot et al. 1998).

Diversity and Distribution of Biota

Its geographic extent (nearly a tenth of the area of the continental United States) and diversity of landforms, along with its continental setting, mean that the CRB assessment area has come

to be inhabited by a wide variety of plants and animals. Some species, subspecies, and races occur as local endemics, found nowhere else except in particular sites within the CRB assessment area, or as regional endemics, found only in the Western States. The distributions of still others occur only on the periphery of the CRB assessment area and extend beyond. And some species are more widely distributed within both the CRB assessment area and throughout western North America and beyond.

Few or no field studies have been conducted on most of the nonvertebrate terrestrial life forms within the basin. Much of the terrestrial invertebrate fauna is poorly known to unknown. However, in contrast, most if not all of the terrestrial vertebrate fauna—only a mere 1 percent of the entire estimated richness of all floral and faunal species within the CRB assessment area—is at least known by occurrence and distribution. We present here range distribution maps that we developed of selected invertebrates and of all regularly occurring vertebrate species of the CRB assessment area. Also included are maps of natural areas currently designated on federal and other lands (see below for description).

Methods

Many sources depicting species distributions, particularly of terrestrial vertebrates, are available, but these have never been collected into CRB assessment area-specific maps. To meet this need, our methods included (1) collecting existing publications and maps showing the distribution of terrestrial species or communities within the CRB assessment area (see “Map Bibliography” in app. 1); (2) reviewing these sources for recency, accuracy, and utility for our needs; (3) transferring composite maps onto mylar at 1:2,000,000 scale; and (4) having the mylar sheets optically scanned into a geographic information system (GIS) (ArcInfo®)¹ as vector data. We also had our

¹The use of trade or firm names in this publication is for reader information and does not imply endorsement by the U.S. Department Agriculture of any product or service.

draft maps peer reviewed and refined by species experts (see “Acknowledgments and Reviewers”).

Data Collection

We obtained initial sources of information to compile the maps from literature, individual experts, and state and federal organizations (see “Map Bibliography” in app. 1). We were primarily interested in known distributions of species occurrence rather than species ranges predicted from vegetation conditions. For this reason, and because data were not available at the time of our request, we were unable to use as source material any of the maps generated from the Gap Program (Scott et al. 1993).

Map Creation

We used the U.S. Geological Survey (USGS) 1:2,000,000 scale Northwest States map (Albers equal area projection) from the USGS atlas series as the base map. Species ranges were initially hand drawn in black ink on mylar overlay material, following existing range map information. In combining multiple information sources, we used several techniques to draw the species ranges at this scale, including enlarging published ranges (often presented with only state lines and no measure of scale) to the appropriate scale, as well as matching ranges to county, state, and latitude-longitude lines on the base map.

Expert Review and Validation

The level of expert review and validation of the maps differed by region, species, and class depending on time and budget constraints and on the availability of experts with sufficient knowledge of the species distribution within the CRB assessment area. For example, Michael Denny, an expert on bird distribution, was able to review and edit the range maps on many of the bird species to great detail in Oregon and Washington, whereas the same level of review was not available for Montana. Because of the availability of species experts, the range maps of amphibians, reptiles, bats, and many of the birds were reviewed more intensely than were the maps of most mammals other than bats.

Taxonomy

Taxonomy of species follows the latest available updates of species names. Taxonomy of the invertebrates included in this report were provided by R. Sandquist² as part of ICBEMP. For vertebrates, sources included Collins and Taggart (2002) for amphibians and reptiles; American Ornithologists' Union (2003 with supplements) for birds; and Jones et al. (1992) for mammals, with latest updates from American Ornithologists' Union (<http://www.aou.org/aou/birdlist.html>) and NatureServe (2003).

Caveats and Cautions Regarding the Species Maps

This effort is a first attempt to produce a comprehensive set of range maps of selected invertebrate species, all vertebrate species, and natural areas for this vast inland West region. For this reason, we encountered several challenges in knitting together existing information on distribution of taxa and in filling in the blanks.

Selected Invertebrates

The maps of invertebrates are offered only as a few examples of species distributions, particularly of taxa locally endemic to the CRB assessment area. The number of invertebrate species in the CRB assessment area is immense (Marcot et al. 1997). Additional information on invertebrate collection sites and species distributions in the CRB assessment area is available in other sources, particularly in the Hopkins U.S. System Index (HUSI) invertebrate database.³

Vertebrates

All of the existing maps of vertebrate species distributions were available only as small thumbnail sketches, such as in field guides, only for a portion

of the assessment area, or only for a portion of the fauna. Maps of adjacent states or geographic areas often were not compiled in the same manner, or were compiled at different scales or resolutions. For example, Dobkin's (1994) highly useful maps pertained only to Neotropical migrant land birds and only to the Northern Rocky Mountains and Great Plains, and were displayed based on latitude and longitude. Other sources commonly provided maps that stopped at state boundaries (e.g., Gabrielson and Jewett 1940 for birds of Oregon) or portions of states (e.g., Zeweloff 1988 for mammals of the intermountain West); maps that showed overall species distributional range (e.g., Leonard et al. 1993); and still other maps that displayed only point locations of individual sightings (e.g., Nussbaum et al. 1983). Thus, our synthesis of existing maps reflected a combination of original mapping goals, methods, scales, and resolution. This was inevitable given the high number of species and the large geographic area we addressed.

We expect that the maps in this publication are most useful at regional and state levels and that their accuracy decreases at scales of individual counties or smaller land units. Species distribution polygons shown on the maps likely include some areas of unsuitable environments and absence of the species, which would be revealed only at finer scales of resolution. Maps of species whose field distribution is poorly known or likely to be scattered and scarce, such as lynx (*Lynx canadensis*) and wolverine (*Gulo gulo*), are based on the best professional estimates from the few available publications on distribution, as well as on historical range, known recent sightings, and distribution of potentially suitable habitats and environments, where such information was available.

Overall, the vertebrate range maps are simple. When possible, we tried to base the maps on actual or expected observations, although poor resolution of published range maps often resulted in some inevitable inaccuracy when these maps were enlarged. Seasonal and migratory ranges, population densities, and levels of habitat suitability are not depicted on the maps. For such

²Sandquist, R. 2000. Personal communication. Entomologist, U.S. Department of Agriculture, Forest Service, Pacific Northwest Region, P.O. Box 3623, Portland, OR 97208.

³The HUSI database is available on the World Wide Web at <http://www.fs.fed.us/pnw/bmnri/hussi1.html>.

information, we direct the user to other, more species- or site-specific sources. Some of these are listed here as references for each map.

We also present historical (early 1800s) distribution maps of 3 birds and 10 mammals. These maps were developed as part of ICBEMP analyses of vertebrate species for whom distributional ranges were suspected to have shifted significantly since historical times.⁴

Maps of Natural Areas

The maps of natural areas are based in part on some 26 existing land allocations, used by BLM and FS, that provide for natural or near-natural conditions. In this context, natural refers to land use allocations that largely preclude direct alteration of the environment from human activities. In addition, we included as natural areas the locations of reserves of The Nature Conservancy, refuges administered by the USDI Fish and Wildlife Service, and national parks administered by the USDI National Park Service, again using existing administrative boundaries.

Identifying all “natural areas” on a few maps is a tricky business because the term is rather indefinite. Depending on the intended use and resolution of such maps, the user also might want to seek out additional maps of state parks, county parks, city parks, greenbelts, visual corridors, roadless areas, botanical waysides, or a host of other land allocations not included on our maps. Our broad-scale use of the natural areas maps in Marcot et al. (1997) did not particularly warrant considering these other sources, and thus they are not included here. The user should decide what is appropriate.

Availability of Computer Versions of These Maps

All of the maps presented in this publication are available in computer format, namely as ArcInfo® GIS files, as part of ICBEMP at <http://www.icbemp.gov/>.

⁴Holthausen, R. 2001. Personal communication. Wildlife ecologist, U.S. Department of Agriculture, Forest Service, 250 S. Pine Knoll, Flagstaff, AZ 86001.

Acknowledgments and Reviewers

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Carnivores—Chuck Gibilisco, Donald Johnson, Lori Nordstrom, Chris Servheen, John Weaver

English Equivalents

1 hectare (ha) = 2.47 acres

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