

The Lower Chehalis Riparian Assessment



Submitted by Grays Harbor County
Lead Entity for the Chehalis Basin

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The Lower Chehalis Riparian Assessment

Prepared for Grays Harbor County

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Section I-Introduction

An assessment of riparian condition of the Lower Chehalis Basin [Water Resource Inventory Area (WRIA) 22] was conducted for streams in the Lower Humptulips, Lower Wishkah, Wynoochee, Middle Fork Satsop, and East Fork Satsop Rivers where no watershed analysis had been conducted. The assessment work occurred between April 2002 and July 2003. The project received funding from the Interagency Committee for Outdoor Recreation, Salmon Recovery Funding Board.

The *Salmon and Steelhead Habitat Limiting Factors Analysis* (LFA 2001) identified a data need for riparian vegetation conditions in the above subbasins. The LFA 2001 describes riparian areas as the land adjacent to streams, rivers, and nearshore environments that interacts with the aquatic environment. This limiting factor category examines the ability of native riparian vegetation to provide shade, nutrient, bank stability, large woody debris, and the abundance and depth of pool habitat. Riparian impacts (limiting factors) can include timber harvest, clearing for agriculture or development, and direct access of livestock to stream channels.

Riparian function can be defined as the interaction of various hydrologic, geomorphic, and biotic processes within the riparian environment (WFPB 1997). As such, riparian areas are the interface between terrestrial and aquatic ecosystems (Gregory et al. 1991), and this dynamic riparian environment gives rise to a higher diversity of plant communities than do upland areas.

Loss of riparian vegetation can have detrimental effects on bank stability as root strength is lost or diminished. Food web support from insect and organic matter, fish and wildlife habitat, and thermal regulation of stream temperature and riparian microclimates can be lost or degraded as riparian vegetation is altered in size, abundance, and species composition (USDA 1995).

The purpose of this riparian assessment is to evaluate the portions of the riparian areas in the Lower Chehalis Watershed for their ability to provide a continuous supply of LWD and canopy shade to stream channels. This assessment will give a landscape perspective on the current condition of riparian areas throughout the watershed. In the future, it will then help to prioritize areas within the watershed for restoration efforts

Section II-Methodology

Under the Salmon Recovery Act (passed by the legislature as House Bill 2496 and later revised by Senate Bill 5595), the Washington Conservation Commission (WCC) was charged with identifying the habitat factors limiting the production of salmonids throughout most of the state. This information should help lead entity groups and the Salmon Recovery Funding Board in prioritizing salmonid habitat restoration and protection projects seeking state and federal funds. To provide the best guidance possible, current, known habitat conditions were identified and rated. Rating habitat limiting factors requires a set of standards that can be used to compare the significance of different factors and consistently evaluate habitat conditions in each WRIA throughout the state.

To develop a set of standards for rating salmonid habitat conditions, several tribal, state, and federal documents that use some type of habitat rating system were reviewed. The goal was to identify appropriate rating standards for as many types of habitat limiting factors as possible, with an emphasis on those that could be applied to readily available data. Based on the review, it was decided to rate habitat conditions into three categories: "good", "fair", and "poor". For habitat factors that had wide agreement on how to rate habitat condition, the accepted standard was adopted by the WCC. For factors that had a range of standards, one or more of them were adopted. Where no standard could be found, a default rating standard was developed, with the expectation that it will be modified or replaced as better data become available.

The ratings adopted by the WCC are presented in the LFA 2001. These ratings are not intended to be used as thresholds for regulatory purposes, but as a coarse screen to identify the most significant habitat limiting factors in a WRIA. They should also provide a level of consistency between WRIsAs to allow comparison of habitat conditions across the state. However, for many habitat factors, there might not be sufficient data available to use a rating standard or there might be data on habitat parameters where no rating standard is provided. For these factors, the professional judgment of the Technical Advisory Group should be used to assign the appropriate ratings. In some cases, local conditions could warrant deviation from the rating standards presented here. This is acceptable as long as the justification and a description of the procedures used are clearly documented in the limiting factors report.

A summary of the habitat conditions for WRIsAs 22 and 23 is presented in the LFA 2001. These represent generalized conditions within that stream. There are likely some reaches of the stream that will be in better or worse condition than the rating suggests. In many cases, insufficient data and knowledge about the conditions was found. For those instances, a DG is listed, which stands for data

gap. The conditions are based upon the standards in the LFA 2001, and are described in more detail in the respective LFA 2001 chapter.

For this assessment, riparian conditions relevant to LWD recruitment and canopy shading were characterized on Type 1 through 4 streams, using 1997 black and white aerial photographs taken at a 1:12,000 scale. Channel segments developed by the Salmon and Steelhead Habitat Inventory and Assessment program (SSHIAP) were delineated on the hydrography layer of Type 1-4 streams to create a base map. Riparian vegetation conditions were mapped to correspond with the channel segment breaks in most cases. In a few cases, an additional break within a SHIAPP segment was necessary to better characterize existing vegetation conditions. These segments are termed riparian condition units (RCUs). RCU codes include a description of the dominant tree type (conifer, hardwood, or mixed), tree size (small < 12", medium 12-20", or large > 20" dbh), and stocking density (sparse or dense). These codes were developed for use on forested lands. In agricultural and rural residential land uses, the 100-foot riparian assessment area may contain the upland land use (for example, pasture) as well as riparian vegetation. A modifier (Ag) was added to the RCU code to represent this situation, which could lead to different restoration opportunities than stream reaches where the upland use is forestry.

Field verification was necessary to evaluate photograph interpretation results. Over a hundred RCU were viewed or visited and investigations confirmed that most photograph interpretations were accurate. Tree size class and species composition were modified in several RCUs based on the field verification.

Section III- Lower Humptulips Riparian Assessment

An assessment of riparian condition was conducted for streams in the Lower Humptulips River Watershed (Lower Humptulips) during September through October 2002. The Lower Humptulips as defined here includes the Humptulips River and its tributaries from its mouth at Grays Harbor upstream to the confluence of the East Fork and West Fork, except that Stevens Creek is excluded. Riparian areas in the Stevens Creek watershed have been evaluated as part of the Stevens Creek Habitat Survey (Erickson 2001).

The purpose of this riparian assessment is to evaluate the riparian areas in the Lower Humptulips Watershed for their ability to provide a continuous supply of LWD and canopy shade to stream channels. This assessment will give a landscape perspective on the current condition of riparian areas throughout the watershed. It will then help to prioritize areas within the watershed for restoration efforts

METHODOLOGY

Field verification was necessary to evaluate photograph interpretation results. Over fifty RCUs were viewed or visited and investigations confirmed that most photograph interpretations were accurate. Tree size class and species composition were modified in several RCUs based on the field verification.

The major landowner in the Lower Humptulips Watershed is Rayonier Timberland Operating Company. Several other industrial and public entities manage land in the watershed, but small, private landowners occupy most of the lowland area.

The map produced from the assessment will show the characterization of the channel segments in terms of LWD recruitment and percent shade. In situations where recruitment potential is poor and the land use is agricultural/residential, an identifier was added to the riparian code (Ag). Tables with summary data are found at the end of each section in this report.

LFA 2001 SUMMARY

According to the LFA 2001, riparian vegetation in the Humptulips River has been impacted by timber management activities since the late 1800s. Except for fragmented areas of old growth remaining in the upper reaches of the watershed within the National Forest, the watershed consists primarily of second-growth timber (Peter 1999). Prior to 1930, timber harvesting was concentrated near the mainstem Humptulips River, the East and West Fork Humptulips Rivers, and larger tributaries because the only method of log transport was by splash dams.

Early logging practices did not protect riparian habitat and by 1960, the majority of private forestland had been harvested including the majority of timber in riparian areas. The regenerated riparian areas have a greater component of red alder than in pre-harvest conditions. Natural channel migration zones frequently disturbed during high flow have created a considerable number of reaches dominated by alder, and riparian harvests of conifers in areas outside of channel migration zones have further decreased the conifer component (Bretherton and Matye 1999).

Overall the majority of the riparian zones downstream of the confluence with the East and West Fork Humptulips Rivers are "poor" because they consist of either no vegetation or are dominated by hardwoods (data from Lunetta et al. 1997). The Tulips WAU (lower Humptulips watershed) riparian has 52% open or hardwood riparian lengths and 35% mid-seral stage conifer riparian (Lunetta et al. 1997). The middle Humptulips WAU consists of 62% open or hardwood riparian and 28% mid-seral stage conifer. The Stevens Creek WAU riparian includes 51% open or hardwood trees, 31% mid-seral conifer, and 11% late seral stage conifer (Lunetta et al. 1997). These riparian conditions are worse than those in the East and West Fork Humptulips Rivers, which have a significant component of late seral conifer and less open or hardwood riparian. Specific reach data for riparian conditions downstream of the Forks are not available, and this is a data need.

Riparian conditions of the lower West Fork Humptulips mainstem consist of either alder or mixed conifer/hardwood stands due to frequent natural channel meandering. Large woody debris recruitment and riparian canopy is low in this reach. Riparian stands in the upper West Fork Humptulips mainstem have medium to large conifers, which provide a good source of large woody debris and riparian shade. The lower East Fork Humptulips mainstem is more confined, but past riparian harvests have created poor large woody debris recruitment and riparian shade. The lower reaches of tributary channels to the East and West Fork Humptulips Rivers have poor LWD recruitment and riparian shade. The upper tributaries within the National Forest are mostly unmanaged, where LWD recruitment and riparian shade are "good" (Bretherton and Matye 1999).

Near-term future LWD recruitment potential is worse in areas of the West Fork Humptulips River compared to the East Fork (Figure 19). Near-term LWD recruitment potential is "poor" in the lower West Fork Humptulips mainstem, O'Brien Creek, Newbury Creek, Rainbow Creek, Elk Creek, and Donkey Creek (Bretherton and Matye 1999). In the East Fork Humptulips watershed, Rock Creek and Webfoot Creek rated "poor" for near-term LWD recruitment potential (Bretherton and Matye 1999). Near-term future LWD recruitment is more of an indicator of current riparian health. Restoration projects can do little to alter

near-term recruitment, but can improve long-term LWD recruitment potential through the addition of conifers within certain areas of riparian zones.

The long-term LWD recruitment potential for the majority of the drainage has improved since riparian buffer protection increased on all lands in the mid-1980s, and became even more restrictive with the recent Forest Practices addressing listed salmon species (WFPB 2000). The potential size of future large woody debris will be controlled by the degree of riparian protection implemented during more frequent harvest cycles of current timber processing.

LOWER HUMPTULIPS SUB-BASIN SUMMARIES

Tidal Influence Areas

The tidal influence area refers to the lower mainstem Humptulips River and associated sloughs. For the most part, this includes all reaches southerly of State Route 109, and a few reaches northerly of State Route 109 but southerly of Ocean Beach Road. It is assumed that riparian vegetation does not play a dominant role in geomorphic and fluvial processes in these areas: no effort was made to categorize vegetation in the tidal influence areas.

Lower Mainstem Lower Humptulips River

The Lower Mainstem includes areas downstream of Deep Creek and for the most part corresponds with the diked portion of the river. Land use includes a high proportion of agricultural and rural-residential. Much of this land use occurs within the historic channel migration zone, though recent avulsive and meandering activity is more limited than in the Upper Mainstem. There are a number of oxbow lakes, large riparian wetlands, and side channels associated with historic river activity. The riparian vegetation along the Lower Mainstem is primarily medium-sized stands of hardwoods with some mixed conifer. Where the land use is agricultural, the riparian areas generally are either sparsely stocked or narrow. Where there is forested land, the riparian stands have dense stocking in most segments. The mainstem channel has gravel bars and meander bends along some reaches. In general, the river is too wide to be fully shaded by the tree canopy in these lower reaches and therefore shade was not rated. This combination of factors makes the channel more difficult to shade, and shading is "naturally low". The oxbow lakes and large riparian wetlands were identified as "naturally low" in the recruitment potential assessment.

Upper Mainstem Lower Humptulips River

The Upper Mainstem includes areas upstream of Deep Creek. Land use includes a high proportion of agricultural and rural-residential. Much of this land use

occurs within the channel migration zone, and recent overbank flow and meandering activity is fairly common. There are a number of oxbow lakes, large riparian wetlands, and side channels associated with historic river activity. The riparian vegetation along the Upper Mainstem is primarily medium-sized stands of hardwoods with some mixed conifer; buffers tend to be highly variable within reaches. Where the land use is agricultural, the riparian areas generally are either sparsely stocked or narrow. Where there is forested land, the riparian stands have dense stocking in most segments. The mainstem channel has gravel bars and meander bends along some reaches. In general, the river is too wide to be fully shaded by the tree canopy in these lower reaches and therefore shade was not rated. This combination of factors makes the channel more difficult to shade, and shading is "naturally low". The oxbow lakes and large riparian wetlands were identified as "naturally low" in the recruitment potential assessment.

Deep Creek

Much of the lower and middle portions of this watershed were harvested in about the 1970s. For the most part leave trees were retained along only the largest channels. Riparian vegetation is primarily medium sized conifer that is densely stocked: size is transitional from small to medium, though functional woody debris has developed along the smaller channels. Riparian vegetation where the inner portion is hardwood and the outer portion conifer is fairly common. Shading is generally high, except where large non-forested wetlands exist in association with streams where shading is "naturally low". Much of the upper portions of this watershed, including Nelson and Shaw Creeks and the Failor Lake area, were harvested in about the 1980s. Riparian vegetation is primarily rated small size conifer that is densely stocked. However, minimal riparian buffers consisting of scattered medium size trees are common along many channels. Shading is generally high.

Big Creek and Brittain Creek

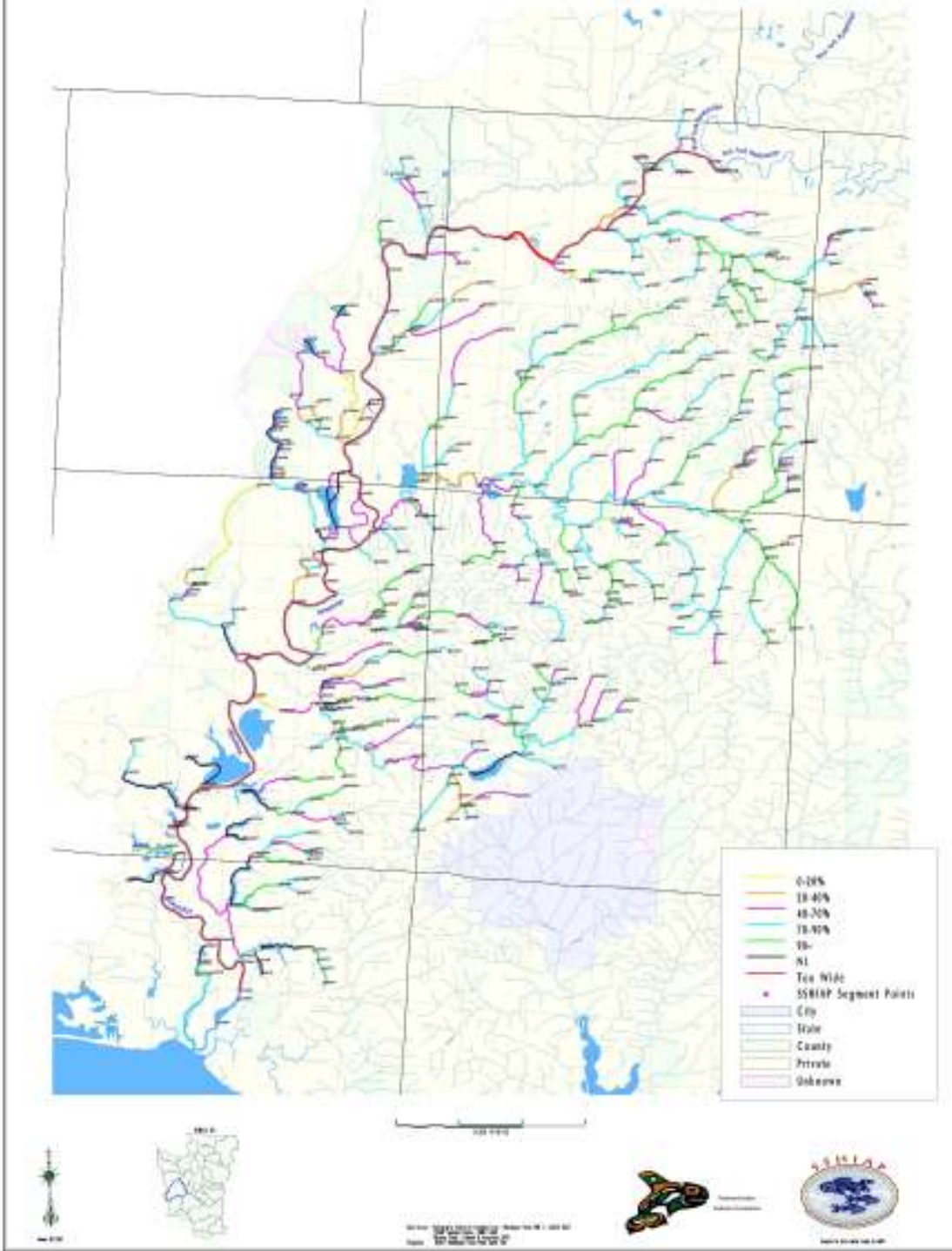
Lower reaches of Big Creek, its tributary Hansen Creek, and Brittain Creek have a high proportion of rural-residential and non-industrial forestland uses. Generally, riparian stands are small to medium-sized mixed conifer with inadequate streamside vegetation. Shading is mixed, though generally lower than on industrial forestland. Upper reaches of these drainages are mostly in industrial forest ownership, and were harvested at various times. Riparian stands are small to medium-sized conifer, densely stocked. Areas harvested later than the mid-1990s tend to have wide buffers of mature vegetation. Harvest units from earlier decades often have minimal-width riparian buffers consisting of scattered medium size trees. Shading in the upper reaches is mostly good.

Table 1:
Lower Humpulips Stream Shading Assessment Summary Data

% Shade¹	Channel Length (feet)	Channel Length (%)
0-20	33,940	3.1
20-40	61,103	5.6
40-70	190,098	17.3
70-90	366,717	33.4
90 +	232,513	21.2
NL	203,952	18.5
Tidal	9719	0.9
Total	1,098,042	

¹ Shading levels assessed from aerial photographs

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PerCent Shade - Humptulips River WBIA 22

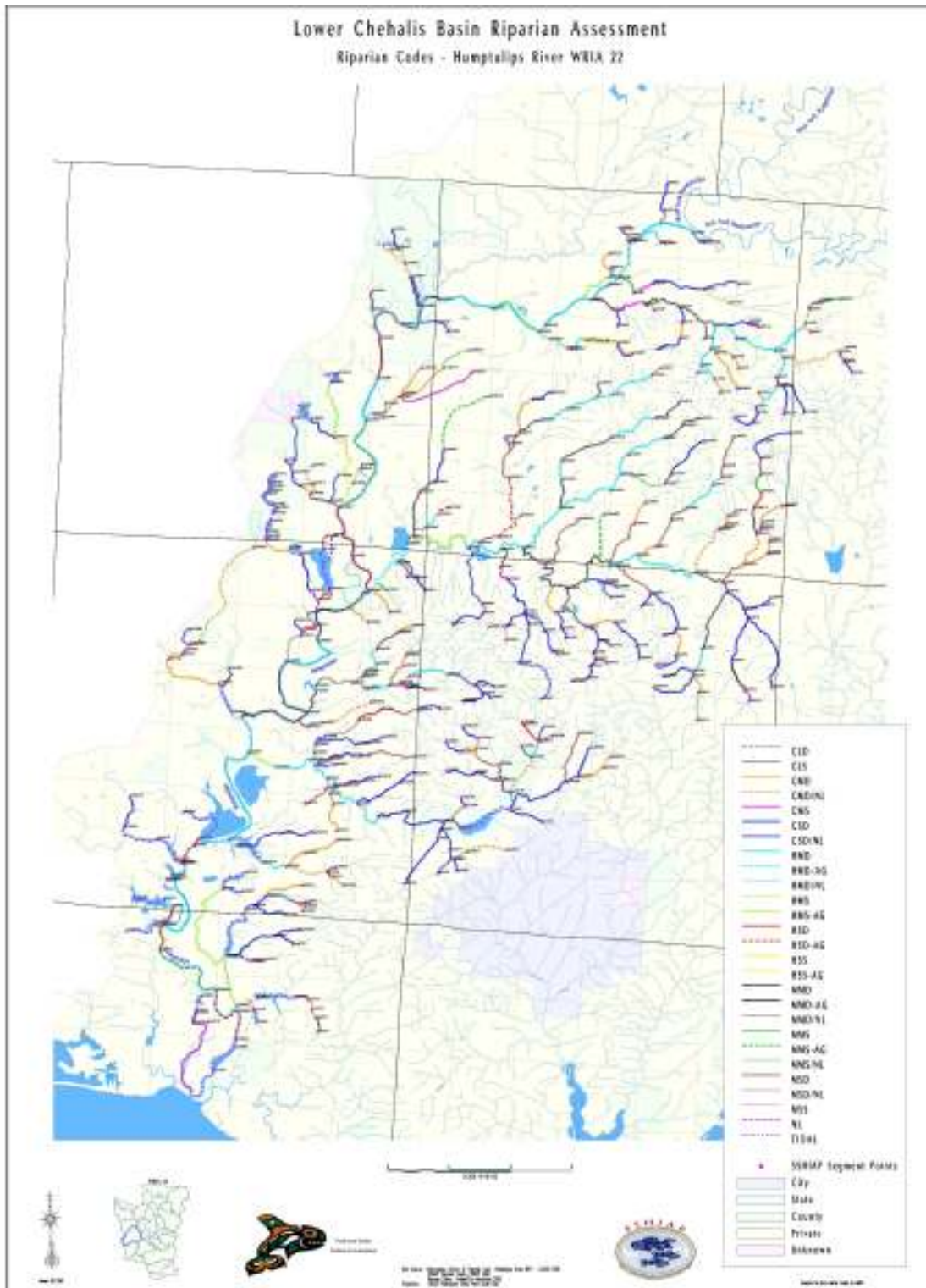


*Table 2:
Lower Humptulips Riparian Stand Condition Summary Data*

Riparian Code²	Channel Length (feet)	Channel Length (%)
CLD	1782	0.1
CLS	3546	0.2
CMD	197,884	9.0
CMS	47,998	2.2
CSD	380,099	17.3
MMD	238,996	10.9
MMS	13,938	0.6
MSD	148,393	6.8
MSS	13,426	0.6
HMD	350,029	15.9
HMS	10,146	0.5
HSD	56,334	2.6
HSS	2927	0.1
MMD – Ag	6983	0.3
MMS – Ag	57,824	2.6
HMD – Ag	41,228	1.9
HMS – Ag	79,605	3.6
HSD – Ag	33,696	1.5
HSS – Ag	20,746	0.9
CMD/NL	106,576	4.9
CSD/NL	138,288	6.3
MMD/NL	14,222	0.6
MMS/NL	38,832	1.8
MSD/NL	16,784	0.8
HMD/NL	19,912	0.9
NL	136,446	6.2
Tidal	19,438	0.9
Total	2,196,078	

Species: C = conifer, M = mixed, H = hardwood
 Size: L = large, M = medium, S = small
 Stocking: D = dense, S = sparse
 NL = naturally low in riparian vegetation
 Ag = agricultural lands

² RCU lengths are 2X stream length



Section IV- Satsop Riparian Assessment

An assessment of riparian condition was conducted for streams in the Middle and East Forks of the Satsop River Watershed (M/E Satsop) during April through June 2002. Riparian areas in the West Fork Satsop watershed have been evaluated as part of the West Fork Satsop watershed analysis (Weyerhaeuser Co. and Simpson Timber 1995). The assessment of large woody debris (LWD) recruitment potential and riparian shade generally followed the Washington State Methodology for the Riparian Function Module as described in Version 4.0 of the *Standard Methodology for Conducting Watershed Analysis* (WFPB 1997).

The purpose of this riparian assessment is to evaluate the riparian areas in the M/E Satsop Watershed for their ability to provide a continuous supply of LWD and canopy shade to stream channels. This assessment will give a landscape perspective on the current condition of riparian areas throughout the watershed. It will then help to prioritize areas within the watershed for restoration efforts

Field verification was necessary to evaluate photograph interpretation results. Approximately thirty RCUs were viewed or visited and investigations confirmed that most photograph interpretations were accurate. Tree size class and species composition were modified in several RCUs based on the field verification.

The major landowner in the M/E Satsop Watershed is the Simpson Timber Company. The US Forest Service (USFS) manages land in the headwaters area, and small, private landowners occupy most of the lowland area. Both Simpson Timber Co. and the USFS have existing riparian management prescriptions. Because of these existing prescriptions, most channel segments under Simpson and USFS ownership were not assessed for riparian characteristics. However, in some cases where other land ownerships are interspersed with these lands, segments were assessed in order to provide more continuity in the assessment, and better identify restoration opportunities on the other ownerships.

Simpson Timber Company owns lands in the middle and upper reaches of the Middle Fork Satsop, Decker Creek, Dry Bed Creek, Bingham Creek and the East Fork Satsop River. Riparian areas on Simpson ownership are managed under a 50 year Habitat Conservation Plan (Simpson Timber Co. 2000). Eight strategies for riparian protection are defined, specific to underlying geology and channel type classification. Guidelines range from a no-harvest strategy to experimental management to accelerate development of late-seral forest characteristics.

The USFS manages public lands in the upper headwater reaches of the Middle Fork and East Fork Satsop River. Riparian areas on those lands are classed as "Riparian Reserves", within either the Adaptive Management Area or the Late

Successional Reserve land use class. These areas are managed according to guidelines in the Northwest Forest Plan (USDS and USDI 1994).

The map produced from the assessment will show the characterization of the channel segments in terms of LWD recruitment and percent shade. In situations where recruitment potential is poor and the land use is agricultural/residential, an identifier was added to the riparian code (Ag). Tables with summary data are found at the end of this report.

LFA 2001 SUMMARY

According to the LFA 2001, a loss of bank vegetation was noted for sections of the mainstem Satsop River, but very little tree canopy loss was documented in the mainstem (Wampler et al. 1993). However, the Satsop WAU riparian data indicates that most of the riparian (79%) is either lacking vegetation or is dominated by hardwoods and is rated "poor" (Lunetta et al. 1997).

Early logging in the lower two thirds of the West Fork Satsop watershed removed the old-growth forest, including the riparian areas, and burned the land without replanting. This has led to the conversion of the riparian from old-growth fir to alder (Jordan 1995). From the late 1940s to 1990, old growth in the upper watershed was harvested, including some in the riparian areas. In 1995, watershed analysis results documented the widespread conversion of the riparian zone from conifer to deciduous, particularly in the middle and lower West Fork Satsop watershed.

The lower West Fork Satsop River is a wide meandering channel with a high percentage of naturally low shade (Jordan 1995). The riparian in this area is mostly alder, and the land use is agricultural, rural residences, or commercial forest management. The riparian stands of the middle reaches of the West Fork Satsop River (until just south of the Canyon River confluence) are mostly dense deciduous or mixed mature stands. The upper West Fork Satsop River is more confined with a conifer-dominated riparian. The upper portion is owned by the U.S. Forest Service and has a few stands of old growth Douglas fir remaining (Jordan 1995). The Canyon River riparian is contained within an incised canyon with dense deciduous and mixed mature stands in the lower drainage, to mature and old conifer in the upper region.

The most common riparian stand in the West Fork Satsop watershed is 48% deciduous, 62% mature, and 73% dense. This classification accounts for about 32% of the total riparian miles in the West Fork Satsop watershed (Jordan 1995), and is rated "poor". Mature, dense conifer account for only 5% of the riparian miles; old, dense conifers form 4% of the riparian; and old, sparse conifers comprise another 4% of the riparian miles (Jordan 1995). Using the

Lunetta et al. (1997) data, "poor" riparian conditions are found in about 52% of the West Fork Satsop watershed.

The predominance of alder greatly impacts the potential recruitment of large woody debris (LWD). Near-term LWD recruitment potential in the lower West Fork Satsop watershed (downstream of RM 13, including associated tributaries such as Still Creek) is rated as generally "moderate" to "low"(Jordan 1995). Long-term LWD potential in the area is generally "poor" due to the high percentage of mature deciduous riparian stands on the tributaries and "poor" riparian conditions along the mainstem (Jordan 1995).

Near-term LWD recruitment potential in the middle reaches of the West Fork Satsop watershed (RM 13 to 30, including tributaries such as lower Little River) is variable. Both the middle mainstem and tributaries had a greater percentage of samples rated as "high", but both also had very significant percentages rated as "low" (Jordan 1995). Long-term LWD recruitment potential is "poor" with 40% of the stands consisting of mature alder.

The upper West Fork Satsop River and tributaries such as upper Little River, Spoon Creek, and Pederson Creek, rate better for near-term LWD recruitment potential in the mainstem, but worse in the tributaries (Jordan 1995). Long-term LWD recruitment potential is "high" because of the greater percentages of conifer. Near-term recruitment of LWD in the Canyon River mainstem rated mostly "moderate" to "high", but the tributaries rated generally "moderate" to "low" (Jordan 1995). The long-term LWD potential is primarily "good", although 25% of the sub-basin was classified as having "poor" long-term LWD recruitment potential.

Current LWD levels are highly variable. Most of the current functional pieces are from previous timber harvests or old mortality that remained in the stream channel; the riparian has added only small mobile wood (Jordan 1995). Most of the current levels are considered to be "poor" to "moderate" (Jordan 1995). Only 11% of the sampled areas are rated as "good" for LWD, with 33% rating "poor" (Baxter 1995). Key pieces of LWD rate even worse, with 88% of the samples classified as "poor" (Baxter 1995). The low current levels of LWD are a major factor in the number of pools available for salmon. Pool frequency is rated as "fair" for 47% of the segments and "poor" for 35% of the segments (Baxter 1995). This reduces coho and steelhead rearing habitat, and increases stress of migrating adults for all salmonids. The areas with the lowest pool abundance include Black Creek, Little River, and some of the smaller tributaries.

Loss of riparian vegetation is documented in the middle and lower reaches of the mainstem Middle Fork Satsop, as well as extensive loss in Rabbit Creek (Wampler et al. 1993). Small areas of tree canopy loss are noted in the middle and upper

reaches of the Middle Fork Satsop. Overall, 61% of the Middle Fork Satsop riparian reaches are either lacking in trees or dominated by hardwoods, and are rated "poor" (Lunetta et al. 1997).

Areas lacking riparian vegetation in the East Fork Satsop watershed include Decker Creek and tributaries, the lower mainstem East Fork Satsop River, and upper Bingham Creek (Wampler et al. 1993). The East Fork mainstem from the confluence of Cook Creek to just south of the Township 20 boundary with Township 19 has an extensive loss of tree canopy (Wampler et al. 1993). Loss of tree canopy was also recorded in upper Bingham Creek. About 57% of the riparian buffers are either open or dominated by hardwoods and are rated "poor" (Lunetta et al. 1997). However, the East Fork Satsop watershed has the greatest percentage (29%) of late seral riparian trees in the Satsop drainage. Preservation of these "good" riparian buffers is recommended.

All four WAUs within the Satsop drainage consist of mostly "poor" rated reaches for riparian conditions due to the predominance of hardwood or open areas. The riparian zones in the West Fork Satsop watershed were assessed by a much more rigorous methodology than used in the Middle and East Fork watersheds, and the ratings given the Middle Fork and East Fork Satsop watersheds have been assigned with less confidence.

SATSOP SUB-BASIN SUMMARIES

Mainstem Satsop River

The mainstem Satsop refers to the lower river below the confluence with the west fork of the Satsop. The river is too wide to be fully shaded by the tree canopy in these lower reaches and therefore shade was coded as "naturally low". The riparian vegetation is almost entirely medium-sized hardwood, except along a few tributary channels where some conifer is present. The land use is predominately agricultural, and the hardwood stands along the river are patchy. The river itself meanders and large gravel bars have formed on meander bends. The hardwood stands grow in patches alternating with patches of bare ground along the river. Many segments are coded hardwood, medium, sparse; and this is meant to characterize this patchy vegetation.

Middle Fork Satsop River

The riparian vegetation along the Middle Fork mainstem is primarily medium-sized stands of mixed conifer and hardwoods. Where the land use is agricultural, the riparian areas are sparsely stocked. Where there is forested land, the riparian stands have dense stocking in most segments. The mainstem channel has gravel bars and meander bends along some reaches. This makes the channel more

difficult to shade, and shading percentages are between 0 and 40% along most channel segments.

The tributary channels have mainly conifer in the riparian areas. These stands are either in the small or medium size classes. Most stands have dense stocking, and these smaller channels are well shaded. There are a number of wetland channels. Some wetland channels have small hardwoods growing in the channel floodplain. Other wetland channels have marsh vegetation and naturally low shade.

East Fork Satsop River

The riparian vegetation along the mainstem of the East Fork Satsop is primarily medium sized hardwood and mixed conifer/hardwood stands. There are many agricultural lands that have no buffer at all or very sparse stocking of trees and brush. Where harvesting has occurred, only narrow buffers have been left along the channel. The river meanders and gravel bars and meander bends make shading difficult. Shade is poor in the lower reaches due to these channel characteristics and lack of streamside vegetation.

The riparian vegetation along the East Fork tributary channels is a mix of conifer and hardwoods in the small to medium size classes. The land use is predominately-forested land, interspersed with agricultural/residential land use. There are several large wetlands and wetland channels, which were coded as naturally low for their ability to produce high quality riparian recruitment potential. The tributary channels are smaller and therefore easier to shade. The shading along the tributary channels is generally 70 to 90 percent, except for where wetlands occur. Shading adjacent to open wetlands is considered to be "naturally low."

Lower Decker Creek

Riparian vegetation is primarily medium sized conifer and mixed stands that are sparsely stocked. This is due to residential/agricultural land use that has produced sparse vegetation, and to harvesting with narrow leave buffers on forested land. There is poor shading along this stretch.

Decker Creek

There are numerous wetlands in Decker creek, and many of the stream channels are wetland channels with marsh vegetation. These wetland areas won't grow conifer and were identified as "naturally low" in the recruitment potential assessment. Some riverine wetland channels are narrow with emergent marsh vegetation growing adjacent to the channel, but the outer portions of the 100

feet riparian assessment area are capable of growing trees. These areas were identified as CMD/NL or CMS/NL (conifer in the outer band and wetland vegetation in the inner band).

Generally, riparian stands are small to medium-sized conifer. Most agricultural lands have inadequate streamside vegetation. In forested areas, harvest units have inadequate streamside buffers. Shading is either poor or “naturally low” – due to wetlands.

Dry Bed Creek

There are high levels of gravel-sized bedload observed in this creek, particularly in the lower reaches. The middle reaches are private agricultural lands with very sparse vegetation along the channels. Shading is poor along these reaches. The other reaches are forested lands and have small to medium-sized conifer stands. Some of these riparian areas are sparsely stocked due to harvesting without adequate buffers. No wetland channels were identified in Dry Bed Creek.

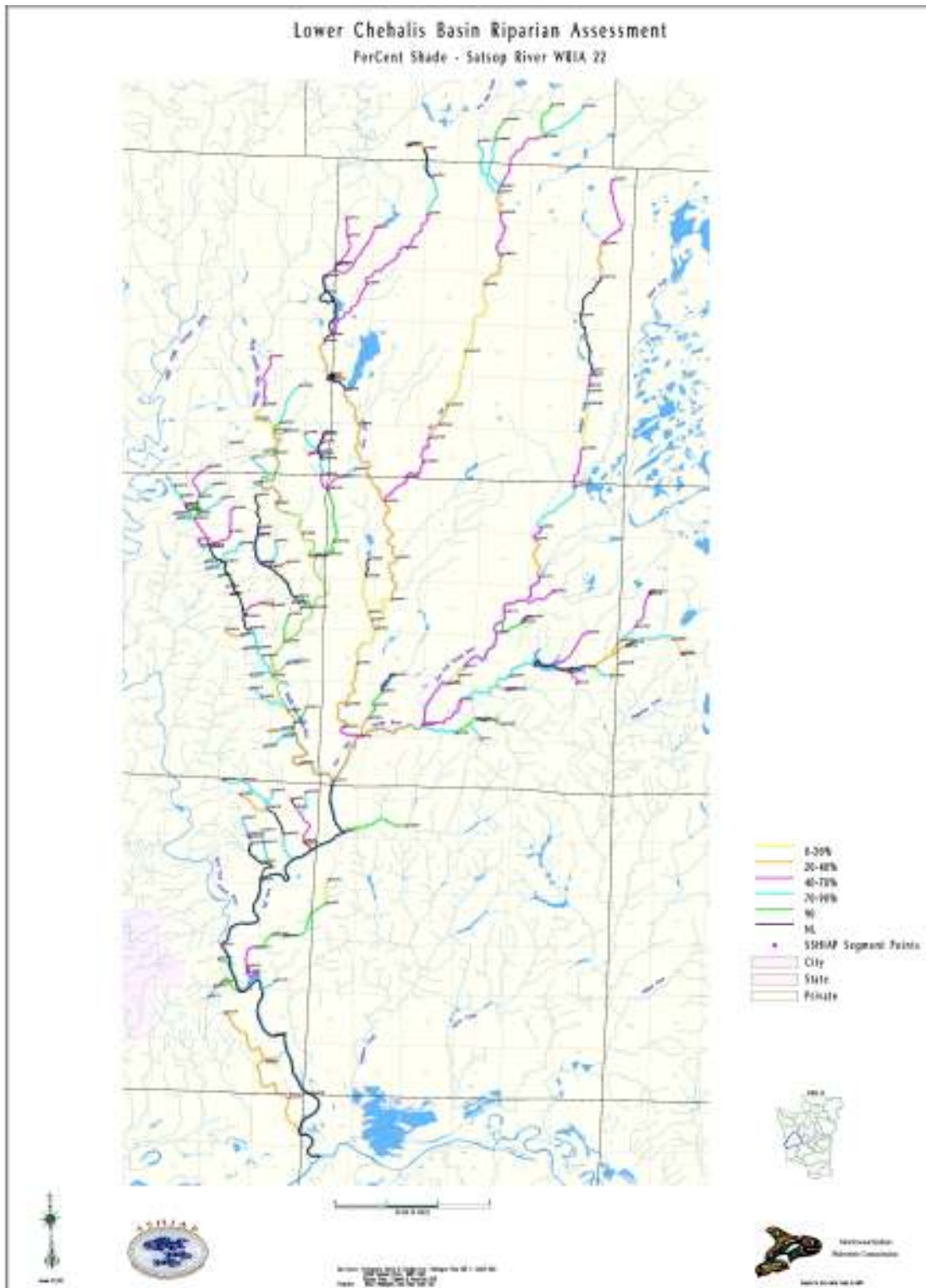
Bingham Creek

Most of the riparian areas in Bingham Creek are forested lands. Where recent harvesting has occurred, riparian buffers are inadequate conifer, medium, sparse coding (CMS). There are several segments with riverine wetland channels where shading is generally poor (CMS/NL).

*Table 3:
Satsop Stream Shading Assessment Summary Data*

% Shade³	Channel Length (feet)	Channel Length (%)
0-20	83,539	11.3
20-40	147,443	19.9
40-70	152,754	20.7
70-90	138,892	18.8
90 +	68,915	9.3
NL	148,018	20.0
Total	739,561	

³ Shading levels assessed from aerial photographs



*Table 4:
Riparian Stand Condition Summary Data*

Riparian Code⁴	Channel Length (feet)	Channel Length (%)
CMD	111,407	15.0
CMS	97,408	13.2
CSD	44,602	6.0
CSS	14,441	2.0
MMD	87,680	11.9
MMS	6417	0.9
MSD	34,218	4.6
HMD	27,754	3.8
HSD	1926	0.3
CMS – Ag	66,149	8.9
MMS – Ag	54,105	7.3
HMS – Ag	79,806	10.8
CSS – Ag	11,559	1.6
MSD – Ag	3615	0.5
CMD/NL	29,587	4.0
CMS/NL	21,691	2.9
CSD/NL	1828	0.2
NL	45,368	6.1
Total	739,561	

Species: C = conifer, M = mixed, H = hardwood

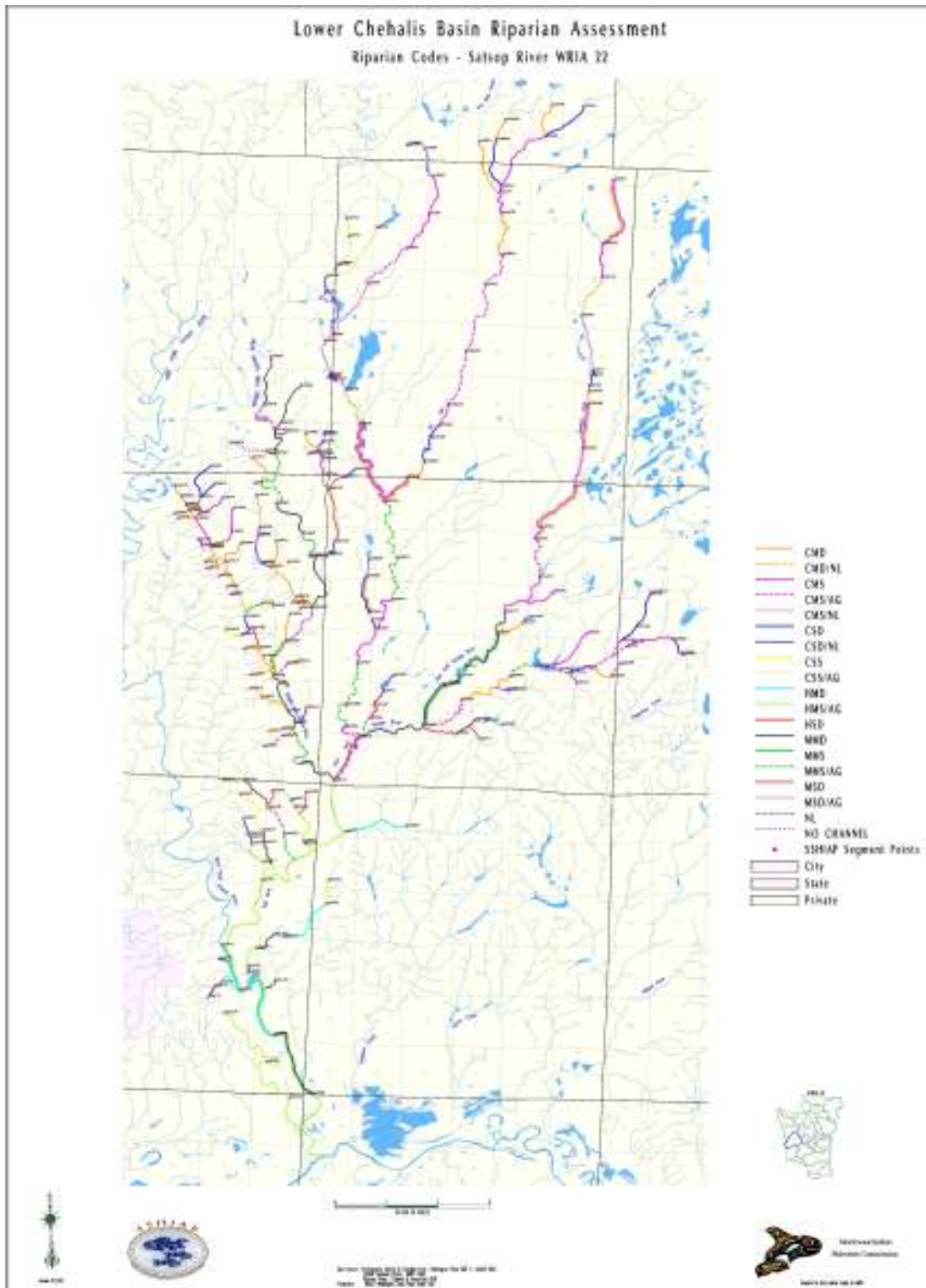
Size: M = medium, S = small

Stocking: D = dense, S = sparse

NL = naturally low in riparian vegetation

Ag = agricultural lands

⁴ RCU lengths are 2X stream length



Section V-Lower Wishkah Riparian Assessment

An assessment of riparian condition was conducted for streams in the Lower Wishkah River Watershed during March through May 2003. Riparian areas upstream from the confluence of Big Creek have been evaluated as part of the Wishkah Watershed Analysis (Rayonier 2002). The assessment of LWD recruitment potential and riparian shade generally followed the Washington State Methodology for the Riparian Function Module as described in Version 4.0 of the *Standard Methodology for Conducting Watershed Analysis* (WFPB 1997).

The purpose of this riparian assessment is to evaluate the riparian areas in the Lower Wishkah Watershed for their ability to provide a continuous supply of LWD and canopy shade to stream channels. This assessment will give a landscape perspective on the current condition of riparian areas throughout the watershed. It will then help to prioritize areas within the watershed for restoration efforts.

Field verification was necessary to evaluate photograph interpretation results. Approximately thirty riparian conditions units (RCU) were viewed or visited and investigations confirmed that most photograph interpretations were accurate. Tree size class and species composition were modified in several RCUs based on the field verification.

The map produced from the assessment will show the characterization of the channel segments in terms of LWD recruitment and percent shade. In situations where recruitment potential is poor and the land use is agricultural/residential, an identifier was added to the riparian code (Ag). Tables with summary data are found at the end of this report.

LFA 2001 SUMMARY

According to the LFA 2001 and based on the broad scale classification of riparian vegetation cover in response channel buffers, riparian conditions in the Lower Wishkah and West Fork Wishkah WAUs are mostly "poor", with the majority of native conifer converted to non-forest or hardwoods. The Upper Wishkah WAU has "poor" conditions in about half its buffers, with the other half "good", consisting of conifer or mixed conifer in mid- to late seral stages (Lunetta et al. 1997).

The Upper Wishkah Watershed Analysis conducted a riparian assessment and identified riparian areas into conifer, mixed, or hardwood, as well as density and age class. Mature-dense-hardwoods were the dominant riparian type, followed by mature-dense-mixed stands. Reach breaks of the riparian conditions were not mapped in that analysis. Based on the WCC rating criteria, overall riparian

conditions upstream of RM 29.5 were rated as "fair", since over 30% of riparian cover was conifer or mixed over story in mature and old age classes. The data suggest that the riparian shade is "good" based on over 70% being mature or old trees, but "fair" based on a future source of large woody debris from riparian stands dominated by red alder (Raines et al. 1992).

To map general riparian conditions for the Wishkah, Hoquiam, and South Grays Harbor drainages, ortho-photography on the DNR Salmon Recovery Data Viewer was reviewed to identify riparian conditions as "good", "fair", or "poor" in addition to some field visits. The lower three miles of the Wishkah are exclusively industrial or residential lands, with only small areas of riparian vegetation ("poor"). From this point upstream to RM 7.5 near the upper limit of tidal influence, there is dense riparian vegetation of alder with a few reaches of stands dominated by mature conifer. Within this reach, the Wishkah Road closely parallels the river at four locations, resulting in the overall riparian condition being a mix of "poor" with some reaches of "good" riparian in this upper tidal zone. From the upper tidal zone upstream to RM 20 in the mainstem and the lower mile of the East Fork Wishkah, riparian conditions are "poor" due to narrow buffers associated with past timber harvests and agriculture development. The remainders of the mainstem Wishkah and East Fork Wishkah Rivers and the entire West Fork Wishkah River have riparian conditions alternating from "fair" to "good" depending on the width of buffers left from past forest management. Riparian conditions in the upper drainages will improve over time as wider riparian buffer requirements are implemented under the year 2000 state forest practices rules.

SUB-BASIN SUMMARIES

Lower Mainstem Wishkah River

The Lower Mainstem refers to the lower river below the confluence with the east fork of the Wishkah River. The first portion of the river flows through Aberdeen. The next reaches have associated wetlands and the vegetation is sparse with scattered conifer. Upstream, the land use becomes agricultural. Vegetation is either sparse or non-existent along the river in these reaches. The river is too wide to be fully shaded by the tree canopy in the lower reaches and therefore shade was not estimated for this portion of the river. The shading in the agricultural lands is also poor.

Lower Mainstem Tributaries

The vegetation along the tributary channels depends on the associated land use. If it is agricultural land, then the vegetation is typically sparse hardwood. There are a lot of wetland channels where soils are too wet to grow large conifer. Some

of these channels have dense hardwood stands. If the land use is forestry, then the vegetation is either young trees in plantations, or sparse leave buffers. Shading is varied.

Middle Mainstem Wishkah River

The riparian areas along these reaches are predominately vegetated with hardwoods. Some sections are densely stocked, and others have sparse or narrow buffers along agricultural lands. Most channel segments have shade estimates of either 20-40%, or 40-70%.

Middle Mainstem Tributaries

Riparian areas along most tributaries in this section of the Wishkah River have hardwood or mixed stands of trees. There is a corridor of private land that is adjacent to the river, which is agricultural in land use. Vegetation is often sparsely stocked along the agricultural fields. In the upper reaches of the tributaries, land use is forestry. Vegetation is either small young plantations or narrow leave buffers along clear cuts. Shading is varied.

East Fork Wishkah

The riparian vegetation along the east fork mainstem is dominated by medium-sized hardwood stands. These stands are either dense or sparsely stocked. The sparsely stocked stands occur in the lowest reaches in the agricultural lands. Sparsely stocked stands in the upper reaches are due to logging with narrow or patchy leave buffers. There are some mixed conifer/hardwood stands in the riparian areas in the upper reaches of the east fork. Shading estimates are mostly in the 40-70% range, with some reaches having an estimate of 70-90% shade.

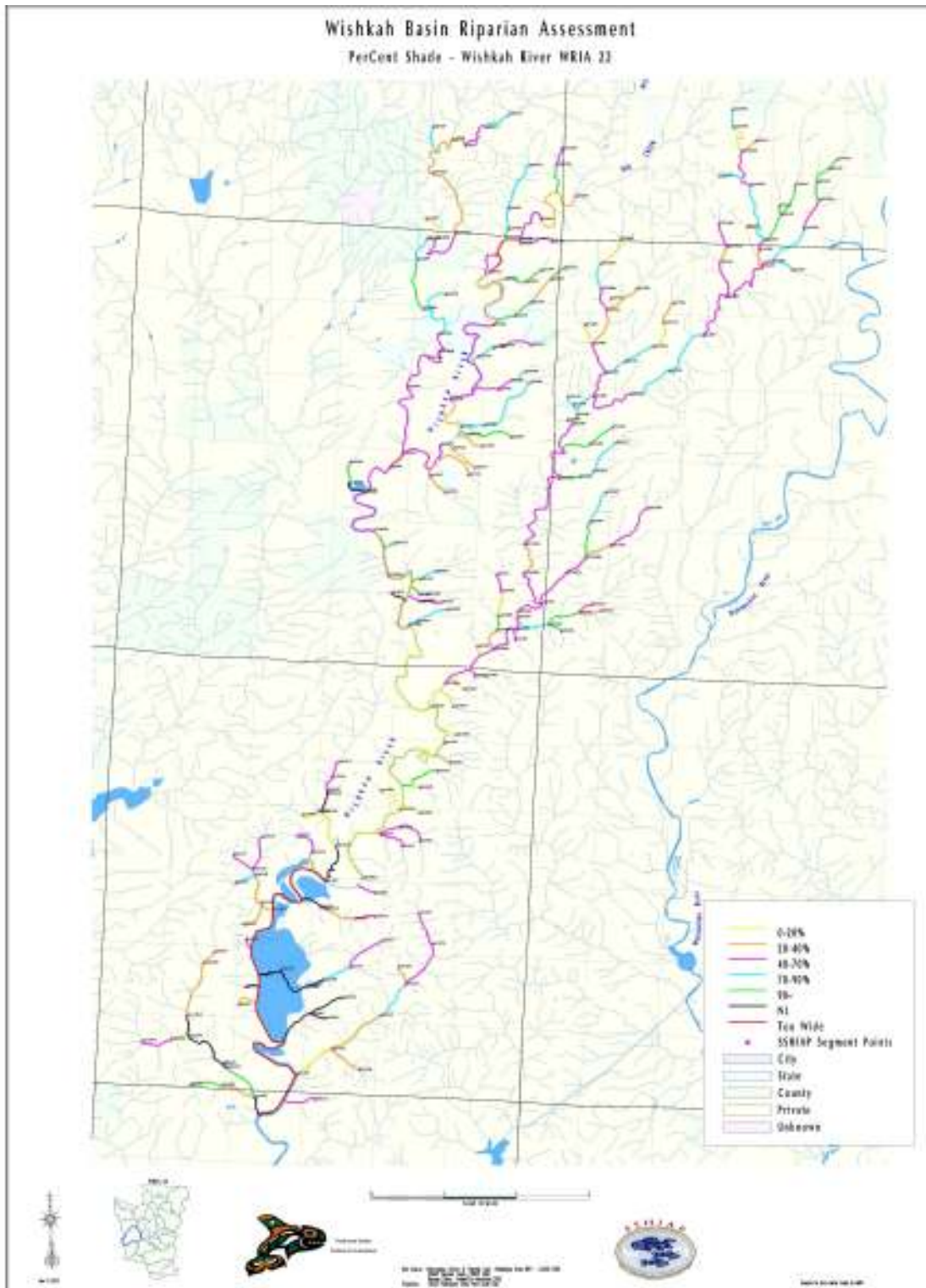
East Fork Tributaries

The riparian vegetation along the tributary channels is primarily mixed hardwood/conifer stands. They are medium-sized trees. Some of the vegetation is sparsely stocked due to narrow leave buffers adjacent to clearcuts. And other stands are small trees in plantations where no buffers were left during harvesting. Shading is varied.

*Table 5:
Lower Wishkah Stream Shading Assessment Summary Data*

% Shade⁵	Channel Length (feet)	Channel Length (%)
0-20	66,298	12.1
20-40	95,595	17.5
40-70	183,797	33.7
70-90	78,433	14.4
90 +	56,013	10.3
NL	65,414	12.0
Total	545,550	

⁵ Shading levels assessed from aerial photographs



*Table 6:
Lower Wishkah Riparian Stand Condition Summary Data*

Riparian Code⁶	Channel Length (feet)	Channel Length (%)
CMD	13,924	1.3
CMS	14,152	1.3
CSD	34,196	3.1
MMD	148,508	13.7
MMS	52,781	4.8
MSD	78,132	7.2
HMD	237,018	21.8
HMS	131,544	12.2
CMS – Ag	3604	0.3
HMD – Ag	13,756	1.3
HMS – Ag	114,236	10.5
HSS – Ag	125,574	11.6
CMS/NL	50,324	4.6
NL	68,565	6.3
Total	1,091,100	

Species: C = conifer, M = mixed, H = hardwood

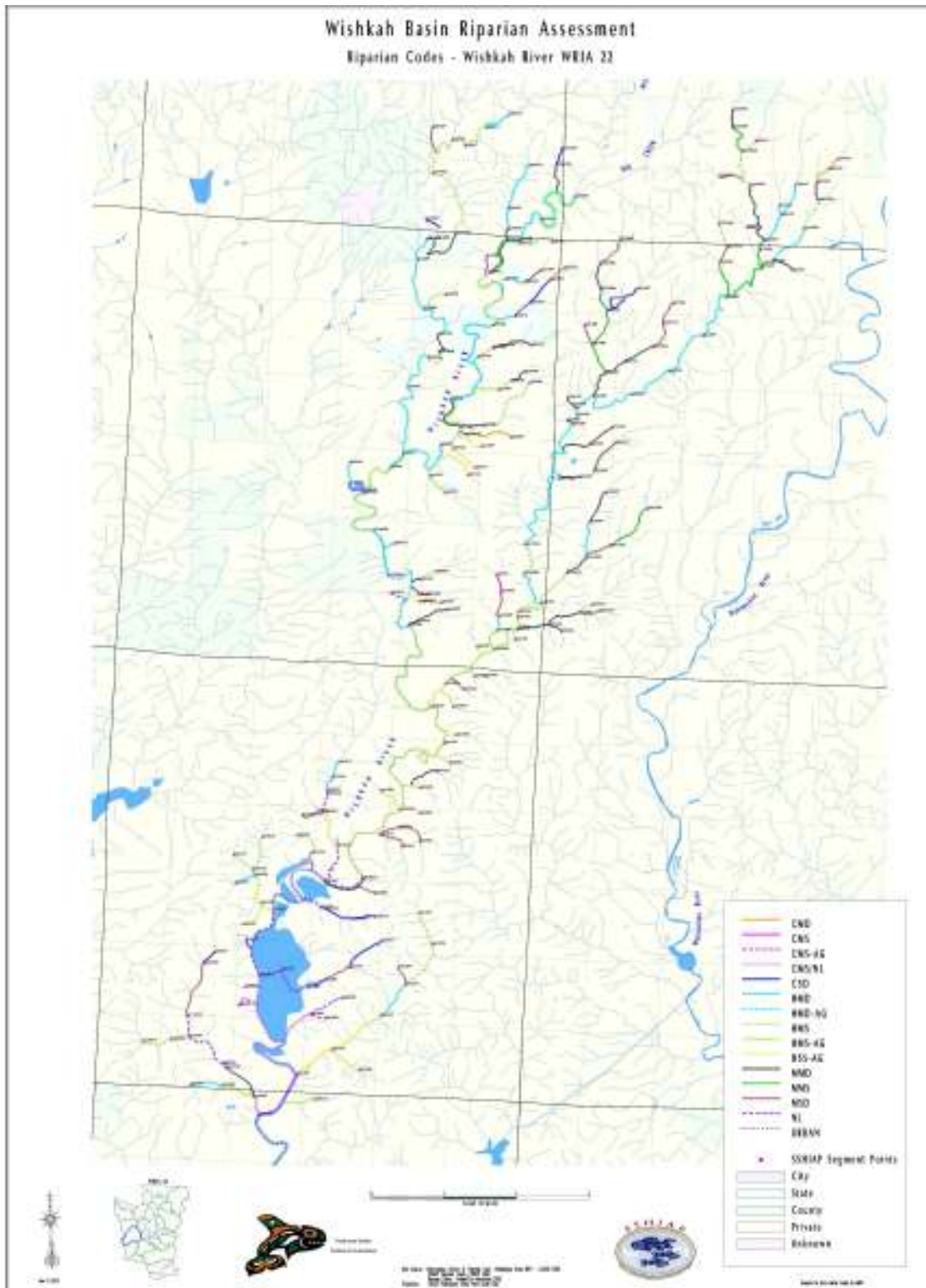
Size: M = medium, S = small

Stocking: D = dense, S = sparse

NL = naturally low in riparian vegetation

Ag = agricultural lands

⁶ RCU lengths are 2X stream length



Section VI-Lower Wynooche Riparian Assessment

An assessment of riparian condition was conducted for streams in the lower Wynoochee River watershed during June through July 2003. The purpose of this riparian assessment is to evaluate the riparian areas in the Lower Wynoochee River Watershed for their ability to provide a continuous supply of LWD and canopy shade to stream channels. This assessment will give a landscape perspective on the current condition of riparian areas throughout the watershed. It will then help to prioritize areas within the watershed for restoration efforts.

The major forest landowners in the Wynoochee Watershed are Simpson Timber Company and Weyerhaeuser. The USFS manages land in the headwaters area, and small, private landowners occupy most of the lowland area. Both Simpson Timber Co. and the USFS have existing riparian management prescriptions. Because of these existing prescriptions, most channel segments under Simpson and USFS ownership were not assessed for riparian characteristics. However, in some cases where other land ownerships are interspersed with these lands, segments were assessed in order to provide more continuity in the assessment, and better identify restoration opportunities on the other ownerships.

Riparian areas on Simpson ownership are managed under a 50 year Habitat Conservation Plan (Simpson Timber Co. 2000). Eight strategies for riparian protection are defined, specific to underlying geology and channel type classification. Guidelines range from a no-harvest strategy to experimental management to accelerate development of late-seral forest characteristics.

The USFS manages public lands in the upper headwater reaches of the Wynoochee River. Riparian areas on those lands are classed as "Riparian Reserves", within either the Adaptive Management Area or the Late Successional Reserve land use class. These areas are managed according to guidelines in the Northwest Forest Plan (USDS and USDI 1994).

The map produced from the assessment will show the characterization of the channel segments in terms of LWD recruitment and estimated percent shade. In situations where recruitment potential is poor and the land use is agricultural/residential, an identifier was added to the riparian code (Ag). Tables with summary data are found at the end of this report.

LFA 2001 SUMMARY

Due to the lack of funding, the watershed analysis conducted for the upper Wynoochee River did not include a riparian vegetation assessment (U.S. Forest Service 1996). With no riparian module or other comprehensive study of riparian conditions available, a broad scale analysis of riparian conditions was made using

1993 USGS aerial photos online (Terra Server.Com), and by reviewing riparian vegetation classification for the Lower and Upper Wynoochee WAUs (Lunetta et al.1997). Because these are coarse-scale analyses, riparian condition ratings are made with the notation that a finer resolution of riparian conditions remains a data need.

According to the LFA 2001, timber harvests in the upper Wynoochee River within the Olympic National Forest implemented riparian protection measures even before the spotted owl decision in 1994. Since then, there has been no commercial timber harvest on National Forest Land within the Wynoochee sub-basin except for salvage logging or pre-commercial thinning (U.S. Forest Service 1996). Therefore, riparian conditions are generally "good" in the upper 17 miles of the mainstem and its tributaries within the National Forest.

There were no harvest restrictions on private lands associated with the spotted owl decision, because no old growth forest remained outside of the Olympic National Forest. Downstream of the Forest Service boundary at RM 44.7 to RM 31, the riparian zone is exclusively second growth reforestation, consisting of mixed Douglas fir and alder. Riparian vegetation in this reach provides good shade and limited near-term large woody debris recruitment, but does provide a long-range future source of large woody debris. Between RM 31 and 22, the forest has been intensely managed in recent years. Riparian conditions are mostly "fair" within this reach, where narrow buffers of second growth conifer remain. Below RM 22, essentially all timberlands located with the floodplain were harvested and converted to agricultural land. The riparian zone in the lower 22 miles is primarily a narrow band of mostly alder trees mixed with Douglas fir, and is rated "poor."

The Lunetta et al. (1997) database describes the Wynoochee River riparian conditions in two geographical regions (WAUs), with the reach break being the outlet to Wynoochee Lake. The lower WAU has a predominately (53%) hardwood riparian ("poor"), with 36% of the riparian consisting of more than 70% conifer ("good"). A 1997 aerial photograph indicates that within this lower reach, the majority of the conifer component is upstream of the Olympic National Forest boundary, while most of the hardwood riparian is within the lower 22 miles, where forested land has been converted to agricultural land. The upper WAU, upstream of the Wynoochee Dam, consists of 63% conifer reaches, 33% hardwood-dominated reaches, and 4% mixed hardwood and conifer riparian areas.

During the mid 1990s, the Grays Harbor Conservation District, in cooperation with landowners, administered several riparian livestock exclusion-fencing projects. These projects successfully protect stream banks from livestock grazing

through established buffers. The buffer widths are negotiated between the Grays Harbor Conservation District and the landowner.

Because there has been no riparian assessment in the Wynoochee River drainage, there is a data need to evaluate and rate riparian conditions. Based on the review of high elevation aerial photographs, and land use patterns in the floodplain, some assumptions can be made on riparian conditions. Upstream of RM 44.7 (Olympic National Forest boundary), riparian vegetation is almost exclusively conifer forest, and is rated "good". Downstream of the Olympic National Forest to RM 22, there has been intensive forest management where riparian buffers do not meet current standards. Current riparian conditions in this reach are "fair" to "poor". However, as the Forests and Fish Agreement is implemented, riparian conditions will improve over time. Agricultural development in the lower 22 miles of the river has removed the majority of riparian conifers, and riparian buffers are now mostly narrow stands of red alder. Overall, riparian conditions in this lower reach are "poor".

WYNOOCHEE SUB-BASIN SUMMARIES

Lower Mainstem Wynoochee River (T17 & T18)

The mainstem Wynoochee River is too wide to be fully shaded by the tree canopy in these reaches. Therefore percent canopy cover was not estimated for the mainstem river segments. Vegetation is almost entirely medium-sized hardwoods stands that are often just a narrow band of trees along the channel. Sometimes there is no riparian vegetation at all, or it is patchy with bare areas in between. Land use is agricultural or residential.

Middle Mainstem Wynoochee River (T19 & 20)

Along this section of the river, land use alternates between agricultural and forestry. The agricultural land typically has medium-sized hardwood stands that are sparsely stocked. The vegetation along the forestland segments is usually forested with dense medium-sized hardwood stands or mixed conifer/hardwood vegetation. Some segments have sparsely stocked riparian trees due to harvesting with narrow riparian leave buffers.

Major Tributary – East Bank (T18)

The majority of land use along this tributary channel is forestry. There are some agricultural lands in the lowest reaches of the main channel. The riparian stands along the main channel have primarily hardwood stands, with some mixed stands in the uppermost reaches of the main channel. Shading is generally good (70-90%), with some moderately shaded channel segments (40-70%).

Along the smaller tributary channels, the land use is forestry. Riparian stands vary from HMD in the lower channels to MMD stands along the upper smaller channels. Sparse stands are due to narrow leave buffers in harvest units. There are also some wetland channels with no trees along the channel edge. Shading is generally good in most channel segments.

All Other Tributaries (T17 & T18)

Tributaries to the lowest reaches of the Wynoochee River (T17) are in agricultural lands; otherwise the land use along tributary channels is forestry. There are more stands with mixed conifer/hardwood composition along the channels that are tributary to the upper reaches of the river in T18. Shading is poor in the lower tributary channel in agricultural lands. Shading is generally good in most of tributary channels except where harvesting with sparse leave buffers has occurred.

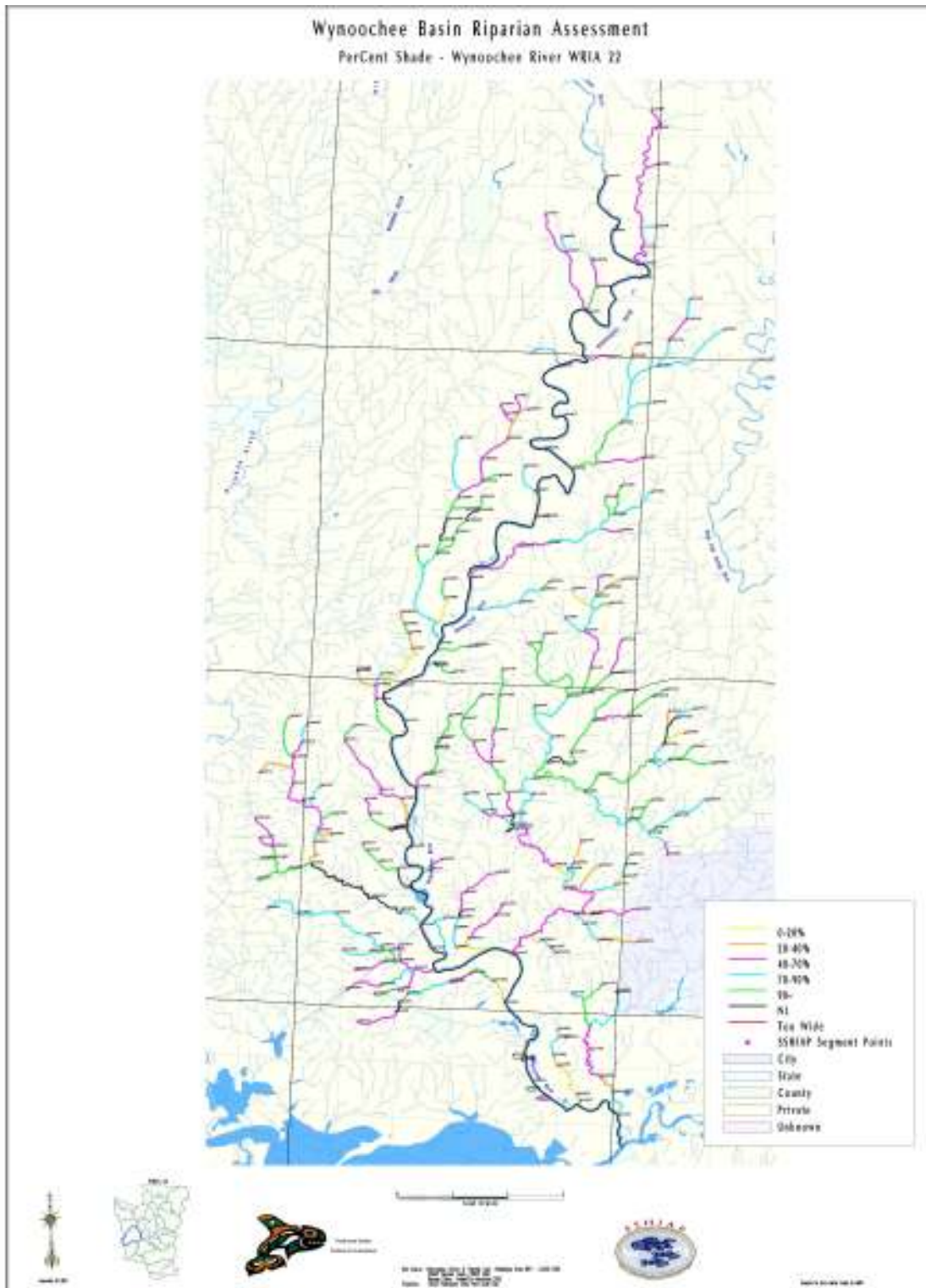
All Tributaries (T19 & T20)

These tributaries have forestland use except the lowest channel segments that are adjacent to the mainstem Wynoochee. Most stands are hardwoods and mixed conifer/hardwood. There are a few conifer stands in the uppermost reaches. Some stands have sparse stocking due to narrow harvest buffers. Shading is good in most segments.

*Table 7:
Wynoochee Stream Shading Assessment Summary Data*

% Shade⁷	Channel Length (feet)	Channel Length (%)
0-20	34,045	3.9
20-40	39,148	4.5
40-70	202,375	23.1
70-90	197,936	22.6
90 +	180,804	20.6
NL	221,916	25.3
Total	876,224	

⁷ Shading levels assessed from aerial photographs



*Table 8:
Riparian Stand Condition Summary Data*

Riparian Code⁸	Channel Length (feet)	Channel Length (%)
CMD	90,456	5.2
CMS	43,860	0.3
CSD	46,180	2.5
MMD	250,726	0.3
MMS	114,115	2.6
MSD	67,392	0.5
HMD	524,599	29.9
HMS	124,498	7.1
HSD	2632	18.5
CMS – Ag	4952	4.7
HMS – Ag	323,866	0.2
HSS – Ag	47,584	2.7
CMD/NL	5282	14.3
CSD/NL	8714	6.5
HMS/NL	81,840	3.8
NL	15,752	0.9
Total	1,752,448	

Species: C = conifer, M = mixed, H = hardwood

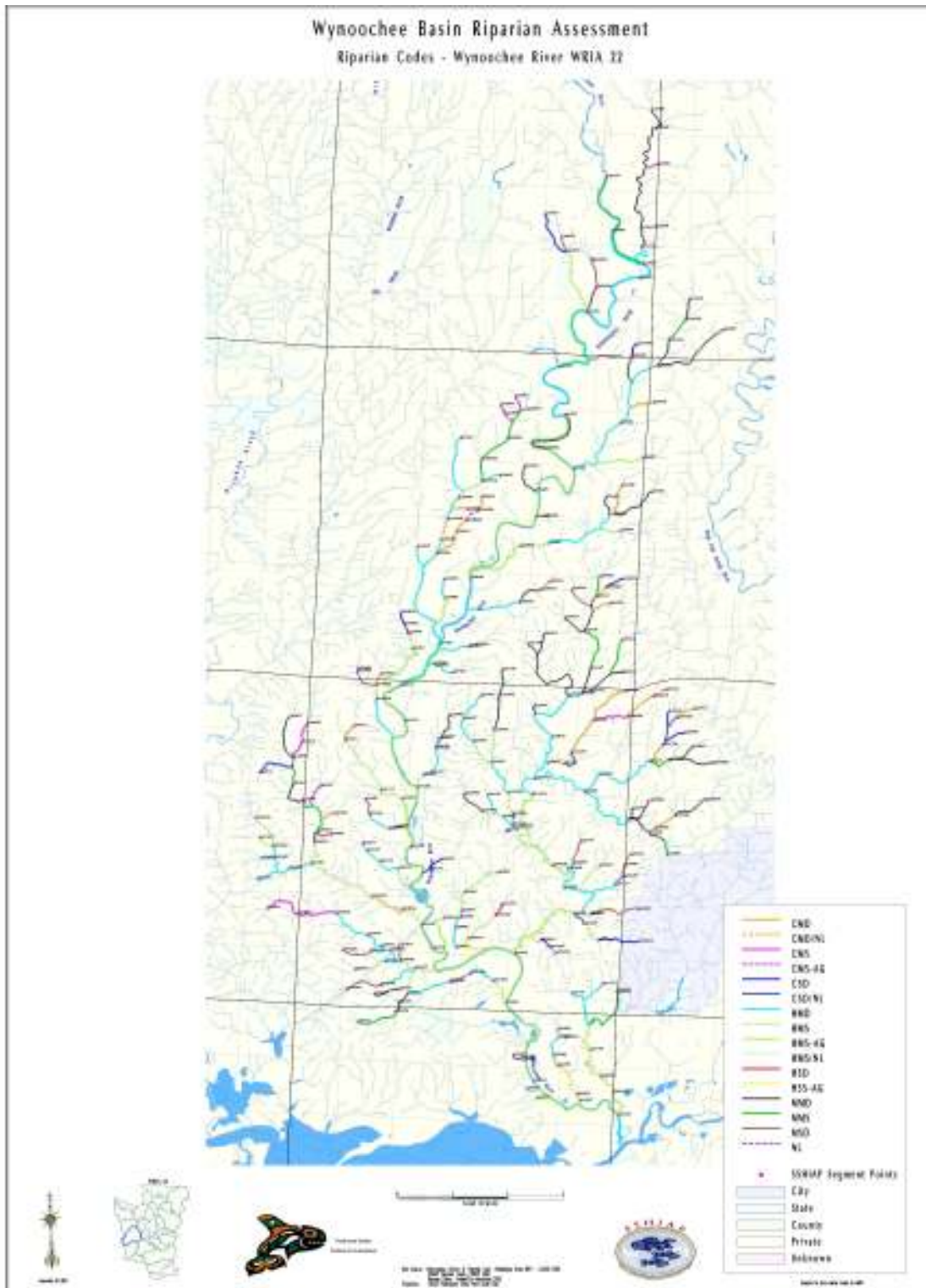
Size: M = medium, S = small

Stocking: D = dense, S = sparse

NL = naturally low in riparian vegetation

Ag = agricultural lands

⁸ RCU lengths are 2x stream length



Section VII-Project Selection Criteria

Although bull trout are the only salmonid listed as “threatened” in the Chehalis Basin, this is not a clean bill of health for WRIAs 22 and 23 by any means. The LFA 2001 analysis by Smith and Wenger point out that human activity in the watershed has degraded or eliminated aquatic habitats by altering many of the key natural stream processes that support salmonids. Riparian conditions are no exception.

To ensure that salmonids in the Chehalis Basin fare better than in Puget Sound, the Columbia River, and Hood Canal actions must be taken to restore, preserve or better understand riparian areas. To this end, the LFA 2001 analysis and the *Chehalis Basin Salmon Habitat Restoration and Preservation Work Plan WRIA 22 and 23* (Work Plan) adopted strategies, all equal in value, for addressing the most pressing limiting factors identified within the sub-basins of WRIAs 22 and 23. Salmon habitat projects and activities that address riparian areas must meet one or more of these strategies for inclusion on the Habitat Project List. These guiding strategies are:

- ❖ **Attain a healthy and diverse population of wild salmonids.**
- ❖ **Restore, enhance, and protect the Grays Harbor Estuary.**
- ❖ **Restore and preserve properly functioning riparian areas**
- ❖ **Restore habitat access**
- ❖ **Restore properly functioning hydrology**
- ❖ **Restore floodplain and stream channel function**
- ❖ **Concentrate habitat projects and activities in those sub-basins that have the greatest salmonid diversity and quantity of habitat**

The Work Plan provides several layers to insure those projects develop occur in the most beneficial areas for habitat restoration and that projects reflect and fulfill the limiting factors for habitat. This is accomplished by prioritizing the sub-basins into high, medium, and low priority areas. Then a second layer is applied for project development to guidance individual sub-basins. Each sub-basin has a matrix that recommends general projects and technical assessments that address its limiting factors.

The following table represents a portion of the matrix describing the common actions for riparian areas. These are the restoration, preservation, and data gap actions recommended by the Limiting Factors Technical Advisory Group. The actions have been prioritized based upon the Limiting Factors Report coupled with professional judgment.

*Table 9
Template to Address Limiting Factor Conditions in Riparian Areas*

Limiting Factor	LF Rating	Restoration Actions	Preservation Action	Data Gap
Riparian	Poor (DG). Known Problems: riparian loss, conversion to hardwoods.	<p>H - Revegetate open riparian areas with native plants including conifers in appropriate places.</p> <p>M - Interplant conifer into hardwood riparian areas that were historically conifer areas.</p> <p>M- Plant conifer adjacent to and outside existing and limited existing conifer hardwood riparian areas.</p>	<p>H - Funds, lands, and easement opportunities should be identified to obtain areas of mid-to late seral stage riparian with priority given to older stands. This is applicable to lands that do not have current protection such as those outside of current forest practice regulations.</p> <p>H – Continue enforcement and revision of current regulations that preserve and enhance riparian regeneration.</p>	<p>H - Assess and prioritize recovery and protection for riparian conditions.</p>

Project planners/sponsors are encouraged to use the above strategies to develop competitive projects. Additionally, project planners/ sponsors should consult the Work Plan, Appendix B, which contains data, maps, and matrixes for each sub-basin in WRIAs 22 and 23.

Through the development of this assessment, an additional layer was added as review criteria for riparian related projects. Eventually these criteria will become part of the work plan for habitat restoration during the next update.

This assessment identified riparian conditions relevant to LWD recruitment and canopy shading were characterized on Type 1 through 4 streams, using 1997 black and white aerial photographs taken at a 1:12,000 scale. Channel segments developed by the SSHIAP program were delineated on the hydrography layer of Type 1-4 streams to create a base map.

Riparian vegetation conditions were mapped to correspond with the channel segment breaks in most cases. In a few cases, an additional break within a SHIAPP segment was necessary to better characterize existing vegetation conditions. These segments are termed RCU. RCU codes include a description of the dominant tree type (conifer, hardwood, or mixed), tree size (small < 12", medium 12-20", or large > 20" dbh), and stocking density (sparse or dense). These codes were developed for use on forested lands. In agricultural and rural residential land uses, the 100-foot riparian assessment area may contain the upland land use (for example, pasture) as well as riparian vegetation. A modifier (Ag) was added to the RCU code to represent this situation, which could lead to different restoration opportunities than stream reaches where the upland use is forestry.

Based on the assessment findings riparian related projects are subject to the following criteria:

- High priority projects address areas designated as 0-20% Riparian Shade cover.
- High priority projects address areas designated as sparse riparian unit codes.
- Medium priority projects address areas designated as 20-40% Riparian Shade cover.
- Low priority projects address areas designated as 20-40% Riparian Shade cover.
- High priority projects focus primarily on areas not subject to Forest and Fish regulations.
- Use Salmonid Stock Inventory (SaSI) status as screening criteria.
- Project addressing TMDL target areas will be considered high priority work.
- Valuable information to fill the data gaps identified in the strategy will be considered high priority work.

Section VIII-Next Steps

Implementation work related to this assessment will include:

- Identifying private land ownership through GIS. This involved application of several data layers that would include ownership, ortho photographs, and an overlay of the assessment inventory
- Once property ownership is clarified, then the Lead Entity or its partners can begin outreach with property owners to determine willingness to develop a project.
- Project develops will need site review(s) to confirm the viability of that targeted area as a candidate project site. This will insure that the site is conducive to riparian plants.

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