Humboldt Redwood™

Our background…

When we began as a company in August 2008, we took as our stewardship model the management practices and policies developed over the previous 10 years by Mendocino Redwood Company, LLC (MRC). Since then, HRC has operated with a publicly declared purpose to manage a large block of productive forestland utilizing high standards of environmental stewardship and at the same time to operate as a successful business.

We have made a number of significant changes to the management of our land, compared to the way it was. This document is intended to show what those changes were, where we are now, and where we believe we are going in the future.

About Humboldt Redwood Company

The Landscape

- 209,300 acres (327 square miles)
- 305 miles of fish-bearing streams
- Nearly 1,100 miles of streams supporting non-fish aquatic life
- 1,800+ miles of roads

Wildlife and Aquatic Habitat

- 20 significant aquatic and upslope animal species (17 covered by our Habitat Conservation Plan, plus 3 others for which we regularly survey and mitigate)
- 18 significant plant species (defined as being Federal or State Threatened or Endangered, and/or on California Native Plant Society Lists 1, 2, or 4)

Economics

- Over 50employees in the Forest Operations
- Our forestlands supply logs primarily to our sawmill in Scotia, California
- Local expenditures around $13 million annually

The lumber industry has been an important part of Humboldt County's economy for over 150 years, and HRC is an integral part of that economy with over 50 employees managing the forestlands.

HRC forestlands are comprised of over 153,000 acres of redwood and Douglas-fir forests, almost 46,000 acres of conifer/hardwood and hardwood forest, and about 10,000 acres of meadows, all within Humboldt County, California. Abundant streams provide habitat for fish and non-fish aquatic life. There is a dense road system, consisting of over 1,800 miles of roads mostly built by the previous landowners. About half of these road miles have been stormproofed and upgraded, and the rest are older roads still in need of stormproofing and upgrading, including roads that will be closed and decommissioned.

Threatened, endangered, and rare species reside within HRC forestlands. The marbled murrelet is known to nest in HRC's old growth redwood, and the northern spotted owl (photo, right), a well-known threatened species, occurs here at a high density compared to neighboring lands inland and to the north. Golden eagles, ospreys, Coho salmon (photo of young Coho below, left), Chinook salmon, steelhead, Sonoma tree vole, and Pacific fisher are some other endangered or threatened animals that make their homes here. Rare amphibians and reptiles such as the northern red-legged frog, foothill yellow-legged frog, tailed frog, southern torrent salamander, and the Northwestern pond turtle are found on these lands. The California endangered Humboldt milk-vetch is found here (photo below, right), as well as other rare plants including northern clustered sedge, both the coast and giant fawn-lilies, Pacific gilia, seacoast ragwort, and Siskiyou checkerboom.

HRC inherited a functioning Habitat Conservation Plan (HCP) that went into effect in 1999. The HCP contains multiple measures for protecting and conserving wildlife and their habitat on the landscape. The protections consist of operating restrictions organized into Operating Conservation Plans for each "covered" species, including a comprehensive road and hillslope conservation plan designed to reduce sediment inputs into streams. In addition to the operating restrictions, the HCP requires long-term monitoring of forest and stream conditions to

ensure that the conservation measures are accomplishing the desired effects. For more detail, please see HRC's Management Plan on our web site. Components of the HCP are integral to our approach to forest stewardship and are mentioned below where appropriate.

In addition to the HCP, HRC inherited a number of approved Timber Harvesting Plans (THPs) developed by the previous landowner. Following our policy on using uneven-aged silviculture to develop multi-aged stand structure, all harvesting stopped until forestry staff could review all open THPs for opportunities to change proposed clearcuts to selection silviculture.

Some views of HRC land:

Yager Creek in September 2007

Remnants of an old RR trestle at Bridge Creek

Forest above Strongs Creek

Summer fog on the Mattole River

Biologically Significant Forest Attributes

- Old Growth
- Snags
- Live Trees with Structure Important to Wildlife
- Forest Age Structure
- Downed Woody Debris
- Goosepens (basal tree cavities)
- Rocky Outcrops
- Carbon Storage

Protect Old-Growth Trees

HRC protects all trees meeting our old-growth definition either as individual trees or as a stand of trees. To better manage our forestlands, we have divided old-growth stands into two types (as defined by the Forest Stewardship Council® (FSC® C031337): (1) Type 1 stands are unharvested old-growth of three or more acres, and (2) Type 2 stands are previously harvested areas of 20 or more acres which retain significant old-growth structure and function. Type 1 stands are permanently protected from harvest and new road construction. Harvest of Type 2 stands is allowed only if the harvest will maintain the area of the stand, retain existing old-growth trees, and enhance the old-growth characteristics of the stand.

The remaining previously logged second-growth forests on HRC lands contain scattered old-growth trees in varying densities. HRC defines these trees based on age, size, function and characteristics specific to particular species. Individual old-growth trees are not harvested.

Individual old-growth trees preserved from harvesting include:

- Any redwood tree, ≥ 48" diameter at breast height (DBH), established prior to 1800 C.E.
- Any Douglas-fir tree, ≥ 36" DBH, established prior to 1800 C.E.
- Any tree established prior to 1800 C.E. (conifer or hardwood), regardless of DBH, with a preponderance of species-specific old-growth characteristics
- Any tree (conifer or hardwood) established prior to 1800 C.E. that cannot be replaced in size or ecological function within 80-130 years regardless of DBH or presence of old-growth characteristics. Generally, this fourth trigger is applicable to areas of exceptionally low soil quality, such as serpentine soils or rocky outcroppings.

We also retain screen trees where they exist around old-growth trees. Screen trees provide additional protection and are usually immediately adjacent to, or are close enough to influence the growth and form of the old-growth tree. Screen trees often have intermingling crowns or crowns which if left to grow would eventually intermingle with the retained tree crown.

In rare instances, the cutting of an old-growth tree is required for road construction, skyline corridors, or workplace safety considerations. Trees cut under these circumstances will be left in

the forest to provide large wood on the forest floor. Old-growth trees mistakenly cut due to misjudgment of age will also be left in the woods.

Retained old-growth redwood in Root Creek – note original mark has been painted over and “NC” for “no-cut” prominently painted on bole

Old-growth Douglas-fir in the Bear River drainage, retained with screen trees

Golden eagle nest in old-growth Douglas-fir, Larabee Creek

Retain Snags and Live Trees Important to Wildlife

Snags are standing dead trees and are critical habitat for cavity-dwelling species such as woodpeckers, songbirds, and owls. Historically, snags were cleared from forests during logging activities. HRC's Habitat Conservation Plan has provisions for the retention of all snags; the only exceptions are if they pose a hazard to workers during harvest or could fall on roads used by the public. The minimum number of hardwood and conifer snags averaged over the THP unit is:

- 1.2 snags per acre over 30 inches DBH and over 30 feet tall
- 2.4 snags per acre over 20 inches DBH and over 16 feet tall
- 1.2 snags per acre over 15 inches DBH and over 12 feet tall

When planning for harvest in units where the number of these structures has been depleted due to previous harvesting, the HCP requires that green trees in the same size categories be retained in numbers sufficient to meet the snag objective. The intent is to "recruit" them as future snags. HRC's silviculture policies retain far more trees than are required to meet this objective.

Live trees with complex structure (e.g. broken, multiple or dead tops, cavities, etc.) are also important for wildlife. These high-value wildlife trees are referred to by the HCP as "live culls." In addition to the snag/snag replacement tree retention requirements of the HCP, to the extent they exist, up to four "live cull" green trees per acre averaged over the THP unit are marked for long-term retention. Large hardwood trees over 30 inches diameter breast height (DBH) are also retained, up to an average of two per acre. In addition, HRC voluntarily maps and protects regionally significant forest types such as true oak forest.

Live trees with complex structure important to wildlife are retained

A live redwood tree with complex structure

Snags are important to wildlife

Madrone with complex structure in Happy Valley

This snag contains an osprey nest

Acorn woodpecker granary snag

Promote Complex Forest Age Structure Using Selection Harvest

Where well-stocked confer stands occur, HRC uses selection harvesting techniques that retain the structure and function of the forest stand and promote the development of complex, high-value, uneven-aged stand structure. Here are examples of selection harvest in well-stocked conifer stands in the Bear River watershed (Douglas-fir) and the Elk River watershed (redwood).

Selection harvest – HRC's preferred harvesting technique in well-stocked stands

Douglas-fir stand marked for selection harvest

Redwood stand remaining after harvest

Selection silviculture is used primarily to thin conifer-dominated stands of redwood or Douglas-fir, or very young, dense stands of redwood or Douglas-fir. Redwood at any age, and young Douglas-fir up to around 60 years old, will respond well to a stand thinning harvest by increasing its annual growth shown by the wider growth rings in the photos below. This "release" growth is in response to greater access to sun and less competition for nutrients. Periodic selection harvests (every 15-20 years) encourage tree growth while allowing the remaining trees to fill small gaps created by harvest.

Tree cross-section showing "release" of growth after a harvest entry in the 1960's

Growth ring size changes after release

Preserve Downed Large Woody Debris

Large woody debris (LWD) on the forest floor is important for nutrient cycling, soil protection, and as habitat for a variety of organisms. Woody debris provides an important micro-climate for fungi, mosses, invertebrates, and amphibians, and valuable feeding and hiding areas for mammals. The photo below left shows downed woody debris that may be used as a biological anchor for a retained area in a variable retention harvest. Other biological anchors include snags, hard-to-replace complex tree structures, and rare plant protection buffers. The photo below right shows LWD contributing to pool development in a stream. The bottom photo is of a "nurse log" supporting huckleberry and ferns, among other plants, and providing habitat for other organisms.

Rotting logs and stumps on the forest floor provide nutrient cycling and habitat for many kinds of organisms

Large woody debris contributes to enhanced stream function for fish habitat – this plunge pool is on Nelson Creek

Nurse log – a rotting log that supports a variety of plants

Retain Goosepens in harvest plan layout

Burned-out basal cavities in trees are known as "goosepens." These important wildlife habitat structures in the forest were used by early ranchers to pen their geese at night. Goosepens provide habitat for bats, birds, and small and medium-sized mammals. HRC's timber marking process used during timber harvesting plan layout puts a high value to retention of trees with goosepens. Most goosepens are found in trees with fairly large diameter (conifers greater than 36 inches diameter breast height [DBH] or hardwoods greater than 24 inches DBH).

A goosepen, located within Humboldt Redwood State Park just south of Humboldt Redwood Company land, is very uncommon as it contains a spring (photo courtesy of Humboldt Redwood State Park Interpretive Association)

This goosepen is on HRC property

Restoration

What is Restoration?

The term restoration as applied to industrial timberlands refers to two ideas. One is to reverse the effects of former logging practices that caused timber stands to change from their original conifer structure to dominance by hardwood species – specifically tanoak, a broad-leaved tree that can and will take over lands formerly covered by conifers. Forest restoration involves silviculture methods that reduces the amount of hardwoods and eventually returns the stand to its original, conifer-dominated condition.

The other type of restoration refers to roads. One hundred fifty years of industrial logging has left an extensive legacy road system that is in need of restoration work to prevent road-related sediment delivery to streams, and to provide an efficient road network for land management.

The Need for Restoration

- 150-year history of industrial logging
- 1,500 mile legacy road system
- Historic conversion of conifer stands to tanoak

What Restoration Means to HRC

At HRC, we are committed to the long-term improvement and restoration of our lands. This involves investing in restoration expertise, road and timber inventories, work crews, and monitoring.

Here are some restoration efforts that we are undertaking:

- The total acreage of timber stands in need of restoration due to a species imbalance of hardwoods caused by prior harvesting is small compared to the acres that have their natural, historic species composition. Even so, those acres needing conversion back to conifers are being scheduled into a multi-year plan for restoring the historic conifer species balance. HRC uses the silviculture method called Variable Retention to restore the conifer component in hardwood-dominated stands.
- Important elements for upslope habitat, such as old growth trees, trees with complex structure that provide nesting opportunities, and snags, are retained and where in low supply, are recruited.
- Road restoration is an integral component of our HCP. We have an ambitious program of road improvements to reduce the road-related sediment that is delivered to streams from our road network. Approximately 750 miles of legacy roads were stormproofed in the first 10 years under the HCP, resulting in significant decreases in sediment delivered to streams, and another 750 miles will be stormproofed in the next 10 years.
- During watershed analysis and timber harvesting unit layout, foresters examine streams for opportunities to remove barriers to fish migration.

- The Lower North Fork Elk River Conifer Enhancement project focuses on the restoration and enhancement of streamside conifer levels for the long term benefit of large wood recruitment to the Elk River. Dense patches of small diameter hardwood, such as alder and willow, and brush thickets are manipulated to the extent that conifer seedlings can be planted in areas where survival can be reasonably anticipated.

Our goal is to continuously improve the biological potential and diversity of these forestlands. Each Timber Harvesting Plan is an opportunity to upgrade roads, reduce sediment, restore conifer species to tanoak-challenged areas, and retain and recruit upslope habitat structural elements. We are implementing monitoring projects to tell us how well we are doing and what can be improved.

Road Restoration and Stormproofing

HRC's Habitat conservation plan stipulates that in the next 10 years, 750 miles of roads will be upgraded to the "stormproof" standard – a pro-active process which includes upsizing culverts and rocking road surfaces near streams, and in some cases removing the road crossings entirely – so that the road can withstand a large magnitude storm with minimal sediment delivery to streams.

Our staff inspects every road at least once annually, and some roads are inspected multiple times a year. Sites needing upgrading are identified during these inspections and entered into our data base. Prioritizing these sites for repair and maintenance is a complex process, but the goal is to repair the worst sites as soon as feasible.

Of particular concern are the many "Humboldt" stream crossings left from logging and road building practices common up until the 1960's. These are stream crossings made of logs piled into the channel more or less haphazardly and then covered with soil to make a road. Some "Humboldts" are amazingly stable and have low priority for removal, but others have a high potential for failure. Over time, the buried wood rots, bark sloughs off, and the soil eventually washes away, depositing sediment into streams and creating "sinkholes" in the road. Humboldts can fail catastrophically and deliver tons of wood and soil into the streams and rivers during a single rainstorm, or they can "bleed" small amounts of sediment year after year.

The following photos show repair of a "Humboldt bridge." It differs from a crossing because the logs are placed perpendicular across the stream with the ends on opposite banks, and then the logs are covered with a heavy layer of soil to make the road. New sinkholes like this one are usually repaired the next summer after they are discovered. Some emergency repairs are made as soon as there is a break in the weather for heavy equipment to access the site, as was the case here.

This failing Humboldt “bridge” was discovered on January 7, 2009 during our normal winter road monitoring; the fill had washed away resulting in this dangerous sinkhole in the road

Looking underneath, you can see the redwood logs half-buried in the stream bed – after consultation with State agencies, the decision was made to fix the site during the winter

Same site on January 19, 2009 after pulling the wood and soil out of the stream – note the straw mulch placed on disturbed soil

July 21, 2009 – note the clear rocky stream bed and the grass growing where the soil was mulched above the logs and on the bank downstream

Some roads are scheduled for permanent closure. All the culverts and associated dirt fill are removed, and the stream crossings are reshaped to be as close as possible to the natural streambed grade. The banks are protected and armored against erosion using straw mulch, rocks, slash, and logs as needed depending on the size of the site. The photos below show such a “pulled” crossing on a permanently closed road.

Two stream crossings on this old road are “Humboldt” crossings – wood and soil dumped into the channels many years ago. This panorama shows the site after the vegetation has been removed to allow access for heavy equipment.

The same two crossings after the restoration work was completed. Note the rock protecting the upstream part of the channel and the slash (small trees and limbs) providing bank stabilization. The larger wood chunks were excavated from the crossing. Straw covers all bare soil for erosion control.

Examples of Restoration Projects

North Fork Elk River Conifer Enhancement Project

The photos below show the initial step in a conifer enhancement project that is on-going on the North Fork of the Elk River. Conifers are an important riparian tree component for long-term large wood recruitment that will enhance the quality of the stream channel, helping create pools and fish spawning beds. This project, begun by the previous landowner as a result of recommendations from watershed analysis, is being continued by Humboldt Redwood Company.

Much of the lower North Fork Elk River was overgrown by hardwoods such as these thickets of alder trees; logging in the early 1900's used the streams as highways to move logs to the mills, and after such heavy impacts the hardwoods grew back in excess, to the expense of the conifers

Woody brush and small hardwood trees are removed, leaving the larger hardwoods and any existing conifers, and preparing the plot for planting conifer trees such as redwood, spruce, and western hemlock

Graham Gulch barrier to migration of salmonids

A partially collapsed historic railroad trestle constituted a barrier to the migration of fish in Graham Gulch. This barrier was identified during watershed analysis and was removed during the summer of 2009. Portions of the structure were buried in the stream and most of it was covered by dense vegetation. Approximately 0.5 mile of stream was made available for fish spawning and migration after removal of the barrier.

Restoration Milestones Planned

In the next decade, HRC plans to:

- Increase conifer inventory by 400 million board feet;
- Control approximately 60,000 cubic yards of sediment annually (equals 6,000 large dump truck loads of dirt that will not enter streams);
- Enhance salmon and steelhead habitat through removal of fish migration barriers;
- Replant conifers to 200 acres of mixed hardwood forest; and
- Plant up to 75,000 redwood and Douglas-fir trees each year.

Third Party Monitoring and Certification

HRC from the outset declared its intention to seek certification by the Forest Stewardship Council® (FSC®). Many models exist for being a successful business, but there are very few models that construct the framework for being a successful environmental steward. The FSC® certification program consists of a set of voluntary measures that if met, provide validation for a company's stewardship practices. This certification process allows us to work with experts for continuous improvement of our forest stewardship work and provides for review on an annual basis.

- HRC owners publicly committed to the pursuit of FSC® certification when we started as a company;
- We became FSC® certified in December 2009, at which time we had 20 Corrective Action Requests;
- We successfully closed all pending Corrective Action Requests as of the Surveillance Audit in August 2010.

Our FSC® assessment and surveillance audit reports are on our website. Our next full assessment will be in 2019.

In addition, our Habitat Conservation Plan (HCP) requires a third-party entity to monitor the implementation of the HCP on behalf of the Wildlife Agencies. The HCP Monitor inspects the Company's activities that fall under the HCP's Operating Conservation Plans. The HCP Agencies have oversight responsibility for the Monitor and adjudicate disagreements between

HRC and the Monitor's reports of potential problems with HCP implementation. The active communication and feedback between the Company, the Agencies and the Monitor provide opportunities for HRC to identify ways to better implement the HCP, which can include better contractor oversight, improved methods, and training of staff and contractors.

Community Involvement

As a newcomer to Humboldt County, we knew we had to build trust with our employees, our business partners, and the community. We continue to work on this every day. Restoration of public trust is a primary goal, and means we will seek to engage with the community all the time. We believe that the best way to reach common ground on complex and sometimes controversial issues is to go to the forest and see the issue or concern first-hand. Our policy is to take interested people out on the land to review any concerns or observations they would like to share and review.

To build and maintain trust, we are willing to:

- Take anyone anywhere on the property – we believe that the best way to learn about what we are doing is to go out in the forest and have a look;
- Be open to new points of view – if you have an idea of how we might do a better job, we would like to hear from you; and,
- Answer questions candidly and promptly.

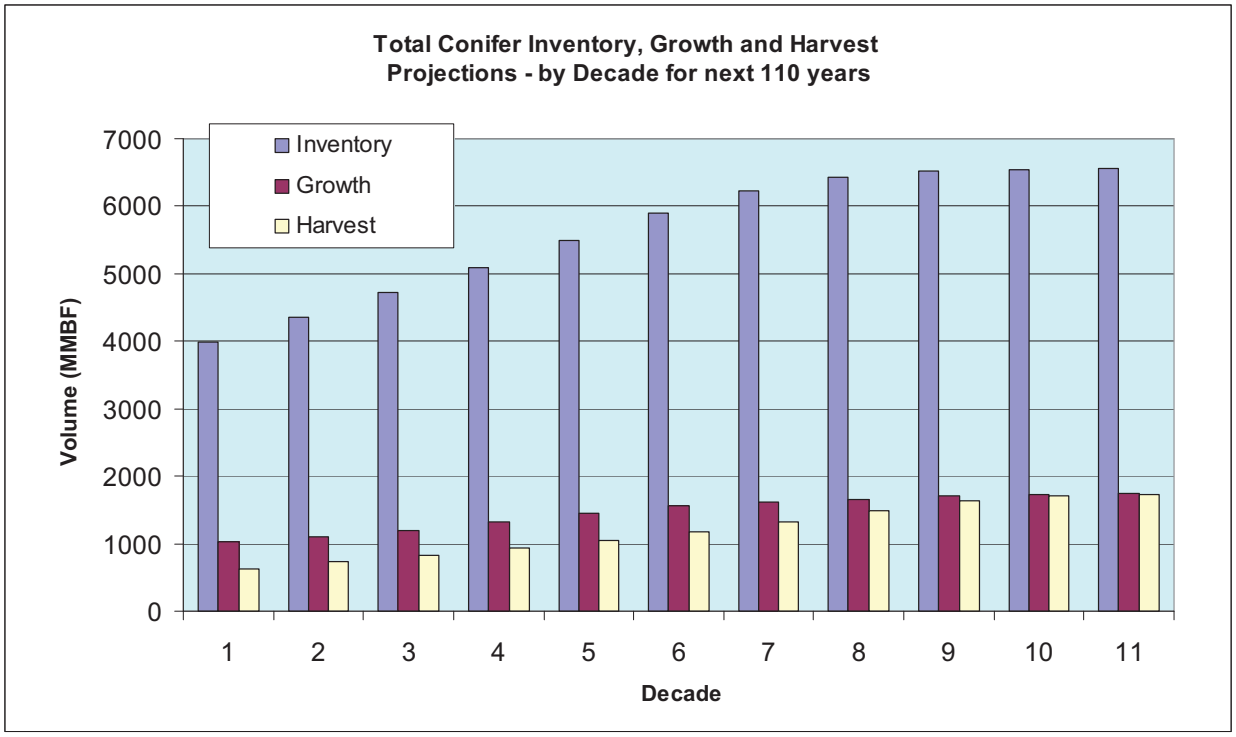
If you are interested in seeing a part of our operations or our forest, please contact us via our online contact form at *www.hrcllc.com*.

Company President and Chief Forester Mike Jani (holding shoulder bag) meeting with community stakeholders

Plans for the Future

At the beginning of this document, we said we would describe the changes we've made in our first years of business, where we are now, and where we are going. We believe the changes to our forestland management are visible to anyone who has been out to see our forestry activities. We implemented an old growth protection policy, and encouraged an interested stakeholder to work with our forestry staff in the field to verify how well we were implementing it. This resulted in feedback that lead to a better understanding of the policy by our staff. Under the Habitat Conservation Plan which we acquired with the property, there were stands of redwoods containing marbled murrelet habitat which were approved for harvest under the "take" provisions of the HCP – these stands are now being reserved from harvest under our old-growth protection policy.

Other changes are more subtle, but important none-the-less. We work closely as team members with the same goals, to implement responsible stewardship within an economically viable commercial forest, to support our staff and our local communities, and to be a business that produces quality products. This requires communication and commitment. One example is that the growth and harvest projections for the landscape, formerly held confidential, are now being made available to the public (see chart below).



We expect to build our conifer inventory over time and, and as forest stand structure is gradually converted from even-aged stands to multi-aged stands, we expect to see increased biodiversity, better habitat conditions for wildlife, and fewer invasive weeds with an associated decrease in herbicide use. Marbled murrelets will continue to nest in our old growth stands, golden eagles will continue to nest in our old growth Douglas-fir trees, and northern spotted owls will continue to maintain some of the highest population densities on Earth. We will continue to monitor the economic, social, and environmental impacts of our forest management, and integrate the results of our monitoring into revisions of our Management Plan.

Want to Know More?

We invite you to come see us.

We have given a number of tours in our first years of business and believe that coming to see us at HRC is the best way to learn what we are trying to accomplish. We will take out a map and you just point to where you want to go. We intend to create a model sustainable forestry company that enhances and restores a previously-harvested forest as part of a viable business plan. This is our mission and we work on it every day.

To arrange a visit or tour, please call us or contact us via our web site.

Larabee Creek and the Eel River