

APPENDIX A

REACH CHARACTERIZATION TABLES

RICHLAND		CITY OF RICHLAND
REACH 1	Reach Length: 0.86 mile	
Shoreline Jurisdiction: 48.63 acres		
		
Source: https://www.bing.com/maps/		
<p>Description: The shoreline within this reach extends about 4,000 feet along the left bank of the Yakima River and is agricultural land owned by the City of Richland; it is currently in agricultural use.</p>		
PHYSICAL CHARACTERISTICS		
Ownership: City of Richland		
Existing Land Cover/Development: Existing irrigated agriculture		
<p>Land Use/Current SMP:</p> <p>Current SMP Environment Designation: Conservancy</p> <p>Current Zoning: Agriculture</p> <p>Current Land Use: Agriculture</p> <p>Water-dependent Uses: None</p> <p>Water-related Uses: None</p> <p>Non-water related Uses: Agriculture</p> <p>Future Land Use: No change from agricultural use is projected.</p>		
<p>Major Infrastructure: Side roads and trails along the shoreline, Horn Rapids Ditch irrigation canal (recently replaced with underground piping), boat ramp</p>		
<p>Geomorphic Character: Reach 1 is a relatively short reach located on the east bank (left bank) of the Yakima River at the upstream extent of the City of Richland. It is a confined, single-thread channel, with channel banks and margins that consist of flood deposits. The high bank rises steeply from the channel margins. This reach is located in an alluvial valley and has a slope of 2% to 15%. Soils are loamy fine sand, with a gravelly</p>		

RICHLAND	CITY OF RICHLAND
<p>substratum.</p> <p>Hardened banks: No significant armoring was noted during inspection of aerial photography.</p>	
<p>Flooding and Geological Hazards: This reach is adjacent to FEMA High Risk Flood Areas and the majority of the east bank is mapped in this category. Geologic hazards are identified as a low flooding risk due to historical channel migration patterns and the location of a small freshwater emergent wetland along the east bank. There is a slight potential for erosion as the bank has a 2% to 15% slope and the soils contain a gravelly substratum.</p>	
<p>Channel Migration Zone: The CMZ is narrow and follows along the perimeter of the high left bank comprised of flood deposits. There is limited floodplain along the left bank, with flooding mostly confined to the channel. The channel is aligned along the toe of this high bank with limited potential for channel migration into the left bank.</p>	
<p>REACH CHARACTERIZATION AND ANALYSIS</p>	
<p>Water Quantity and Sediment: Water quantity is mainly dependent on releases from Yakima Project reservoirs, irrigation diversions, and irrigation return flow. There are no major surface water inputs or outputs in this reach.</p>	
<p>Water Quality: There are water quality listings for Dieldrin, dissolved oxygen, pH, DDT, endosulfan, and temperature. Ecology remarks that the reach returned to Category 5 from 4A in 2005 because the Lower Yakima pesticides total maximum daily load (TMDL) targets are for chronic aquatic life criteria and not the more stringent human health criteria (Ecology 2008). Water quality is not likely to be impacted by local sources in this reach.</p>	
<p>Habitat Characteristics and PHS Species Presence:</p> <p>Upland species include potential nesting and foraging areas for ferruginous hawk, loggerhead shrike, and curlew. Upland species in the vicinity include burrowing owl. There is a variety of species related to wetlands and floodplains in the rural area across the river. The water area of the Yakima River supports migratory waterfowl as a resting and feeding area. The water area of the Yakima River supports concentrations of wintering migratory waterfowl, primarily as a resting and feeding area for dabbling ducks, primarily mallard, Canada Goose, Canvasback, Ring-necked Duck, and Wood Duck. Some nesting may occur.</p> <p>Because of the very limited riparian area between the water and the buried irrigation piping, there are limited opportunities along the shoreline for species with lifecycle stages related to water. On the other hand, the steep slope provides isolation from urban disturbance and may provide opportunities for reproduction, rearing, and shelter for reptiles, amphibians, and small mammals. Carrying capacities are limited due to the lack of a floodplain and the associated complex mosaic of habitat types and the limited area between the water and the buried irrigation piping.</p> <p>The area presents few limitations for movement corridors for both aquatic and terrestrial species. The low level of human activity along the shoreline and irrigation access road provide little barrier for movement. The undisturbed Department of Energy land north of Horn Rapids Road provides an area of relatively undisturbed habitat for upland species. Upland species can easily cross SR 240, Horn Rapids Road, and</p>	

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<p>Snyder Road, especially at night, although mortality may be substantial along SR 240.</p> <p>The National Wetland Inventory (NWI) shows small patches of riparian wetlands present in this reach. The shoreline has historically been confined due to the presence of irrigation canals (recently piped) just downstream of Horn Rapids Dam.</p> <p>Several fish species populate the Lower Yakima River in this reach. Salmonid fish include fall Chinook salmon, which are known to spawn in this reach, spring Chinook, and steelhead. Coho salmon were historically present here, and a coho reintroduction program is currently underway in the Yakima Basin. Bull trout were historically present and abundant in upper tributaries of the Yakima Basin and may now occur in this reach in low numbers. Lamprey are present but have experienced population decline in recent years. Resident fish include small- and largemouth bass, northern pikeminnow, sculpin, mountain whitefish, white sturgeon, catfish, sucker, walleye, rainbow trout, chiselmouth, dace, common carp, and various minnow species.</p> <p>Limitations to aquatic habitat in this reach are the elevated water temperatures and low flow common to the lower Yakima River. Fish passage is impeded regionally by the presence of several dams.</p>	
<p>ECOLOGICAL FUNCTIONS ANALYSIS (BY SUBREACH)</p>	
<p>Level of Existing Function: Partially functioning</p> <p>Stressors: Channel migration is limited by infrastructure (e.g., roads and ditches), and the Horn Rapids dam upstream limits sediment transport into the reach.</p> <p>Potential Restoration Opportunities: Identify opportunities to provide high-flow refuge and increase riparian planting density.</p> <p>Potential Protection Opportunities: Maintain existing riparian and wetland buffers.</p>	
<p>Preliminary Shoreline Environment Designation Considerations:</p> <p>Conservancy</p>	
<p>PUBLIC ACCESS</p>	
<p>Existing Public Access:</p> <p>WDFW has a primitive boat launch at Snively Road within or immediately abutting the south end of the reach (WDFW 2012). This launch/water access area is considered a link in the Tapteal Greenway Plan, a 30-mile corridor promoting habitat conservation and public access along the Yakima River (Tapteal 2012).</p>	
<p>Existing Public Access Goals:</p> <p>The Richland Comprehensive Land Use Plan (City of Richland 2008) includes a Land Use Element referencing the Tapteal Greenway Plan and includes a goal to promote regional cooperation in developing an open space network:</p> <p><i>“OS Policy 1 - Work with other jurisdictions, property owners, open space groups and all interested parties to develop a broadly accepted regional open space plan and appropriate implementation strategies.”</i></p>	

RICHLAND	CITY OF RICHLAND
<p>Identified Public Access Improvements:</p> <p>The Tapteal Greenway Trail is a conceptually planned improvement along the length of the reach (Tapteal 2012; Ridges to Rivers Open Space Network Steering Committee 2011). Richland’s Capital Facilities Element (Richland 2008) references the Tapteal Greenway Plan and incorporates its improvements into the City’s Capital Facility Element:</p> <p style="padding-left: 40px;"><i>“The Tapteal Greenway Plan outlines activities and facilities to be constructed at each of these sites. The Plan states that these facilities should become a component of each jurisdiction’s comprehensive plan. Accordingly, these facilities are included in the Capital Facilities Element.”</i></p>	
<p>CUMULATIVE IMPACT CONSIDERATIONS</p>	
<p>Watershed level: The SMP has limited influence on Yakima River operations by the U.S. Bureau of Reclamation and irrigation districts, and upriver degradation of water quality conditions. Richland’s focus should be on preventing further degradation of Lower Yakima conditions.</p> <p>Reach level:</p> <ul style="list-style-type: none"> • Water quality impacts from impervious surface runoff from nearby transportation facilities and from herbicide and fertilizer run-off 	

References:

Washington State Department of Fish and Wildlife. 2012. Water Access Sites: Benton County. Available: http://wdfw.wa.gov/lands/water_access/county/Benton/. Accessed: December 2012.

Tapteal Greenway Association. 2012. Website: Tapteal Greenway Association. Available: <http://www.tapteal.org/index.html>. Accessed December 2012.

City of Richland. 2008. City Of Richland, Comprehensive Land Use Plan. Available: <http://www.ci.richland.wa.us/index.aspx?nid=227> Accessed: December 2012.

Ridges to Rivers Open Space Network Steering Committee. 2011. Vision Plan for Open Space Conservation and Trail Connectivity in the Mid-Columbia Region. January 2011.

RICHLAND		CITY OF RICHLAND
REACH 2	Reach Length: 0.58 mile	
Shoreline Jurisdiction: 14.06 acres		
		
Source: https://www.bing.com/maps/		
<p>Description: The shoreline within this reach extends about 3,000 feet along the left bank of the Yakima River on an outer oxbow with a very narrow band of riparian vegetation on a steep slope up from the river. At the top of the slope is the Bluffs subdivision, which is part of the Horn Rapids Golf Course development. Shoreline Management Act jurisdiction of 200 feet from the OHWM extends to just below the top edge of the slope.</p>		
PHYSICAL CHARACTERISTICS		
<p>Ownership: Land immediately adjacent to the river is open space dedicated as part of the subdivision with a conservation easement to the City of Richland.</p>		
<p>Existing Land Cover/Development: Open space</p>		
<p>Land Use/Current SMP:</p> <p>Current SMP Environment Designation: Conservancy Current Zoning: Natural Open Space and Residential Current Land Use Land Use: Residential and golf course Water-dependent Uses: None Water-related Uses: None Non-water-related Uses: Residential and golf course Future Land Use: No change from current use is projected.</p>		
<p>Major Infrastructure: Informal trail or dirt road halfway up shoreline bank</p>		

RICHLAND	CITY OF RICHLAND
<p>Geomorphic Character: Reach 2 is a short segment located on the east bank (left bank) of the Yakima River. It is a confined, single-thread channel located along the outside apex of a tight meander bend. The river banks are high and steep and consist of both alluvium and flood deposits. The soils are comprised mostly alluvial and flood deposits of loamy sand. The river is constrained by farmland and local roads, and historical photos indicate very little movement on the east bank between 1952 and 2011. Channel migration occurred on the opposite bank more noticeably onto farmland.</p> <p>Hardened banks: No armoring, but steep graded bank makes up the entire shoreline area</p>	
<p>Flooding and Geological Hazards: This reach is mapped within the FEMA High Risk Flood Area and supports freshwater emergent wetlands and forested/shrub wetlands. Geologic hazards include a low risk of flooding. Flooding is unlikely due to historical channel migration patterns.</p>	
<p>Channel Migration Zone: The channel migration zone in Reach 2 is narrow and follows along the perimeter of the left bank (outside of the meander bend). The left bank is very high and comprised of alluvium and flood deposits. There is limited floodplain, with flooding confined to the channel. The channel is aligned along the toe of this high bank with limited potential for channel migration into the left bank.</p>	
REACH CHARACTERIZATION AND ANALYSIS	
<p>Water Quantity and Sediment: Water quantity is mainly dependent on releases from Yakima Project reservoirs, irrigation diversions, and irrigation return flow. There are no major surface water inputs or outputs in this reach, except perhaps for shallow groundwater returns from the upstream Barker Ranch area.</p>	
<p>Water Quality: Water quality listings for Dieldrin, dissolved oxygen, pH, DDT, endosulfan, and temperature. Ecology remarks that the reach returned to Category 5 from 4A in 2005 because the Lower Yakima pesticides total maximum daily load (TMDL) targets are for chronic aquatic life criteria and not the more stringent human health criteria (Ecology 2008). A nearby golf course and impervious surfaces from roads and residential roofs may contribute to likely limited stormwater runoff in Reach 2. Shallow groundwater returns to the river from the upstream Barker Ranch could reduce water temperature in this reach.</p>	
<p>Habitat Characteristics and PHS Species Presence:</p> <p>There are no threatened or endangered terrestrial species present in the immediate vicinity.</p> <p>The water area of the Yakima River throughout this reach supports concentrations of wintering migratory waterfowl, primarily as a resting and feeding area for dabbling ducks, primarily mallard, Canada Goose, Canvasback, Ring-necked Duck, and Wood Duck. Some nesting may occur.</p> <p>Because of the very limited riparian area between the water and the canal, there are limited opportunities along the shoreline for species with aquatic lifecycle stages. On the other hand, the steep slope isolates the area from urban disturbance and may provide opportunities for reproduction, rearing, and shelter for reptiles, amphibians, and small mammals. Carrying capacity is limited by the lack of a floodplain and the associated complex mosaic of habitat types and the limited area between the water and the canal. Proximity impacts such as noise, light, and glare, as well as predation from domestic animals related to adjacent urban use, likely limit productivity of adjacent areas.</p>	

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<p>The area presents few opportunities for movement corridors for terrestrial species. The high level of human activity above the slope likely limits both habitat and the potential for movement by species except birds and flying insects. The residential development and golf course is an effective barrier for movement between the river and undisturbed Department of Energy land to the north.</p> <p>The National Wetland Inventory (NWI) shows small patches of riparian wetlands present in this reach. The shorelines are natural and are flanked by residential areas to the north and agriculture to the south.</p> <p>Several fish species populate the Lower Yakima River in this reach. Salmonid fish include fall Chinook salmon, which are known to spawn just southwest of this reach, steelhead, and spring Chinook. Coho salmon were historically present here, and a coho reintroduction program is currently underway in the Yakima Basin. Bull trout were historically present and abundant in upper tributaries of the Yakima Basin and may now occur in this reach in low numbers. Lamprey are present but have experienced population decline in recent years. Resident fish include small- and largemouth bass, northern pikeminnow, sculpin, mountain whitefish, white sturgeon, catfish, sucker, walleye, rainbow trout, chiselmouth, dace, common carp, and various minnow species.</p> <p>Limitations to aquatic habitat in this reach are the elevated water temperatures and low flow common to the lower Yakima River. Fish passage is impeded regionally by the presence of several dams.</p>	
ECOLOGICAL FUNCTIONS ANALYSIS (BY SUBREACH)	
<p>Level of Existing Function: Partially functioning</p> <p>Stressors: Upland residential development (just outside the shoreline jurisdiction boundary) and recreation use</p> <p>Potential Stressors: Medium density residential allows for 10 dwelling units per acre</p> <p>Potential Restoration Opportunities: Consider options to restore vegetation on cut bank to prevent unnatural deposition of sediment</p> <p>Potential Protection Opportunities: Limit encroachment by upland residential uses, and evaluate potential opportunities for protecting water quality from golf course operations</p>	
<p>Preliminary Shoreline Environment Designation Considerations:</p> <p>Conservancy</p>	
PUBLIC ACCESS	
<p>Existing Public Access:</p> <p>The public Horn Rapids Golf Course lies along Reach 2 (City of Richland 2012).</p>	
<p>Existing Public Access Goals:</p> <p>See Reach 1 regarding the City's overall goal to develop and implement a regional open space plan.</p>	
<p>Identified Public Access Improvements:</p> <p>Similar to Reach 1, the conceptual Tapteal Greenway Trail is planned to continue along this reach.</p>	

RICHLAND	CITY OF RICHLAND
CUMULATIVE IMPACT CONSIDERATIONS	
<p>The SMP has limited influence on Yakima River operations by the U.S. Bureau of Reclamation and irrigation districts and upriver degradation of water quality conditions. Richland’s focus should be on preventing further degradation of Lower Yakima conditions.</p>	
<p>Reach level:</p>	
<ul style="list-style-type: none"> • Impacts from potential development along the shoreline in residential areas • Water quality impacts from potential herbicide and fertilizer use on irrigated landscaped lawn, golf course and garden areas • Potential for vegetation alterations from existing development • Other impacts from non-native predation (domestic pets, smallmouth bass, and pike minnow) 	

References:

City of Richland. 2012. 2012 - 2018 Final: Parks, Trails and Open Space Master Plan. Available at: <http://www.ci.richland.wa.us/index.aspx?nid=227>. Accessed in December 2012.

RICHLAND		CITY OF RICHLAND
REACH 3	Reach Length: 4.56 mile	
Shoreline Jurisdiction: 896.32 acres (approx.)		
		
Source: https://www.bing.com/maps/		
<p>Description: The shoreline within this reach extends about 4 miles along the left bank of the Yakima River from north of Glen Road to the I-182 bridge. Land use is largely agriculture or large lot rural lands in lots of 2 to 10 acres to the border of the W.E. Johnson Park at about the alignment of Swift Boulevard. The park and lands to the south are in public ownership. This area is largely floodplain that ranges up to $\frac{3}{4}$ of a mile wide to Glen Briar Lane. Between this point and the bridge, there is a narrow riparian corridor bounded by a steep slope.</p>		
<p>Subreaches (SR), see Figure:</p> <p>SR A: Begins at the City Limits and extends to the south to a flood channel at about 1.5 river miles south of the Van Giesen Street Bridge</p> <p>SR B: Extends approximately 0.8 miles to approximately the alignment of Glen Briar Lane</p> <p>SR C: Extends approximately 1.5 miles to the I-182 bridge</p>		

RICHLAND	CITY OF RICHLAND
PHYSICAL CHARACTERISTICS	
Ownership: Private land within the majority of SR A, City land within SR B, and federal ownership along shoreline of SR C	
Existing Land Cover/Development: Irrigated agriculture, native riparian land cover, and floodplain open space	
<p>Land Use/Current SMP:</p> <p>Current SMP Environment Designation: Rural, except for Conservancy at Fox Island (SR A); Conservancy (SRs B and C)</p> <p>Current Zoning: Agriculture, floodplain, park and public facility, and natural open space</p> <p>Current Land Use Land Use: Agriculture, large lot residential, public park, and open space</p> <p>Water-dependent Uses: None</p> <p>Water-related Uses: None</p> <p>Non-water-related Uses: Agriculture, residential, park and open space</p> <p>Future Land Use: No change from existing land use is projected. Some larger lots may be sub-dividable.</p>	
Major Infrastructure: Public water access, public water system, W.E. Johnson Park, SR 224 and crossing, and I-182 and crossing.	
<p>Geomorphic Character: Reach 3 is a long segment located on the east bank (left bank) of Yakima River that extends downstream to the I-182 Bridge. This river reach is a meandering, mostly single-thread, low gradient channel. At the upstream extent, the SR 224 (Van Giesen Street) Bridge crossing constricts the channel. Based on the available LiDAR coverage and historical air photos, the river has migrated through its valley in this reach, as evidenced by old channel scars. Geologic units are primarily alluvial deposits. Soils consist of fine loamy sand, loamy sand, and loamy fine sand.</p> <p>Hardened banks: Armoring includes bridge abutments for I-182 and SR 224.</p>	
Flooding and Geological Hazards: Approximately 25% of this reach is mapped within the FEMA High Risk Flood Area. Geologic hazards are primarily a low risk of flooding as evidenced by historical photos.	
<p>Channel Migration Zone: Reach 3 is a long reach along the left bank of the Yakima River and includes multiple bridge crossings. The CMZ is wide in places where the channel is not confined by infrastructure and where the floodplain is wide and made of erodible materials (alluvium and soils comprised of sand). Areas of the reach include old meander bends that consist of mostly low ground that is included in the floodway. The CMZ narrows where infrastructure (highways) limits the migration potential.</p>	
REACH CHARACTERIZATION AND ANALYSIS	
Water Quantity and Sediment: Water quantity is mainly dependent on releases from Yakima Project reservoirs, irrigation diversions, and irrigation return flow. There are no major surface water inputs or outputs in this reach.	

RICHLAND	CITY OF RICHLAND
<p>Water Quality: There are water quality listings for Dieldrin, dissolved oxygen, pH, DDT, endosulfan, and temperature. Ecology remarks that the reach returned to Category 5 from A in 2005 because the Lower Yakima pesticides total maximum daily load (TMDL) targets are for chronic aquatic life criteria and not the more stringent human health criteria (Ecology 2008). Nearby agricultural land may contribute surface runoff in SR A, and nearby impervious surfaces from roads and residential roofs may contribute stormwater runoff in SR C.</p>	
<p>Habitat Characteristics and PHS Species Presence:</p> <p>No threatened or endangered terrestrial species present in the immediate vicinity.</p> <p>The water area of the Yakima River throughout this reach supports concentrations of wintering migratory waterfowl, primarily as a resting and feeding area for dabbling ducks, primarily mallard, Canada Goose, Canvasback, Ring-necked Duck, and Wood Duck. Some nesting may occur.</p> <p>SR A: Shoreline riparian habitat in this reach varies greatly according to topography and human alteration. Between the City limits and the Van Giesen Street Bridge, topography limits riparian vegetation to a relatively narrow band.</p> <p>South of the bridge, the riparian vegetation expands within the floodway, except for a short armored stretch where Van Giesen Street is adjacent to the water.</p> <p>The rural residential large lot area along the Yakima River results in riparian vegetation that varies from parcel to parcel depending on the extent of upland clearing. The floodway in this area includes an overflow channel to the east with a more complex mosaic of vegetation and habitat. Except for the overflow channel, most upland vegetation is mowed pasture. Proximity impacts such as noise, light, and glare and predation from domestic animals related to adjacent large lot use likely further limits productivity of adjacent areas.</p> <p>Upland species include potential nesting and foraging areas for ferruginous hawk, loggerhead shrike, and curlew. Upland species in the vicinity include burrowing owl. A variety of species related to wetlands and floodplains are present in the floodplain and wetland complex.</p> <p>Because of the change in vegetation cover, limited riparian vegetation, and proximity of single-family residences, the area along the shoreline provides limited habitat for reptiles, amphibians, and small mammals that depend on water for lifecycle functions. The limited riparian vegetation and associated mosaic of habitat types likely limits functions largely to foraging.</p> <p>The area presents moderate limitations for movement corridors for terrestrial species other than birds. The level of human activity from low intensity residential use and the traffic on Van Giesen Street likely limit daytime crossings to the vicinity of the bridge over the river and the bridge over the overflow channel. The highway and roads in the vicinity, however, are not a physical barrier to movement by most animals, especially at night, although mortality from vehicle collisions likely is moderate to high. Upstream of the Van Giesen Bridge, the low intensity development on Fox Island and the West Richland Golf Course on the right bank likely provides a less constrained corridor. South of the bridge the left bank in Richland provides the most effective potential corridor for movement because of the levee on the right bank in West Richland.</p>	

RICHLAND**CITY OF RICHLAND**

SR B: In this park and open space area, the extent of riparian vegetation is largely dependent upon topography. Several large wetland areas are present in abandoned channels within the floodplain.

The area includes a complex mosaic of riparian and upland vegetation, with some areas of shrub steppe sagebrush and grasses. Floodway and riparian areas include native trees and shrubs including Cottonwood, Alder Red Osier Dogwood, and a variety of Willow species, as well as invasive species such as Russian Olive.

This area primarily provides productive floodplain and wetland habitat for small resident species of reptiles, amphibians, and small mammals, particularly those with lifecycle stages dependent on water. The small area of upland shrub/steppe habitat and the inherent low productivity of such habitat limits the range of species and populations. This likely supports a small resident population, as well as providing additional habitat for mobile species that can move between a number of small habitat areas. The availability of the area to larger mammals, such as mule deer, is dependent upon preservation of migration routes, which are currently constrained both upriver and across adjacent urbanized uplands.

The area provides opportunities for movement corridors for terrestrial species; however, human activity on the trail system within the area above the bluff and the trail through the area likely limits movement to evenings and night, as well as seasons of lower human use. The urban development to the east provides little habitat or movement potential for shrub steppe species.

SR C: This subreach extends approximately 7,500 feet to the I-182 bridge. A steep slope adjacent to the river limits riparian vegetation and provides limited area and limited habitat complexity. The presence of a trail connection through the area also introduces human disturbance. This area has limited habitat value for reptiles, amphibians, and small mammals dependent on the water for specific lifecycle stages.

The area provides opportunities for movement corridors for terrestrial species; however, the high level of human activity above the bluff and the trail through the area likely limits movement to evening, night, and seasons of lower human use. The urban development to the east provides little habitat or movement potential for shrub steppe species. Proximity impacts such as noise, light, and glare from adjacent urban use likely limit productivity of adjacent areas.

The National Wetland Inventory (NWI) shows large patches of riparian wetlands present in this reach, especially concentrated near SR B. The shoreline has long expanses of natural areas in riparian areas of SR B. Shorelines in SR A are natural but are flanked by agricultural areas, and SR C shorelines are natural and surrounded by residential development.

Several fish species populate the lower Yakima River in this reach. Salmonid fish include steelhead and spring and fall Chinook salmon. Coho salmon were historically present here, and there is currently a coho reintroduction program underway in the Yakima Basin. Bull trout were historically present and abundant in upper tributaries of the Yakima basin and may now occur in this reach in low numbers. Lamprey are present but have experienced population decline in recent years. Resident fish include small- and largemouth bass, northern pikeminnow, sculpin, mountain whitefish, white sturgeon, catfish, sucker, walleye, rainbow trout, chiselmouth, dace, common carp, and various minnow species.

Limitations to aquatic habitat in this reach are the elevated water temperatures and low flow common to the lower Yakima River. Fish passage is impeded regionally by the presence of several dams.

RICHLAND	CITY OF RICHLAND
ECOLOGICAL FUNCTIONS ANALYSIS (BY SUBREACH)	
SUBREACH A	
<p>Level of Existing Function: Small section on right bank is functioning and rest of subreach is partially functioning</p> <p>Stressors: Upland development in shrub steppe areas, channel migration limited by highway in one segment, residential with irrigated lawns within portion of sub-reach, road crossing, agriculture irrigation practices.</p> <p>Potential Restoration Opportunities: Improve riparian buffer, consider geomorphically appropriate control of channel migration at Van Giesen, small farm buffer strips for irrigation management and water quality</p> <p>Potential Protection Opportunities: Protect low lying areas and relic channels</p>	
<p>Preliminary Shoreline Environment Designation Considerations:</p> <p>Agriculture</p>	
SUBREACH B	
<p>Level of Existing Function: Functioning</p> <p>Stressors: Minimal floodplain development and limited riparian in some areas</p> <p>Potential Restoration Opportunities: Improve consistency of riparian conditions, improve side channel connectivity, and evaluate opportunities for additional side channels</p> <p>Potential Protection Opportunities: Protect existing floodplain and riparian habitat</p>	
<p>Preliminary Shoreline Environment Designation Considerations:</p> <p>Low Intensity</p>	
SUBREACH C	
<p>Level of Existing Function: Partially functioning</p> <p>Stressors: Upland development and recreation use, channel migration limited by SR 240, vegetation on cut slope near SR 240 is limited</p> <p>Potential Stressors: Single-family residential allows for 5 dwelling units per acre. Multiple-family residential allows for 10 or more dwelling units per acre.</p> <p>Potential Restoration Opportunities: Shrub steppe restoration based on WDFW guidelines, consider options to restore vegetation on cut bank to prevent unnatural deposition of sediment (particularly on cut banks just above river)</p> <p>Potential Protection Opportunities: Protect existing floodplain and riparian habitat.</p>	
<p>Preliminary Shoreline Environment Designation Considerations:</p> <p>Parallel Conservancy to top of slope and Residential above slope</p>	

RICHLAND	CITY OF RICHLAND
PUBLIC ACCESS	
<p>Existing Public Access:</p> <p>SR A: WDFW provides another primitive boat launch at Hyde Road (road end) (WDFW 2012). An on-street trail traverses the river at Van Giesen Street (City of Richland 2012). Fox Island is designated as natural open space on the Comprehensive Land Use Plan (City of Richland 2008). The Tapteal Greenway Association identifies that environmental education activities take place at Tapteal Bend (access on Van Giesen just east of Yakima River Bridge). The Tapteal Bend location is part of the Tapteal Water Trail site.</p> <p>SR B: The subreach contains W.E. Johnson Park and associated trails.</p> <p>SR C: The Duportail primitive boat launch is provided by WDFW and is considered part of the Tapteal Greenway Water Trail. A neighborhood park is located along Glen Briar Lane (shown as undeveloped; Richland 2012). An existing soft surface trail in W.E. Johnson Park extends along the shoreline in this reach.</p>	
<p>Existing Public Access Goals:</p> <p>See Reach 1 regarding the City’s overall goal to develop and implement a regional open space plan. The Tapteal Greenway Plan and Ridges to Rivers Vision Plan identify a desire to “[e]stablish a connective trail between W.E. Johnson Park and Horn Rapids County Park” to the north, which also captures Reaches 1 and 2. This same concept is included in the City’s Final Parks, Trails and Open Space Master Plan (2012).</p>	
<p>Identified Public Access Improvements:</p> <p>SR A: None</p> <p>SR B: The City has adopted a master plan for W.E. Johnson Park (City of Richland 2011 and 2012)</p> <p>SR C: None</p>	
CUMULATIVE IMPACT CONSIDERATIONS	
<p>Watershed level: The SMP has limited influence on Yakima River operations by the U.S. Bureau of Reclamation and irrigation districts, and upriver degradation of water quality conditions. Richland’s focus should be on preventing further degradation of Lower Yakima conditions.</p> <p>Reach level:</p> <ul style="list-style-type: none"> • Water quality impacts from herbicide and fertilizer run-off • Impacts from recreation use along the shoreline • Other impacts from non-native predation (domestic pets, smallmouth bass, and pike) • Impervious surfaces leading to habitat loss and potential runoff • Vegetation alterations removing organic material and increasing soil erosion • Structural effects on habitat through road fragmentation and development within the uplands 	

References:

City of Richland. WE Johnson Final Master Plan-Option A.

Available: <http://richlandparksandrec.com/DocumentCenter/Home/View/173>. Accessed.

RICHLAND		CITY OF RICHLAND
REACH 4	Reach Length: 4.89 mile	
Shoreline Jurisdiction: 1737.52 acres (approx.)		
		
Source: https://www.bing.com/maps/		
<p>Description: The shoreline within this reach extends about 3 miles along the river south of the I-182 bridge over the Yakima River extending to the I-182 bridge over the Columbia River and is floodplain under U.S. Army Corps of Engineers jurisdiction and adjacent uplands managed by the City of Richland.</p>		
<p>Subreaches (SR), see Figure:</p> <p>SR A: Extends approximately 2 miles from the I-182 bridge to the SR 240 bridge</p> <p>SR B: Extends approximately 2.3 miles from the SR 240 bridge to about 700 feet east of the Columbia River confluence</p> <p>SR C: Extends approximately 2,300 feet around the point at the confluence of the Yakima and Columbia rivers</p>		
PHYSICAL CHARACTERISTICS		
<p>Ownership: U.S. Army Corps of Engineers leased to the City of Richland</p>		

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<p>Existing Land Cover/Development: Open space, Industrial development (gravel mining) mostly outside of the shoreline jurisdiction</p>	
<p>Land Use/Current SMP: Current SMP Environment Designation: Conservancy Current Zoning: Natural open space Current Land Use: Natural open space, developed open space, industrial, and public facility (SR 4C) Water-dependent Uses: None Water-related Uses: Trails in the area provide for water enjoyment Non-water-related Uses: Open space Future Land Use: No change from open space use is projected.</p>	
<p>Major Infrastructure: Public water access, public water system, informal trails along the shoreline, SR 240 and crossing, and I-182 and crossing.</p>	
<p>Geomorphic Character: Reach 4 extends along the Yakima River (left bank) from the I-182 bridge downstream to its confluence with the Columbia River. Reach 4 also includes a small segment of the Columbia River (right bank) upstream of the confluence with the Yakima River. The river is a low-gradient, single-thread channel throughout the reach. The river channel generally widens downstream through the reach. Deposits of alluvial sediments have created island features. Soils are all alluvial silt loams. This reach is moderately constrained by roads; however, historically this is an actively moving channel. Hardened banks: Armoring includes abutments for the I-182 and Highway 240 bridges.</p>	
<p>Flooding and Geological Hazards: Small parts of this reach are mapped in the FEMA High Risk Flood Areas, and it supports freshwater forested/shrub wetlands. Flooding risks in this area are moderate because of active historical channel movement and expansive OHWM area.</p>	
<p>Channel Migration Zone: Reach 4 is located along the left bank of the Yakima River and includes a small segment of the Columbia River. Infrastructure influencing the location of the CMZ includes the I-182 bridge crossing at the upstream extent and a railroad and the Hwy 240 bridge crossings. A levee is located in the left bank floodplain downstream of the I-182 Bridge (extending downstream to Hwy 240) and protects the area of the City of Richland Waste Water Treatment Plant. Along the upstream extent of this reach, the CMZ generally follows an off-set of this levee alignment through the floodplain. The CMZ does not extend back to the levee alignment because of the distance from the channel. Downstream of Hwy 240 bridge, the CMZ widens in the broad flat floodplain at the mouth of the Columbia River. There are no limiting infrastructure features to limit channel migration. Per Ecology, a CMZ delineation is not necessary for the Columbia River.</p>	
<p>REACH CHARACTERIZATION AND ANALYSIS</p>	
<p>Water Quantity and Sediment: Water quantity is influenced by releases from Yakima Project reservoirs, irrigation diversions, and irrigation return flow; and from the Columbia River McNary Pool, with water extending upstream near the I-182 bridge, as this reach includes the Yakima River delta. The major surface water inputs in this reach include the City's wastewater treatment plant discharge. Badger Mountain</p>	

RICHLAND	CITY OF RICHLAND
Irrigation District also diverts water in this reach for agriculture and landscape irrigation purposes.	
<p>Water Quality: There are water quality listings for Dieldrin, dissolved oxygen, pH, DDT, endosulfan, and temperature. Ecology remarks that the reach returned to Category 5 from 4A in 2005 because the Lower Yakima pesticides total maximum daily load (TMDL) targets are for chronic aquatic life criteria and not the more stringent human health criteria (Ecology 2008). Additionally, WWTP discharges in this reach may impact water quality for a short time downstream until it completely mixes with the Yakima River and Columbia River.</p>	
<p>Habitat Characteristics and PHS Species Presence:</p>	
No threatened or endangered terrestrial species present in the immediate vicinity.	
The water area of the Yakima River supports migratory waterfowl as a resting and feeding area. Some nesting may occur.	
<p>SR A: This subreach includes the 276-acre Chamna Natural Preserve managed by the Tapteal Greenway Association. It is part of the Yakima River delta and is managed in conjunction with other lands owned by the USACE as a Nature Preserve with limited non-motorized access. Habitat includes about 100 acres of upland, including 50 acres of abandoned farm fields. Floodway and riparian areas are dominated by invasive Russian Olive with a mixture of native and non-native trees and shrubs including Cottonwood, Alder, Red Osier Dogwood, and a variety of Willow species (CWG 2006). The downstream 1,000 feet closest to the SR 240 bridge is the site of a former gravel mine and has more limited riparian habitat than upstream areas.</p>	
<p>This area primarily provides productive floodplain and wetland habitat for reptiles, amphibians, and small mammals with lifecycle stages dependent on water. The prevalence of invasive species limits habitat productivity. The small area of upland shrub/steppe habitat limits the range of species and populations. The area likely functions as available habitat for mobile species that can move between small habitat areas rather than supporting a resident population. The availability of the area to larger mammals, such as mule deer is dependent upon preservation of migration routes, which are constrained both upriver and across adjacent urbanized uplands.</p>	
<p>This area presents few limitations for movement corridors for both aquatic and terrestrial species. The level of human activity provided by trail systems through the area likely retards animal movement during periods of high human use.</p>	
<p>SR B: This subreach includes the portion of the Yakima River delta downstream of SR 240 and is managed in conjunction with other lands owned by the USACE as a Nature Preserve with limited non-motorized access. Habitat includes productive floodplain and wetland habitat for reptiles, amphibians, and small mammals with lifecycle stages dependent on water. The area has effective connections with other portions of the delta upstream and to the south and provides a range of functions for a variety of mobile species that can move between various habitat areas. The dense urban development along the shoreline to the north precludes movement of terrestrial species other than by flight or swimming.</p>	
<p>The upland shrub/steppe habitat in the Columbia Point area above the adjacent steep slope is isolated by the I-182 freeway to the north and is substantially degraded by past agricultural and off-road use, which further reduces the low productivity of such habitat limits the range of species and populations. The availability of the</p>	

RICHLAND	CITY OF RICHLAND
<p>area to larger mammals, such as mule deer, is dependent on preservation of regional migration routes.</p>	
<p>SR C: This subreach includes about 800 feet of the Yakima River delta upstream of I-182 and consists of a steep bank that rises from the water's edge with a very narrow margin of riparian vegetation. Riparian habitat value is very limited for some species but valuable for some bird species.</p>	
<p>The National Wetland Inventory (NWI) shows patches of riparian wetlands in most of SR A and SR B, as the shoreline nears the Yakima Delta. SR C has no wetlands. The immediate shorelines in SR A and most of SR B are natural, but the river's course is confined due to the City's presence. SR C is confined due to the proximity of Highway 12.</p>	
<p>Several fish species populate the Lower Yakima River in this reach. Salmonid fish include steelhead and spring and fall Chinook salmon. Coho salmon were historically present here, and a coho reintroduction program is currently underway in the Yakima Basin. Bull trout were historically present and abundant in upper tributaries of the Yakima Basin and may now occur in this reach in low numbers. Lamprey are present but have experienced population decline in recent years. Resident fish include small- and largemouth bass, northern pikeminnow, sculpin, mountain whitefish, white sturgeon, catfish, sucker, walleye, rainbow trout, chiselmouth, dace, common carp, and various minnow species.</p>	
<p>Limitations to aquatic habitat in this reach are the elevated water temperatures and low flow common to the lower Yakima River. Fish passage is impeded regionally by the presence of several dams.</p>	
ECOLOGICAL FUNCTIONS ANALYSIS (BY SUBREACH)	
SUBREACH A	
<p>Level of Existing Function: Functioning</p>	
<p>Stressors: Bridges limit channel migration and control patterns of sediment deposition, industrial uses (gravel mine and wastewater treatment plant), backwater effect from McNary dam, wastewater treatment discharge from outfall, recreation uses</p>	
<p>Potential Restoration Opportunities: Consider opportunity to buffer from adjacent industrial land (near SR-240 bridge) use or reclaim areas of gravel mine for off channel rearing habitat</p>	
<p>Potential Protection Opportunities: Protect riparian and wetland vegetation in low-lying floodplain areas</p>	
Preliminary Shoreline Environment Designation Considerations:	
<p>Parallel Conservancy and Recreation (100' from OHWM/Industrial inland)</p>	
SUBREACH B	
<p>Level of Existing Function: Functioning</p>	
<p>Stressors: Backwater effect from McNary dam, bridge crossings limit channel migration and McNary pool controls sediment deposition, water quality concerns related to past agriculture practices, recreation use.</p>	
<p>Potential Restoration Opportunities: Adjacent to SR 240; revegetation of riparian areas</p>	
<p>Potential Protection Opportunities: Shrub-steppe protection consistent with WDFW guidelines, limit public access to designated trails</p>	

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<p>Preliminary Shoreline Environment Designation Considerations: Parallel Conservancy below slope and Recreation above slope</p>	
<p>SUBREACH C</p>	
<p>Level of Existing Function: Functioning, partially functioning, impaired</p> <p>Stressors: Limited riparian vegetation due natural conditions, degraded shrub-steppe from roads and trails and recreation use</p> <p>Potential Restoration Opportunities: Riparian and shrub steppe vegetation restoration as part of future development or management decisions</p> <p>Potential Protection Opportunities: Prevent further degradation to shrub steppe and riparian areas</p>	
<p>Preliminary Shoreline Environment Designation Considerations: Parallel Natural below slope, Mixed Use above slope</p>	
<p>PUBLIC ACCESS</p>	
<p>Existing Public Access:</p> <p>SR A: As noted in the habitat discussion above, this reach includes the 276-acre Chamna Natural Preserve. The City’s Final parks plan (City of Richland 2012) indicates that the area is owned by the U.S., managed by the U.S. Army Corps of Engineers, and leased to the City of Richland. Chamna has two land use designations: 262 acres of natural open space and 32 acres of developed open space. About 11 miles of trails are found throughout the preserve. The Tapteal Greenway Association maintains trails (Tapteal Greenway Association 2012). The preserve is part of the Yakima River delta and is managed in conjunction with other lands owned by the Corps as a nature preserve with limited non-motorized access.</p> <p>SR B: As described above, this reach includes the portion of the Yakima River delta downstream of SR 240 and is managed in conjunction with other lands owned by the Corps as a nature preserve with limited non-motorized access. City inventories show a portion of the land as part of the Columbia Point Environment. A primitive boat launch is mapped (City of Richland 2012).</p> <p>SR C: The City identifies this reach as part of the Columbia Point Environment. The Tapteal Greenway Association (2012) notes this area has “controlled access for muscle-powered recreation.”</p>	
<p>Existing Public Access Goals:</p> <p>The City’s Comprehensive Plan Capital Facilities Element includes a stewardship goal:</p> <ul style="list-style-type: none"> • Protect and provide responsible stewardship of the community's unique natural habitat and ecologically sensitive and scenic waterfront areas; develop public recreational activities appropriate to these venues 	

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<p>Identified Public Access Improvements:</p> <p>SR A: Richland’s Comprehensive Plan (2008) includes several objectives in the Parks and Recreation element, including:</p> <ul style="list-style-type: none"> • Complete the Chamna Natural Preserve ADA Loop Trail • Construct restroom facilities at all community parks, larger neighborhood parks, and the Chamna Natural Preserve <p>The City’s Final Parks, Trails and Open Space Master Plan (2012) identifies the following action:</p> <ul style="list-style-type: none"> • Establish trails connecting Amon Creek Natural Preserve with Little Badger Mountain and the Chamna Natural Preserve 	
<p>CUMULATIVE IMPACT CONSIDERATIONS</p>	
<p>Watershed level: The SMP has limited influence on Yakima River operations by the U.S. Bureau of Reclamation and irrigation districts, and upriver degradation of water quality conditions. Richland’s focus should be on preventing further degradation of Lower Yakima conditions.</p> <p>Reach level:</p> <ul style="list-style-type: none"> • Impacts from recreation use and recreation development along the shoreline • Water quality impacts from impervious surface runoff from transportation facilities • Potential for vegetation alterations from existing and future development • Other impacts from non-native predation (domestic pets, smallmouth bass, and pike minnow) 	

RICHLAND		CITY OF RICHLAND
REACH 5	Reach Length: 1.58 mile	
Shoreline Jurisdiction: 192.02 acres		
		
Source: https://www.bing.com/maps/		
<p>Description: The shoreline within this reach extends about 8,300 feet along the right bank of the Yakima River from the City Limits at Northlake Drive to the I-182 Yakima River bridge.</p>		
PHYSICAL CHARACTERISTICS		
<p>Ownership: U.S. Army Corps of Engineers</p>		
<p>Existing Land Cover/Development: Open space with no significant development other than the I-182 crossing and the Columbia Irrigation District canal.</p>		
<p>Land Use/Current SMP:</p> <p>Current SMP Environment Designation: Conservancy</p> <p>Current Zoning: Natural open space (east of Columbia Canal)</p> <p>Adjacent Zoning: Natural open space</p> <ul style="list-style-type: none"> • Limited business (adjacent to City View Drive, west of Columbia Canal) • Medium-density residential small lot (adjacent to Ridgecliff Drive, west of Columbia Canal) <p>Current Land Use Land Use: Natural open space (east of Columbia Canal)</p> <ul style="list-style-type: none"> • Agriculture (west of Columbia Canal) • Vacant commercial (west of Columbia Canal) • Single-family residential (west of Columbia Canal) <p>Water-dependent Uses: None</p> <p>Water-related Uses: None</p> <p>Non-water-related Uses: Agriculture, commercial, single-family residential</p>		

RICHLAND	CITY OF RICHLAND
<p>Future Land Use: No change from the current pattern of use is projected for commercial and residential areas, although vacant commercial areas are likely to develop in the future.</p> <p>Existing open space use is not likely to change in the future consistent with the comprehensive plan designation of the area as urban reserve, which provides that these lands that are to be held in reserve during the 20-year planning period of the comprehensive plan.</p> <p>There is no potential for water-oriented use on private upland parcels due to the intervening open space.</p>	
<p>Major Infrastructure: Public water access, public water system, Informal trails along the shoreline, Columbia Canal irrigation channel, transmission lines over river</p>	
<p>Geomorphic Character: Reach 5 is located on the west bank (right bank) of Yakima River upstream of the I-182 bridge. This reach is characterized as a meandering, mostly single-thread channel that is moderately stable, with slight channel migration since 1956 (based on aerial photo interpretation). The geologic units along the reach corridor consist of alluvium, flood deposits, and, to a lesser extent, basalt bedrock and sedimentary rocks. The channel is partially confined against the right bank valley wall. The right bank valley wall rises steeply at its margins. An irrigation canal is located along the channel margins. Throughout much of this reach, soils consist mostly of loamy fine sand. This reach primarily supports freshwater forested/shrub wetlands—wetland acreage increases as this reach nears the confluence of the Columbia and Yakima rivers.</p> <p>Hardened banks: No significant armoring was noted during inspection of aerial photography.</p>	
<p>Flooding and Geological Hazards: Approximately 25% of this reach is mapped within the FEMA High Risk Flood Area. Geologic hazards are primarily a low risk of flooding as evidenced by historical channel movement.</p>	
<p>Channel Migration Zone: Reach 5 is located along the right bank of the Yakima River upstream of the I-182 bridge. The CMZ is mostly defined by the presence of infrastructure. An irrigation canal located along the left bank limits the CMZ throughout most of this reach. The distance of the alignment of the irrigation canal to the Yakima River increases downstream. A bedrock outcrop is located along the left bank also limits migration. Upstream of this bedrock outcrop, where the canal is aligned closer to the channel, the CMZ follows this canal. Downstream, the CMZ widens where the canal is offset back from the river a greater distance. In the area immediately upstream of the I-182 bridge, the floodplain is wider, allowing for more channel migration through the alluvium and sand dominated soils.</p>	
<p>REACH CHARACTERIZATION AND ANALYSIS</p>	
<p>Water Quantity and Sediment: Water quantity is influenced by releases from Yakima Project reservoirs, irrigation diversions, and irrigation return flow.</p>	
<p>Water Quality: There are water quality listings for Dieldrin, dissolved oxygen, pH, DDT, endosulfan, and temperature. Ecology remarks that the reach returned to Category 5 from 4A in 2005 because the Lower Yakima Pesticides total maximum daily load (TMDL) targets are for chronic aquatic life criteria and not the more stringent human health criteria (Ecology 2008). Water quality is not likely to be impacted by local sources in this reach.</p>	

RICHLAND	CITY OF RICHLAND
Habitat Characteristics and PHS Species Presence:	
<p>No threatened or endangered terrestrial species present in the immediate vicinity.</p>	
<p>The water area of the Yakima River supports migratory waterfowl as a resting and feeding area. Some nesting may occur.</p>	
<p>This floodplain within this area is part of the Yakima River delta and is managed in conjunction with other lands owned by the USACE as a Nature Preserve with limited non-motorized access. The initial 1,000 feet of this area is a floodplain separated by a slough from the steep bank defining the adjacent areas. This area primarily provides productive floodplain and wetland habitat for reptiles, amphibians and small mammals with lifecycle stages dependent on water. Floodway and riparian areas are characterized by both native and invasive species. The relative lack of ongoing human disturbance provides for a vegetation community supporting a range of species. The small area, however, limits the range and number of species.</p>	
<p>Upland shrub/steppe habitat has been altered in the past and provides a limited area of habitat for a variety of species.</p>	
<p>The 1,500 linear feet of residential development along View Drive is bounded by steep slopes and has relatively low habitat value due both to a narrow area of riparian vegetation and proximity impacts from noise.</p>	
<p>This area presents few limitations for movement corridors for both aquatic and terrestrial species. Movement upstream is largely dependent on the floodway areas on the opposite side of the river due to urban development on the left bank adjacent to the river. The Columbia Canal provides a barrier for human activity. Proximity impacts such as noise, light, and glare from adjacent urban use likely limit productivity of adjacent areas.</p>	
<p>The National Wetland Inventory (NWI) shows patches of riparian wetlands present in this reach, especially along the immediate shoreline. Shorelines are natural but are confined by the irrigation canal and the Highway 182 corridor.</p>	
<p>Several fish species populate the Lower Yakima River in this reach. Salmonid fish include steelhead and spring and fall Chinook salmon. Coho salmon were historically present here, and a coho reintroduction program is currently underway in the Yakima Basin. Bull trout were historically present and abundant in upper tributaries of the Yakima basin and may now occur in this reach in low numbers. Lamprey are present but have experienced population decline in recent years. Resident fish include small- and largemouth bass, northern pikeminnow, sculpin, mountain whitefish, white sturgeon, catfish, sucker, walleye, rainbow trout, chiselmouth, dace, common carp, and various minnow species.</p>	
<p>Limitations to aquatic habitat in this reach are the elevated water temperatures and low flow common to the Lower Yakima River. Fish passage is impeded regionally by the presence of several dams.</p>	
ECOLOGICAL FUNCTIONS ANALYSIS (BY SUBREACH)	
<p>Level of Existing Function: Functioning</p>	
<p>Stressors: Irrigation canal with access road, some shoreline access points, McNary pool effects, transmission lines, little channel migration potential, slumping of steep slope</p>	

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<p>Potential Restoration Opportunities: Restore vegetation on shoreline slope near irrigation canal</p> <p>Potential Protection Opportunities: Protect existing low lying, riparian and shrub-steppe habitat</p>	
<p>Preliminary Shoreline Environment Designation Considerations:</p> <p>Parallel Natural below CID canal, Residential above canal where in SMA jurisdiction.</p>	
PUBLIC ACCESS	
<p>Existing Public Access:</p> <p>Reach 5 is designated as natural open space in the City's Comprehensive Plan (City of Richland 2008), though not mapped in the Final parks plan with a particular facility name. A soft surface trail exists along this reach (City of Richland 2012).</p>	
<p>Existing Public Access Goals:</p> <p>See general City goals regarding a connected open space plan described in Reach 1 and stewardship of sensitive areas and public recreation in Reach 4.</p>	
<p>Identified Public Access Improvements:</p> <p>None</p>	
CUMULATIVE IMPACT CONSIDERATIONS	
<p>Watershed level: The SMP has limited influence on Yakima River operations by the U.S. Bureau of Reclamation and irrigation districts, and upriver degradation of water quality conditions. Richland's focus should be on preventing further degradation of Lower Yakima conditions.</p> <p>Reach level:</p> <ul style="list-style-type: none"> • Water quality impacts from herbicide and fertilizer run-off into agriculture canals • Impacts from recreation use along the shoreline • Other impacts from non-native predation (domestic pets, smallmouth bass, and pike) 	

RICHLAND		CITY OF RICHLAND
REACH 6	Reach Length: 5.07 mile	
Shoreline Jurisdiction: 392.84 acres		
		
Source: https://www.bing.com/maps/		
<p>Description: The shoreline within this reach extends along the right bank of the Yakima River from the I-182 Yakima River bridge through the SR 240 bridge and to the eastern city limits, including Bateman and other smaller islands</p>		
<p>Subreaches (SR), see Figure:</p> <p>SR A: Extends approximately 2.7 miles from the I-182 bridge to the 240 bridge</p> <p>SR B: Extends approximately 0.2 miles across the SR 240 bridge</p> <p>SR C: Extends approximately 1.5 miles to the east of the SR 240 bridge</p>		
PHYSICAL CHARACTERISTICS		
<p>Ownership: Reach 6 is federally owned by the U.S. Army Corps of Engineers with some areas leased to the City; some private ownership in SR 6C.</p>		
<p>Existing Land Cover/Development:</p> <p>SRs A and B: Public lands and open space with no significant development other than the I-182 crossing.</p> <p>SR C: Public open space directly neighboring medium to high density commercial, residential, waterfront, and research park developments to the south</p>		
<p>Land Use/Current SMP:</p> <p>SR A:</p> <p>Current SMP Environment Designation: Conservancy</p> <p>Current Zoning: Natural open space (floodplain area)</p> <p>Adjacent Zoning: Benton County – Residential</p> <p style="padding-left: 40px;">City of Richland: Single-family residential</p> <p>Current Land Use: Natural open space (east of residential area on View Drive, east of Columbia Canal)</p> <p style="padding-left: 40px;">Single-family residential (along View Drive and east of Columbia Canal)</p> <p>Water-dependent Uses: None</p>		

RICHLAND	CITY OF RICHLAND
<p>Water-related Uses: None</p> <p>Non-water related Uses: Single-family residential</p> <p>Future Land Use: No change from the current pattern of use is projected for residential areas</p> <p>There is no potential for water-oriented use on private upland parcels due to the intervening open space. Non-motorized recreation use will continue on open space lands.</p> <p>SR B:</p> <p>Current SMP Environment Designation: Conservancy, except for islands, which are Natural</p> <p>Current Zoning: Natural open space (floodplain area)</p> <p>Adjacent Zoning: Benton County – Residential City of Richland: Single-family residential</p> <p>Current Land Use: Natural open space (east of residential area on View Drive, east of Columbia Canal) Single-family residential (along View Drive and east of Columbia Canal)</p> <p>Water-dependent Uses: None Water-related Uses: None</p> <p>Non-water related Uses: Single-family residential</p> <p>Future Land Use: No change from the current pattern of use is projected for residential areas</p> <p>There is no potential for water-oriented use on private upland parcels due to the intervening open space. Non-motorized recreation use will continue on open space lands.</p> <p>SR C</p> <p>Current SMP Environment Designation: Urban, except for Bateman Island, which is Conservancy</p> <p>Current Zoning: Natural open space (floodplain area)</p> <p>Adjacent Zoning: Natural Open Space Commercial & Waterfront</p> <p>Current Land Use: Public open space Single-family residential (south of Columbia Canal) Vacant commercial (south of Columbia Canal)</p> <p>Water-dependent Uses: None</p> <p>Water-related Uses: Parks provide opportunities for water enjoyment Non-water related Uses: All existing uses except park</p> <p>Future Land Use: There is little potential for water-oriented use on private upland parcels</p>	
<p>Major Infrastructure: Public water access, public water system, informal trails along the shoreline, Columbia Canal irrigation channel, Columbia Park Trail, Wye Park, Connection to the Bateman Island, Columbia Park West</p>	

RICHLAND	CITY OF RICHLAND
<p>Geomorphic Character: Reach 6 extends along the south bank (right bank) to the confluence of the Yakima River with the Columbia River. The channel is low gradient and generally widens towards the confluence with the Columbia River. The Highway 240 crossing is located near the confluence with the Columbia River. This meandering channel is confined by roads to a greater extent than Reach 4, but still shows historical channel movement (in comparison to the 1954 aerial photographs). Geologic features are mostly flood and alluvial deposits with soils consisting of loamy fine sand and a small region confined by basalt bedrock.</p> <p>Hardened banks: Raised bank along the river on the east of SR 240 crossing, armoring in Columbia Point Marina Park and along some portion of Columbia Park Trail.</p>	
<p>Flooding and Geological Hazards: Small parts of this reach are mapped in the FEMA High Risk Flood Areas, and it contains mostly freshwater forested/shrub wetlands—wetlands increase as this reach nears the confluence of the Columbia and Yakima rivers. Flooding risks in this area are moderate because of active historical channel movement and expansive OHWM area. The geologic features of flood deposits show that this area has a history of flooding.</p>	
<p>Channel Migration Zone: Reach 6 is located along the right bank of the Yakima River and extends from the I-182 Bridge to the Columbia River. Infrastructure defining the location of the CMZ includes the I-182 bridge crossing at the upstream extent and a railroad and SR 240 bridge crossings. In the upstream extent, the CMZ follows the high, steep bank. Downstream of the high bank, the floodplain widens and the CMZ follows the setback along Columbia River Trail to the railroad and SR 240 bridge crossings. Downstream of SR 240, the CMZ follows a setback levee along the right bank. Downstream of the levee, the CMZ widens as the floodplain widens at the mouth of the Columbia River.</p>	
REACH CHARACTERIZATION AND ANALYSIS	
<p>Water Quantity and Sediment: Water quantity is influenced by releases from Yakima Project reservoirs, irrigation diversions, and irrigation return flow; and from the Columbia River McNary Pool, as this reach includes the Yakima River delta. The major surface water inputs in this reach include the City’s wastewater treatment plant discharge. Badger Mountain Irrigation District also diverts water in this reach for agriculture and landscape irrigation purposes.</p>	
<p>Water Quality: There are water quality listings for Dieldrin, dissolved oxygen, pH, DDT, endosulfan, and temperature. Ecology remarks that the reach returned to Category 5 from 4A in 2005 because the Lower Yakima pesticides total maximum daily load (TMDL) targets are for chronic aquatic life criteria and not the more stringent human health criteria (Ecology 2008). Additionally, WWTP discharges in this reach may impact water quality for a short time downstream until it completely mixes with the Yakima River and Columbia River. Nearby impervious surfaces from roads, residential roofs, and industrial activities may contribute stormwater runoff in SR C.</p>	
<p>Habitat Characteristics and PHS Species Presence:</p> <p>No threatened or endangered terrestrial species present in the immediate vicinity.</p> <p>The water area of the Yakima River supports migratory waterfowl as a resting and feeding area. Some nesting may occur.</p>	

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SR A: A range of opportunities are provided along the shoreline for species with lifecycle stages related to water in extensive floodplains area. Portions of the floodplain are likely to be particularly productive because of a slough separating a large part of the floodplain from the bank. The upstream portion consists of an island separated from the bank by a slough. This slough, together with a steep bank and the canal reduces human disturbance in the upstream 1,000 feet of the corridor. This area primarily provides productive floodplain and wetland habitat for small resident species of reptiles, amphibians, and small mammals, particularly those with lifecycle stages dependent on water.

Adjacent to the residential area for about 1,500 feet along View Drive, the riparian area narrows due to the steep bank with corresponding reduction in habitat value, which is further reduced by proximity impacts such as noise and light and likely predation by domestic animals.

The portion adjacent to the Columbia Canal, a distance of about 4,000 feet, features a steep bank between the water's edge and the canal that provides a very narrow band of riparian vegetation and limited potential for wildlife movement.

SR B: This subreach includes the Riverview Preserve, a 268-acre floodplain area extending about 6,500 feet along the river that is maintained by the Corps of Engineers. This is part of the larger Yakima Delta, but is isolated by a railroad and the SR 240 corridor. An existing tunnel under SR 240 provides a wildlife movement corridor.

This extent to which this area functions as part of the larger delta is dependent on movement corridors both upstream and downstream. Movement downstream is largely constrained by the existing Yakima River bridge. The level of human activity from trail systems through the area is relatively limited. However, proximity impacts from highways on the margin of the area produces substantial proximity impacts such as noise and light and likely limits areas near these facilities to less sensitive species. Mortality for animals attempting to cross the highway may be substantial along SR 240.

SR C: This subreach includes the Yakima Delta stretching from SR 240 to the city limits. The margins of the shoreline include about 4,500 feet of levee, and high bank steep slope. This reach includes the 160-acre Bateman Island and several hundred acres of delta deposits. The land uses along the shoreline provide little habitat value, although parts provide cover, understory and food sources for songbirds, shorebirds and small mammals. The delta area as a whole provides a wide variety of riparian/wetland and upland vegetation in a large contiguous area with limited human disturbance and has the potential for providing a range of lifecycle functions for a wide range of species.

The National Wetland Inventory (NWI) shows patches of riparian wetlands in the eastern half of SR A and western half of SR B, as the shoreline becomes the Yakima Delta. The shoreline of SR C is developed and hardened, with roads adjacent to the shore. Patches of wetlands occur on the islands and outcroppings of the Yakima Delta. The confluence area wetland habitats are important staging and acclimatization zones for migrating salmonids. Several fish species populate the lower Yakima River in this reach. Salmonid fish include steelhead and spring and fall Chinook salmon. Coho salmon were historically present here, and a coho reintroduction program is currently underway in the Yakima Basin. Bull trout were historically present and abundant in upper tributaries of the Yakima Basin and may now occur in this reach in low numbers. Lamprey are present but have experienced population decline in recent years. Resident fish include small- and largemouth bass, northern chiselmouth, dace, common carp, and various minnow species.

RICHLAND	CITY OF RICHLAND
<p>Limitations to aquatic habitat in this reach are the elevated water temperatures and low flow common to the lower Yakima River. Fish passage is impeded regionally by the presence of several dams.</p>	
<p>ECOLOGICAL FUNCTIONS ANALYSIS (BY SUBREACH)</p>	
<p>SUBREACH A</p>	
<p>Level of Existing Function: Functioning</p> <p>Stressors: Irrigation canal with access road, McNary pool effects</p> <p>Potential Restoration Opportunities: Evaluate vegetation on shoreline slope near irrigation canal, evaluate potential to further restore Yakima River delta natural processes currently constrained by SR 240</p> <p>Potential Protection Opportunities: Protect existing low lying, riparian and shrub steppe habitat</p>	
<p>Preliminary Shoreline Environment Designation Considerations:</p> <p>Natural</p>	
<p>SUBREACH B</p>	
<p>Level of Existing Function: Functioning</p> <p>Stressors: SR 240, McNary pool, recreation use</p> <p>Potential Restoration Opportunities: Remove invasive species and restore with native vegetation</p> <p>Potential Protection Opportunities: Manage recreation activities to maintain function</p>	
<p>Preliminary Shoreline Environment Designation Considerations:</p> <p>Conservancy</p>	
<p>SUBREACH C</p>	
<p>Level of Existing Function: Functioning</p> <p>Stressors: Trail, hardened shoreline along levee, over-water structures at marina, and irrigated lawn area at parks, parking, boat launch</p> <p>Potential Restoration Opportunities: Evaluate potential benefits from breaching portions of causeway, emphasize shoreline public access, and demonstrate appropriate native landscaping as part of Columbia Park West Master Plan and Hanford Reach Interpretive Center development. Remove invasive species and restore with native vegetation on Bateman Island and other applicable areas.</p> <p>Potential Protection Opportunities: BMPs for irrigated landscaping within developed parks</p>	
<p>Preliminary Shoreline Environment Designation Considerations:</p> <p>Natural waterward of levee/steep slope, Waterward landward of levee/Road, small area of Recreation</p>	

RICHLAND	CITY OF RICHLAND
PUBLIC ACCESS	
<p>Existing Public Access:</p> <p>This area includes (City of Richland 2012):</p> <ul style="list-style-type: none"> • Portions of the Riverview Natural Preserve and Columbia Park Trail (SRs A and B) • Bateman Island Natural Open Space (SR C) • Wye Neighborhood Park (SR C) • Columbia Park Trail and Columbia Park West (SR C) with boat launches, docks, water moorage facilities, trails, picnic facilities, and others 	
<p>Existing Public Access Goals:</p> <p>See general City goal regarding a connected open space plan described in Reach 1 and stewardship of sensitive areas and public recreation in Reach 4.</p>	
<p>Identified Public Access Improvements:</p> <p>A Master Plan was adopted in 2010 for Columbia Park West.</p>	
CUMULATIVE IMPACT CONSIDERATIONS	
<p>Watershed level: The SMP has limited influence on Yakima River operations by the U.S. Bureau of Reclamation and irrigation districts, and associated upriver degradation of water quality conditions; and on U.S. Army Corps of Engineers McNary Dam operations. Richland’s focus should be on preventing further degradation of Lower Yakima and Columbia River conditions.</p> <p>Reach level:</p> <ul style="list-style-type: none"> • Impacts from recreation use and recreation development along the shoreline • Water quality impacts from impervious surface runoff from transportation facilities • Other impacts from non-native predation (domestic pets, smallmouth bass, and pike minnow) 	

RICHLAND		CITY OF RICHLAND
REACH 7	Reach Length: 2.51 mile (excluding islands)	
Shoreline Jurisdiction: 79.60 acres (excluding islands)		
		
Source: https://fortress.wa.gov/ecy/coastalatlus/UICoastalAtlas/Tools/ShorePhotos.aspx		
<p>Description: The shoreline within this reach extends about 8,000 feet along the right bank of the Columbia River from the north Urban Growth Area boundary to the City limits at Horn Rapids Road. The reach includes largely U.S. Department of Energy (DOE) land and includes portions of Wooded Island, Susan Island, and Barb Island in the Columbia River.</p>		
<p>Subreaches (SR), see Figure:</p> <p>SR A: Extends approximately 0.8 miles from the UGA Boundary</p> <p>SR B: Extends approximately 0.7 miles just east of Apple Street</p> <p>SR C: Extends approximately 0.8 miles to the southern extent of the UGA Boundary</p> <p>SR D: Includes the islands</p>		
PHYSICAL CHARACTERISTICS		
Ownership: City of Richland		
Existing Land Cover/Development: Open space		
<p>Land Use:</p> <p><i>SRs A through C:</i></p> <p>Current SMP Environment Designation: Urban</p> <p>Current Zoning: Zoning not established for this area</p> <p>Current Land Use Land Use: Vacant (DOE)</p>		

RICHLAND	CITY OF RICHLAND
<p>Water-dependent Uses: None</p> <p>Water-related Uses: None</p> <p>Non-water related Uses: Federal research and development laboratory</p> <p>Future Land Use: No change from the current pattern of use is projected in the near future</p> <p>The Richland Comprehensive Plan designates the area for a mix of developed and natural open space, commercial, residential, business research park and industrial</p> <p>There is potential for a variety of water-oriented use if this area is made available for non-federal use</p> <p><i>SRs D through F—Columbia River Islands:</i></p> <p>Current SMP Environment Designation: Natural</p> <p>Current Zoning: Natural open space (floodplain area)</p> <p>Adjacent Zoning:</p> <p>Current Land Use: Open space – National Wildlife Refuge Water-dependent Uses: None</p> <p>Water-related Uses: None Non-water related Uses: None</p> <p>Future Land Use: Federal Wildlife Refuge open space.</p>	
<p>Major Infrastructure: Railroad nearby.</p>	
<p>Geomorphic Character: Reach 7 includes the east bank (right bank) and associated bars along the Columbia River (upstream of the City of Richland limits). In this reach, the Columbia River is a straight, incised, single-thread channel. The geologic units are primarily flood deposits on the east bank while alluvial deposits make up the mid-channel unvegetated bars. The soils along the shoreline are made up of loamy sand and fine sandy loam.</p> <p>Hardened banks: No significant armoring was noted during inspection of aerial photography.</p>	
<p>Flooding and Geological Hazards: The mid- to channel islands are mapped in FEMA High Risk Flood Areas, but the bank is stable and unlikely to be susceptible to flood risks in its current form.</p>	
<p>Channel Migration Zone: Per Ecology, a CMZ delineation is not necessary for the Columbia River.</p>	
<p>REACH CHARACTERIZATION AND ANALYSIS</p>	
<p>Water Quantity and Sediment: Water quantity is dependent on Columbia River (specifically Priest Rapids Dam) operations. There are no major surface water inputs or outputs in this reach.</p>	
<p>Water Quality: Impervious roads and buildings within the adjacent Hanford Nuclear Reservation may contribute stormwater runoff in SRs A, B, and C.</p>	

RICHLAND	CITY OF RICHLAND
Habitat Characteristics and PHS Species Presence:	
<p>No threatened or endangered terrestrial species present in the immediate vicinity.</p>	
<p>The water area of the Columbia River supports migratory waterfowl as a resting and feeding area. Some nesting may occur. The Columbia River islands provide a breeding area for long billed curlew and a variety of gulls and a resting area with limited nesting for great blue heron and great egret.</p>	
<p>DOE land and the Hanford National Monument to the north provides an area of about 600 square miles relatively undisturbed habitat for upland species and about 45 miles or riparian habitat along the Columbia River. There are currently few barriers for wildlife movement between Reach 7 and this wildlife resource to the north.</p>	
<p>SRs A through D provide a limited range of habitat for species with lifecycle stages related to water due to the narrow band of riparian vegetation.</p>	
<p>SRs D through F include the Columbia River islands, which are part of the McNary National Wildlife Refuge and provide a variety of riparian and upland habitat. In addition, the area provides resting area for a variety for a variety of waterfowl including by mallards, Canada geese, and other waterfowl for wintering, and the island habitats for nesting for great blue herons, great egrets, black-crowned night-herons, double crested cormorants, and American white pelicans, as well as several species of gulls. The islands are isolated by water from most human disturbance but are subject to proximity impacts such as noise and light or glare.</p>	
<p>There are no wetlands in this reach. The shoreline is natural except for the area adjacent to the Department of Defense facility, where roads and parking areas encroach on the shore.</p>	
<p>Many fish species populate the Columbia River in this reach. Salmonid fish include Chinook (spring, summer, and fall), coho, chum (fall), pink, and sockeye salmon, as well as bull trout/Dolly Varden and steelhead and rainbow trout. Coho salmon were historically present here, and a coho reintroduction program is currently underway in the nearby Yakima Basin. Lamprey are present but have experienced population decline in recent years. Other native fish species that can be found in the Columbia River near Richland include white sturgeon, bridgelip and mountain suckers, mottled sculpin, chiselmouth, redbelly dace, peamouth, northern pikeminnow. Invasive species include bluegill, bass, crappie, shad, carp, channel catfish, perch, and walleye.</p>	
<p>Shellfish in the Columbia River near Richland include the Columbia River limpet, the Columbia River spire snail, and the California floater.</p>	
ECOLOGICAL FUNCTIONS ANALYSIS (BY SUBREACH)	
SUBREACH A	
<p>Level of Existing Function: Functioning</p>	
<p>Stressors: None</p>	
<p>Potential Restoration Opportunities: None</p>	
<p>Potential Protection Opportunities: Protect shrub steppe and riparian vegetation</p>	

RICHLAND	CITY OF RICHLAND
Preliminary Shoreline Environment Designation Considerations: Conservancy	
SUBREACH B	
Level of Existing Function: Partially functioning Stressors: Hanford 300 Area development and remedial activities, water intake or outfall structure just off of Riverview Loop Potential Restoration Opportunities: Reduce unnecessary impervious surface and re-vegetate with native species Potential Protection Opportunities: Protect shrub steppe and riparian vegetation	
Preliminary Shoreline Environment Designation Considerations: Conservancy	
SUBREACH C	
Level of Existing Function: Functioning Stressors: McNary pool effects (limited) Potential Restoration Opportunities: None Potential Protection Opportunities: Protect shrub steppe and riparian vegetation	
Preliminary Shoreline Environment Designation Considerations: Conservancy	
SUBREACH D	
Level of Existing Function: Functioning Stressors: McNary pool effects (limited) Potential Restoration Opportunities: None Potential Protection Opportunities: Protect shrub-steppe and riparian vegetation	
Preliminary Shoreline Environment Designation Considerations: Columbia River Islands Natural	
PUBLIC ACCESS	
Existing Public Access: None. About 55 acres are in federal ownership (Benton County 2012).	
Existing Public Access Goals: The Richland Comprehensive Plan includes a general objective to:	

RICHLAND	CITY OF RICHLAND
<ul style="list-style-type: none"> Provide public access and use of the Columbia River and Yakima River shoreline in a manner that accommodates various uses but limits their impact on the natural environment 	
Identified Public Access Improvements:	
None	
CUMULATIVE IMPACT CONSIDERATIONS	
Watershed level: The SMP has limited influence on the Columbia River, and upriver water quality conditions. Richland's focus should be on preventing further degradation of Columbia River conditions.	
Reach level:	
<ul style="list-style-type: none"> Structural effects on habitat through informal road fragmentation within the uplands 	

RICHLAND		CITY OF RICHLAND
REACH 8	Reach Length: 2.07 mile (excluding islands)	
Shoreline Jurisdiction: 80.35 acres (excluding islands)		
		
Source: https://fortress.wa.gov/ecy/coastalatlantools/UICoastalAtlas/Tools/ShorePhotos.aspx		
<p>Description: The shoreline within this reach extends about 8,000 feet along the right bank of the Columbia River from the current City limits at Horn Rapids Road to Spring Road. The reach includes shoreline areas managed as part of the McNary Dam project and private and public uplands.</p>		
<p>Subreaches (SR), see Figure:</p> <p>SR A: Extends approximately 0.2 miles from the northern extent of the City limits to 11th Street</p> <p>SR B: Extends approximately 0.3 miles to Battelle Boulevard</p> <p>SR C: Extends approximately 0.7 miles to the WSU campus (east of University Drive)</p> <p>SR D: Extends approximately 0.3 miles to Sprout Street</p> <p>SR E: Extends approximately 0.6 miles to Spring Street</p> <p>SR F: Includes the island</p>		
PHYSICAL CHARACTERISTICS		
Ownership: U.S. Army Corps of Engineers, City of Richland, and private		
Existing Land Cover/Development: Vacant, public access trail, public institution and residential		

RICHLAND	CITY OF RICHLAND
<p>Land Use/Current SMP:</p> <p>Current SMP Environment Designation: Urban (SRs A – E) and Natural (island – SR F)</p> <p>SR A includes about 1,000 feet at the northern end of the reach.</p> <p>Current Zoning: Parks and public facilities and industrial</p> <p>Current Land Use: Developed open space and industrial</p> <p>Water-dependent Uses: Two barge unloading facilities</p> <p>Water-related Uses: None</p> <p>Non-water-related Uses: None</p> <p>Future Land Use: Water-oriented development is likely in the near future.</p> <p>The Richland Comprehensive Plan designates the area as industrial to accommodate the continued use of the existing barging facilities while maintaining the current generally undeveloped condition of the shoreline area.</p> <p>SR B extends along about 1,800 feet of the shoreline with a recently approved multi-family development</p> <p>Current Zoning: Natural open space & Waterfront</p> <p>Adjacent Zoning: Business Research Park</p> <p>Current Land Use: Natural open space and residential development</p> <p>Water-dependent Uses: None</p> <p>Water-related Uses: None</p> <p>Non-water-related Uses: None</p> <p>Future Land Use: Maintenance of undeveloped shoreline in current condition is anticipated. Future development of upland areas with business research and business park uses is anticipated, along with the build out of the current residential development. Conservation easement in place on portion of shoreline adjacent to residential development.</p> <p>SR C extends along about 2,700 feet of the shoreline.</p> <p>Current Zoning: Waterfront, Natural Open Space, Parks & Public Facilities</p> <p>Adjacent Zoning: Business Research Park, Waterfront, & Parks & Public Facilities</p> <p>Current Land Use: Natural open space and undeveloped land</p> <p>Water-related Uses: None</p> <p>Non-water-related Uses: None</p> <p>Future Land Use: Water-oriented development is likely in the near future.</p>	
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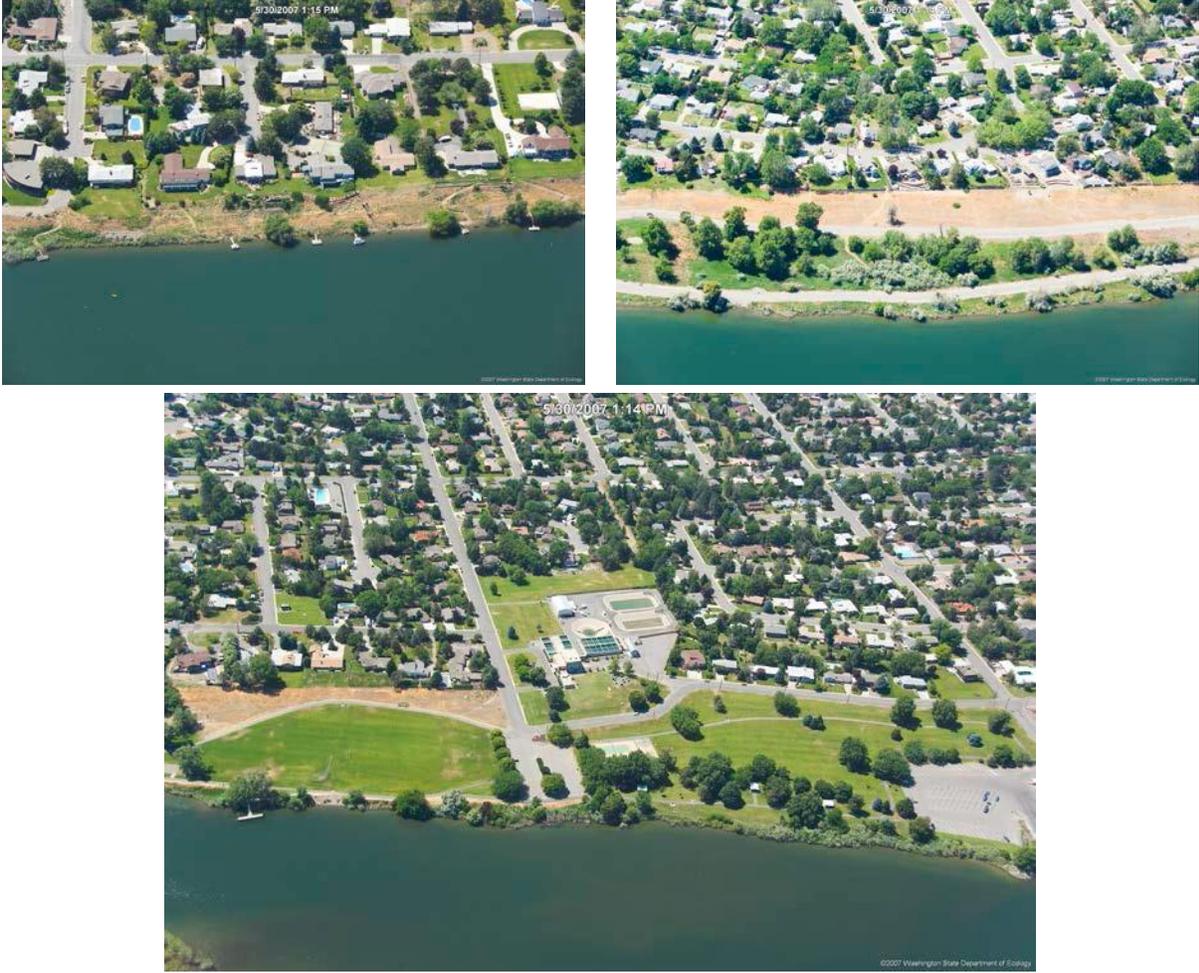
RICHLAND	CITY OF RICHLAND
<p>The Richland comprehensive plan designates the area as waterfront and provides for future development of a variety of water-oriented uses consistent with the City’s vision and that incorporates public access recreational features and attractive and high quality development</p> <p>SR D extends along about 2,800 feet of the shoreline and consists of the WSU Tri-Cities Campus.</p> <p>Current Zoning: Parks & Public Facilities</p> <p>Adjacent Zoning: Parks & Public Facilities</p> <p>Current Land Use: Washington State University Tri-Cities Campus consisting of a variety of buildings and cultivated open space</p> <p>Water-related Uses: None</p> <p>Non-water-related Uses: None</p> <p>Future Land Use: Further development of public facilities in adjacent upland locations associated with expansion of the WSU Tri-Cities Campus.</p> <p>SR E extends along about 1,800 feet of the shoreline.</p> <p>Current Zoning: Natural Open Space</p> <p>Adjacent Zoning: Single Family Residential</p> <p>Current Land Use: Single family residential neighborhood</p> <p>Water-related Uses: None</p> <p>Non-water-related Uses: None</p> <p>Future Land Use: Limited potential for further development.</p> <p>Water-oriented use is not likely, but water enjoyment opportunities likely will be provided.</p> <p>SR F includes a Columbia River island, which is part of the McNary National Wildlife Refuge and provides a variety of riparian and upland habitat.</p>	
<p>Major Infrastructure: Public water access, public water system, railroad, and Port of Benton nearby</p>	
<p>Geomorphic Character: Reach 8 includes the east bank (right bank) and a large mostly unvegetated island along the Columbia River downstream of the City of Richland boundary. This straight, incised, single-thread channel is confined by urban/agricultural infrastructure. The soils are primarily flood deposits on the east bank while alluvial deposits make up the mid channel island. The soils on the shoreline are made up of loamy sand and fine sandy loam.</p> <p>Hardened banks: Reminiscent water exhaust structures from the Hanford site; the water intake facility and barge landing, and a few docks near the residential area south of the WSU campus</p>	
<p>Flooding and Geological Hazards: The mid- to channel islands are mapped in FEMA High Risk Flood Areas, but the bank is stable and unlikely to be susceptible to flood risks in its current form.</p>	

RICHLAND	CITY OF RICHLAND
Channel Migration Zone: Per Ecology, a CMZ delineation is not necessary for the Columbia River.	
REACH CHARACTERIZATION AND ANALYSIS	
Water Quantity and Sediment: Water quantity is dependent on Columbia River (specifically Priest Rapids Dam) operations. There are no major surface water inputs or outputs in this reach.	
Water Quality: Nearby impervious surfaces from roads and residential roofs may contribute stormwater runoff in SRs A through E.	
<p>Habitat Characteristics and PHS Species Presence:</p> <p>No threatened or endangered terrestrial species present in the immediate vicinity.</p> <p>The water area of the Columbia River supports migratory waterfowl as a resting and feeding area. Some nesting may occur. The Columbia River islands also provide a breeding area for long billed curlew and a variety of gulls, as well as a resting area with limited nesting for great blue heron and great egret.</p> <p>SRs A through E provide a limited range of habitat for species with lifecycle stages related to water due to the narrow band of riparian vegetation. Wildlife movement is accommodated along the shoreline. There is little potential for connection to upland habitat although fragmented upland habitat is present in vacant lands to the west that have largely been disturbed in the past and have limited habitat value.</p> <p>SR F includes a Columbia River island, which is part of the McNary National Wildlife Refuge and provides a variety of riparian and upland habitat. In addition, the area provides resting area for a variety of waterfowl. The islands are isolated by water from most human disturbance but are subject to proximity impacts such as noise and light/glare.</p> <p>The National Wetland Inventory (NWI) has identified wetlands in SR B, SR C, and the north half of SR D. The shorelines are all modified; SR A has a boat launch, SR E has several boat docks and piers, and there is a road along the shore of the remaining reaches.</p> <p>Many fish species populate the Columbia River in this reach. Salmonid fish include Chinook (spring, summer, and fall), coho, chum (fall), pink, and sockeye salmon, as well as bull trout/Dolly Varden and steelhead and rainbow trout. Coho salmon were historically present here, and a coho reintroduction program is currently underway in the nearby Yakima Basin. Lamprey are present but have experienced population decline in recent years. Other native fish species that can be found in the Columbia River near Richland include white sturgeon, bridgelip and mountain suckers, mottled sculpin, chiselmouth, redbelt shiner, peamouth, and northern pikeminnow. Invasive species include bluegill, bass, crappie, shad, carp, channel catfish, perch, and walleye.</p> <p>Shellfish in the Columbia River near Richland include the Columbia River limpet, the Columbia River spire snail, and the California floater.</p>	
ECOLOGICAL FUNCTIONS ANALYSIS (BY SUBREACH)	
SUBREACH A	
Level of Existing Function: Partially functioning	

RICHLAND	CITY OF RICHLAND
<p>Stressors: Water intake facilities and barge slip (dredged), armoring, legacy utility structures (maybe monitoring wells) informal recreation trails and water access, recreation use</p> <p>Potential Stressors: Within waterfront developed land use designations, will have development pressure</p> <p>Potential Restoration Opportunities: Increase density of riparian buffer, consider soft bank stabilization methods</p> <p>Potential Protection Opportunities: Limit public access to designated trails, protect shrub steppe consistent with WDFW guidelines</p>	
<p>Preliminary Shoreline Environment Designation Considerations:</p> <p>Conservancy</p>	
<p>SUBREACH B</p>	
<p>Level of Existing Function: Partially functioning</p> <p>Stressors: Paved bike path, residential development with roads,</p> <p>Potential Stressors: Waterfront development and associated recreational activity increases</p> <p>Potential Restoration Opportunities: Replace invasive riparian species with native, maximize taller riparian vegetation near shoreline; to maintain views of river, infill with smaller trees and shrubs at top of bank</p> <p>Potential Protection Opportunities: Consider low irrigation/xeriscape options for landscaping on public and private parcels</p>	
<p>Preliminary Shoreline Environment Designation Considerations:</p> <p>Parallel Recreation and Waterfront</p>	
<p>SUBREACH C</p>	
<p>Level of Existing Function: Functioning</p> <p>Stressors: Paved bike path and desire paths lower on bank, non-native riparian species, limited industrial development but outside of the shoreline jurisdiction</p> <p>Potential Restoration Opportunities: Replace invasive riparian species with native</p> <p>Potential Protection Opportunities: Limit access to designated trails; consider reconnecting to larger regional trail to discourage informal trails</p>	
<p>Preliminary Shoreline Environment Designation Considerations:</p> <p>Parallel Recreation and Waterfront</p>	
<p>SUBREACH D</p>	
<p>Level of Existing Function: Partially functioning (fully functioning at northern end)</p> <p>Stressors: Irrigated landscape associated with University, trails, water intake, and armoring</p> <p>Potential Stressors: Development pressure from institution</p>	

RICHLAND	CITY OF RICHLAND
<p>Potential Restoration Opportunities: Replace invasive riparian species with native and improve riparian vegetation in degraded or impacted areas, replace armor with soft shoreline techniques</p> <p>Potential Protection Opportunities: Protect existing mature riparian vegetation</p>	
<p>Preliminary Shoreline Environment Designation Considerations: Parallel Recreation and Waterfront</p>	
SUBREACH E	
<p>Level of Existing Function: Partially functioning</p> <p>Stressors: Private docks with trails down steep shoreline to them, impacted riparian buffer</p> <p>Potential Stressors: Single-family residential allows for 5 dwelling units per acre</p> <p>Potential Restoration Opportunities: Improve woody, drought tolerant vegetation at shoreline</p> <p>Potential Protection Opportunities: Protect existing native riparian vegetation, consider consolidating pathways to shoreline docks</p>	
<p>Preliminary Shoreline Environment Designation Considerations: Parallel Recreation and Residential</p>	
SUBREACH F	
<p>Level of Existing Function: Functioning</p> <p>Stressors: Passive recreation</p> <p>Potential Restoration Opportunities: None</p> <p>Potential Protection Opportunities: Protection from recreation uses that limit ecological function or cultural resources</p>	
<p>Preliminary Shoreline Environment Designation Considerations: Columbia River Islands Natural</p>	
PUBLIC ACCESS	
<p>Existing Public Access:</p> <p>SR A: Riverfront Trail</p> <p>SR B: Riverfront Trail</p> <p>SR C: Riverfront Trail</p> <p>SR D: WSU Tri Cities College Campus with Riverfront Trail</p> <p>SR E: None – there is an on-street trail route just outside shoreline jurisdiction</p> <p>SR F: McNary National Wildlife Refuge</p>	
Existing Public Access Goals:	

RICHLAND	CITY OF RICHLAND
<p>The Richland Comprehensive Plan includes a general objective to:</p> <ul style="list-style-type: none"> • Provide public access and use of the Columbia River and Yakima River shoreline in a manner that accommodates various uses but limits their impact on the natural environment <p>Also, the Comprehensive Land Use Plan does indicate an intent for passive or active open space as follows:</p> <ul style="list-style-type: none"> • SR A: Designated as developed open space in Comprehensive Land Use Plan • SR B: Portion designated as natural open space in Comprehensive Land Use Plan and a portion as waterfront, which is described as integrating recreation with other commercial, cultural, office, recreational and residential uses • SR C: Designated a portion as natural open space and developed open space in Comprehensive Plan • SR D: Designated as developed open space in Comprehensive Plan • SR E: A narrow strip of land on the shoreline is designated as natural open space adjacent to residential uses • SR F: The island is designated as natural open space 	
<p>Identified Public Access Improvements:</p> <p>None</p>	
CUMULATIVE IMPACT CONSIDERATIONS	
<p>Watershed level: The SMP has limited influence on Columbia River McNary dam operations by the U.S. Army Corps of Engineers, and upriver water quality conditions. Richland’s focus should be on preventing further degradation of Columbia River conditions.</p> <p>Reach level:</p> <ul style="list-style-type: none"> • Structural effects on habitat through road fragmentation and development within the uplands • Impacts from recreation use along the shoreline 	

RICHLAND		CITY OF RICHLAND
REACH 9	Reach Length: 2.75 mile (excluding islands)	
Shoreline Jurisdiction: 90.79 acres (excluding islands)		
		
Source: https://fortress.wa.gov/ecy/coastalatlantools/UICoastalAtlas/Tools/ShorePhotos.aspx		
Description: The shoreline within this reach extends along the right bank of the Columbia River from Spring Road to Howard Amon Park.		
Subreaches (SR), see Figure:		
SR A: Extends approximately 0.5 miles from Leslie Groves Park		
SR B: Extends approximately 0.6 miles from Snyder to Park Street		
SR C: Extends approximately 0.5 miles from Leslie Groves Park		
SR D: Extends approximately 0.8 miles from Symons Street		
SRs E & F: Includes the two islands, respectively.		
PHYSICAL CHARACTERISTICS		
Ownership: U.S. Army Corps of Engineers, City of Richland, and private		

RICHLAND	CITY OF RICHLAND
Existing Land Cover/Development: Vacant, public, and residential	
<p>Land Use/Current SMP:</p> <p>SR A:</p> <p>Current SMP Environment Designation: Urban</p> <p>Current Zoning: Natural open space</p> <p>Current Land Use: Open space</p> <p>Adjacent Land Use: Residential</p> <p>Water-dependent Uses: None</p> <p>Water-related Uses: None; open space provides for water enjoyment</p> <p>Non-water-related Uses: None</p> <p>Future Land Use: Natural open space is likely to be maintained.</p> <p>SR B:</p> <p>Current SMP Environment Designation: Urban</p> <p>Current Zoning: Park and public facility</p> <p>Adjacent Zoning: Park and public facility and residential</p> <p>Current Land Use: Water treatment facility intake</p> <ul style="list-style-type: none"> • Boat launch ramp and parking • Public park (Leslie Grove Park) <p>Water-dependent Uses: Water treatment facility intake</p> <ul style="list-style-type: none"> • Boat Launch Ramp and parking <p>Water-related Uses: Water enjoyment use of parks and open space</p> <p>Non-water-related Uses: Park recreation and passive use</p> <p>Future Land Use: There is unlikely to be any change in the existing park and open space.</p> <p>SR C:</p> <p>Current SMP Environment Designation: Urban</p> <p>Current Zoning: Natural open space/park and public facility</p> <p>Adjacent Zoning: Residential</p> <p>Current Land Use: Public park (Leslie Grove Park)</p> <p>Adjacent Land Use: Residential</p> <p>Water-dependent Uses: None</p> <p>Water-related Uses: Water enjoyment use of parks and open space</p> <p>Non-water-related Uses: Park recreation and passive use</p> <p>Future Land Use: There is unlikely to be any change in the existing park and open space</p> <p>SR D:</p> <p>Current SMP Environment Designation: Urban</p>	

RICHLAND	CITY OF RICHLAND
<p>Current Zoning: Park and public facility</p> <p>Adjacent Zoning: Residential</p> <p>Current Land Use: Public park</p> <p>Adjacent Land Use: Residential</p> <p>Water-dependent Uses: None</p> <p>Water-related Uses: Water enjoyment use of trail along levee Non-water-related Uses: Residential</p> <p>Future Land Use: There is unlikely to be any change in the existing park and open space or adjacent residential use</p> <p>SRs E and F include Seagull and Nelson islands in the Columbia River, which are part of the McNary National Wildlife Refuge.</p> <p>Current SMP Environment Designation: Natural</p>	
<p>Major Infrastructure: Public water access, public water system, Leslie Groves Park, Hains Avenue Levee Park</p>	
<p>Geomorphic Character: Reach 9 includes the east bank (right bank) and associated un-vegetated islands along the Columbia River. In this reach, the river is a mostly straight, incised, single-thread channel that is confined by urban/agricultural infrastructure. The geologic units are primarily flood deposits on the east bank while alluvial deposits make up the mid-channel islands (bars). The soils on the shoreline are made up of loamy sand and fine sandy loam.</p> <p>Hardened banks: Levees, docks and boat ramp structures along the shoreline and hardening around the water intake structure.</p>	
<p>Flooding and Geological Hazards: The mid- to channel islands are mapped in FEMA High Risk Flood Areas, but the bank is stable and unlikely to be susceptible to flood risks in its current form.</p>	
<p>Channel Migration Zone: Per Ecology, a CMZ delineation is not necessary for the Columbia River.</p>	
REACH CHARACTERIZATION AND ANALYSIS	
<p>Water Quantity and Sediment: Water quantity is dependent on Columbia River (specifically Priest Rapids Dam) operations. There are no major surface water inputs in this reach. The City has a water intake in SR A.</p>	
<p>Water Quality: Nearby impervious surfaces from roads and residential roofs may contribute stormwater runoff in SRs A, B, C, and D.</p>	
<p>Habitat Characteristics and PHS Species Presence:</p> <p>No threatened or endangered terrestrial species present in the immediate vicinity.</p> <p>The water area of the Columbia River supports migratory waterfowl as a resting and feeding area. Some nesting may occur. The Columbia River islands also provide a breeding area for long billed curlew and a variety of gulls, as well as a resting area with limited nesting for great blue heron and great egret.</p> <p>SRs A through D include Seagull and Nelson islands in the Columbia River, which provide a limited range of</p>	

RICHLAND	CITY OF RICHLAND
<p>habitat for species with lifecycle stages related to water due to the narrow band of riparian vegetation. Wildlife movement is accommodated along the shoreline. There is little potential for connection to upland habitat although fragmented upland habitat is present in vacant lands to the west that have largely been disturbed in the past and have limited habitat value. Some areas provide cover, understory and food sources for songbirds, shorebirds and small mammals.</p> <p>The National Wetland Inventory (NWI) has identified wetlands in SR A and SR C. The shorelines are all modified and have adjacent residential development as well as a riverfront trail.</p> <p>Many fish species populate the Columbia River in this reach. Salmonid fish include Chinook (spring, summer, and fall), coho, chum (fall), pink, and sockeye salmon, as well as bull trout/Dolly Varden and steelhead and rainbow trout. Coho salmon were historically present here, and there is currently a coho reintroduction program underway in the nearby Yakima Basin. Lamprey are present but have experienced population decline in recent years. Other native fish species that can be found in the Columbia River near Richland include white sturgeon, bridgelip and mountain suckers, mottled sculpin, chiselmouth, redbelly dace, peamouth, and northern pikeminnow. Invasive species include bluegill, bass, crappie, shad, carp, channel catfish, perch, and walleye. Shellfish in the Columbia River near Richland include the Columbia River limpet, the Columbia River spire snail, and the California floater.</p>	
ECOLOGICAL FUNCTIONS ANALYSIS (BY SUBREACH)	
SUBREACH A	
<p>Level of Existing Function: Functioning</p> <p>Stressors: Passive recreation, designated public access point</p> <p>Potential Restoration Opportunities: Manage for invasive species in riparian buffer</p> <p>Potential Protection Opportunities: Manage activity within designated trails</p>	
<p>Preliminary Shoreline Environment Designation Considerations: Parallel Recreation and Residential</p>	
SUBREACH B	
<p>Level of Existing Function: Impaired</p> <p>Stressors: Water intake structure, boat ramp, armored, parking lot, irrigated and sprayed turf grass at top of bank, recreation use</p> <p>Potential Restoration Opportunities: Look for opportunities for xeriscape landscaping, BMP for landscape maintenance, invasive species removal along shoreline</p> <p>Potential Protection Opportunities: Protect existing native, mature riparian vegetation</p>	
<p>Preliminary Shoreline Environment Designation Considerations: Parallel Recreation and Residential</p>	

RICHLAND	CITY OF RICHLAND
SUBREACH C	
Level of Existing Function: Partially functioning	
Stressors: Riparian vegetation bisected by multi-use trail	
Potential Restoration Opportunities: Improve riparian vegetation	
Potential Protection Opportunities: Protect existing native riparian vegetation	
Preliminary Shoreline Environment Designation Considerations: Parallel Recreation and Residential	
SUBREACH D	
Level of Existing Function: Impaired	
Stressors: Levee (with clearing of riparian vegetation for management), path, armored shoreline, invasive species	
Potential Restoration Opportunities: Evaluate restoration options in front of levee	
Potential Protection Opportunities: Preserve existing vegetation, minimize removal for levee management	
Preliminary Shoreline Environment Designation Considerations: Parallel Recreation and Residential	
SUBREACH E	
Level of Existing Function: Functioning	
Stressors: Passive recreation	
Potential Restoration Opportunities: None	
Potential Protection Opportunities: Protection from recreation uses that limit ecological function or cultural resources	
Preliminary Shoreline Environment Designation Considerations: Columbia River Islands Natural	
PUBLIC ACCESS	
Existing Public Access: Reach 9 contains the Riverfront Trail; Leslie Groves Park, with a wide variety of active waterfront facilities including docks and a launch (SRs A, B, and C); and Hains Avenue Levy Park (SR D). The river islands in SR E are mapped as natural open space on the Comprehensive Land Use Plan.	
Existing Public Access Goals: The Richland Comprehensive Plan includes a general objective to: <ul style="list-style-type: none"> • Provide public access and use of the Columbia River and Yakima River shoreline in a manner that accommodates various uses but limits their impact on the natural environment. 	

RICHLAND	CITY OF RICHLAND
CUMULATIVE IMPACT CONSIDERATIONS	
Watershed level: The SMP has limited influence on Columbia River McNary dam operations by the Corps of Engineers, and upriver degradation of water quality conditions. Richland's focus should be on preventing further degradation of Columbia River conditions.	
Reach level:	
<ul style="list-style-type: none">• Chemical contaminant impacts from recreation infrastructure and landscaping• Structural effects on habitat through road fragmentation and overwater structures• Shoreline hardening/stabilization through recreation development• Existing levees to protect structures• Other impacts including from recreation use	

RICHLAND		CITY OF RICHLAND
REACH 10	Reach Length: 2.12 mile	
Shoreline Jurisdiction: 67.72 acres		
		
Source: https://fortress.wa.gov/ecy/coastalAtlas/UICoastalAtlas/Tools/ShorePhotos.aspx		
<p>Description: The shoreline within this reach extends about 2 miles along the right bank of the Columbia River from the north end of Howard Amon Park to the I-182 bridge. The reach includes shoreline areas managed by the City as park and open space, as well as residential and commercial uses, including a marina.</p>		
<p>Subreaches (SR), see Figure:</p> <p>SR A: Extends approximately 0.7 miles through Howard Amon Park</p> <p>SR B: Extends approximately 0.7 miles from the south end of Howard Amon Park</p> <p>SR C: Extends approximately 0.7 miles from ending at the I-182 bridge</p>		
PHYSICAL CHARACTERISTICS		
Ownership: U.S. Army Corps of Engineers, City of Richland, and private		
Existing Land Cover/Development: Public park, residential, and commercial		
<p>Land Use/Current SMP:</p> <p>SR A includes about 3,500 feet of shoreline between the north end of Howard Amon Park to the Hampton Inn at about the alignment of Falley Street.</p> <p>Current SMP Environment Designation: Urban</p> <p>Current Zoning: Parks and public facilities</p> <p>Current Shoreline Land Use: Boat Launch and associated parking</p> <ul style="list-style-type: none"> • Public Park <p>Adjacent Land Use: Commercial (largely behind existing levee or steep slope)</p> <p>Water-dependent Uses: Boat launch</p> <p>Water-related Uses: Open space provides for water enjoyment</p> <p>Non-water-related Uses: Variety of non-water-related recreation</p> <p>Future Land Use: Continued park use is anticipated</p>		

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SR B extends along about 3,000 feet of the shoreline from the Hampton Inn to the boundary of existing development at the Columbia Point Marina.

Current SMP Environment Designation: Urban

Current Zoning: Waterfront, Park and public facility, Multi-family

Adjacent Zoning: Same as shoreline zoning Current Land Use: Hotels, Residential townhomes, Vacant land, Park and trail use

Water-dependent Uses: None

Water-related Uses: Public trail along waterfront

Non-water-related Uses: Hotels

Future Land Use: There is limited private land available. The most likely site is redevelopment of the Shilo Rivershore Inn to multiple use.

SR C extends along about 4,000 feet of the shoreline from the boundary of existing development at the Columbia Point Marina area to the I-182 bridge.

Current SMP Environment Designation: Urban

Current Zoning: Multi-family, Waterfront, (Columbia Point Marina vicinity) Park and public facility (Columbia Point Marina Park)

Adjacent Zoning: Same as shoreline zoning

Current Land Use: Multi-family development, Restaurant, Marina, Public Park, Boat launch ramp and parking

RICHLAND	CITY OF RICHLAND
<p>Water-dependent Uses: Marina, Boat launch ramp and parking</p> <p>Water-related Uses: Water enjoyment use of parks and open space</p> <p>Non-water related Uses: Hotels, Park recreation and passive use</p> <p>Future Land Use: There is limited private land available. No likely development sites in this subreach have been identified.</p>	
<p>Major Infrastructure: Public water access, public water system, Howard Amon Park, Columbia Point Marina Park, Columbia Point Golf Course, and I-182 and crossing</p>	
<p>Geomorphic Character: Reach 10 includes the south bank (right bank) of the Columbia River immediately upstream of the Interstate 182 Bridge (and the confluence with the Yakima River). This stable, incised, single-thread channel has low sinuosity and is confined by urban/agricultural infrastructure. It narrows from north to south. The soils consist primarily of loamy sand and fine sandy loam.</p> <p>Hardened banks: Docks, 2 boat ramps and a breakwater in the marina facility.</p>	
<p>Flooding and Geological Hazards: None of this reach is mapped in the FEMA High Risk Flood Areas, and the bank is stable and unlikely to be susceptible to flood risks in its current form.</p>	
<p>Channel Migration Zone: Per Ecology, a CMZ delineation is not necessary for the Columbia River.</p>	
REACH CHARACTERIZATION AND ANALYSIS	
<p>Water Quantity and Sediment: Water quantity is dependent on Columbia River (specifically McNary Dam) operations. The mouth of the Yakima River is located at the downstream end of Reach 10C.</p>	
<p>Water Quality: Nearby impervious surfaces from roads and residential roofs may contribute stormwater runoff in Reach 10. Additionally, a golf course may contribute surface runoff in SR B, and a marina may impact water quality in SR C.</p>	
<p>Habitat Characteristics and PHS Species Presence:</p> <p>No threatened or endangered terrestrial species present in the immediate vicinity.</p> <p>The water area of the Columbia River supports migratory waterfowl as a resting and feeding area. Some nesting may occur.</p> <p>All reaches provide a limited range of habitat for species with lifecycle stages related to water due to the narrow band of riparian vegetation or the lack of vegetation. The high public pedestrian volumes on trails along the waterfront limit wildlife use. Wildlife movement not likely to be accommodated along the shoreline except for species adept at swimming. There is little nearby upland habitat in vacant lands or the golf course</p>	

RICHLAND	CITY OF RICHLAND
<p>and therefore little opportunity for movement.</p> <p>The National Wetland Inventory (NWI) has identified a small wetland in Reach 10B. The shorelines are all highly modified and include a marina, residential development, and the riverfront trail.</p> <p>Many fish species populate the Columbia River in this reach. Salmonid fish include Chinook (spring, summer, and fall), coho, chum (fall), pink, and sockeye salmon, as well as bull trout/Dolly Varden and steelhead and rainbow trout. Coho salmon were historically present here, and a coho reintroduction program is currently underway in the nearby Yakima Basin. Lamprey are present but have experienced population decline in recent years. Other native fish species that can be found in the Columbia River near Richland include white sturgeon, bridgelip and mountain suckers, mottled sculpin, chiselmouth, redbelt shiner, peamouth, northern pikeminnow. Invasive species include bluegill, bass, crappie, shad, carp, channel catfish, perch, and walleye.</p>	
ECOLOGICAL FUNCTIONS ANALYSIS (BY SUBREACH)	
SUBREACH A	
<p>Level of Existing Function: Impaired</p> <p>Stressors: Levee (with clearing of riparian vegetation for management), path, armored shoreline, invasive species, boat launch, multiple over water structures and ramp, irrigated turf grass, riparian vegetation lacking, recreation use, and paved areas near water including parking lot</p> <p>Potential Restoration Opportunities: Consider options for soft shore armoring techniques to stabilize shoreline below lawn areas, increase riparian vegetation while still allowing for shoreline access and views, and BMPS for irrigated turfgrass areas to reduce pesticide runoff.</p> <p>Potential Protection Opportunities: Manage shoreline access to allow for further riparian and soft shoreline enhancements</p>	
<p>Preliminary Shoreline Environment Designation Considerations:</p> <p>Recreation</p>	
SUBREACH B	
<p>Level of Existing Function: Functioning</p> <p>Stressors: Armored groin protecting legacy boat ramp, multi use trail, limited riparian buffer in between development and water, invasive species (Russian-olive and milfoil), recreation use</p> <p>Potential Stressors: Waterfront development and redevelopment</p> <p>Potential Restoration Opportunities: Manage invasive species, evaluate restoring natural shoreline plan and cross section (consider groin and boat ramp area)</p> <p>Potential Protection Opportunities: Protect native riparian vegetation</p>	
<p>Preliminary Shoreline Environment Designation Considerations:</p> <p>Waterfront</p>	

RICHLAND	CITY OF RICHLAND
SUBREACH C	
<p>Level of Existing Function: Impaired</p> <p>Stressors: Marina with armored breakwater/multiple over water structures, private development near shoreline, multiuse trail, limited riparian vegetation particularly within marina, park with managed lawn, boat ramp, some invasive species (Russian-olive), bank erosion potentially from boat wake, and recreation use</p> <p>Potential Stressors: Waterfront zoning allows for potential development. Multiple-family residential allows for 10 or more dwelling units per acre.</p> <p>Potential Restoration Opportunities: Riparian planting with native species, evaluate soft shoreline around park; Marina park landscape maintenance BMPs</p> <p>Potential Protection Opportunities: Protect existing native riparian plants</p>	
<p>Preliminary Shoreline Environment Designation Considerations:</p> <p>Waterfront</p>	
PUBLIC ACCESS	
<p>Existing Public Access:</p> <p>Reach 10 includes several facilities with the Riverfront Trail as a connector:</p> <ul style="list-style-type: none"> • Howard Amon Park with a swim dock and boat launch as well as other active recreation facilities (SR A) • Columbia Point Marina Park (SR C) including a boat launch and transient moorage • The Columbia Point Golf Course is located outside of shoreline jurisdiction. 	
<p>Existing Public Access Goals:</p> <p>The Richland Comprehensive Plan includes a general objective to:</p> <ul style="list-style-type: none"> • Provide public access and use of the Columbia River and Yakima River shoreline in a manner that accommodates various uses but limits their impact on the natural environment 	
<p>Identified Public Access Improvements:</p> <p>The Final parks plan (City of Richland 2012) identifies improvements by 2014 to Howard Amon Park consisting of the South Howard Amon Park shelter replacement and trail rebuild.</p> <p>The Comprehensive Plan Capital Facilities Element also includes a couple of objectives regarding Howard Amon Park:</p> <ul style="list-style-type: none"> • Complete improvements to the Riverfront Trail as designated in the Howard Amon Master Plan and Callison Plan • Complete reconstruction and enhancement of the Howard Amon Park parking lot and Lee Boulevard in accordance with the Howard Amon Park Master Plan 	

RICHLAND	CITY OF RICHLAND
CUMULATIVE IMPACT CONSIDERATIONS	
<p>Watershed level: The SMP has limited influence on Columbia River McNary dam operations by the Corps of Engineers, and upriver degradation of water quality conditions. Richland's focus should be on preventing further degradation of Columbia River conditions.</p> <p>Reach level:</p> <ul style="list-style-type: none">• Impervious surfaces leading to habitat loss and potential runoff• Vegetation alterations removing organic material and increasing soil erosion• Chemical contaminant impacts from recreation infrastructure and development• Structural effects on habitat through overwater structures• Shoreline hardening/stabilization through recreation development	