Ecological site group R004BN200CA
Riparian

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Key Characteristics

- Santa Cruz Mountains – LRU N
- Hydrologically-influenced, flood-dominated riverine

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

Physiography

The watershed geomorphology and physical processes form the basis for understanding the spatial extent of the riparian forests, which includes the valley shape, hillslope processes, fluvial processes, soil processes, and hydrologic processes.

Climate

The average annual precipitation in this MLRA is 23 to 98 inches (585 to 2,490 millimeters), increasing with elevation inland. Most of the rainfall occurs as low-intensity, Pacific frontal storms. Precipitation is evenly distributed throughout fall, winter, and spring, but summers are dry. Snowfall is rare along the coast, but snow accumulates at the higher elevations directly inland. Fog is a significant variable that defines this MLRA from other similar MLRAs. Summer fog frequency values of greater than 35% are strongly correlated to the extent of coast redwood distribution, which is a primary indicator species in this MLRA. Nighttime fog is approximately twice as common as daytime fog and seasonally, it reaches its peak frequency in early August, with the greatest occurrence of fog from June through September (Johnstone and Dawson 2010). The average annual temperature is 49 to 59 degrees F (10 to 15 degrees C). The freeze-free period averages 300 days and ranges from 230 to 365 days, decreasing inland as elevation increases.

Climate varies from the west to the east in LRU N. The Santa Cruz Mountains reduce the penetration of maritime air. Winters are cool and wet with the occasional snowstorms at the highest elevations and in narrow, north-facing drainages. Heavy rains are also known to cause mudslides throughout this LRU, and on the west side, summers are cooler, and fog or low overcast skies are only around for the mornings and carry through the low slopes and stream terraces.

Soil features

Soil development within alluvial environments is highly variable. Frequent erosional and depositional disturbances from flooding create a complex mosaic of soil conditions in the active floodplain that fundamentally influences vegetation colonization and establishment. Well-drained soil or recently deposited mineral alluvium may be found adjacent to very poorly drained organic soils in abandoned high-flow channels. This variability in soil conditions is a major factor in maintaining the high plant diversity typical of riparian ecological sites.

Vegetation dynamics

Riparian areas represent the low-gradient areas within this LRU that are heavily influenced by fluvial processes. This ESG is composed of a variety of different riverine expressions/ecological sites and will require more detailed field investigations to refine the site concepts and likely develop several new sites that are correlated to similar geologic structure and processes, hydrologic regimes, and vegetation characteristics. This ecological site concept

captures a variety of typical riparian vegetation expressions and ranges from mostly herbs and shrubs to shrubs and trees that are found in riverine systems that are primarily smaller streams at the bottom of mountain slopes and terraces. The band of riparian vegetation may be broader or narrower depending on where in the LRU it is found and the valley shape and slope shape surrounding the riverine system. These riparian sites differ from the riparian sites in LRUs immediately adjacent to the coast due to the much more limited amount of days in fog during the hotter summer months. This allows for higher amounts of evapotranspiration and heavier usage of water by plants upslope. Water limitations shift the vegetation composition, distribution, and biomass from those of similar riparian areas in the more northern LRUs along the coast such as LRUs A, L and I. Although redwood occurs in some drainages, many riparian areas in LRU N are occupied by forests that lack redwood and are instead made up of a mix of hardwoods and Douglas-fir. Riparian areas in LRU N are particularly distinct from riparian areas in LRUs north of the San Francisco Bay area (e.g. LRUs J and K) in that they sometimes include coast or interior live oak which are absent further north. Some riparian areas are surrounded by open grasslands and oak woodlands. Streams in this ESG are generally smaller, higher velocity stream orders, such as Rosgen A or B channels with larger bedding sediments.

Abiotic Factors/Primary Disturbance

Riparian forests are a complex interaction of many various physical and biologic factors, including function of valley morphology, physical processes, vegetative legacies, and life history strategies.

Coastal fog and yearly precipitation amounts are also a major factor that defines this ecological site from other riparian ecological sites in other MLRAs and LRUs. Windthrow and wind-breakage are less common during winter storms in this LRU but still can occur and open the canopy creating more diversity in the understory.

The disturbances that drive this ecological site concept are dependent on the type, frequency, predictability, extent, magnitude, and timing of the disturbance. The fluvial processes that are dominant in this riparian ecological site concept include stream power, basal shear stress, channel migration, and sediment deposition. The characteristic vegetation pattern of these higher-gradient valleys is maintained by fluvial disturbances and geomorphology. The amount of force exerted on the channel bed and vegetation growing in the active channel and floodplain during a flood is a product of fluid density, gravitational acceleration, flow depth, and water surface slope.

Due to the drier climate of this LRU, fire is likely to play a significant role in this ESG and other riparian areas throughout LRU N. Fires from lightning, historic cultural burning by Native American tribes, and fires set by ranchers in the post-settlement period are likely to have regularly burned into and through riparian areas, especially during periods of drought or extreme wind and fire weather events.

Major Land Resource Area

MLRA 004B
Coastal Redwood Belt

Stage

Provisional

Contributors

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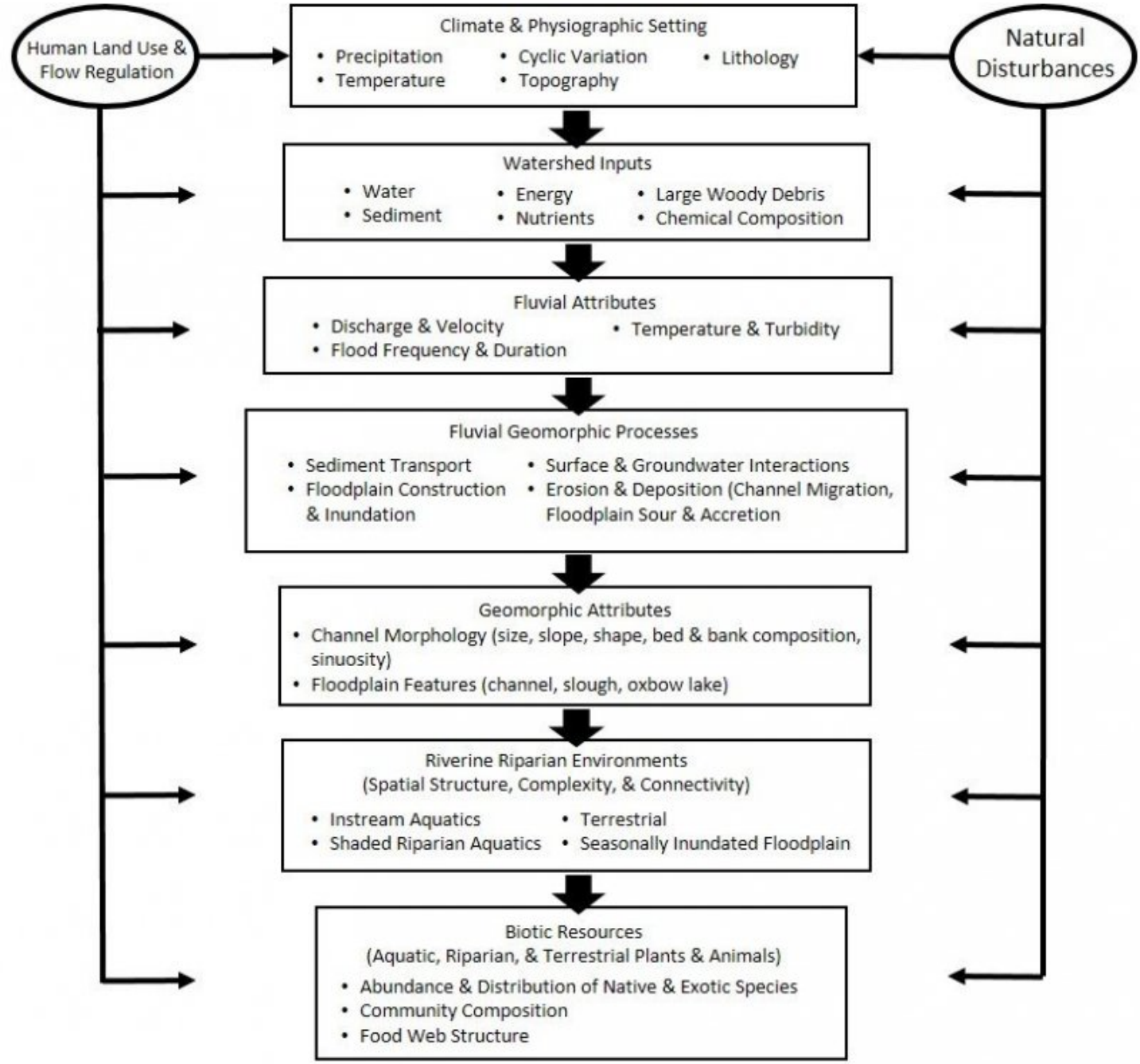
State and transition model



Conceptual physical and biological framework of alluvial river systems. Adapted from Barbour et al 2007.

State 1
Reference State

Reference State (State 1) – The riparian areas of the Central Coast in general are not as floristically diverse as the riparian areas found across much of the rest of the state. The cooler climate, lower-gradient streams of LRU N create a fairly consistent variety of adapted species along a fairly narrow band directly adjacent to the streams. The reference state for this site is essentially only dominated by a limited genera of species adapted to the seasonal fluctuations of inundation from precipitation primarily in the forms of upslope surface runoff and groundwater into the valley bottoms, and the cooler, sometimes foggy climate that limits evapotranspiration rates, especially during the summer months. There are likely a variety of different riparian ecological sites that have been included in this provisional ecological site concept and should be further investigated to refine the concepts at an individual ecological site scale. At this very general scale, this reference state only really captures the generalities related to the functional groups that are most dominant and does not capture the more specific dynamics and patterns that would be found at the more detailed and refined ecological site scale that focuses on specific abiotic factors that drive some of these various complex plant expressions. More data and refinement is needed to capture the information needed in order to make specific land management decisions at the ecological site-component scale.

Community 1.1
Reference Community Phase

This community phase represents the riverwash portions, herbaceous portions, shrub-dominated portions and riparian forest portions of the fluvially-influenced areas within this ecological site concept. Species that are most dominant include *Alnus rubra* (red alder), Populus spp. (cottonwoods), Salix spp. (willows), Myrica californica (California wax myrtle), Sambucus spp. (elderberry), Rubus spp. (berries), Ribes spp. (currents), and an array of grasses, forbs, and grass-likes. There may be locally distinct and endemic species only found in certain areas of these riparian communities, but they are not recognized at this scale of provisional ecological site concept development.

State 2

This state represents the intensive land uses that have significantly altered this ESG in a myriad of ways including removal of topsoil, fertilizer additions and other topsoil manipulations, hydrologic alterations that remove native soil fauna, among many other things and is typically due to urban developments, recreational activities, and intensive agriculture. More information about this state is needed to flesh out the various impacts these types of land uses/alterations have had on the ecological site in order to better understand how to manage these areas or potentially attempt restoration of these areas where possible.

Community 2.1
Intensive disturbance

This community phase represents all the varied land uses that significantly alter this ecological site group. This is an extremely varied community phase that includes all types of alterations that so significantly alter the ecological site that it is permanently changed and no longer has typical or even representative ecological dynamics. Land use models would be an appropriate option to develop these types of variations in altered landscapes. At this scale of grouping, specific drivers and triggers and expressions of communities is too varied and broad to be more specific. More data collection and field verification is necessary.

Transition T1
State 1 to 2

This transition is caused by significant human alterations that remove essential topsoil horizons, alter hydrologic functions, and/or add significant inputs that change soil chemistry and soil properties for housing developments, urban infrastructures or intensive cropping systems and force this ecological site over a threshold and change the function and structure of this site in extensive ways.

Restoration pathway R1
State 2 to 1

This restoration pathway occurs only when significant time and money inputs to return crucial hydrologic cycles and flooding regimes to the riparian system that would require constant maintenance and weed management and should be focused on areas that have not been permanently altered by urban developments.

Citations