- Six large jams with lots of logs and stored gravels were observed in the main channel and its two primary contributing forks.
- Coho fry, fingerlings, and trout are observed in lower and middle reaches where flow is perennial.

Creek. The other municipal storage site is on Electric Creek, and serves the city of Garibaldi. Based on the size of the streams, their annual discharge, and the number of surface withdrawals in the frontal subwatershed, dewatering could be a concern during summer low flow periods in terms of aquatic habitat.

In the Lower Miami subwatershed seven of the permitted withdrawals serve domestic users and draw from the Miami River, Hobson Creek and Minich Creek. All four of the permitted withdrawals serving irrigation users in the subwatershed are from surface sources associated with either the Miami River or unnamed tributaries. There are seven permitted withdrawals serving the City of Garibaldi, which is outside of the project area. Two of these are wells in the Whitney Creek drainage, one is a reservoir on ODF land up Struby Creek, and the others are surface withdrawals from Hobson and Whitney Creeks.

There are eight permitted withdrawals in the Upper Miami subwatershed. They serve private non industrial land owners located near the lower reaches and mouth of Prouty Creek. Two are on ODF land on a very small unnamed stream. All are designated as surface withdrawal permits for domestic and irrigation purposes. Two in the Prouty Creek drainage are located on ODF land.

There are no known significant permitted withdrawals importing water into the project area, although one used for irrigation purposes that is located on the southern boundary is recorded as drawing from a surface source noted as the Kilchis River. There is anecdotal information about an un-permitted withdrawal on ODF land on an unnamed tributary in the upper reaches of the lower Miami subwatershed. When discovered, ODF attempts to encourage un-permitted users to register their facility with the State to claim the right for the withdrawal.

Chapter 5 of the Miami Watershed Assessment (E&S 2001) presents a comprehensive discussion of water rights and use within the Miami River. It was concluded that the potential for dewatering streams with documented fish presence during low flow periods is a concern. This echoes concerns of ODFW and OWRD, which designated the Miami River a state priority for streamflow restoration to support anadromous species. Considering the greater number of permitted withdrawals and the greater amount of use recorded in the Tillamook Bay frontal subwatershed, where surface sources are associated with small streams exhibiting far less annual discharge and available water compared to the Miami River, it is logical to assume that dewatering effects to aquatic species would also be a concern.

4.3 Riparian Conditions and Wetlands

4.3.1 Riparian Conditions

Vegetation in the project area was mapped by aerial photo interpretation using 2004 orthophotos. Polygons that depicted discrete individual patch types were delineated and classified according to the OWAM (OWEB 1999) methodology for attributing cover types. Each individual polygon was assigned a 3-digit code. Each digit in the code

represents a unique structural attribute: a vegetation type, a size class, and a density class. Combining each digit into a 3-letter code provides a structural characterization of an individual polygon, thereby conferring a relative stand or patch condition. Table 10 introduces the definitions of each structural attribute and its corresponding code.

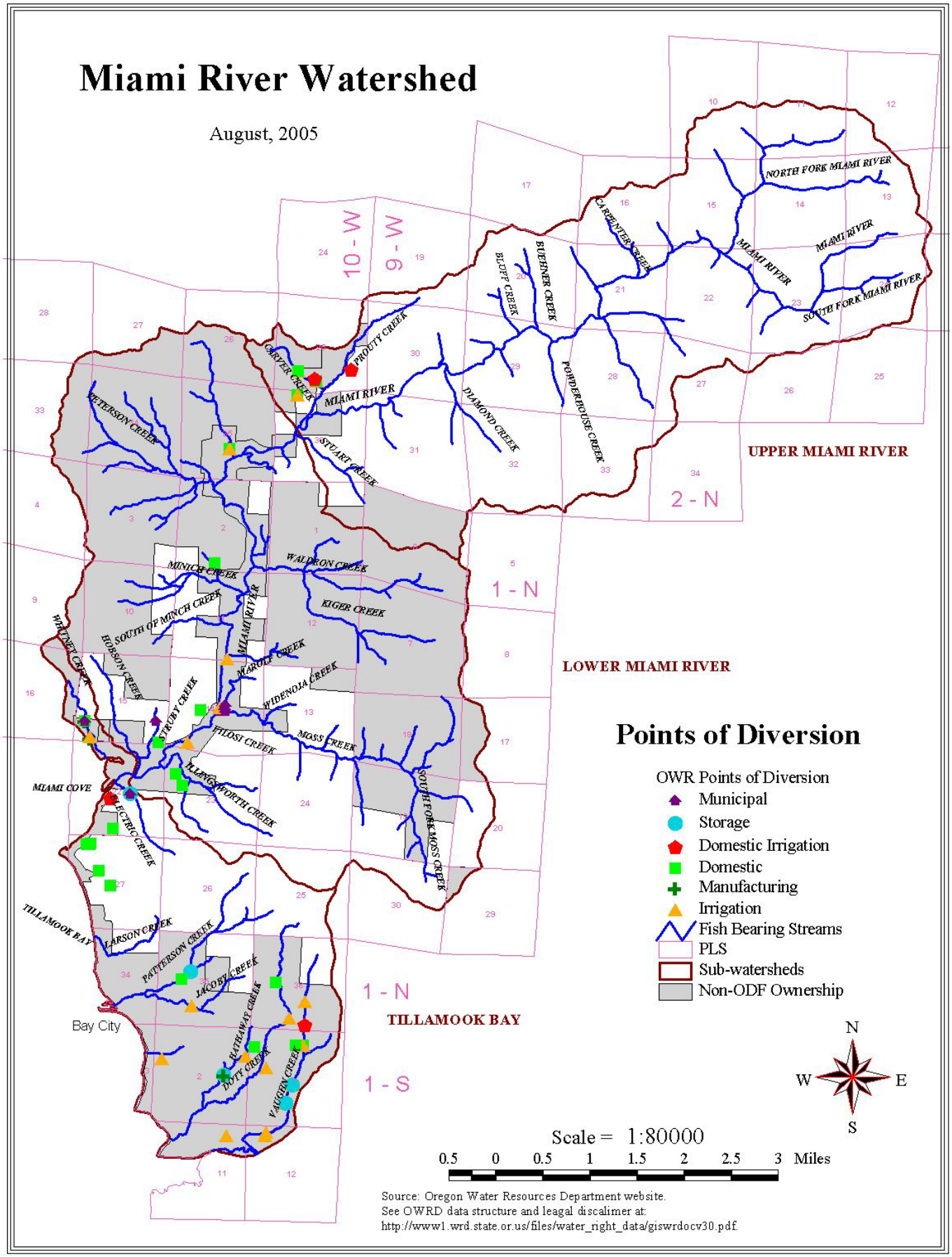

Figure 1. Points of diversion in the Miami River Watershed Project Area.

Table 1. Vegetation Cover Type Definitions

Vegetation Type	1st Digit Code	Size Class	2nd Digit Code	Density Class	3rd Digit Code
Mostly conifers (>70%)	C	Regeneration (<4” avg, DBH)	R	Dense (<1/3 closure)	D
Mostly hardwoods (70%)	H	Small (4-12” avg, DBH)	S	Sparse (>1/3 closure)	S
Mixed conifer/hardwood	M	Medium (>12-24” avg, DBH)	M	Non forest	N
Brush	B	Large (>24” avg, DBH)	L		
Grass/meadow	G	Non forest	N		
No riparian veg.	N				
Rock	R				
Slide area	S				
Right-of-way	ROW				

To assess riparian composition, vegetation cover types within a designated riparian corridor network were compiled. The width of this corridor is one hundred feet on either side of a mapped stream, for a total width of 200 feet. This default was selected based upon OWAM methodology for ecoregions represented in the project area. However, it is the maximum suggested width irregardless of other influencing factors such as confinement and valley form. Actual widths in the field may vary considerably. Nonetheless, this width was used because of the inherent potential for the vegetation zones in the region to produce large tall trees, which represent a potential future source of large wood. This mapped riparian area is assumed to represent the immediate zone of influence to the stream network, and it amounts to approximately 46 percent of the project area. A spatial representation of both riparian and upland vegetation cover types and stream size is presented in Figure 9.

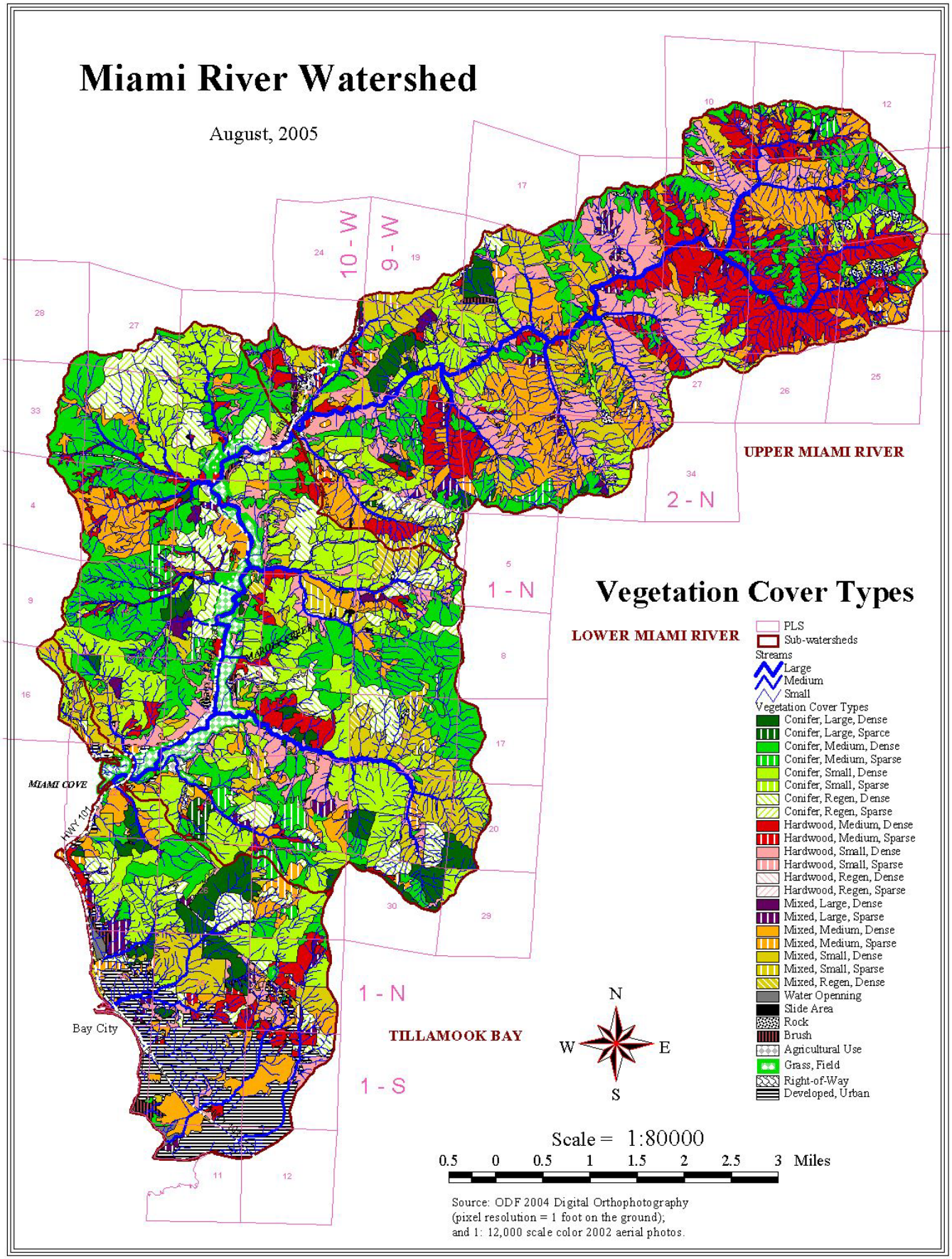

Figure 2. Vegetation cover types and streams in the Miami River Watershed Project Area.

Table 2. Percent Riparian Corridor by Major Cover Type

		Percent Area by Subwatershed and Owner Class (nearest whole percent)								
Cover Type	Total Percent	Lower Miami			Upper Miami			Tillamook Bay		
		PI	PNI	State	PI	PNI	State	PI	PNI	State
Conifers	39	40	1	17	2	<1	22	1	5	28
Hardwood	27	8	2	6	2	1	40	0	10	2
Mixed	27	14	1	5	2	1	29	2	16	8
Non Forest	8	<1	5	<1	<1	<1	2	0	27	1

Key: PI = Private Industrial, PNI = Private Non Industrial

It is estimated that thirty-nine percent of the stream riparian network is comprised of conifer dominated stands, 27 percent is hardwood dominated, 27 percent mixed, and about 8 percent is non forest (Table 11). Most of the non forest patch types are located on non industrial private lands in the Tillamook Bay frontal subwatershed. The Lower Miami subwatershed, which is predominantly in private industrial ownership, exhibits the highest percentage of conifer dominated stands, while the Upper Miami subwatershed which is primarily ODF lands has the greatest percentage of hardwood dominated stands, presumably a reflection of the effects of the Tillamook Burn and post fire salvage.

As displayed in Table 12, the majority (81%) of the riparian network is comprised of medium and small tree size classes (45% and 36% respectively). Only 6 percent is comprised of the large tree size class, and 5 percent is in the regeneration size class. The highest percentage in the Lower and Upper Miami subwatersheds is the medium size tree class. The highest percentage of the large tree size class is in the Tillamook Bay frontal subwatershed.

Table 3. Estimated Percent Riparian Corridor by Vegetation Size Class

		Percent Area by Subwatershed and Owner Class (nearest whole percent)								
Size Class	Total Percent	Lower Miami			Upper Miami			Tillamook Bay		
		PI	PNI	State	PI	PNI	State	PI	PNI	State
Large	6	<1	<1	4	<1	<1	4	0	2	10
Medium	45	29	2	11	3	1	54	0	13	9
Small	36	25	2	12	2	<1	34	3	13	15
Regen.	5	7	1	2	1	0	1	0	2	4

Key: PI = Private Industrial, PNI = Private Non Industrial

Only about 4 percent of the riparian network is comprised of large conifer dominated stands. They are fragmented, widely distributed patch types. Under more natural conditions, where less widespread and complex human and natural disturbance had occurred historically, riparian vegetation would consist of a much greater proportion of large conifer cover types. ODF (2002) estimated the historical distribution of forest types to be 15 - 20% age 100 – 200 years and 40 – 50% age greater than 200 years. If this is true, the current condition could be considered outside the range of variability for the vegetation zones in these types of ecoregions.

About 59 percent of the mapped riparian network is located on ODF lands. Approximately 89 percent of those acres are associated with small steep, headwater tributaries. As displayed in Table 13, cover types in the riparian network on ODF lands are variable, proportions of each are evenly represented. Most of the Upper Miami, which is predominantly ODF land, is comprised of hardwood and mixed components: conifer dominated stands comprise the smallest percentage. The medium and small tree size classes dominate.

Table 4. Percent of Cover Type and Size Class in Riparian Network on ODF Lands

Cover Type	Lower Miami River	Upper Miami River	Tillamook Bay	Grand Total
Conifer Dominated	11	17	8	36
Hardwood Dominated	4	30	1	35
Mixed	4	22	2	28
Size Class				
Large	2	3	3	8
Medium	7	41	3	50
Small	8	25	4	37
Regeneration	2	<1	1	3

Ninety-five percent of the large conifer riparian patches are located on ODF land, their acreage nearly evenly distributed across all three subwatersheds. Several of the largest more prominent patches are located on ODF land on the frontal highlands above the coastal plain in the Tillamook Bay frontal subwatershed. Other large notable patches on ODF land are located in the upper headwaters of Moss Creek, above the north bank of the Miami River across from Diamond Creek, and in the steep headwaters of Bluff Creek.

Using the vegetation mapping of the riparian network, shade and LWD recruitment potential were rated as per the OWAM methodology (Figure 10, Figure 11, and Tables 14 and 15). More than 80 percent of the riparian network is rated as exhibiting high shade potential. Recruitment of LWD on the other hand is rated as low to moderate across more than 95 percent of the mapped riparian network. The same trend holds for Shade and LWD recruitment potentials on ODF lands.

The average stream channel width generally increases in a downstream progression, potentially resulting in decreased shade levels. A comparison of current shade levels on perennial, Type F and critical habitat stream segments on ODF lands indicates no significant difference (Table 14).

Table 5. Percent of mapped riparian buffers by shade rating for perennial, Type F and critical habitat stream segments on ODF lands.

	Perennial		**Type F**		**Critical Habitat**	
Shade class	**acres**	**percent**	**acres**	**percent**	**acres**	**percent**
High	1622.20	87.3%	906.20	85.2%	143.26	87.1%
Moderate	142.42	7.7%	90.97	8.6%	19.67	12.0%
Low	93.76	5.0%	65.83	6.2%	1.46	0.9%
Total	1858.38	100%	1063.00	100%	164.39	100%