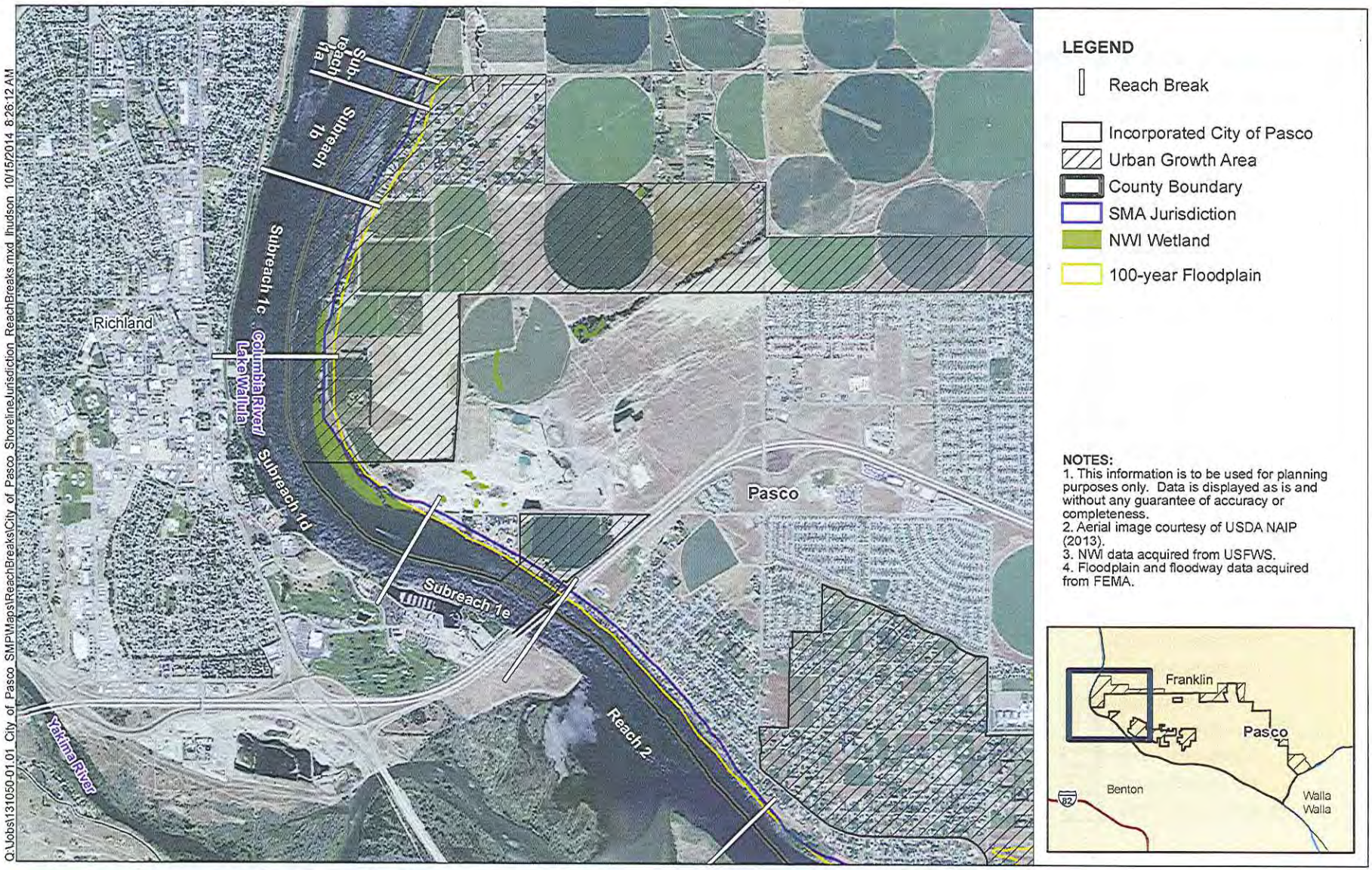
APPENDIX A
CITY OF PASCO REACH CHARACTERIZATION TABLES AND REACH MAPS



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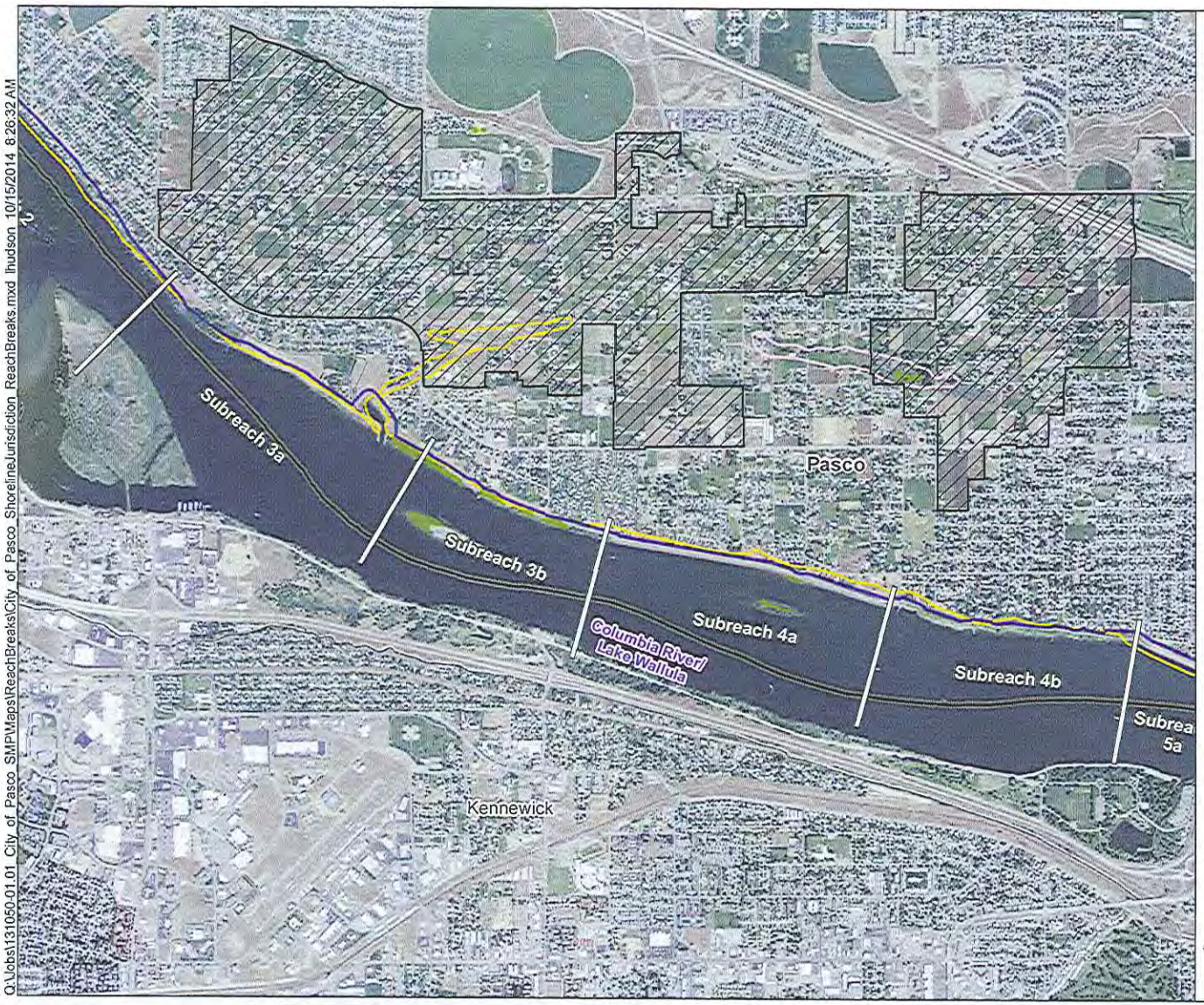
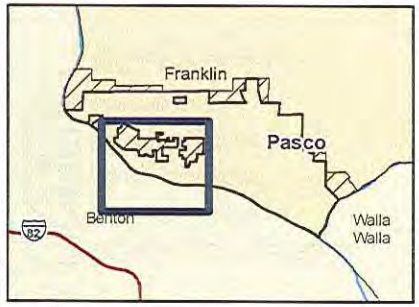
Map 1
Subreach 1a - Reach 2
City of Pasco Shoreline Master Program
City of Pasco, WA



LEGEND

- Reach Break
- Incorporated City of Pasco
- Urban Growth Area
- County Boundary
- SMA Jurisdiction
- NWI Wetland
- 100-year Floodplain
- 500-year Floodplain

NOTES:
1. This information is to be used for planning purposes only. Data is displayed as is and without any guarantee of accuracy or completeness.
2. Aerial image courtesy of USDA NAIP (2013).
3. NWI data acquired from USFWS.
4. Floodplain and floodway data acquired from FEMA.



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Map 2
Subreaches 3a - 4b
City of Pasco Shoreline Master Program
City of Pasco, WA

LEGEND

- Reach Break
- Incorporated City of Pasco
- Urban Growth Area
- County Boundary
- SMA Jurisdiction
- NWI Wetland
- 100-year Floodplain

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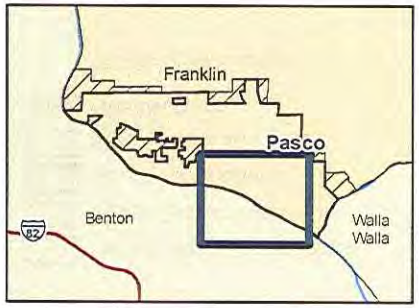
2. Aerial image courtesy of USDA NAIP (2013).
3. NWI data acquired from USFWS.
4. Floodplain and floodway data acquired from FEMA.



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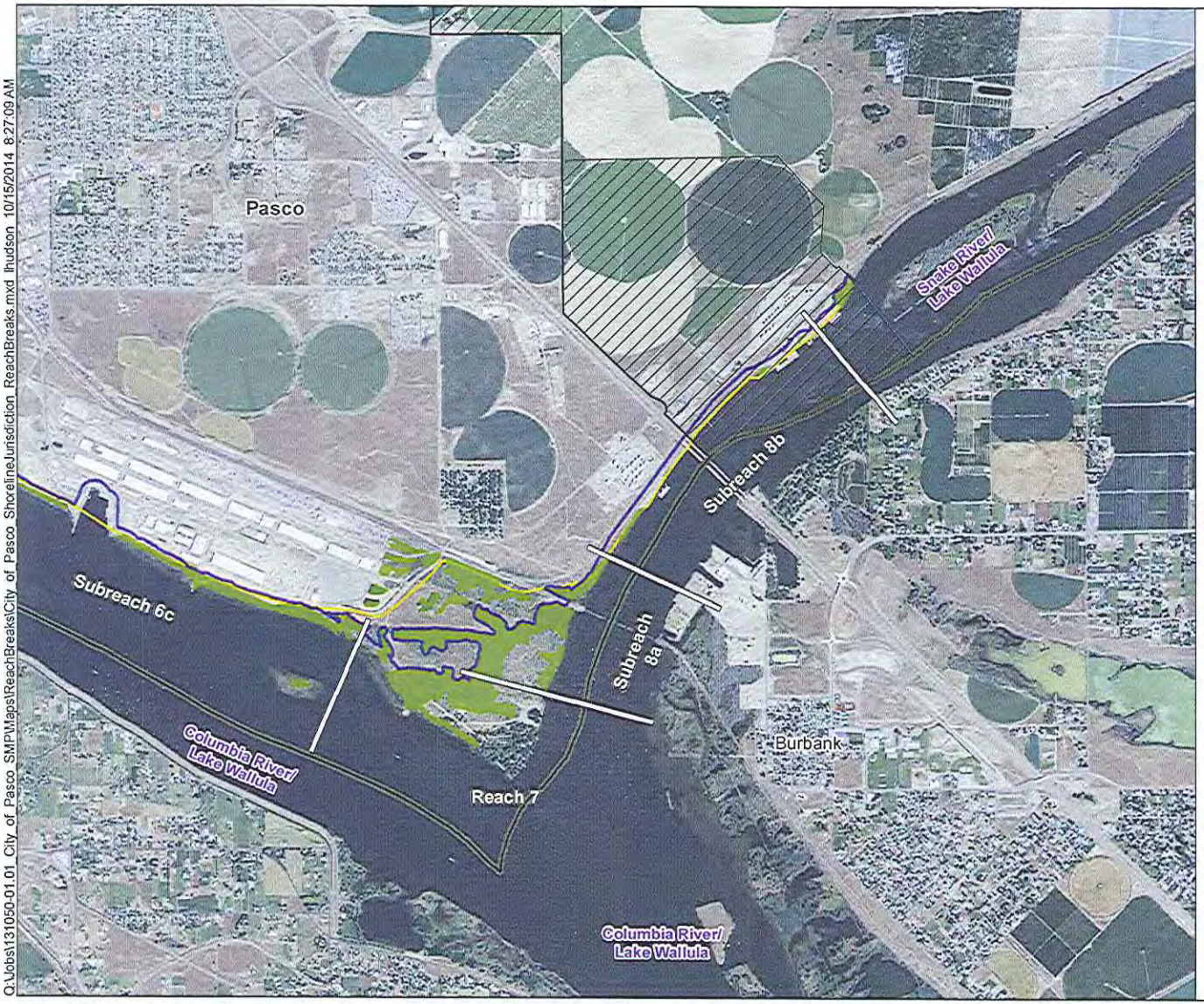
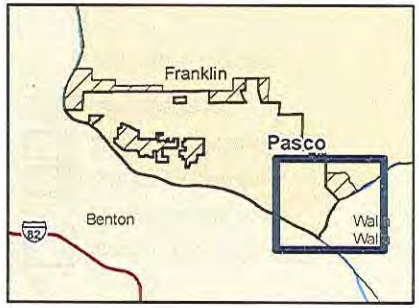
Map 3
Subreaches 5a - 6c
City of Pasco Shoreline Master Program
City of Pasco, WA



LEGEND

- Reach Break
- Incorporated City of Pasco
- Urban Growth Area
- County Boundary
- SMA Jurisdiction
- NWI Wetland
- 100-year Floodplain

NOTES:
1. This information is to be used for planning purposes only. Data is displayed as is and without any guarantee of accuracy or completeness.
2. Aerial image courtesy of USDA NAIP (2013).
3. NWI data acquired from USFWS.
4. Floodplain and floodway data acquired from FEMA.



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Map 4
Reach 7 - Subreach 8b
City of Pasco Shoreline Master Program
City of Pasco, WA

Reach 1	City of Pasco

Reach Description: Columbia River from City of Pasco boundary to Interstate 182 bridge

Shoreline Jurisdiction: 368 acres

Source: https://fortress.wa.gov/ecy/coastalatlas/UICoastalAtlas/Tools/ShorePhotos.aspx

Subreaches (SRs); see Map 1:

SR 1a: Begins at City of Pasco Urban Growth Area (UGA) boundary extending south to the edge of residential developments

SR 1b: Extends 0.5 mile to the south to the edge of agricultural lands

SR 1c: Extends 0.7 mile to the south to the beginning of river bend and where the City limits begin

SR 1d: Extends 0.9 mile to the southeast to the edge of residential developments where the City limits end

SR 1e: Extends 0.8 mile to the southeast to the Interstate 182 bridge and entirely within the UGA

CHARACTERISTICS

Ownership: Reach 1 is mostly private with a small amount (less than 10%) of public ownership.

Land Use/Current Shoreline Master Program (SMP):

Land use designation:

- Current land uses are Low Density Residential, Mixed Residential, Mixed Residential Commercial, and Open Space Nature
- Zoning – Suburban District (RS-20) and Residential Transition (RT)

Current SMP Environment Designation: Rural and Urban (SR 1e)

Reach 1	City of Pasco

Existing Land Cover/Development:

Reach 1 includes a mix of natural unimproved land, riparian vegetation, agricultural land, roads, utilities, and residential structures. SR 1b and SR 1e include residential and accessory structures. SR 1c includes a boat dock, irrigation pump, and parking. SR 1d includes a boat launch.

Geomorphic Character:

Description: The shoreline throughout the reach consists of mostly of outburst flood deposits with relatively low banks. In addition, a minor amount of alluvium and sand dune deposits are located at the most downstream extent of the reach (SR 1e). Residential and some industry infrastructure are present along the shoreline throughout Reach 1.

Hardened Banks: A minor amount of hardened banks appear to exist along the Reach 1 extent and is primarily associated with the Interstate 182 bridge crossing at downstream extent (SR 1e).

Flooding and Geological Hazards:

Flooding: Flooding is regulated by upstream dam operations and Lake Wallula pool elevation controls (SR 1d and SR 1e).

Geological Hazards: SR 1b, 1c, and 1d have soils susceptible to erosion. SRs 1d and 1e contain slopes that are greater than 15% and underlain by dune sand, which make them designated landslide hazard areas.

Existing Public Access:

Reach 1 currently does not include any significant public access amenities. West Court Street parallels much of the Columbia River in this reach. Dent Road ends near the shoreline providing access to the publicly owned portion of the shoreline. The Pasco Ranch boat dock is also located on U.S. Army Corps of Engineers (USACE) property.

Identified Public Access Improvements:

The Rivershore Linkage and Amenity Plan (Pasco 2012) indicates opportunities to preserve right-of-ways on Dent Road in SR 1a. It also recommends the extension of the Sacajawea Heritage Trail in this reach. The Broadmoor Area Plan encompassing SR 1d plans to provide trail and boat accesses.

ECOLOGICAL CONDITIONS

Water Quantity and Sediment:

Local inputs to water quantity include a minor drainage ditch in SR 1c. An irrigation pump in SR 1d appears to withdraw water from the reach. Sediment may aggrade in SR 1d where the normal pool elevation of Lake Wallula begins, which would likely cause reduced velocities. Agricultural runoff from SR 1a, 1c, and 1e may contribute some sediment, as well as a gravel mining operation in SR 1d.

Reach 1	City of Pasco

Water Quality:

Water quality may be slightly impacted from agricultural runoff in SR 1a, SR 1c, and SR 1e. Water quality may also be impacted by gravel mining in SR 1d and residential runoff in SR 1b and SR 1e. Boat use may also impact water quality throughout the reach. These impacts are expected to be minor compared to the volume of water in the river.

Habitat Characteristics and Priority Habitat Species (PHS) Presence:

This reach has minimal undeveloped habitat and is noted for presence of chukar, urban natural open space, waterfowl concentrations, and specifically, grebe species. The Columbia River in this reach supports a number of Endangered Species Act (ESA)-listed fish species, as identified in the Inventory, Analysis, and Characterization Report (IAC) Report.

SR 1a: SR 1a is adjacent to an agricultural area with crops extending almost to the water. There is a 20-to 50-foot band of vegetation of mostly larger trees immediately adjacent to the shoreline. No docks occur in this subreach.

SR 1b: SR 1b is adjacent to a low-density residential neighborhood with landscaped vegetation extending almost to the water's edge on several parcels. Some parcels maintain a 30-foot band of vegetation, including larger trees along the shoreline edge of their property, although some have significantly more tree cover. This subreach does not include any residential docks.

SR 1c: SR 1c contains upland lands in agricultural and orchard use. There is a small manmade/dredged off-channel area adjacent to Court Street and Dent Road that contains a private small craft boat dock and that may provide private access for the upland land owners. Shoreline vegetation is either absent or limited mainly to small shrubs in a wide 50- to 100-foot band. Waterfowl, including grebes, are known to congregate here.

SR 1d: The main land use in the northern half of this subreach is orchards, and the main use in the southern half is upland aggregate sorting operations. The river makes a bend along this subreach, and the riparian vegetation zone along the curve of this bend is wider. This zone may be partially flooded subject to changes in water levels, as aerial photos show some evidence of standing water and potential off-channel habitat. Farther downstream, the riparian vegetation becomes more confined and sparse where it is adjacent to the aggregate facility. The northern end of this subreach also contains a small embayment that is used as an intake water supply and water access area for foot traffic. Because shoreline riparian habitat is limited, this subreach provides lower functioning habitat to ESA-listed and resident fish species that populate the river.

SR 1e: The north half of this subreach is adjacent to low-density residential development and includes another small portion of land near the Interstate 182 bridge. Along the residential area are five visible residential boat docks with two other informal river access points, and the riparian vegetation is thin and patchy, but does include overhanging trees and shrubs. Wildlife habitat is sparse due to development. The south half of this subreach is adjacent to agricultural use. Because shoreline riparian habitat is limited or patchy, this subreach provides lower functioning habitat to ESA-listed and resident fish species that populate the river.

Reach 1	City of Pasco
ECOLOGICAL FUNCTIONS ANALYSIS	
SR 1a	
Level of Existing Function: Partially Functioning **Stressors:** Upland development: Orchard field and dirt maintenance access areas in between riparian area (approximately a 25-feet width) an orchard, overhead power lines, a few non-native riparian species (Russian-olive). Recreational use: Informal water access area **Potential Restoration Opportunities:** Replace non-native riparian species with native alternatives. Control dust through placing gravel on access roads. **Potential Protection Opportunities:** Protect existing riparian areas. Provide stormwater controls consistent with Eastern Washington Stormwater Manual.	
SR 1b	
Level of Existing Function: Partially Functioning **Stressors:** Upland development: Single family residential development with irrigated landscaping, limited riparian areas in northern half of subreach, established riparian buffers in southern half though approximately half consists of non-native (Russian-olive species), informal water access paths. **Potential Restoration Opportunities:** Establish riparian plantings at northern half of subreach, considering the use of lower shrubs to preserve views of the water, consider incentives for homeowners to replace irrigated turf with native plantings of shrub-steppe or riparian vegetation. Replace non-native riparian species with native alternatives. **Potential Protection Opportunities:** Protect existing riparian areas. Provide stormwater controls consistent with Eastern Washington Stormwater Manual.	
SR 1c	
Level of Existing Function: Partially Functioning **Stressors:** Upland development: Irrigated agricultural fields, rural residential development, armored banks associated with infrastructure, small segment of W. Court Street within shoreline jurisdiction, non-native riparian species (Russian-olive) where tall trees are present. Recreational use: One overwater structure associated with informal boat launch. **Potential Restoration Opportunities:** Establish riparian buffer within central portion of subreach. Replace non-native riparian species with native alternatives. **Potential Protection Opportunities:** Protect existing riparian areas. Provide stormwater controls consistent with Eastern Washington Stormwater Manual.	

Reach 1	City of Pasco
SR 1d	
Level of Existing Function: Functioning **Stressors:** Upland development: Armoring within cove associated with infrastructure (water intake facilities), sparse non-native (Russian-olive) trees within riparian area. Recreational use: Upland recreation trails and a few water access areas at north side of subreach. **Potential Restoration Opportunities:** Replace non-native riparian species with native alternatives. Formalize recreation trail to discourage new informal trails through upland and riparian areas. **Potential Protection Opportunities:** Protect riparian area and intact shrub-steppe habitat.	
SR 1e	
Level of Existing Function: Partially Functioning **Stressors:** Upland development: Industrial development and Harris Road outside of shoreline jurisdiction, limited riparian buffer, and presence of non-native (Russian-olive) trees, single family residential development with irrigated landscaping and limited quantity of overwater structures, small area of upland irrigated agricultural fields adjacent to shoreline slope, W. Court Street, bridge for Highway 12 and Interstate 182. Recreational use: Boat ramp water access and associated trails to the water at north end of subreach. **Potential Restoration Opportunities:** Establish riparian buffers where not present, replace non-native riparian species with native alternatives, add vegetative filter strip where not present around agriculture fields. **Potential Protection Opportunities:** Protect existing riparian areas. Provide stormwater controls consistent with Eastern Washington Stormwater Manual.	

Reach 2	City of Pasco

Reach Description: Columbia River from Interstate 182 bridge (City limits boundary) to the end of waterfront residential developments

Shoreline Jurisdiction: 102 acres

Source: https://fortress.wa.gov/ecy/coastalatlas/UICoastalAtlas/Tools/ShorePhotos.aspx

Subreaches; see Map 1:

Not Applicable

CHARACTERISTICS

Ownership: Reach 2 is mostly private with a very small amount (less than 5%) of public ownership (Washington Department of Transportation).

Land Use/Current SMP:

Land use designation:

- Current land uses are Low Density Residential and Open Space Nature
- Zoning – Residential Suburban (RS-12) and Residential Suburban (RS-20)

Current SMP Environment Designation: Urban

Existing Land Cover/Development:

Reach 2 is primarily residential and accessory structures and private boat docks. Parking, an inlet filtration pump (under the Interstate 182 bridge), and an irrigation pump station are also within this reach.

Geomorphic Character:

Description: The shoreline throughout the reach consists of outburst flood deposits with relatively low banks. Moderate-density residential infrastructure is present along the shoreline throughout this reach.

Reach 2	City of Pasco

Hardened Banks: A minor amount of hardened bank exists along the reach extent at certain private docks and landscaped areas associated with waterfront residences.

Flooding and Geological Hazards:

Flooding: Flooding is regulated by Lake Wallula pool levels.

Geological Hazards: There are no geologic hazard areas in Reach 2.

Existing Public Access:

Reach 2 is mostly privately owned and developed and doesn't include direct public access. There is one parking area beneath the Interstate 182 bridge, located adjacent to the Sacajawea Heritage Trail.

Identified Public Access Improvements:

The Rivershore Linkage and Amenity Plan (Pasco 2012) identifies an action to work with the Franklin County Irrigation District to provide public access on this property.

ECOLOGICAL CONDITIONS

Water Quantity and Sediment:

No local water quantity or sediment inputs are noted in this reach. Sediment may aggrade in this reach from Yakima River input reaching the Lake Wallula pool, which may cause reduced velocities, although this predominately occurs on the right bank of the Columbia River.

Water Quality:

Minor inputs from residential runoff and boat traffic may slightly impact this reach. This reach is also likely in the mixing zone of the confluence between the Columbia River and Yakima River, so water quality may be impacted from Yakima River input.

Habitat Characteristics and PHS Presence:

This reach contains 21 overwater docks and ramps located in low density residential area. Landscaped vegetation extends to the river in most cases, and most yards have terracing and/or vertical bulkheads. Most residential land parcels within this reach have at least one row of trees adjacent to the water. Because of the residential nature of this reach, undeveloped areas do not exist in the uplands; therefore, wildlife habitat is limited and connectivity is low between the river and upland habitat areas. ESA-listed and resident fish species are expected to be present in the river.

ECOLOGICAL FUNCTIONS ANALYSIS

Level of Existing Function: Partially Functioning

Stressors:

Upland development: Single family residences with irrigated landscaping, fairly limited riparian buffers (though most parcels have at least a small area with a vegetative buffer), overwater structure docks for many parcels.

Reach 2	City of Pasco
Potential Restoration Opportunities: Consider incentives for homeowners to convert irrigated turf to native plant species. **Potential Protection Opportunities:** Protect existing riparian areas. Provide stormwater controls consistent with Eastern Washington Stormwater Manual.	

Reach 3	City of Pasco

Reach Description: Columbia River from the upstream end of Chiawana Park to the edge of the hardened bank

Shoreline Jurisdiction: 382 acres

Source: https://fortress.wa.gov/ecy/coastalatlas/UICoastalAtlas/Tools/ShorePhotos.aspx

Subreaches; see Map 2:

SR 3a: Begins at the upstream end of Chiawana Park extending east to near Road 84

SR 3b: Extends 0.8 mile to the east ending at the edge of the hardened bank

CHARACTERISTICS

Ownership: Reach 3 is mostly owned by US Army Corps of Engineers with a very small amount (less than 5%) of private ownership.

Land Use/Current SMP:

Land use designation:

- Current land uses are Low Density Residential and Open Space Nature
- Zoning – Residential Suburban (RS-20)

Current SMP Environment Designation: Urban

Existing Land Cover/Development:

Reach 3 predominantly consists of riparian vegetation, vacant land, park land (Chiawana Park) along with trail, parking, pier, and boat launch facilities.

Geomorphic Character:

Description: The shoreline throughout the reach consists of outburst flood deposits with relatively low banks.

Reach 3	City of Pasco
Hardened Banks: Hardened bank exists at the Chiawana Park boat dock.	
Flooding and Geological Hazards: **Flooding:** Flooding is controlled by Lake Wallula pool elevations. **Geological Hazards:** There are no geologic hazard areas in Reach 3.	
Existing Public Access: Reach 3 has public access along Chiawana Park. The Sacajawea Heritage Trail parallels the shoreline in this reach. The park contains public access amenities such as a boat launch and pier. **Identified Public Access Improvements:** The Rivershore Linkage and Amenity Plan (Pasco 2012) identifies improvement of park amenities and adding a second boat launch and a beach along the park. The Plan also recommends improving the trail amenities by adding park areas at the termini of Roads 76 and 84 and developing the USACE area as an extension of Chiawana Park.	
ECOLOGICAL CONDITIONS	
Water Quantity and Sediment: A minor drainage ditch appears to be a minor input to SR 3a. No known local sediment inputs are noted.	
Water Quality: Water quality in this reach may be slightly impacted by residential and recreational (boating) use.	
Habitat Characteristics and PHS Presence: Reach 3 is primarily characterized by a park-like environment, with public use areas along the shoreline for the entirety of the reach. While shoreline vegetation is rather limited, open and undeveloped areas are present within several hundred feet of the shore, which may support limited numbers of upland mammal and bird species, and provide access from the upland areas to the shoreline. ESA-listed and resident fish species are present in the river. **SR 3a**: This subreach almost entirely comprises Chiawana Park, which exhibits riparian vegetation of several hundred feet in width at the northern end of the subreach. Otherwise, mowed areas extend to the water's edge. The park has landscaped areas and picnic pavilions throughout the upland area. There is one dock present in this subreach, an 80-foot-long, T-shaped structure associated with the park. There is also a dredged inlet serving as a public boat launch at the southern end of this subreach. **SR 3b**: Low-density residential areas characterize this subreach with lawns that end about 275 feet short of the shoreline. The remaining area near the shoreline contains unvegetated areas with a multi-use recreational trail. Sparse trees in patchy zones are along the water's edge. These areas are identified as habitat for Townsend's ground squirrel and burrowing owl.	

Reach 3	City of Pasco
ECOLOGICAL FUNCTIONS ANALYSIS	
SR 3a	
Level of Existing Function: Partially Functioning **Stressors:** Upland development: Park development, including parking areas and buildings, irrigated turf landscaping, limited riparian buffer throughout park. Recreational use: Boat launch, overwater structures, shoreline trail associated with Chiawana Park. **Potential Restoration Opportunities:** Riparian buffer restoration within park. **Potential Protection Opportunities:** Protect intact shrub-steppe habitat. Provide stormwater controls consistent with Eastern Washington Stormwater Manual.	
SR 3b	
Level of Existing Function: Partially Functioning **Stressors:** Upland development: Bulkhead area and access road in central portion of subreach, some non-native species (Russian-olive) within riparian buffer. Recreational use: Multiple informal upland trails to water connected to formal paved trail at top of slope. **Potential Restoration Opportunities:** Replace non-native species with native alternatives. Formalize water access trails to discourage new informal access trails. **Potential Protection Opportunities:** Protect intact shrub-steppe and riparian habitat. Provide stormwater controls consistent with Eastern Washington Stormwater Manual.	