

APPENDIX C
SANPOIL RIVER REACH
CHARACTERIZATION TABLES AND
REACH MAPS

Sanpoil River – Reach 1 Ferry County	
Reach Description	
Sanpoil River from the NE ¼ of T36N_R33E_S07 near the City of Republic to the NW ¼ of T35N_R32E_S12 near National Forest Road 53	
Shoreline Jurisdiction	
667 acres	
	
Source: U.S. Department of Agriculture (USDA) National Agriculture Imagery Program (NAIP) 2013	
Subreaches (SRs); see Map 23:	
<ul style="list-style-type: none"> • SR 1a – Begins at the SE ¼ of T36N_R33E_S06 near the City of Republic and extends south to the southwest (SW) ¼ of T36N_R33E_S18 • SR 1b – Extends 4.1 miles to the south to the SE ¼ of T36N_R32E_S36 • SR 1c – Extends 2.1 miles to the south to the NW ¼ of T35N_R32E_S12 near National Forest Road 53 	
Characteristics	
Ownership	
Reach 1 is mostly private with a very small amount (less than 5%) of public ownership (Washington Department of Natural Resources).	

Sanpoil River – Reach 1	Ferry County
<p>Land Use/Current Shoreline Management Program</p> <p>Land Use Designation:</p> <ul style="list-style-type: none"> • Current land uses are private ownership and public lands • Rural <p>Current Shoreline Management Program Environment Designation:</p> <ul style="list-style-type: none"> • Rural 	
<p>Existing Land Cover/Development</p> <p>Existing land cover in SR 1a and 1b include grassland, wetland, and agriculture. SR 1c has less agricultural development, and more shrub and grassland on the steep slope.</p>	
<p>Geomorphic Character</p> <p>Description – The Sanpoil River flows within a wide, unconfined valley throughout Reach 1. The channel and floodplain consist of continental glacial drift (SR 1a and 1b) and alluvium (SR 1c). Wide floodplains with relic channels, multiple flowpaths, and wetlands occur throughout the reach. The valley margins and hill slopes consist of bedrock, which is mostly dacite flows of the Sanpoil Volcanic Formation. Limited mass wasting deposits occur in SR 1a.</p> <p>Hardened Banks – Approximately 150 feet of hardened banks occur in Reach 1 and are associated with the Highway 21 alignment.</p> <p>Channel Migration Zone – Because of the limited infrastructure in the valley and floodplain, the channel migration zone (CMZ) consists of most of the valley bottom throughout Reach 1. The Highway 21 alignment is located along the western valley hill slope margin and limits channel migration to the west.</p>	
<p>Flooding and Geological Hazard</p> <p>Flooding – Reach 1 has a designated Federal Emergency Management Agency (FEMA) floodplain. The floodplain width varies from moderately wide to wide (SR 1a and 1b), and generally narrows downstream (SR 1c). The floodplain occupies most of the valley bottom.</p> <p>Geological Hazards – Reach 1 has soils susceptible to moderate to severe erosion, areas of severe erosion potential are dominant in SR 1a and 1b. SR 1a – 1c contain slopes that are greater than 15% and underlain by glacial continental drift (SR 1a and 1b) and alluvium (SR 1c), which make them designated landslide hazard areas. A seismic hazard area, rated moderate to high, is located in the downstream extent of SR 1c. No mine sites are located within Reach 1.</p>	
<p>Existing Public Access</p> <p>There are no existing public access sites in Reach 1 of the Sanpoil River. State Route 21 runs the length of the reach on the western shoreline.</p> <p>Identified Public Access Improvements</p> <p>There are no public access improvements identified for Reach 1.</p>	

Sanpoil River – Reach 1	Ferry County
Public Access Opportunities	
Most of the reach is privately held and in agriculture, so public access opportunities may be limited.	
Ecological Conditions	
Water Quantity and Sediment	
<p>Sanpoil River Reach 1 tributary inflows include McMann, Golden Harvest, Camel, and Granite creeks. In addition, numerous unnamed tributaries and intermittent drainages flow into this reach. Flow data were historically collected by the U.S. Geological Service (USGS) in this reach (Gage #12433890), but data have not been collected since 2012. Based on historical records of the USGS gage located downstream near the Town of Keller (USGS Gage #12434590), peak flows likely occur during the spring (April/May), and low flows likely occur during the late summer and early fall (August/September).</p> <p>Sediment sources throughout the reach include the erodible continental glacial drift (SR 1a and 1b) and alluvium (SR 1c) banks, soils prone to erosion, slopes prone to landslides, and sediment transported in the local surface runoff and drainages. Mass wasting deposits (as landslides) are located in SR 1a. Widespread deposition is occurring throughout this reach due to the low-gradient and limited-transport capacity of the sediment load and occurs in the numerous large floodplain/wetland complexes.</p>	
Water Quality	
<p>In the upstream extent of SR 1a, a total maximum daily load (TMDL) is required for dissolved oxygen. SR 1a is also listed as a water of concern for dissolved oxygen, pH, temperature, and bacteria on Washington Department of Ecology’s (Ecology’s) 305b list. Water quality may be impacted by roadway, agricultural, industrial, and residential runoffs.</p>	
Habitat Characteristics and Priority Habitat Species Presence:	
<p>This reach of the Sanpoil River is not noted for presence under Priority Habitat Species (PHS) information, though mule deer and white-tailed deer may be present in the upland forests, and waterfowl may utilize the creek and adjacent wetland areas in this reach for foraging areas.</p> <p>This reach is located within a relatively wide floodplain valley, and the wide migration zone and relic channels support wetlands in areas where lands are not drained or used for agriculture. The riparian vegetation in this reach consists mostly of grasses, rushes, small shrubs, and trees, with minimal overhanging vegetation. Highway 21 runs along the western edge of the valley floor throughout this reach, and occasionally encroaches to within 40 feet of the creek channel.</p> <p>SR 1a – SR 1a is adjacent to lands in agricultural use with crops extending almost to the water in many areas, and includes several crossings of local access roads, with Highway 21 encroaching, the closest in this subreach.</p> <p>SR 1b – This reach is similar to SR 1a, but has less land in agricultural use. There are multiple channels of Sanpoil River visible, with wetland areas spanning the distance between the current and farthest westward relic, with the eastern channel potentially being somewhat artificially constrained. Livestock access to the river is apparent in this subreach.</p>	

Sanpoil River – Reach 1	Ferry County
<p>SR 1c – SR 1c includes a large wetland complex. Upland forests are found on the eastern slope of Brown Mountain rising out of the floodplain.</p>	
Ecological Functions Analysis	
SR 1a	
<p>Level of Existing Function</p> <p>SR 1a is designated as Partially Functioning, based on agricultural fields with limited buffers and transportation corridors.</p> <p>Stressors</p> <p>Upland development:</p> <ul style="list-style-type: none"> • Agricultural fields with limited riparian buffers • Highway 21 and local access roads crossing and/or confining the channel <p>Potential Restoration Opportunities</p> <p>Create easements to encourage planting of grass or woody planting strips between agricultural fields and stream banks.</p> <p>Potential Protection Opportunities</p> <p>Implement or retrofit stormwater controls consistent with the Eastern Washington Stormwater Manual.</p>	
SR 1b	
<p>Level of Existing Function</p> <p>SR 1b is designated as Partially Functioning, based on agricultural fields with limited buffers.</p> <p>Stressors</p> <p>Upland development:</p> <ul style="list-style-type: none"> • Agricultural fields with limited grass or riparian buffers • Local access roads crossing channel • Constraint of natural channel flow <p>Potential Restoration Opportunities</p> <p>Create easements to encourage planting of grass or woody planting strips between agricultural fields and stream banks.</p> <p>Potential Protection Opportunities</p> <p>Protect wetland habitat. Implement or retrofit stormwater controls consistent with the Eastern Washington Stormwater Manual.</p>	

Sanpoil River – Reach 1	Ferry County
SR 1c	
Level of Existing Function SR 1c is designated as Partially Functioning, based on transportation corridor confining channel.	
Stressors Upland development: <ul style="list-style-type: none">• Highway 21 west of channel limits migration in certain areas• McMann Creek Road crosses the channel• Limited rural residential near McMann Creek Road	
Potential Restoration Opportunities None.	
Potential Protection Opportunities Protect wetland habitat surrounding channel. Implement or retrofit stormwater controls consistent with the Eastern Washington Stormwater Manual.	

Sanpoil River – Reach 2	Ferry County
Reach Description	
Sanpoil River from the NW ¼ of T35N_R32E_S12 near National Forest Road 53 to the NW ¼ of T35N_R33E_S19 at the edge of U.S. Forest Service (USFS)-owned lands	
Shoreline Jurisdiction	
137 acres	
	
Source: USDA NAIP 2013	
Subreaches (SRs); see Map 24:	
Not applicable	
Characteristics	
Ownership	
Reach 2 is about 70% private and 30% public ownership (Washington Department of Natural Resources and USFS).	
Land Use/Current Shoreline Management Program	
Land Use Designation:	
<ul style="list-style-type: none"> • Current land uses are private ownership and public lands • Rural 	

Sanpoil River – Reach 2	Ferry County
<p>Current Shoreline Management Program Environment Designation:</p> <ul style="list-style-type: none"> • Rural 	
<p>Existing Land Cover/Development</p> <p>Most of developments in Reach 2 are associated with recreational usages or Highway 21. The remainder of the reach has shrub, forest, and wetland land cover.</p>	
<p>Geomorphic Character</p> <p>Description – The Sanpoil River flows within a narrow to moderately wide valley throughout Reach 2. The channel and floodplain consist of alluvium. Wider floodplain areas with relic channels, multiple flowpaths, and wetlands occur throughout the reach. The valley margins and hill slopes consist of bedrock with dacite flows of the Sanpoil Volcanic Formation.</p> <p>Hardened Banks – Approximately 2,100 feet of hardened banks occur in Reach 2 and are associated with the Highway 21 alignment.</p> <p>Channel Migration Zone – Because of the limited infrastructure in the valley and floodplain, the CMZ consists of most of the valley bottom throughout Reach 2. The Highway 21 alignment is located along the western valley/hill slope margin and limits channel migration to the west.</p>	
<p>Flooding and Geological Hazard</p> <p>Flooding – Reach 2 has a designated FEMA floodplain throughout its entire extent. The floodplain is generally narrow throughout and extents are controlled by the overall valley width and topography.</p> <p>Geological Hazards – Reach 2 has soils susceptible to moderate to severe erosion, with areas of severe erosion are dominant. Reach 2 contains slopes that are greater than 15% and underlain by alluvium, which make them designated landslide hazard areas. A seismic hazard area, rated moderate to high, is located throughout Reach 2. No mine sites are located within Reach 2.</p>	
<p>Existing Public Access</p> <p>In general, the western shoreline of Reach 2 is private land, and the eastern shoreline is Colville National Forest lands. There are no formal public access sites in the reach. State Route 21 runs the length of Reach 2 along the western shoreline.</p> <p>Identified Public Access Improvements</p> <p>There are no public access improvements identified for this reach.</p> <p>Public Access Opportunities</p> <p>Because the eastern shoreline is Colville National Forest, there are possible public access opportunities; however, road access into the reach from the east is limited. The reach is entirely in the floodplain, limiting the type of public access that could be provided.</p>	

Sanpoil River – Reach 2	Ferry County
Ecological Conditions	
Water Quantity and Sediment	
<p>Sanpoil River Reach 2 tributary inflows include Sunset and Ninemile creeks. In addition, numerous unnamed tributaries and intermittent drainages flow into this reach. No flow gages are located along this reach, but based on historical records of the USGS gage located downstream near the Town of Keller (USGS Gage #12434590) peak flows likely occur during the spring (April/May), and low flows likely occur during the late summer and early fall (August/September).</p> <p>Sediment sources throughout the reach include the erodible alluvium banks, soils prone to erosion, slopes prone to landslides, and sediment transported in the local runoff and surface drainages. Based in the narrow channel and floodplain widths, the upstream extent of the reach likely transports sediment. In the lower reach extents, the floodplain widens and the channel meanders throughout this low-gradient area resulting in some widespread depositional areas.</p>	
Water Quality	
<p>Reach 2 has two tributaries that are listed as a water of concern for pH and dissolved oxygen (Scatter Creek), and temperature (Ninemile Creek). Water quality is likely impacted by a lack of effective shade, as well as roadway runoff.</p>	
Habitat Characteristics and Priority Habitat Species Presence	
<p>Reach 2 of the Sanpoil River is within mule deer and white-tailed deer winter range, and Okanogan highlands populations may occur here.</p> <p>Highway 21 runs along this reach on the west side of the valley floor and often encroaches the shoreline jurisdiction. This reach is similar to Reach 1, but the valley floodplain is much narrower. The northern portion of this reach includes shrubby and limited width riparian buffers along the river, and the central portion flows within a wetland complex, with multiple channels. The southern portion includes adjacent agricultural fields with limited riparian or grass buffers.</p>	
Ecological Functions Analysis	
Level of Existing Function	
<p>Reach 2 is designated as Partially Functioning, based on rural residential, agriculture, and transportation development.</p>	
Stressors	
<p>Upland development:</p> <ul style="list-style-type: none"> • Fairly dense rural development at north end of reach with more remote residences farther south • Access roads to residences cross the creek • Highway 21 confines channel, particularly in northern half of reach • Agricultural fields with limited buffers 	

Sanpoil River – Reach 2	Ferry County
Potential Restoration Opportunities Create easements to encourage planting of grass or woody planting strips between agricultural fields and stream banks.	
Potential Protection Opportunities Implement or retrofit stormwater controls consistent with the Eastern Washington Stormwater Manual. Protect existing wetland habitat.	

Sanpoil River – Reach 3	Ferry County
Reach Description	
Sanpoil River from the NW ¼ of T35N_R33E_S19 at the edge of USFS-owned lands to the northeast (NE) ¼ of T33N_R32E_S35	
Shoreline Jurisdiction	
1,103 acres	
	
Source: USDA NAIP 2013	
Subreaches (SRs); see Maps 24 and 25:	
<ul style="list-style-type: none"> • SR 3a – Begins at the NW ¼ of T35N_R33E_S19 near the edge of USFS-owned lands extending south to the NW ¼ of T34N_R32E_S11 • SR 3b – Extends 2.2 miles to the south to the SE ¼ of T34N_R14E_S14 • SR 3c – Extends 11.5 miles to the NE ¼ of T33N_R32E_S35 	
Characteristics	
Ownership	
Reach 3 is about 20% private, 60% tribal lands, and 20% public (USFS and Washington Department of Natural Resources).	

Sanpoil River – Reach 3	Ferry County
<p>Land Use/Current Shoreline Management Program</p> <p>Land Use Designation:</p> <ul style="list-style-type: none"> • Current land uses are private ownership, public lands and Indian allotment trust lands • Rural <p>Current Shoreline Management Program Environment Designation:</p> <ul style="list-style-type: none"> • Rural 	
<p>Existing Land Cover/Development</p> <p>SR 3a and 3b include recreational and agricultural developments. SR 3c is mostly consists of forest and riparian vegetation.</p>	
<p>Geomorphic Character</p> <p>Description – The Sanpoil River flows within a narrow (SR 3a) to moderately wide valley (SR 3b and 3c) throughout Reach 3. The channel and floodplain consist of alluvium (SR 3a) and glacial continental drift (SR 3a – 3c). Wider floodplain areas with relic channels, multiple flowpaths, and wetlands occur throughout the reach. The valley margins and hill slopes consist of bedrock, with mostly units of the Sanpoil Volcanic Formation.</p> <p>Hardened Banks – Approximately 1,900 feet of hardened banks occur in Reach 3 and are associated with the Highway 21 alignment.</p> <p>Channel Migration Zone – The CMZ consists of most of the valley bottom throughout Reach 3. The Highway 21 alignment is located along the western valley/hill slope margin and limits channel migration to the west.</p>	
<p>Flooding and Geological Hazard</p> <p>Flooding – Most of SR 3a has a designated FEMA floodplain. The floodplain width is narrow and is limited by the overall valley width and topography. SR 3b and 3c do not have a mapped FEMA floodplain or floodway. Based on topography, floodplains likely exist along these subreaches, but are not determined. In SR 3b and 3c, the floodplain width ranges from relatively narrow to moderate.</p> <p>Geological Hazards – Reach 3 has soils susceptible to moderate to severe erosion. Areas of severe erosion potential are dominant in SR 3a. SR 3a – 3c contain slopes that are greater than 15% and underlain by glacial continental drift, which make them designated landslide hazard areas. A seismic hazard area, rated moderate to high, is located in the upstream extent of SR 3c. No mine sites are located within Reach 3.</p>	
<p>Existing Public Access</p> <p>There are a substantial number of public access sites in Reach 3 of the Sanpoil River. State Route 21 runs the length of the reach on the western shoreline and connects the Bear Creek Campground and a primitive, Confederated Tribes of the Colville Reservation (CTCR)-owned, no-fee, campground that provides campsites, outhouse, fire pits, garbage service, picnic tables, water access, and a horse corral. Twenty-One Mile Creek Campground, a CTCR-owned, no-fee, primitive campground that provides campsites, outhouse, fire pits, water access, and garbage facilities. Thirteen-Mile Creek Trailhead is jointly managed by USFS and the CTCR Parks Department. The site is a trailhead for hiking</p>	

Sanpoil River – Reach 3	Ferry County
<p>in the Colville National Forest and provides primitive camping, garbage facilities, restrooms, loading dock for horses, and picnic tables. Ten-Mile Creek Campground is managed by USFS (no-fee) and provides primitive camping, vault toilets, water access, and picnic tables. Even though several of the campgrounds are owned and operated by CTCR, they are available for use by non-tribal members.</p> <p>Identified Public Access Improvements</p> <p>There are no public access improvements identified for this reach of the Sanpoil River.</p> <p>Public Access Opportunities</p> <p>Public access opportunities may be adequate for Reach 3.</p>	
Ecological Conditions	
<p>Water Quantity and Sediment</p> <p>Sanpoil River Reach 3 tributary inflows include Bear, Twentyfive Mile, Twentythree Mile, Anderson, Twentyone Mile, Nineteen Mile, Seventeen Mile, Thirteen Mile, and Ten Mile creeks; and the West Fork Sanpoil River. In addition, numerous unnamed tributaries and intermittent drainages flow into this reach.</p> <p>No flow gages are located along this reach, but based on historical records of the USGS gage located downstream near the Town of Keller (USGS Gage #12434590), peak flows likely occur during the spring (April/May), and low flows likely occur during the late summer and early fall (August/September).</p> <p>Sediment sources throughout the reach include the erodible alluvium (SR 3a) and continental glacial drift (SR 3b and 3c) banks, soils prone to erosion, slopes prone to landslides, and sediment transported in the local runoff and surface drainages. Based in the narrow channel and floodplain widths, SR 3a likely transports sediment. In SR 3b, the floodplain widens and the channel meanders throughout this low-gradient area resulting in widespread deposition. Segments of SR 3c appear to support deposition, and transport with depositional bars is evident throughout.</p>	
<p>Water Quality</p> <p>In the downstream extent of SR 3a, a TMDL is required for bacteria. The same extent is also listed as a water of concern for dissolved oxygen on Ecology’s 305b list. SR 3a has a tributary (Thirteenmile Creek) that is listed as a water of concern for bacteria. Water quality is likely impacted by grazing in addition to roadway, wildlife, and agricultural runoff.</p>	
<p>Habitat Characteristics and Priority Habitat Species Presence</p> <p>Reach 3a of the Sanpoil River is within mule deer and white-tailed deer winter range, and Okanogan highlands populations may occur here.</p> <p>Highway 21 runs alongside the river for the entire reach, and vegetation is similar to Reach 2. Reaches 3a and 3c are substantially forested, though the highway limits riparian widths west of the channel.</p>	

Sanpoil River – Reach 3	Ferry County
<p>SR 3a – This reach includes forested areas along the shoreline at the northern end. There is a campground or other recreational area at the north end of this subreach, along with other informal locations along Highway 21, where recreational users may access the river. There is minimal development outside of the very northern end of this subreach.</p> <p>SR 3b – There are several residential/agricultural parcels located along this subreach, where livestock have access to the river. South of the confluence with the West Fork Sanpoil River, there is a wetland complex with several apparent relic channels.</p> <p>SR 3c – There is minimal development along this subreach, including only a few scattered residences and some small agricultural areas, which are constrained on the east side by Highway 21, and there are several access roads that cross the river. In general, the shorelines are not forested due to the high prevalence for meandering, but there is adjacent forested area associated with the slopes on the mountains on either side of the valley.</p>	
Ecological Functions Analysis	
SR 3a	
<p>Level of Existing Function</p> <p>SR 3a is designated as Partially Functioning, mostly based on impacts from transportation corridor.</p> <p>Stressors</p> <p>Upland development:</p> <ul style="list-style-type: none"> • Highway 21 crosses and confines the creek in a number of areas • Rural residential area with many water access trails <p>Recreational use:</p> <ul style="list-style-type: none"> • Campground at northern edge of subreach <p>Potential Restoration Opportunities</p> <p>None.</p> <p>Potential Protection Opportunities</p> <p>Implement or retrofit stormwater controls consistent with the Eastern Washington Stormwater Manual.</p>	
SR 3b	
<p>Level of Existing Function</p> <p>SR 3b is designated as Partially Functioning, based on impacts from agricultural fields.</p> <p>Stressors</p> <p>Upland development:</p> <ul style="list-style-type: none"> • Agricultural fields with limited riparian or grass buffers • Limited rural residential development 	

Sanpoil River – Reach 3	Ferry County
<p>Potential Restoration Opportunities</p> <p>Create easements to encourage planting of grass or woody planting strips between agricultural fields and stream banks.</p> <p>Potential Protection Opportunities</p> <p>Implement or retrofit stormwater controls consistent with the Eastern Washington Stormwater Manual.</p>	
SR 3c	
<p>Level of Existing Function</p> <p>SR 3c is designated as Partially Functioning, based on transportation corridor and land clearing impacts.</p> <p>Stressors</p> <p>Upland development:</p> <ul style="list-style-type: none"> • Forest roads along and/or crossing the channel • Rural mobile homes/development within central portion of this subreach • Forest clearing for agricultural use in some areas near the channel <p>Potential Restoration Opportunities</p> <p>Implement riparian restoration projects that may include passive (e.g., Conservation Reserve Expanded Program riparian buffers or protected area conservation easements) or active (e.g., riparian plantings) efforts to reduce erosion and increase filtration.</p> <p>Potential Protection Opportunities</p> <p>Implement or retrofit stormwater controls consistent with the Eastern Washington Stormwater Manual.</p>	

Sanpoil River – Reach 4		Ferry County
Reach Description Sanpoil River from the NE ¼ of T33N_R32E_S35 to the NE ¼ of T31N_R33E_S06		
Shoreline Jurisdiction 1,017 acres		
		
<small>Source: USDA NAIP 2013</small>		
Subreaches (SRs); see Map 26: <ul style="list-style-type: none">• SR 4a – Begins at the NE ¼ of T33N_R32E_S35 and extends south to the SW ¼ of T32N_R32E_S01• SR 4b – Extends 2.4 miles to the SW ¼ of T32N_R33E_S18• SR 4c – Extends 6.5 miles to the NE ¼ of T31N_R33E_S06		

Sanpoil River – Reach 4	Ferry County
Characteristics	
Ownership	
Reach 4 is 20% private and 80% tribal lands.	
Land Use/Current Shoreline Management Program	
Land Use Designation:	
<ul style="list-style-type: none"> • Current land uses are private ownership, public lands, and Indian allotment trust lands • Rural 	
Current Shoreline Management Program Environment Designation:	
<ul style="list-style-type: none"> • Rural 	
Existing Land Cover/Development	
Reach 4 includes little development within the shoreline jurisdiction and mostly remains as shrubland, forest, and wetlands. Agricultural developments can be found along SR 4b, just outside of the jurisdiction boundary.	
Geomorphic Character	
<p>Description – The Sanpoil River flows within a moderately narrow to wide valley throughout Reach 4. The channel and floodplain consist of continental glacial drift. Wider floodplain areas with relic channels, multiple flowpaths, and wetlands occur throughout the reach. The valley margins and hill slopes consist of bedrock, with mostly monzodiorite of the Devils Elbow Suite.</p> <p>Hardened Banks – Approximately 400 feet of hardened banks occur in Reach 4 and are associated with the Highway 21 alignment.</p> <p>Channel Migration Zone – The CMZ consists of most of the valley bottom found within Reach 4. The Highway 21 alignment is located along the western valley hill slope margin and limits channel migration to the west along segments of the reach.</p>	
Flooding and Geological Hazard	
<p>Flooding – Reach 4 does not have a mapped FEMA floodplain or floodway. Based on topography, floodplains likely exist along this reach, but are not determined. The floodplain width in Reach 4 likely varies from moderately narrow to wide. The floodplain is wide in the low lying areas occupied by large wetland complexes (SR 4a and the lower segment of SR 4c).</p> <p>Geological Hazards – Reach 4 has soils susceptible to moderate to severe erosion, and areas of severe erosion potential are dominant in SR 4a. SR 4c contains only minimal amounts of soils susceptible to erosion. SR 4a and 4b contain slopes that are greater than 15% and underlain by glacial continental drift, which make them designated landslide hazard areas. A minor amount of landslide hazards area is located in SR 4c. No mine sites or seismic hazards are located within Reach 4.</p>	

Sanpoil River – Reach 4	Ferry County
<p>Existing Public Access</p> <p>There is no formal public access in Reach 4 of the Sanpoil River. State Route 21 runs the length of the reach on the western shoreline. There are a few informal pull-offs from the road with paths leading down to the water.</p> <p>Identified Public Access Improvements</p> <p>There are no public access improvements identified for the reach.</p> <p>Public Access Opportunities</p> <p>Reach 4 is mostly CTCR land with private residences and agriculture, limiting opportunities for public access.</p>	
Ecological Conditions	
<p>Water Quantity and Sediment</p> <p>Sanpoil River Reach 4 tributary inflows include Bridge, Thirtymile, Deadhorse, Cub, and North and South Nanamkin creeks. In addition, numerous unnamed tributaries and intermittent drainages flow into this reach. No flow gages are located along this reach, but based on historical records of the USGS gage located downstream near the Town of Keller (USGS Gage #12434590), peak flows likely occur during the spring (April/May), and low flows likely occur during the late summer and early fall (August/September).</p> <p>Sediment sources throughout the reach include the erodible continental glacial drift banks, soils prone to erosion, slopes prone to landslides, and sediment transported in the local runoff and surface drainages. The reach appears to support sediment transport and depositional areas (SR 5a, 5b, and 5d) that have lower channel gradients and wide floodplain areas.</p>	
<p>Water Quality</p> <p>Reach 4 is not listed on Ecology’s 305b list. Water quality may be impacted by grazing and a lack of effective shade.</p>	
<p>Habitat Characteristics and Priority Habitat Species Presence</p> <p>This reach of the Sanpoil River is not noted for presence under PHS information.</p> <p>SR 4a – There are numerous agricultural fields with limited riparian habitat, particularly west of the river. This reach includes a large wetland complex that crosses over to the west side of Highway 21.</p> <p>SR 4b – This subreach is substantially forested, and there is minimal developed area outside of the Highway 21 roadway.</p> <p>SR 4c – This subreach flows through a mix of forested and wetland/agricultural land-cover areas.</p>	

Sanpoil River – Reach 4	Ferry County
Ecological Functions Analysis	
SR 4a	
<p>Level of Existing Function</p> <p>SR 4a is designated as Partially Functioning, based on agricultural fields land use.</p> <p>Stressors</p> <p>Upland development:</p> <ul style="list-style-type: none"> • Agricultural fields, some of which have limited riparian or grass filters • Access road east of the creek within jurisdiction boundary <p>Recreational use:</p> <ul style="list-style-type: none"> • Informal trails to water access points <p>Potential Restoration Opportunities</p> <p>Create easements to encourage planting of grass or woody planting strips between agricultural fields and stream banks.</p> <p>Potential Protection Opportunities</p> <p>Implement or retrofit stormwater controls consistent with the Eastern Washington Stormwater Manual.</p>	
SR 4b	
<p>Level of Existing Function</p> <p>SR 4b is designated as Functioning.</p> <p>Stressors</p> <p>Upland development:</p> <ul style="list-style-type: none"> • Highway 21 within jurisdiction boundary in central portion of subreach (in this area the highway confines the channel) <p>Potential Restoration Opportunities</p> <p>None.</p> <p>Potential Protection Opportunities</p> <p>Implement or retrofit stormwater controls consistent with the Eastern Washington Stormwater Manual.</p>	

Sanpoil River – Reach 4	Ferry County
SR 4c	
Level of Existing Function	
SR 4c is designated as Partially Functioning, based on impacts from transportation corridors and agricultural uses.	
Stressors	
Upland development:	
<ul style="list-style-type: none">• Multiple creek crossings by Highway 21 and Thirtymile and Bridge Creek roads• Agricultural fields and pasturelands• Rural residential development, some of which include informal access roads to the water	
Potential Restoration Opportunities	
None	
Potential Protection Opportunities	
Implement or retrofit stormwater controls consistent with the Eastern Washington Stormwater Manual.	

Sanpoil River – Reach 5 Ferry County	
Reach Description	Sanpoil River from the NE ¼ of T31N_R33E_S06 to the NW ¼ of T30N_R33E_S33 at the head of Sanpoil River Arm
Shoreline Jurisdiction	946 acres
	
<p>Source: https://fortress.wa.gov/ecy/coastalatlantools/UICoastalAtlas/Tools/ShorePhotos.aspx</p>	
Subreaches (SRs); see Maps 27 and 28:	
<ul style="list-style-type: none"> • SR 5a – Begins at the NE ¼ of T31N_R33E_S06 and extends south to the NE ¼ of T31N_R33E_S30 • SR 5b – Extends 4.5 miles to the south to the north ¼ of T30N_R33E_S18. • SR 5c – Extends 2.1 miles to the south to the NW ¼ of T31N_R33E_S20. • SR 5d – Extends 2.7 miles to the south to the NW ¼ of T30N_R33E_S33 at the head of the Sanpoil River arm. 	
Characteristics	
Ownership	Reach 5 is about 30% private and 70% tribal lands with a very small amount (less than 5%) of public ownership (U.S. Bureau of Reclamation) at the head of the Sanpoil River arm.

Sanpoil River – Reach 5	Ferry County
<p>Land Use/Current Shoreline Management Program</p> <p>Land Use Designation:</p> <ul style="list-style-type: none"> • Current land uses are private ownership, public lands, and Indian allotment trust lands • Rural and Rural Service Area <p>Current Shoreline Management Program Environment Designation:</p> <ul style="list-style-type: none"> • Rural 	
<p>Existing Land Cover/Development</p> <p>SR 5a and 5b consist of wetlands, forest, and shrubland with very limited developments. Starting in SR 5c, forests and shrubland become more dominant land-cover types, and there are pockets of residential development, recreational development, and agricultural fields.</p>	
<p>Geomorphic Character</p> <p>Description – The Sanpoil River flows within a moderately narrow to wide valley throughout Reach 5. The channel and floodplain consist of continental glacial drift (SR 5a) and glaciolacustrine and outwash deposits (undivided) (SR 5b – 5d). Wider floodplain areas with relic channels, multiple flowpaths, and wetlands occur throughout the reach. The valley margins and hill slopes consist of bedrock (Sanpoil Volcanics, monzodiorite of the Devils Elbow Suite, and Daisy Trail Granite).</p> <p>Hardened Banks – Approximately 1,500 feet of hardened banks occur in Reach 5 and are associated with the Highway 21 alignment.</p> <p>Channel Migration Zone – The CMZ consists of most of the valley bottom located within portions of Reach 5. The Highway 21 alignment is located along the western valley hill slope margin and limits channel migration to the west along segments of the reach.</p>	
<p>Flooding and Geological Hazard</p> <p>Flooding – Reach 5 does not have a mapped FEMA floodplain or floodway. Based on topography, floodplains likely exist along this reach, but are not determined. The floodplain is moderately narrow to wide throughout this reach.</p> <p>Geological Hazards – SR 5a – 5c have soils susceptible to moderate to severe erosion. SR 5d contains a minor amount of soils susceptible to severe erosion. SR 5a – 5d contain slopes that are greater than 15% and underlain by continental glacial drift, which make them designated landslide hazard areas. A seismic hazard area, rated low, extends from the very downstream extent of SR 5a – 5d. No mine sites are located within Reach 5.</p>	
<p>Existing Public Access</p> <p>State Route 21 intermittently runs along the west shore of the Sanpoil River in this reach. There are two public access sites—Sanpoil Campground #1104 and Keller Junior Rodeo Grounds. Sanpoil Campground #1104 has primitive camping, an outhouse, and garbage facilities. The campground is a no-fee area and provides water access. Keller Junior Rodeo Grounds are located adjacent to the Sanpoil River and provide rodeo grounds, a pavilion, restrooms, and water access.</p>	

Sanpoil River – Reach 5	Ferry County
<p>Identified Public Access Improvements</p> <p>There are no public access improvements identified for Reach 5 of the Sanpoil River.</p> <p>Public Access Opportunities</p> <p>Reach 5 comprises a mixture of private land and CTCR-owned lands, limiting public access opportunities.</p>	
<p>Ecological Conditions</p>	
<p>Water Quantity and Sediment</p> <p>Sanpoil River Reach 5 has many tributary inflows, including Jack, Meadow, Brush, Cow, Fortymile, Iron, Empire, Cache, McAllister, and Capoose creeks. In addition, numerous unnamed tributaries and intermittent drainages flow into this reach. Data are collected in the Sanpoil River upstream of the Town of Keller (USGS Gage #12434590), including instantaneous flow data. Based on historical records, peak flows occur during the spring (April/May), and low flows occur during the late summer and early fall (August/September).</p> <p>Sediment sources throughout the reach include the erodible continental glacial drift (SR 5a), glaciolacustrine and outburst flood deposits (undivided) banks, soils prone to erosion, slopes prone to landslides, and sediment transported in the local runoff and surface drainages. The reach appears to support sediment transport and deposition areas. Low-gradient channel and wide floodplain areas occur throughout reach and support areas of deposition.</p>	
<p>Water Quality</p> <p>SR 5c is listed as a water of concern for bacteria on Ecology’s 305b list. Water quality may be impacted by residential, roadway, wildlife, and agricultural runoffs.</p>	
<p>Habitat Characteristics and Priority Habitat Species Presence</p> <p>This reach of the Sanpoil River is not noted for presence under PHS information.</p> <p>SR 5a contains agricultural fields, mostly to the east of the river. Some of the fields have segments with limited riparian habitat or grass buffers between the field and the shoreline. The northern half and southern third of SR 5b are substantially forested, though segments of Highway 21 limit riparian development and confine the river. The central portion of SR 5b contains agriculture and grazing fields, though the majority of the shoreline includes a riparian buffer. SR 5c includes more development within the uplands, but the riparian buffers are nearly continuous, though not always as dense or wide in this area.</p>	

Sanpoil River – Reach 5	Ferry County
Ecological Functions Analysis	
SR 5a	
<p>Level of Existing Function</p> <p>SR 5a is designated as Partially Functioning, based on agricultural and residential development.</p> <p>Stressors</p> <p>Upland development:</p> <ul style="list-style-type: none"> • Agricultural fields with limited buffers in some areas • East San Poil Road within jurisdiction boundary west of river • Rural residential development <p>Potential Restoration Opportunities</p> <p>Implement riparian restoration projects that may include passive (e.g., Conservation Reserve Expanded Program riparian buffers or protected area conservation easements) or active (e.g., riparian plantings) efforts to reduce erosion and increase filtration, particularly in agricultural and rural residential areas.</p> <p>Potential Protection Opportunities</p> <p>Implement or retrofit stormwater controls consistent with the Eastern Washington Stormwater Manual.</p>	
SR 5b	
<p>Level of Existing Function</p> <p>SR 5b is designated as Partially Functioning, based on impacts from transportation corridors.</p> <p>Stressors</p> <p>Upland development:</p> <ul style="list-style-type: none"> • Highway 21 and East San Poil Road within jurisdiction boundary in certain areas of the river • Limited rural residential development • Limited livestock grazing and agricultural fields <p>Recreational use:</p> <ul style="list-style-type: none"> • Informal water access point with parking <p>Potential Restoration Opportunities</p> <p>Create easements to encourage shrub-steppe and riparian restoration, for properties east of the river.</p> <p>Potential Protection Opportunities</p> <p>Implement or retrofit stormwater controls consistent with the Eastern Washington Stormwater Manual.</p>	

Sanpoil River – Reach 5	Ferry County
SR 5c	
<p>Level of Existing Function</p> <p>SR 5c is designated as Partially Functioning, based on agricultural and residential development.</p> <p>Stressors</p> <p>Upland development:</p> <ul style="list-style-type: none"> • Agricultural fields with limited buffers in some areas • East San Poil Road within jurisdiction boundary west of the river • Rural residential development <p>Potential Restoration Opportunities</p> <p>Create easements to encourage shrub-steppe and riparian restoration, particularly for properties west of the River.</p> <p>Potential Protection Opportunities</p> <p>Implement or retrofit stormwater controls consistent with the Eastern Washington Stormwater Manual.</p>	
SR 5d	
<p>Level of Existing Function</p> <p>SR 5d is designated as Partially Functioning, based on residential development at north end of subreach and transportation corridors toward south end of subreach.</p> <p>Stressors</p> <p>Upland development:</p> <ul style="list-style-type: none"> • Residential development and associated roads, including road crossing concentrated at the north end of this subreach • Silver Creek Road along east side of channel confines channel migration in certain segments <p>Potential Restoration Opportunities</p> <p>Stabilize banks along Silver Creek Road</p> <p>Potential Protection Opportunities</p> <p>Implement or retrofit stormwater controls consistent with the Eastern Washington Stormwater Manual.</p>	

Sanpoil River – Reach 6 Ferry County	
Reach Description	
Sanpoil River from the NW ¼ of T30N_R33E_S33 at head of Sanpoil River Arm to the confluence with Columbia River	
Shoreline Jurisdiction	
2,701 acres	
	
Source: https://fortress.wa.gov/ecy/coastalatlus/UICoastalAtlas/Tools/ShorePhotos.aspx	
Subreaches (SRs); see Map 28:	
Not applicable	
Characteristics	
Ownership	
Reach 6 is about 40% tribal lands and 60% public (National Park Service, U.S. Bureau of Reclamation, and U.S. Department of the Interior) with a very small amount (less than 5%) of private ownership.	
Land Use/Current Shoreline Management Program	
Land Use Designation:	
<ul style="list-style-type: none"> • Current land uses are private ownership, public lands, and Indian allotment trust lands • Rural 	
Current Shoreline Management Program Environment Designation:	
<ul style="list-style-type: none"> • Rural 	
Existing Land Cover/Development	
More than half of Reach 6 is publicly owned land, and there are very limited private developments throughout. Recreational developments can be found in downstream portion of the reach, which is owned by National Park Service. Land-cover types consist of shrubland and forest.	

Sanpoil River – Reach 6	Ferry County
Geomorphic Character	
<p>Description – Throughout Reach 6, the Sanpoil River occupies a wide, low-gradient valley. Valley bottom and floodplain materials consist of glaciolacustrine and outburst flood deposits, which are undivided. Bedrock occurs along the valley margin and hill slopes and includes Sanpoil Volcanics and Covada Group marine metasedimentary rocks. Mass wasting deposits are also present along the valley margin. Backwater effects from the Columbia River influence the river flows throughout this reach. Downstream, the Columbia River is controlled by the Grand Coulee Dam, and river levels can fluctuate based on downstream dam operations.</p> <p>Hardened Banks – Approximately 1,500 feet of hardened banks occur in Reach 6 and are associated with the Highway 21 alignment.</p>	
Flooding and Geological Hazard	
<p>Flooding – Flooding is regulated by downstream dam operations and Lake Roosevelt pool elevation controls.</p> <p>Geological Hazards – Reach 6 has soils susceptible to moderate to severe erosion throughout its entire length. Reach 6 contains slopes that are greater than 15% and underlain by glaciolacustrine and outburst flood deposits (undivided), which makes them designated landslide hazard areas. Large segments of the reach area are rated as a low to moderate seismic hazard area. No mine sites are located within Reach 6.</p>	
Existing Public Access	
<p>Keller Ferry connects the Lincoln County side of the Columbia River (south side), with the Ferry County side of the Columbia (north side), where the Sanpoil River empties into the Columbia. The Keller Ferry is owned and operated by Washington Department of Transportation and is free to the public. There is an outhouse and parking area just north of the ferry dock. Sanpoil Campground is located in Reach 6. Sanpoil Campground is a for-fee campground operated by the CTCR Parks Department. The campground has a playground, tent and trailer sites, picnic tables, a boat dock, a swimming area, restrooms, fire pits, and garbage facilities. It is open to non-tribal members.</p> <p>Identified Public Access Improvements</p> <p>There are no public access improvements identified for Reach 6 of the Sanpoil River.</p> <p>Public Access Opportunities</p> <p>Public Access opportunities may be adequate for the reach.</p>	
Ecological Conditions	
Water Quantity and Sediment	
<p>This reach of the Sanpoil River is managed as a lake impounded by the Grand Coulee Dam downstream. Sanpoil River Reach 6 major tributary inflows include Silver, John Tom, Dick, and Manila creeks. In addition, numerous unnamed tributaries and intermittent drainages flow into this reach. Flow data are not available for this reach.</p>	

Sanpoil River – Reach 6	Ferry County
<p>Sediments are likely accumulating throughout this reach because the river is managed as a lake impounded by the Grand Coulee Dam downstream. Sediment input sources likely include tributary inflow and landslide potential along steep slopes. In addition, the draft of Columbia River (Lake Roosevelt) levels may cause some movement of sediment.</p>	
<p>Water Quality Reach 6 is not listed on Ecology’s 305b list. Water quality may be impacted by recreational activities.</p>	
<p>Habitat Characteristics and Priority Habitat Species Presence This reach of the Sanpoil River is not noted for presence of any specific priority species or habitat. Reach 6 contains steep sloped shorelines with a mix of forested and shrub-steppe vegetation. The forest vegetation is limited by water availability.</p>	
Ecological Functions Analysis	
<p>Level of Existing Function SR 6 is designated as Partially Functioning based on transportation infrastructure and recreation uses.</p>	
<p>Stressors Upland development:</p> <ul style="list-style-type: none"> • Highway 21 within jurisdiction boundary in about a third of the reach <p>Recreational use:</p> <ul style="list-style-type: none"> • Camping areas 	
<p>Potential Restoration Opportunities Concentrate recreation access and implement shrub-steppe restoration based on Washington Department of Fish & Wildlife guidelines.</p>	
<p>Potential Protection Opportunities Protect intact forested and shrub-steppe habitat from recreation impacts.</p>	

Granite Creek	Ferry County
Reach Description	
Granite Creek from the NE ¼ of T36N_R32E_S03 to the confluence with Sanpoil River	
Shoreline Jurisdiction	
197 acres	
	
Source: USDA NAIP 2013	
Subreaches (SRs); see Map 23:	
<ul style="list-style-type: none"> • SR 1a – Begins at the NE ¼ of T36N_R32E_S03 and extends east to the Republic city limits • Republic Reach – Extends 1.1 miles to the south to the southern end of the Republic city limits • SR 1b – Extends 0.8 mile to the southeast to the confluence with the Sanpoil River 	
Characteristics	
Ownership	
Reach 1 is mostly private with a very small amount (less than 10%) of public ownership (Ferry County).	
Land Use/Current Shoreline Management Program	
Land Use Designation:	
<ul style="list-style-type: none"> • Current land uses are private ownership and public lands • Rural and Rural Service Area 	
Current Shoreline Management Program Environment Designation:	
<ul style="list-style-type: none"> • Unavailable – Not included in the existing Shoreline Management Plan 	

Granite Creek	Ferry County
<p>Existing Land Cover/Development</p> <p>Developments are concentrated on north and east side of the shoreline along Highway 20. Land-cover types mostly consist of forests and shrublands.</p>	
<p>Geomorphic Character</p> <p>Description – Granite Creek flows within a mostly narrow, confined valley throughout reach. The channel and floodplain consist of continental glacial drift. Wetlands occur within the areas where the floodplain widens. The valley margins and hill slopes consist of bedrock (dacite flows of the Sanpoil Volcanics and intrusive dacite) and continental glacial drift.</p> <p>Hardened Banks – None identified. No artificial hardened banks appear to exist along the Granite Creek extent.</p> <p>Channel Migrations Zone – The CMZ is narrow and consists of most of the valley bottom throughout the reach. The valley margins and hill slopes limit channel migration along the reach.</p>	
<p>Flooding and Geological Hazard</p> <p>Flooding – Throughout most of SR 1a, no FEMA floodplain is designated, with the exception of the downstream extent this subreach at the City of Republic. The Republic subreach and SR 1b have a FEMA-designated floodplain. No FEMA floodways are designated throughout Granite Creek.</p> <p>Geological Hazards – Granite Creek has soils susceptible to moderate to severe erosion, where areas of severe erosion are dominant. The stream has areas with slopes that are greater than 15% and underlain by glacial continental drift, which make them designated landslide hazard areas. No mine sites or areas susceptible to seismic hazards are located within the shoreline jurisdictional area of the stream.</p>	
<p>Existing Public Access</p> <p>Granite Creek runs along the west side of the City of Republic. There is an off-road vehicle trail that intermittently runs along and crosses the creek via a bridge. Perry Wilderness Park is a public trail that leads to the creek. There is an interpretive sign and a recreational vehicle dump at the park.</p> <p>Identified Public Access Improvements</p> <p>There are public access improvements identified for Granite Creek.</p> <p>Public Access Opportunities</p> <p>Most of Granite Creek is privately owned, and most of it is in steep terrain, limiting public access opportunities.</p>	

Granite Creek	Ferry County
Ecological Conditions	
Water Quantity and Sediment	
<p>Major tributary inflows to Granite include the North Fork Granite Creek at the very upstream extent of SR 1a. Numerous unnamed tributaries flow into the stream along its alignment. In addition, stormwater runoff generated from the impervious surfaces along Highway 20 and throughout the City of Republic likely enter the stream as well. No current flow data are collected on Granite Creek.</p> <p>Sediment is likely transported through much of Granite Creek due to its moderate to steep gradient. Sediment sources throughout the reach include the erodible continental glacial drift banks, soils prone to erosion, steep slopes prone to landslides, and sediment transported by local runoff and surface drainages. Where present, a vegetated riparian corridor likely helps to limit erosion and the delivery of fine sediment to the stream.</p>	
Water Quality	
<p>The downstream extent of SR 1b is listed as a water of concern for pH, dissolved oxygen, temperature, and bacteria. Water quality may be impacted from residential, industrial, wildlife, agricultural, and roadway runoffs.</p>	
Habitat Characteristics and Priority Habitat Species Presence	
<p>Granite Creek is within mule deer and white-tailed deer winter range, and Okanogan highlands populations may occur here. The creek in this reach is relatively small but may support some fish species, including trout.</p> <p>SR 1a – This subreach winds through flat lands between Highway 20 to the north and slopes of adjacent forested foothills to the south. Riparian vegetation generally forms a fully closed canopy through portions of the subreach, although other sections are dominated by riparian zone consisting of small shrubs and grasses. The highway road prism prevents establishment of trees in these areas. There are a few scattered residences and outbuildings along this subreach. The creek is piped under two small roads just outside of the City of Republic, after which it enters a relatively narrow valley that is predominantly forested, with the City of Republic sitting at a higher elevation on the other side of Highway 20.</p> <p>SR 1b – This subreach is similar to the conditions at the end of SR 1a, until it crosses under Highway 20. On the eastern side of Highway 20, there is minimal riparian vegetation beyond grasses and small shrubs, and the creek flows through flat valley lands dominated by agricultural land uses. The subreach ends at Sanpoil River, with a sandy delta forming near the mouth. This area is characterized by a broad, flat floodplain with minimal trees.</p>	

Granite Creek	Ferry County
Ecological Functions Analysis	
SR 1a	
Level of Existing Function	
SR 1a is designated as Partially Functioning, based on transportation and rural residential development.	
Stressors	
Upland development:	
<ul style="list-style-type: none"> • Highway 20 within jurisdiction boundary • Access roads (Lilly Creek and Jolly Shunn) cross the channel • Rural residential development • Livestock pens and grazing 	
Recreational use:	
<ul style="list-style-type: none"> • Off-road vehicle use north of channel 	
Potential Restoration Opportunities	
Reduce riparian and water quality impacts from livestock through expanded use of best management practices (BMPs; e.g., exclusionary fencing and rotational grazing) for livestock operations within shoreline jurisdiction, particularly near the western edge of the subreach.	
Potential Protection Opportunities	
Limit recreation access within intact riparian areas. Make stormwater controls for new development consistent with Eastern Washington Stormwater Manual.	
SR 1b	
Level of Existing Function	
SR 1b is designated as Partially Functioning, based on transportation infrastructure and agricultural and grazing uses.	
Stressors	
Upland development:	
<ul style="list-style-type: none"> • Highway 21 crosses channel and is within the jurisdiction boundary within about a third of the subreach • Livestock pens to the shoreline's edge east of Highway 21 • Agricultural fields with limited riparian or grass buffer at the eastern end of the subreach 	
Recreational use:	
<ul style="list-style-type: none"> • Limited off-road vehicle use at eastern end of this subreach. 	

Granite Creek	Ferry County
<p>Potential Restoration Opportunities</p> <p>Reduce riparian and water quality impacts from livestock through expanded use of BMPs (e.g., exclusionary fencing and rotational grazing) for livestock operations within shoreline jurisdiction, particularly east of Highway 21. Implement riparian restoration projects that may include passive (e.g., Conservation Reserve Expanded Program riparian buffers or protected area conservation easements) or active (e.g., plantings) efforts to reduce erosion and increase filtration near agricultural fields east of Highway 21.</p> <p>Potential Protection Opportunities</p> <p>Protect intact riparian buffers west of Highway 21.</p>	

Granite Creek – Republic Reach	
	City of Republic
Reach Description Granite Creek within the City of Republic limits (from the NE ¼ of T36N_R32E_S01 to the NW ¼ of T36N_R33E_S07).	
Shoreline Jurisdiction 58 acres	
	
Source: USDA NAIP 2013	
Subreaches (SRs); see Map 23a: <ul style="list-style-type: none"> • Republic Reach – Begins near East Flag Hill Road on the western boundary and extends to the southern boundary of the City of Republic. 	
Characteristics	
Ownership The City of Republic reach is mostly private with some public ownership (Ferry County).	
Land Use/Current Shoreline Management Program Land Use Designation: <ul style="list-style-type: none"> • Current land use is private ownership • Rural Service Area Current Shoreline Management Program Environment Designation: Not available, as Granite Creek is not included in the existing Shoreline Master Program.	

Granite Creek – Republic Reach	City of Republic
Existing Land Cover/Development	
Developments are concentrated on east side of the shoreline along Highway 20. The area directly adjacent to the creek consists of forests and shrublands.	
Geomorphic Character	
Description – Granite Creek flows within a mostly narrow, confined valley throughout reach. The channel and floodplain consist of continental glacial drift and continental sedimentary deposits of the Klondike Mountain Formation.	
Hardened Banks – None identified. No artificial hardened banks appear to exist along the Granite Creek extent.	
Channel Migrations Zone – The CMZ is narrow and consists of most of the valley bottom throughout the reach. The valley margins and hill slopes limit channel migration along the reach.	
Flooding and Geological Hazard	
Flooding – The Republic subreach has a FEMA-designated floodplain. No FEMA floodways are designated throughout this reach.	
Geological Hazards – Granite Creek has soils susceptible to severe erosion, where areas of severe erosion are dominant. The stream has areas with slopes that are greater than 15% and underlain by glacial continental drift, which make them designated landslide hazard areas. No mine sites or areas susceptible to seismic hazards are located within the shoreline jurisdictional area of the stream.	
Existing Public Access	
Granite Creek runs along the west side of the City of Republic. There is an ORV trail that intermittently runs along the Creek. Perry Wilderness Park is a publicly accessible area with trails that lead to the Creek. There is a footbridge crossing the creek, along with an interpretive sign and an RV Dump at the Park.	
Identified Public Access Improvements	
There are no public access improvements identified for the City of Republic Reach of Granite Creek.	
Public Access Opportunities	
Most of Granite Creek is privately owned and is in steep terrain, limiting public access opportunities. Trails in the Perry Wilderness Park have opportunity for improvement, and interpretive signage could also be added to highlight local fish and wildlife and habitat features, and other local items of cultural or historical interest. The footbridge crossing the creek appears to be recently added, and additional trails on the west side of the creek could be developed to increase the publicly accessible area in the park.	

Granite Creek – Republic Reach	City of Republic
Ecological Conditions	
<p>Water Quantity and Sediment</p> <p>Numerous unnamed tributaries flow into the stream along its alignment. In addition, stormwater runoff generated from the impervious surfaces along Highway 20 and throughout the City of Republic likely enter the stream as well. No current flow data are collected on Granite Creek.</p> <p>Sediment is likely transported through much of Granite Creek due to its moderate to steep gradient. Sediment sources throughout the reach include the erodible continental glacial drift banks, soils prone to erosion, steep slopes prone to landslides, and sediment transported by local runoff and surface drainages. Where present, a vegetated riparian corridor likely helps to limit erosion and the delivery of fine sediment to the stream.</p>	
<p>Water Quality</p> <p>The Republic Reach is listed as a water of concern for pH. Water quality may be impacted from residential and roadway runoffs.</p>	
<p>Habitat Characteristics and Priority Habitat Species Presence</p> <p>Granite Creek is within mule deer and white-tailed deer winter range, and Okanogan highlands populations may occur here. The creek in this reach is relatively small but may support some fish species, including trout.</p> <p>The Republic Reach winds through steeper sloped lands next to Highway 20 at its northwest segment that continue through the City as the stream turns south and then east, before it emerges onto flatter lands outside the City to the east. Riparian vegetation is dense in many areas and in some cases forms a nearly closed canopy. There are residences and outbuildings along the left bank of the creek, though most structures are outside of the jurisdiction boundary.</p>	

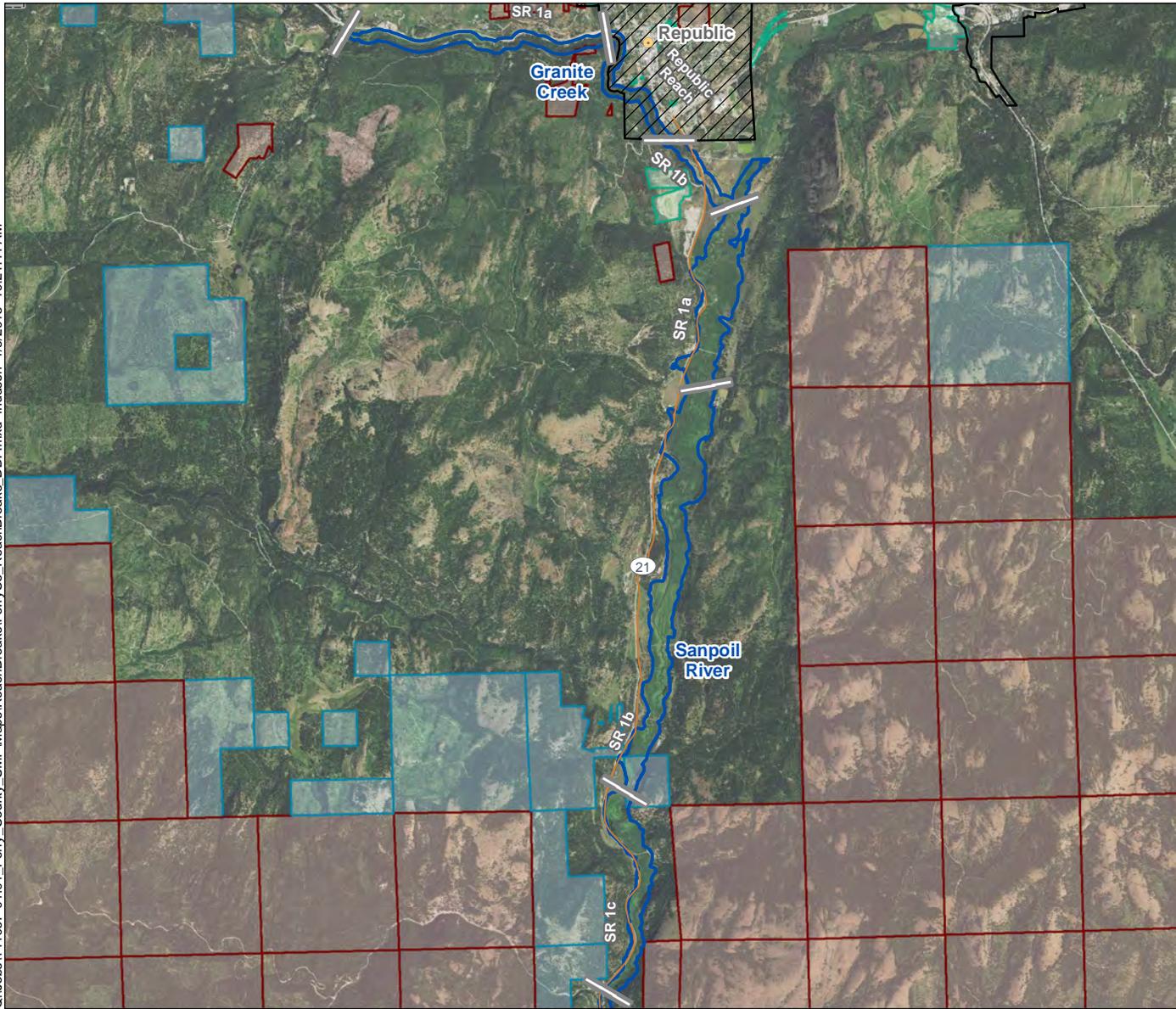
Granite Creek – Republic Reach	City of Republic
Ecological Functions Analysis	
<p>Level of Existing Function</p> <p>The Republic segment of Granite Creek is designated as Partially Functioning, based on transportation and limited residential development impacts.</p>	
<p>Stressors</p> <p>Upland development:</p> <ul style="list-style-type: none"> • Highway 20 within jurisdiction boundary • Private access road from Lilly Creek Road within jurisdiction boundary • Residential development and outbuildings, though only a few buildings are within jurisdiction boundary • Overhead utilities cross creek <p>Recreational use:</p> <ul style="list-style-type: none"> • ORV use on trail east of the creek next to the Wilderness Park entrance and also west of the creek (predominantly outside of jurisdiction boundary) • Multiple trails that extend down the eastern slope of the left bank below the eastern-most ORV trail, and the footbridge across the creek 	
<p>Potential Restoration Opportunities</p> <p>None.</p>	
<p>Potential Protection Opportunities</p> <p>Limit recreation access within intact riparian areas. Make stormwater controls for new development consistent with Eastern Washington Stormwater Manual.</p>	

West Fork Sanpoil River	Ferry County
Reach Description	
West Fork Sanpoil River from Okanagan/Ferry County line (NW 1/4 in T34N_R32E_S07) to the confluence with Sanpoil River	
Shoreline Jurisdiction	
263 acres	
	
Source: USDA NAIP 2013	
Subreaches (SRs); see Map 24:	
Not applicable	
Characteristics	
Ownership	
West Fork Sanpoil River is about 30% private and 70% tribal lands with a very small amount (less than 5%) of public lands (USFS).	
Land Use/Current Shoreline Management Program	
Land Use Designation:	
<ul style="list-style-type: none"> • Current land uses are private ownership, public lands, and Indian allotment trust lands • Rural 	
Current Shoreline Management Program Environment Designation:	
<ul style="list-style-type: none"> • Unavailable – Not included in the existing Shoreline Management Plan 	

West Fork Sanpoil River	Ferry County
<p>Existing Land Cover/Development</p> <p>West Fork Sanpoil River is mostly undisturbed forest, wetland, and shrub land. There is very limited development within the shoreline jurisdiction.</p>	
<p>Geomorphic Character</p> <p>Description – The river’s channel and floodplain consist mostly of continental glacial drift. Wetlands occur within the wider floodplain areas. The valley margins and hill slopes consist of bedrock (dacite flows of the Sanpoil Volcanic Formation, marine metasedimentary rocks, and wacke), glacial outwash, and continental glacial drift.</p> <p>Hardened Banks – None identified. No artificial hardened banks appear to exist along the West Fork Sanpoil River extent.</p> <p>Channel Migrations Zone – The CMZ is narrow and consists of most of the valley bottom throughout the reach. The valley margins and hill slopes limit channel migration along the reach.</p>	
<p>Flooding and Geological Hazard</p> <p>Flooding –The West Fork Sanpoil River does not have a mapped FEMA floodplain or floodway. Floodplains likely exist along this reach. The West Fork Sanpoil River flows within a moderately narrow valley throughout this reach.</p> <p>Geological Hazards – The West Fork Sanpoil River has soils susceptible to moderate to severe erosion, where areas of moderate erosion potential are dominant. The river shoreline has areas that are greater than 15% and underlain by glacial continental drift, which make them designated landslide hazard areas. No mine sites or areas susceptible to seismic hazards are located within the shoreline jurisdictional area of the river.</p>	
<p>Existing Public Access</p> <p>There are no existing formal public access sites on the West Fork Sanpoil River. West Gold Creek Road runs the length of the reach and has several informal pull-offs.</p> <p>Identified Public Access Improvements</p> <p>No public access improvements have been identified for West Fork Sanpoil River.</p> <p>Public Access Opportunities</p> <p>The West Fork Sanpoil River is either privately owned or CTCR-owned, limiting public access opportunities.</p>	
Ecological Conditions	
<p>Water Quantity and Sediment</p> <p>Major tributary inflows to West Fork Sanpoil River include Lime Creek and Gold Creek. No current flow data are collected in the West Fork Sanpoil River. Flow data were historically collected by the USGS (Gage #12434110), but data have not been collected since 2012. Based on the historical monitoring record, peak flows occur during the month of April, and low flows occur in the late summer during the months of August and September.</p>	

West Fork Sanpoil River	Ferry County
<p>Sediment is likely transported through a majority of West Fork Sanpoil River due to its moderate gradient and lack of widespread floodplains. Sediment sources throughout the reach include the erodible continental glacial drift banks, soils prone to erosion, steep slopes prone to landslides, and sediment transported by local runoff and surface drainages. Deposition is likely isolated to localized channel features. Where present, the vegetated riparian corridor likely helps to limit erosion and the delivery of fine sediment to the stream.</p>	
<p>Water Quality</p> <p>West Fork Sanpoil River is not listed on Ecology’s 305b list. Water quality may be impacted by wildlife and agricultural activities near its downstream end.</p>	
<p>Habitat Characteristics and Priority Habitat Species Presence</p> <p>The West Fork Sanpoil River is within mule deer and white-tailed deer winter range, and Okanogan highlands populations may occur here. This river has minimal developed habitat, with the forest canopy covering many portions of the channel.</p>	
Ecological Functions Analysis	
<p>Level of Existing Function</p> <p>West Fork Sanpoil River is designated as Functioning based on intact riparian and upland forests and limited development.</p>	
<p>Stressors</p> <p>Upland development:</p> <ul style="list-style-type: none"> • West Gold Creek Road occasionally runs within the jurisdiction boundary limiting channel migration 	
<p>Potential Restoration Opportunities</p> <p>None.</p>	
<p>Potential Protection Opportunities</p> <p>Protect intact riparian and upland forests.</p>	

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LEGEND

- Reach and Subreach (SR) Breaks
- County Seat
- Highways
- Rural Service Area
- Urban Growth Area
- County Boundary
- Other County Boundary
- SMA Jurisdiction

Public Ownership

- Federal Government
- State Government
- Local Government

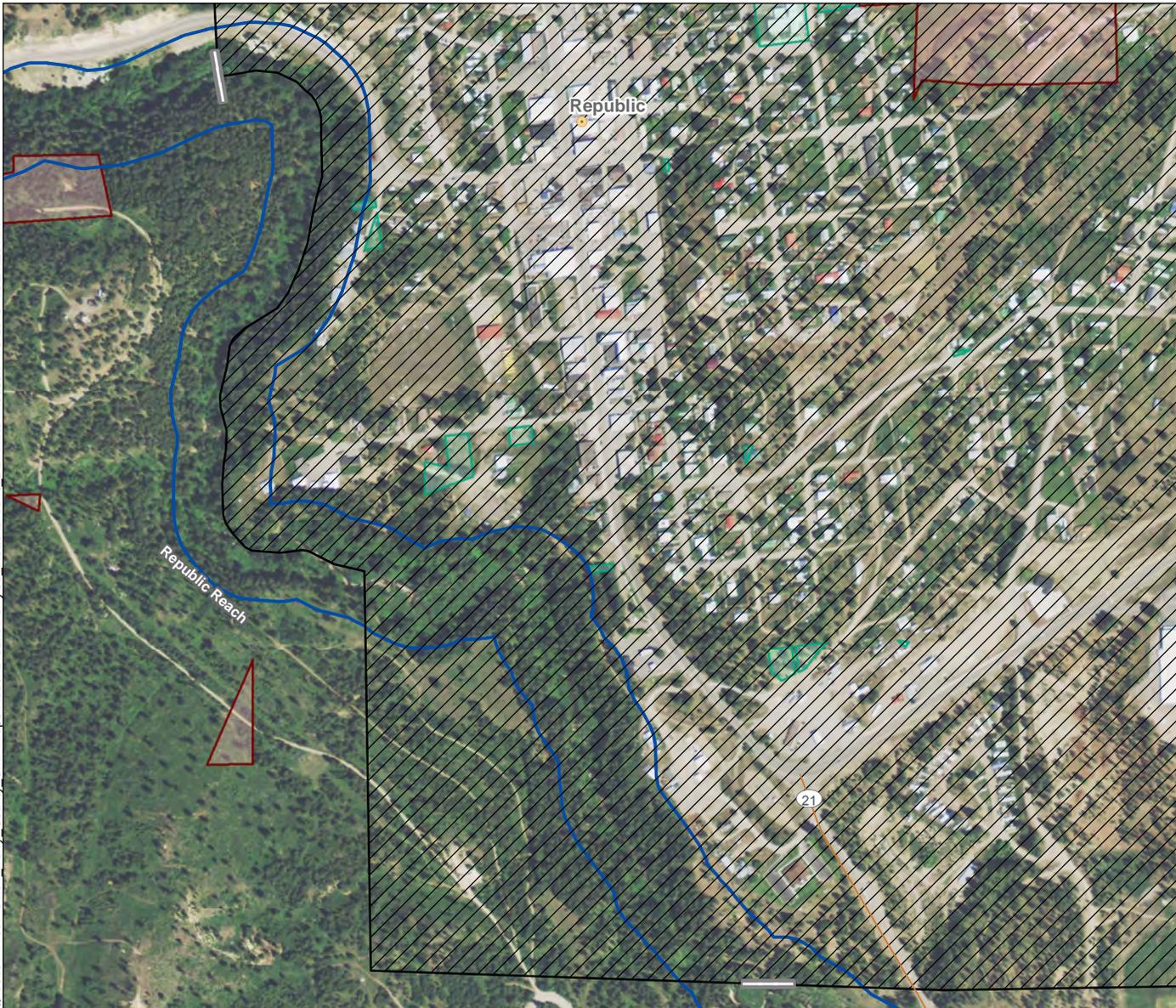
NOTES:

1. This information is to be used for planning purposes only. Data are displayed as is and without any guarantee of accuracy or completeness.
2. Aerial image courtesy of USDA NAIP (2013).
3. Ferry County's shoreline jurisdiction for Columbia River ends in the middle of the river.
4. Floodway and floodplain data acquired from FEMA.
5. Land ownership data acquired from Ferry County.



Map 23
Granite Creek Reach 1 and Sanpoil River Reach 1
Ferry County Shoreline Master Program
Ferry County, WA

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LEGEND

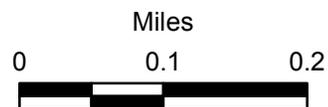
-  Reach and Subreach (SR) Breaks
 -  County Seat
 -  Highways
 -  Rural Service Area
 -  Urban Growth Area
 -  County Boundary
 -  SMA Jurisdiction
- Public Ownership**
-  Federal Government
 -  Local Government

NOTES:

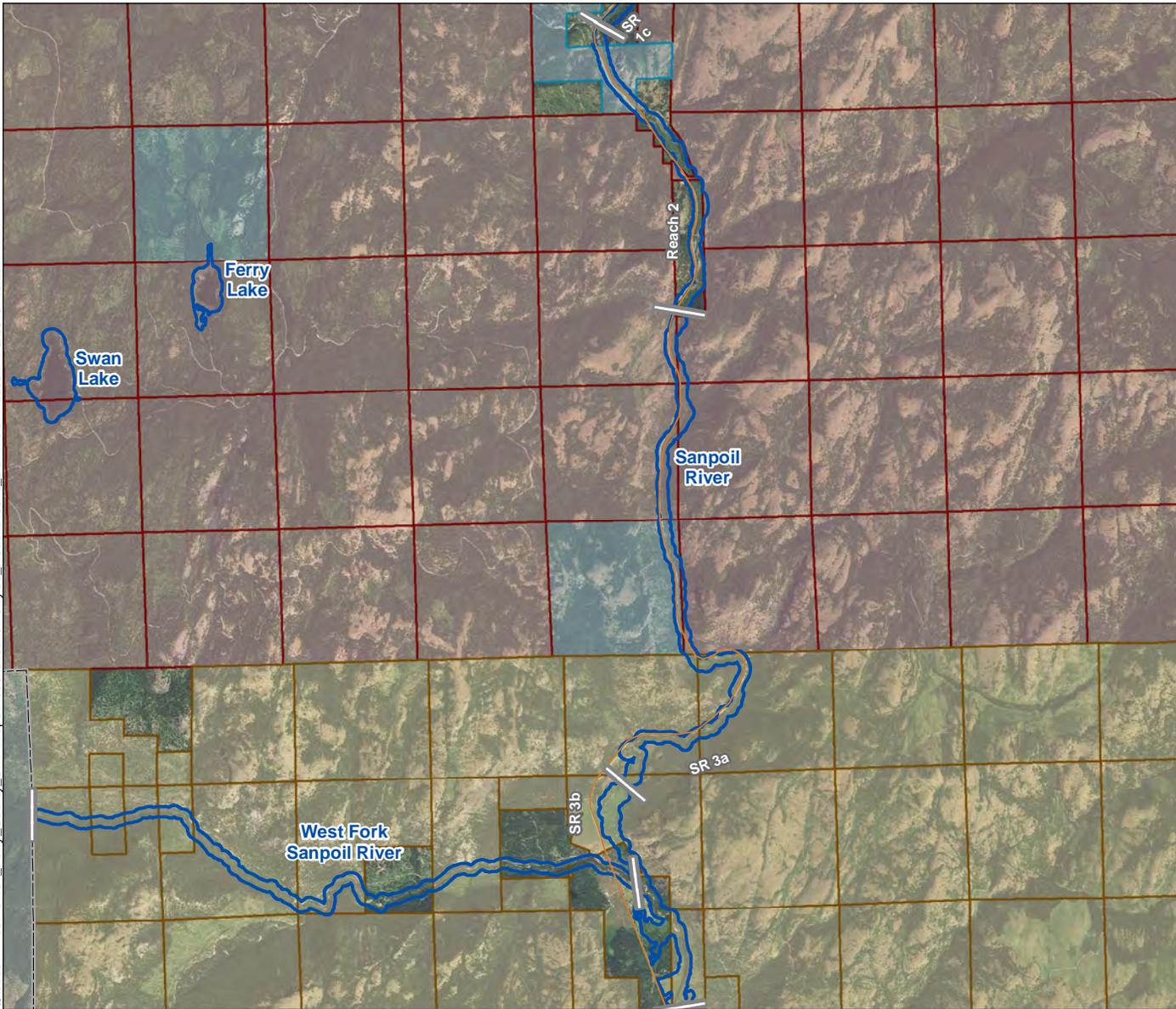
1. This information is to be used for planning purposes only. Data are displayed as is and without any guarantee of accuracy or completeness.
2. Aerial image courtesy of USDA NAIP (2013).
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5. Land ownership data acquired from Ferry County.



Map 23a
 Granite Creek – Republic Reach
 Ferry County Shoreline Master Program
 Ferry County, WA



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LEGEND

-  Reach and Subreach (SR) Breaks
 -  Highways
 -  County Boundary
 -  Other County Boundary
 -  SMA Jurisdiction
- Public Ownership**
-  Federal Government
 -  State Government
 -  Tribal Government

NOTES:

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2. Aerial image courtesy of USDA NAIP (2013).
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5. Land ownership data acquired from Ferry County.



Map 24
 West Fork Sanpoil River and Sanpoil River Reach 2, SR 3a and SR 3b
 Ferry County Shoreline Master Program
 Ferry County, WA

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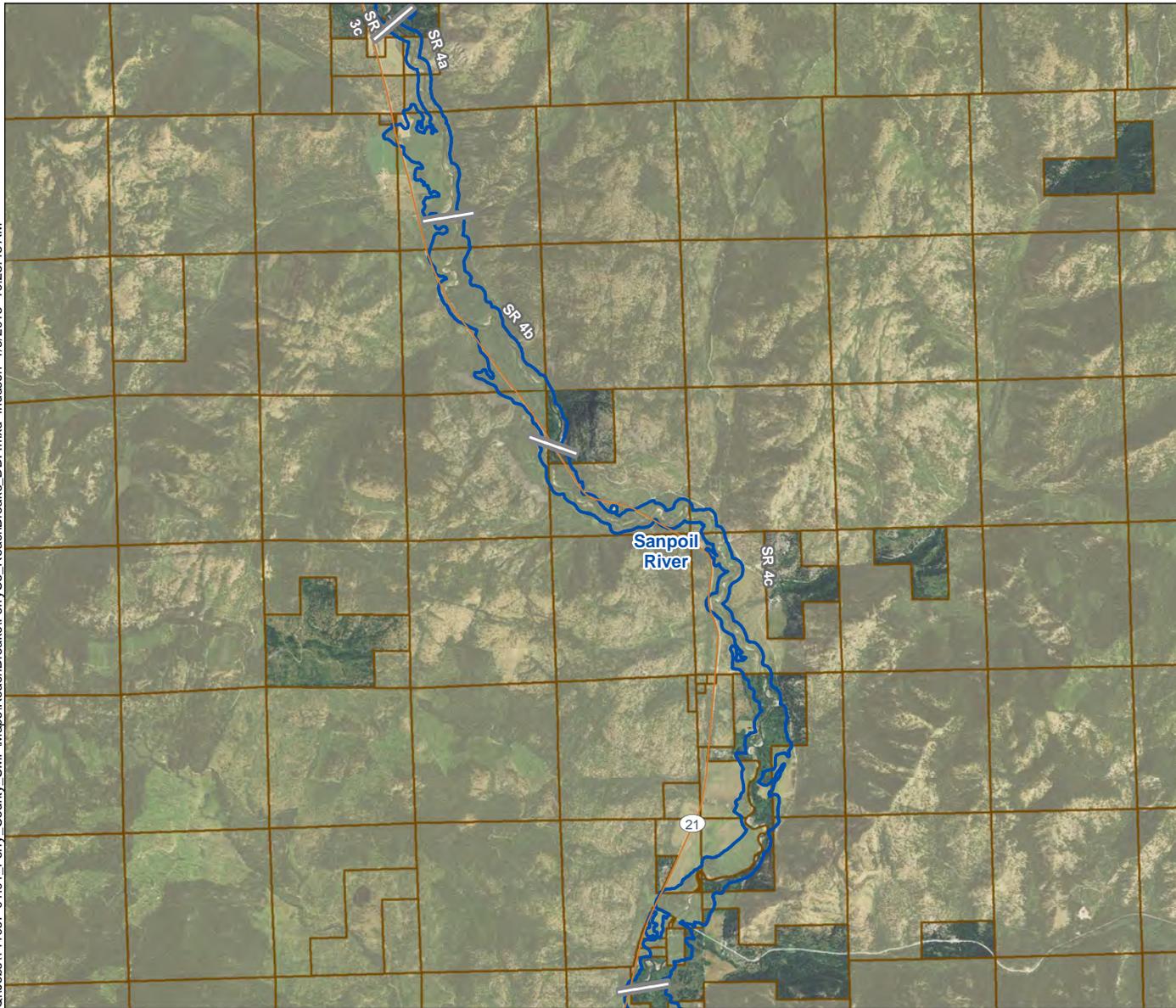
-  Reach and Subreach (SR) Breaks
-  Highways
-  County Boundary
-  Other County Boundary
-  SMA Jurisdiction
- Public Ownership**
-  Tribal Government

NOTES:

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LEGEND

Reach and Subreach (SR) Breaks

Highways

County Boundary

SMA Jurisdiction

Public Ownership

Tribal Government

NOTES:

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4. Floodway and floodplain data acquired from FEMA.
5. Land ownership data acquired from Ferry County.



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LEGEND

 Reach and Subreach (SR) Breaks

 Highways

 Rural Service Area

 County Boundary

 SMA Jurisdiction

Public Ownership

 State Government

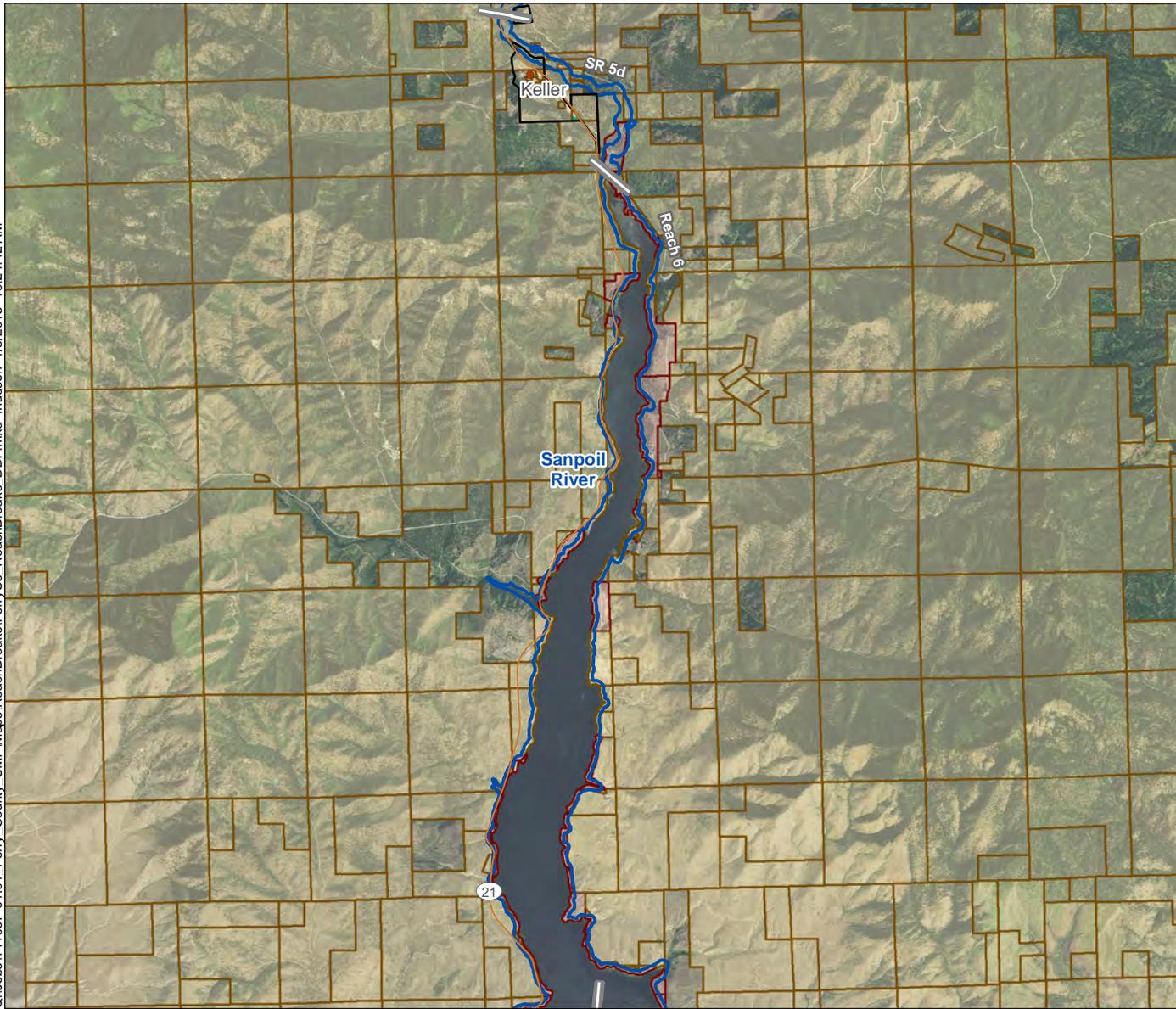
 Tribal Government

NOTES:

1. This information is to be used for planning purposes only. Data are displayed as is and without any guarantee of accuracy or completeness.
2. Aerial image courtesy of USDA NAIP (2013).
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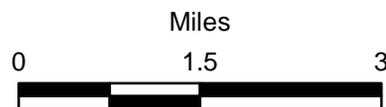


LEGEND

-  Reach and Subreach (SR) Breaks
 -  Populated Place
 -  Highways
 -  Rural Service Area
 -  County Boundary
 -  SMA Jurisdiction
- Public Ownership**
-  Federal Government
 -  Local Government
 -  Tribal Government

NOTES:

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5. Land ownership data acquired from Ferry County.



Map 28
 Sanpoil River SR 5d and Reach 6
 Ferry County Shoreline Master Program
 Ferry County, WA