HACKER
Aaron Mayers, Fatemeh Sheikholya Lavasani, Salix Sampson; Portland State University
Scott Barton-Smith, Cait Sylvain; Hacker

# Wood Red/Green List

Heavy timber construction is gaining momentum within the architectural community because of its aesthetic and perceived sustainable qualities. But where exactly does the wood come from and how sustainable are these forestry practices?

Through research, we seek to analyze the forestry practices, social impacts, and biological aspects of temperate wood species in the Pacific Northwest used for structural lumber to then create a red/green list that displays and compares the sustainability of the forestry practices. The intent is to create a widely available and transparent document that architects and engineers can reference when making decisions on projects.

## Objectives

- Define what constitutes Red/Green list
- Create a clear and concise document
- Promote local sustainable lumber use
- Bring awareness of forestry practices to consumers

## Methods

We started our project by defining political boundaries in pacific Northwest states which include Oregon, Washington, California and British Columbia; two certifications, SFI and FSC; the company, Weyerhaeuser; and the indigenous community, Yakama Nation.
FSC certification is considered the highest standard for sustainably harvested forests. The SFI certification also promotes sustainable forest management, but is not nearly as robust as FSC. Then we established criteria for each boundary. These criteria include forestry practices, biological and social impact.


**Red/Green List Criteria**

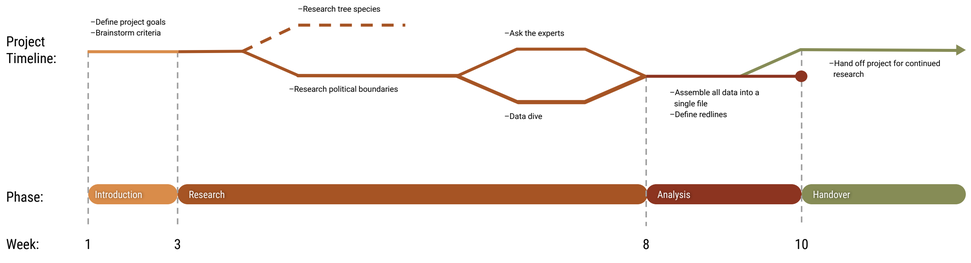
| Forestry | Social | Biological |
|---|---|---|
| Reforestation time | Living wage | Endangered species |
| Restocking | Safety certification | GMO |
| Riparian buffers | Recreational land use | Pesticides/ herbicides |
| Retention | | Harvesting of old growth forest |
| Clear cut size | | Water resources |

SUSTAINABLE FORESTRY INITIATIVE

FSC www.fsc.org

Weyerhaeuser

## Timeline




## Wood Red/Green List

| | | Political Boundaries | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | British Columbia | | Washington | | Oregon | | California | | SFI | | FSC | | Yakama Nation | | Weyerhaeuser | |
| | | Practice | Score | Practice | Score | Practice | Score | Practice | Score | Practice | Score | Practice | Score | Practice | Score | Practice | Score |
| Forestry Practices | Reforestation time | 3-5 years<br>80% replanting<br>20% natural regeneration | 7 | Plant within 3 years or 5 years natural regeneration | 7 | Plant within 2 years | 9 | Plant within 5 years | 4 | 2 years or natural regeneration in 5 years | 10 | Returned to desired stocking levels and composition at the earliest practicable time | 10 | See SFI | 10 | See SFI | 10 |
| | Restocking | Plant 4 for every 1 tree harvested | 7 | | | 100-200 trees/acre* | 6 | 150-300 trees/acre | 9 | | | Returned to desired stocking levels and composition at the earliest practicable time | 10 | See SFI | | See SFI | |
| | Riparian buffers | Qualified Environmental Professional to determine buffer | 4 | Western WA: 90-200 ft, with 50 ft no harvest<br>Eastern WA: 75-130 ft, with 30 ft no harvest. | 7 | Lakes: 50-100 ft<br>Streams: 70 ft limited cut, 20-30 ft no Harvest | 5 | 50-100 ft no harvest either side of stream | 8 | 75 ft buffer on both sides of stream; 150 ft buffer for streams with fish | 10 | 150 buffer; 50 ft inner zone; 100 ft outer zone | 10 | 20 ft no harvest; 200 ft limited with permit | 10 | See SFI | 10 |
| | Retention | Retain 7% of area harvested | 7 | 30% of the unit's perimeter is in stands of trees that are thirty years of age or older; 60% of the unit's perimeter is in stands of trees that are fifteen years of age or older; or At least 90% of the unit's perimeter is in stands of trees that have survived on site a minimum of five growing seasons or, have reached an average height of four feet. | 8 | adjacent areas in the same ownership cannot be clearcut until new trees on the original harvest site are at least four feet tall or are four years-old and the stand is free-to-grow | 4 | | | Neighboring stands protected for 6 years. Emphasis on replanting. | 5 | 10-30% required for openings > 6 acres | 10 | See Washington | 8 | See SFI | 5 |
| | Clear cut size | Coast: 100 max (40 avg.)<br>Interior: 150 (55 avg.) | 7 | 240 acres max* | 4 | 120 acres max | 8 | 20 acres max | 10 | 120 acre max | 8 | 40 acre average | 9 | See SFI | 8 | See SFI | 8 |
| | TOTAL | | 6.4 | | 6.5 | | 6.4 | | 7.75 | | 8.25 | | 9.8 | | 9.0 | | 8.25 |
| Social | Living wage | $35,074 per year ($44,918 CAD) | 6 | $41,468 - $54,455 per year* | 7 | $56,500 per year | 8 | $37,191 per year. | 6 | | | | | $45,000* per year | 7 | $54,100 - $77,544 per | 10 |
| | Safety certification | Certifies as SAFE companies<br>-Endorsed by the BC Forest Safety<br>-Certified under a safety certification scheme recognized by the BC Forest Safety Council or BC Timber Sales | 10 | | | | | | | Requires support for logger certification and training programs. | 10 | Requires qualified professionals, including loggers, to ensure safety and compliance with the management plan. | 10 | Must have member with master logger accreditation on site at all times. | 10 | Follow all laws and regulations | |
| | Recreational land use | Hiking, biking, horseback riding, camping, OHV trails, hunting, and fishing on public forests | 6 | Hiking, biking, horseback riding, camping, OHV trails, hunting, and fishing on public forests | 6 | Hiking, biking, horseback riding, camping, OHV trails, hunting, and fishing on public forests | 6 | Hiking, biking, horseback riding, camping, OHV trails, hunting, and fishing on public forests | 6 | No engagement required on private lands. | 6 | Notice and outreach to local representatives required on public and private land. A public summary of the management plan is required. | 10 | Hunting, fishing, medicine, and spiritual values for tribal members. Limited access for public. | 10 | Public permits | 3 |
| | TOTAL | | 7.33 | | 6.5 | | 7 | | 6 | | 8 | | 10 | | 9 | | 6.5 |
| Biological | Endangered species | Black-tailed deer, black and grizzly bear, mountain goat, wolf, northern river otter, blue grouse, waterfowl, moose, woodland caribou, beaver, red fox, snowshoe hare | 10 | Gray wolf, Grizzly bear, Mountain caribou, Oregon silverspot butterfly, Sandhill crane, Northern spotted owl, Pacific pond turtle, Marbled murrelet | 10 | Osprey, Great blue heron, Bald eagle, Northern Spotted Owl | 10 | Steelhead, california condor, smith's blue butterfly, san joaquin kit fox, bald eagle, california jewelflower, southwestern arroyo toad, and southern sea otter | 10 | Landowners required to have a program to protect threatened and endangered species. | 7 | Develop a list of RTE species present in the forest, modify management plans accordingly, and implement management activities to maintain or enhance habitats for the species. Where adequate plans do not exist, the forest owner is required to follow a precautionary management approach. | 10 | Coastal Tailed Frog, American Beaver, Greater Sandhill Crane, Northern spotted owls, Goshawk, Lynx, Bald Eagle. Wild horses, mountain goats, Mardon skipper, big-eared bats | 10 | See SFI | 7 |
| | GMO | No specific requirement | 5 | No specific requirement | 5 | No specific requirement | 5 | No specific requirement | 5 | No specific requirement | 5 | Not allowed | 10 | See SFI | 5 | See SFI | 5 |
| | Chemical Use | Management of forest pests on 20 hectares or less of public land used for forestry need licence and for more than 20 hectares need pest management plan | 9 | Pesticides must not be applied to the core and inner zone or channel migration zone of any buffer zone | 8 | Not to exceed hazardous levels to wildlife and aquatic life | 4 | Permit required | 6 | Permits chemicals allowed by state law. | 6 | Restricts the use of specific pesticides that exceed thresholds of persistence, toxicity, carcinogenicity, bioaccumulation and other human health and environmental concerns not covered by law. | 10 | Chemical and biological insecticide applications are feasible short-term control measures; but are not a standard practice. | 6 | See SFI | 6 |
| | Old growth forest | | | | | | | | | Requires programs, but does not require outcomes from those programs. | 4 | Requires on the ground maintenance and/or restoration of native biodiversity and protection of rare old-growth forest stands | 10 | 15% of each subbasin is to be designeted as old growth (at least 80 acres) and 10% of each sub-basin must be old-growth at any given time. | 9 | See SFI | 4 |
| | Water resources | | | | | | | | | Only requires adherence to state-level laws and implementation of voluntary guidelines | 7 | Requires forest managers to protect water quality, going beyond state laws and voluntary guidelines, where necessary. | 9 | Managed to standards established by the Water Resources Program | 10 | See SFI | 7 |
| | TOTAL | | 8 | | 7.67 | | 6.33 | | 7 | | 5.8 | | 9.8 | | 8 | | 5.8 |
| **Red/Green Score Total** | | **# 4** | **7.2** | **# 5** | **6.9** | **# 8** | **6.6** | **# 5** | **6.9** | **# 3** | **7.4** | **# 1** | **9.9** | **# 2** | **8.7** | **# 5** | **6.9** |
| | | British Columbia | | Washington | | Oregon | | California | | SFI | | FSC | | Yakama Nation | | Weyerhaeuser | |

(Figure 1) Complete *Wood Red/Green List* table.

## Research

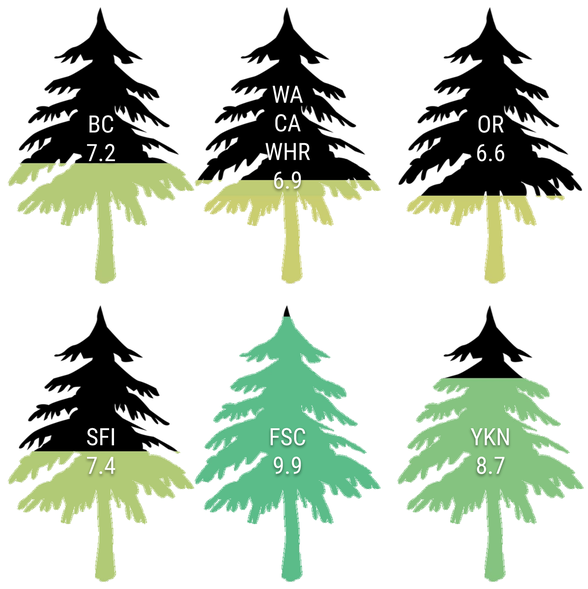
Data was compiled into one file (Figure 1) and then every criteria was compared across the political boundaries and rated on a scale from 1 to 10, with 10 being the best practice. The average of all criteria was then used to determine the overall red/green score (Figure 2). Although some practices were better than others, none of practices crossed the redline threshold for the total of any criteria (Figure 3).

| | | Political Boundaries | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | BC | WA | OR | CA | SFI | FSC | YKN | WHR |
| Assessment Criteria | Forestry Practices | | | | | | | | |
| | Reforestation time | 7 | 7 | 9 | 4 | 10 | 10 | 10 | 10 |
| | Restocking | 7 | | 6 | 9 | | 10 | | |
| | Riparian buffers | 4 | 7 | 5 | 8 | 10 | 10 | 10 | 10 |
| | Retention | 7 | 8 | 4 | | 5 | 10 | 8 | 5 |
| | Clear cut size | 7 | 4 | 8 | 10 | 8 | 9 | 8 | 8 |
| | **TOTAL** | **6.4** | **6.5** | **6.4** | **7.8** | **8.3** | **9.8** | **9.0** | **8.3** |
| | Social | | | | | | | | |
| | Living wage | 6 | 7 | 8 | 6 | | | 7 | 10 |
| | Safety certification | 10 | | | | 10 | 10 | 10 | |
| | Recreational land use | 6 | 6 | 6 | 6 | 6 | 10 | 10 | 3 |
| | **TOTAL** | **7.3** | **6.5** | **7.0** | **6.0** | **8.0** | **10.0** | **9.0** | **6.5** |
| | Biological | | | | | | | | |
| | Endangered species | 10 | 10 | 10 | 10 | 7 | 10 | 10 | 7 |
| | GMO | 5 | 5 | 5 | 5 | 5 | 10 | 5 | 5 |
| | Chemical Use | 9 | 8 | 4 | 6 | 6 | 10 | 6 | 6 |
| | Old growth forest | | | | | 4 | 10 | 9 | 4 |
| | Water resources | | | | | 7 | 9 | 10 | 7 |
| | **TOTAL** | **8.0** | **7.7** | **6.3** | **7.0** | **5.8** | **9.8** | **8.0** | **5.8** |
| **TOTAL SCORE** | | **7.2** | **6.9** | **6.6** | **6.9** | **7.4** | **9.9** | **8.7** | **6.9** |

*Only showing assessment criteria with scores

Right- (Figure 2) Total Red/Green scores of each political boundary.

Left- (Figure 3) *Wood Red/Green List* scored.




## Conclusion

Based on our research and analysis the FSC certification system received the most points. With the most comprehensive and site specific rules, it is undeniable that their practices meet the highest sustainability standards for forestry. It would be ideal for all lumber to be FSC certified. The Yakama Nation scored the second highest amount of points and although they state they follow SFI guidelines, they go above and beyond those standards in many of the categories. Furthermore, it has become evident that this is a vastly broad field that would need to be narrowed down even further for future study. Some harvested lumber does not abide by any forestry certification, yet due to other circumstances such as disease or being an invasive species, they would constitute as being sustainably harvested. More extensive research would need to be done to uncover any new information. From talking to professionals in the field, the consistent message was that of awareness. While we did not make any discoveries about local structural lumber, there are definitely avenues to utilize local and underutilized lumber types. The supply-chain must be able to support its longevity on the market, which again comes down to awareness. We are also aware that our Red/Green list does not fully connect the dots between harvest, milling, and manufacturing. Further research is needed to connect these dots to produce a complete document that architects and engineers can reference when making decisions on projects, and our *Wood Red/Green List* research is a good starting point for the continued research.