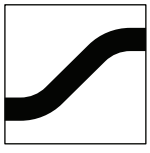
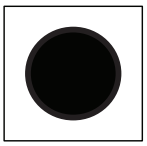
System: Estuary/Riverine

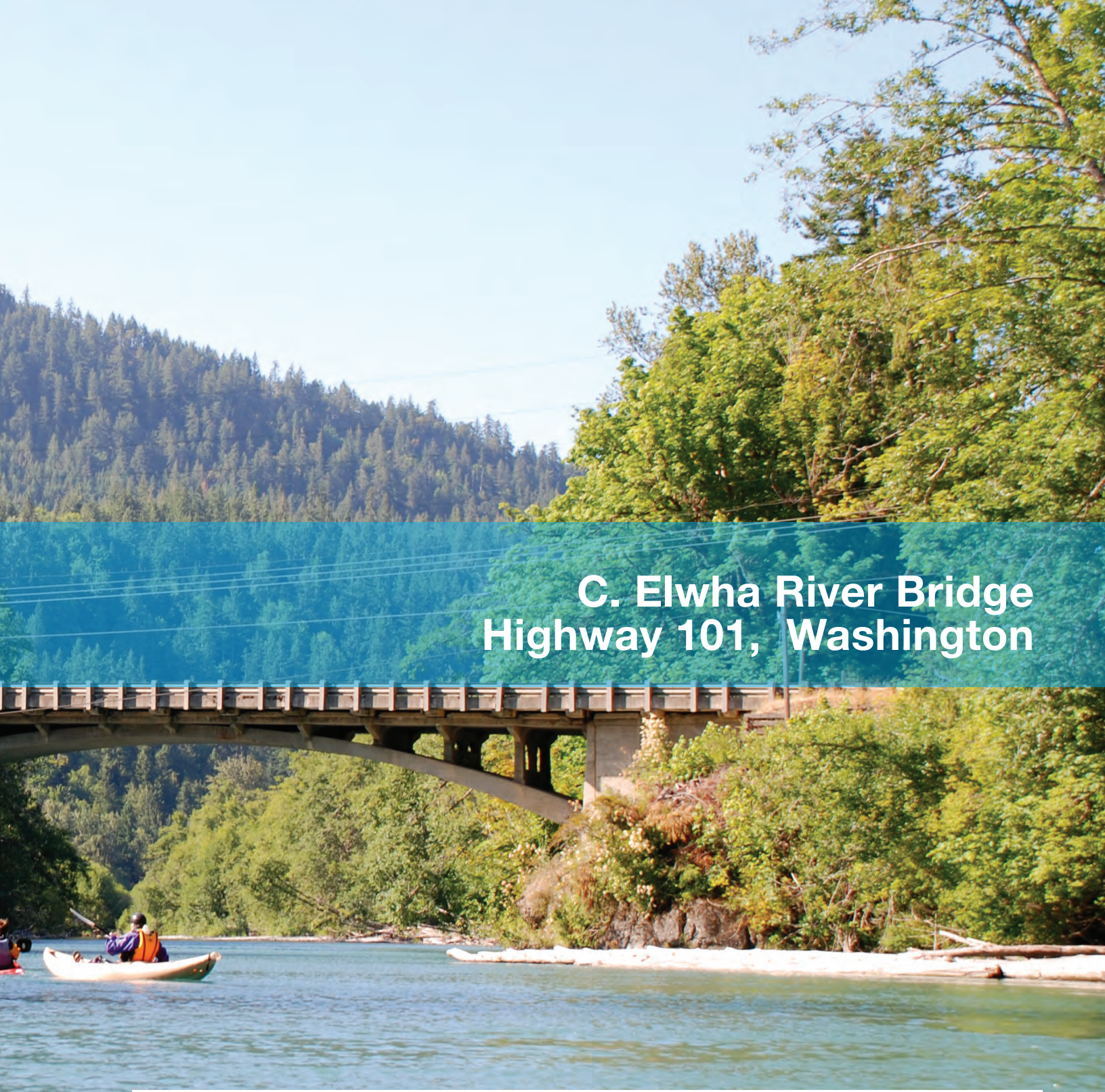


Setting: Natural/Enhanced

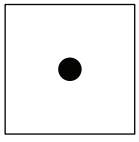
Temporal: 4 Season



C. Elwha River Bridge Highway 101, Washington



Frequency: Low



Density: Low

Location: Highway 101 on the Olympic Peninsula, Washington
Site: Highway 101 Bridge crossing the Elwha River
Context: Half to full-day whitewater river experience
Geomorphology: Boulder/step pool; river is recovering from dam removal
Recreation Use: Active and passive; whitewater rafting and kayaking, private and commercial trips, and river viewing

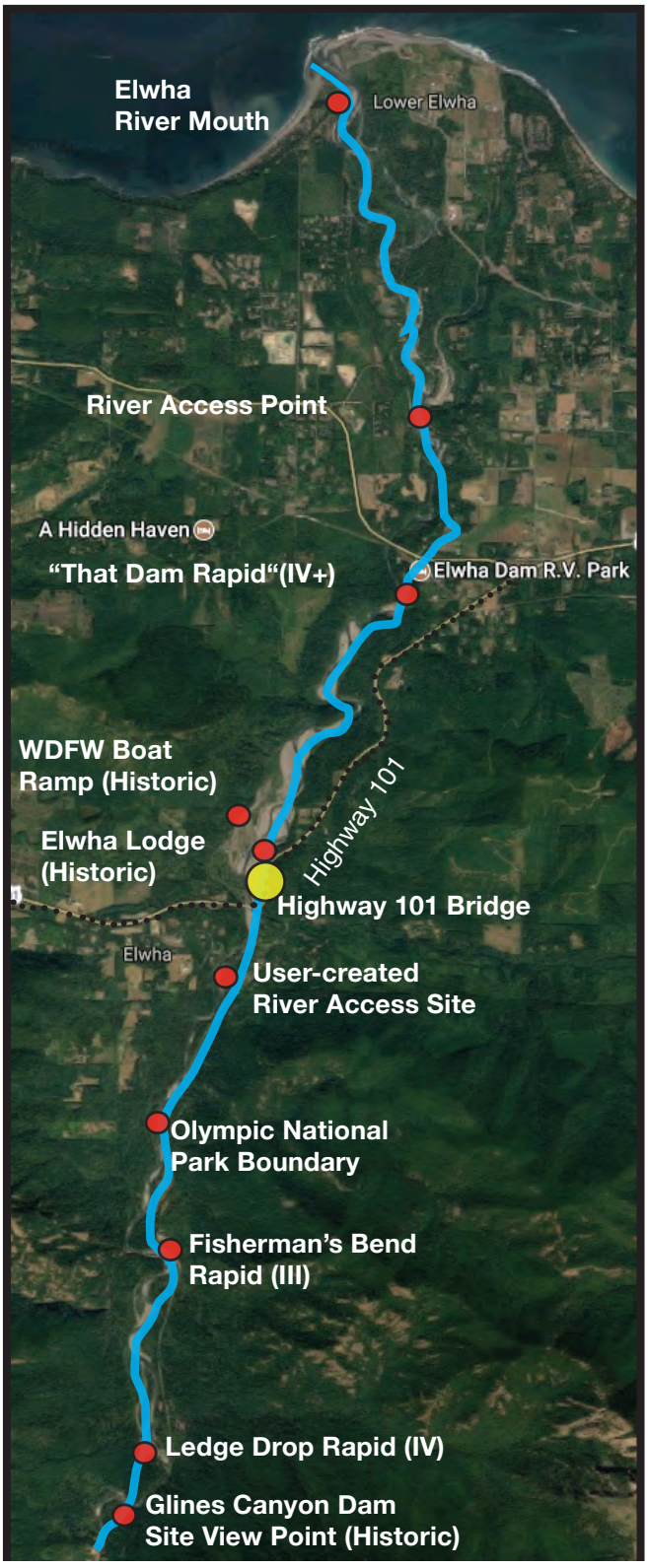
Introduction

This case study applies the River Access Planning Framework to a highway bridge that is being reconstructed across the Elwha River. Bridge right-of-ways are important for access to waterways across the country. A poorly designed project can result in loss of access and missed opportunity, while a well-designed project can enhance the recreation user experience and address potential safety issues at the site.

The National Park Service completed removal of the Elwha Dam from the Elwha River in 2012, and removal of the upstream Glines Canyon Dam in 2014. Prior to dam removal, rafters and kayakers regularly enjoyed the river between the two dams, putting in below Glines Canyon Dam in Olympic National Park and taking-out at the top of the reservoir created by the Elwha Dam (Aldwell Reservoir). Olympic Hot Springs road parallels the river and connects the two access points. The Highway 101 Elwha River Bridge crosses the river at the top of the former Aldwell Reservoir site, and historically, boaters took out at one of two locations immediately downstream of the bridge on the reservoir. These locations have been significantly altered since Elwha Dam has been removed and there currently is no suitable take-out for the run.

The Washington Department of Transportation is planning to reconstruct the Highway 101 Bridge, and Washington State Law requires the agency to evaluate the feasibility of providing public waterway access any time a bridge is reconstructed. The bridge replacement provides an opportunity to consider the options for providing waterway access at this location.

Recreational paddlers have enjoyed the Elwha River within Olympic National Park for decades.



The map of the Elwha River shows the spatial relationships of access points to river features and historic locations within the system. The entire system has changed significantly with the removal of the dams. In particular, the channel bed and alluvial fan at the river's mouth are dramatically different due to the increase in sediment transport. New recreational opportunities are also now available.

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Context

Prior to the removal of Elwha Dam, the two historic access locations just downstream of the Highway 101 Bridge served as a take-out for river runners and provided general access for flatwater recreationists who boated on Aldwell Reservoir.

The first location was at the historic Elwha River Resort, located immediately downstream of the Highway 101 Bridge on the east side of the river, and nestled in between Highway 101 and Aldwell Reservoir. Highway 101 parallels the east bank of the Elwha River/former Aldwell Reservoir and curves sharply to the west just before the bridge. The Resort was built in 1920, and in addition to a gas station and cabins, included a boat ramp and large gravel clearing that trucks pulling boats and travel trailers used, as did vehicles with rafters floating the river. The Resort also had dedicated parking for rafters, and overall was a central location for watersports in the region for many decades.

The Resort eventually fell into disrepair, and all of the buildings have since been removed. However, recreational boaters continued to use the boat ramp and former reservoir resort property as an access point, including for a time after Elwha Dam was removed. The proposed new bridge alignment will pass through the former resort property.

The second access on the reservoir was a Washington Department of Fish and Wildlife (WDFW) boat ramp located on the west bank of the reservoir 0.2 miles downstream of the Elwha River Bridge.

Since Elwha Dam was removed, both sites are no longer feasible for providing access to the river due to the dramatic changes to geomorphology and vegetation in the area. At the WDFW access, the reservoir drained away from the boat ramp immediately after dam removal and vegetation has established on the reservoir bottom lands. At the historic resort property, the river channel eventually migrated away from the boat ramp. As of late 2017, boaters need to walk ¼ mile over debris jams spread out over former reservoir bottom lands, providing a challenge for kayakers and an impractical solution for canoers and rafters.

After a century of use for hydropower production, Elwha Dam removal began in the fall of 2011 and was completed within six months. With removal of the dam the reservoir transitioned to a river environment dramatically changing public access for rafts and kayaks who historically used access points on the upper end of the reservoir as take-outs for river trips.

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Genesis of the Project

In 2016, the Washington State legislature passed legislation requiring the Washington Department of Transportation to prepare a feasibility report on public access as part of the design and construction process for bridges across navigable waterways. This feasibility report "must include a description of the suitability for public use, implications associated with potential access, and the availability of alternate public access within a reasonable distance, if present." (RCW 47.01.500 (3)). Additionally, "to the greatest extent practicable, when constructing a state highway project, including a major improvement project, the department must not adversely impact preexisting, lawful public access to a waterway." (RCW 47.01.500 (2)).

Reconstruction of the Highway 101 Bridge provides an opportunity to improve public access to the river at a site that has historically been used for public access to the waterway.

Purpose and Need

Paddlesports enthusiasts have recognized the Elwha River as a destination for whitewater rafting, kayaking, and canoeing for decades. The segment from Glines Canyon to the Elwha River Bridge is a Class II-III whitewater run that was popular before dam removal and continues to be a close-to-home recreation destination for paddlers living on the North Olympic Peninsula. It is one of the few whitewater runs on the Olympic Peninsula with sufficient flows for whitewater boating during the early part of summer when most other rivers in the region are too low for boating. Now that the two main locations for take-out access are no longer feasible, the whitewater boating community has an interest in improving this situation in conjunction with the construction of a new bridge across the Elwha.

In addition to being the end of a popular Class II-III run, this location is important because there is a challenging Class IV rapid at the former Elwha Dam site. The area in the vicinity of the Elwha River Bridge offers the last practical place to provide a take-out prior to this major rapid. An access at the bridge also allows for an easy shuttle along Olympic Hot Springs Road.

In addition to providing access for boaters, visitors to the region have an interest in learning more about changes to the river following dam removal and seek an opportunity to experience the former reservoir bottom lands directly.

The historic McDonald Bridge was constructed in 1926, but since removal of Elwha Dam was completed in 2012, the elevation of the river bed at the bridge site has lowered 14 feet. Since the bridge foundations are set on gravel, concern over the integrity of the bridge has prompted the Washington Department of Transportation to initiate an emergency project to rebuild the bridge.

The view out across the former reservoir lands from the historic boat launch site at the Elwha River Resort. The active river channel has migrated away from this location.

Existing riprap stabilizes the riverbank next to the existing bridge. This location provides uneven access to the river. The size of the riprap material creates a barrier to access for all but the most agile individuals.

The existing site is clear of vegetation and used by Washington Department of Transportation as a staging area for materials. This site is at the centerline of the new highway alignment highway and will link to the new bridge alignment.

The Elwha River Bridge was built in 1926 and the 3-span, 388-foot, concrete-arch bridge has served the community over 90 years. Alluvial transport of sediments and significant change in river bed morphology have resulted in a river that flows below the bridge foundations.

Framework Assessment

System: River Step Pool

System: River Step Pool
This section of the Elwha River is known for Class II-III whitewater. The river is free-flowing and experiences high flows during rain-on-snow events in early fall. The river is within a 15 minute drive of Port Angeles, Washington with a population of approximately 20,000 and is the closest river run for the local paddling community. The river is approximately 2 hours travel time, including ferry crossing, from the greater Seattle area with a population of approximately 4 million.

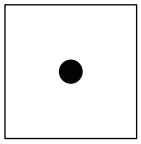
Setting: Natural /Enahnced

Setting: Natural - Enhanced
The river flows through a natural setting. The site at the Elwha River bridge is appropriate for a low level of enhancement.

Temporal: 4 Season

Temporal: 4 Season
Flows on the Elwha are high enough to boat during the winter months and through the spring snowmelt. Flows are often too low to boat in late summer, however it is possible to boat the Elwha year-round depending on snowpack, which varies year to year. A commercial outfitter has operated on the river with a season from late spring to early summer.

Frequency: Low



Frequency: Low
Use is sustained throughout the year at low levels. Weekends are more popular but given the proximity to Port Angeles, weekday use by the local community is common too. Given the easy access to the river from the state highway, paddlers from the greater Seattle area often run the Elwha on trips to the Olympic Peninsula.

Density: Low

Density: Low
Density of use is consistent but low. The river is rarely in use by more than one or two groups at a time. A commercial outfitter has guided trips that involved one to two boats no more than twice a day.

Use Level

Use: Kayaking, Rafting, Canoeing, Sightseeing
The river is used by kayakers, rafters, and canoers. While the general public predominantly uses the river, a commercial outfitter has operated on the river. The river is appropriate for intermediate paddlers with the skills and training to paddle Pacific Northwest rivers. Cold water and wood hazards make this a river that is inappropriate for beginner paddlers or tubers.

Opportunities and Constraints

Following dam removal, opportunities to provide river access for boaters have been limited. The historic access locations are impractical due to dramatic geomorphologic and vegetation changes. Additionally, there are limited alternate sites.

Kayakers sometimes take-out approximately 1.1 miles upstream of the Elwha River Bridge, however, this location is not a practical long-term solution because access is challenging for rafts due to the steep bank and lack of a good eddy.

The new Elwha River Bridge offers an opportunity to realize restoration and recreation goals. The new bridge is proposed to be located north of the existing bridge and will pass through the historic Elwha River Resort property. Although the buildings have been removed, the property continues to provide an informal parking area for visitors inside of the curve of the road, as well as cleared areas that provide potential parking and staging area for a future site.

The purpose of removing the Elwha and Glines Canyon Dams was to restore the Elwha River's once-iconic salmon runs. All projects along the river corridor need to be in alignment with the primary purpose of the $350 million investment in fishery restoration that the Elwha River restoration project represents. The restoration objectives can be realized while recognizing that tourism and river-based recreation are an essential part of the Olympic Peninsula economy. Ideally, any access facilities will include access for kayakers and rafters, as well as opportunities for travelers along Highway 101 to engage in interpretation, viewing, and photographing the river.

The view of the river downstream from the existing highway 101 bridge shows the large cobbles and down woody debris being recruited into the river channel. This tranformation has pushed the mainstem of the river to the north side of the channel.

Using the River Access Planning Framework, we evaluated three options for feasibility of establishing access to the river at the new bridge site. They are identified as options A, B, and C on the site map. Each scenario evaluates vehicle access from Highway 101 to the site, parking location, distance from parking to the river, impacts to existing environmental conditions, and infrastructure needed to support access for whitewater boating, river viewing, and contact access to the water.

Option A:
Under Option A, vehicles will access the site directly off of Highway 101 via a new access road to a wayside visitation area. Parking will be available at an existing cleared meadow that is associated with the historic Elwha River Resort. From this location, visitors will be able to access the river either at the new bridge abutment or via the old boat ramp.

The distance from the parking area to put-in at the bridge abutment under Option A is approximately 200 feet to the new bridge location. Via the old boat ramp, the river is approximately ½ mile away, and includes ¼ of a mile over debris and sediment on former reservoir bottom lands.

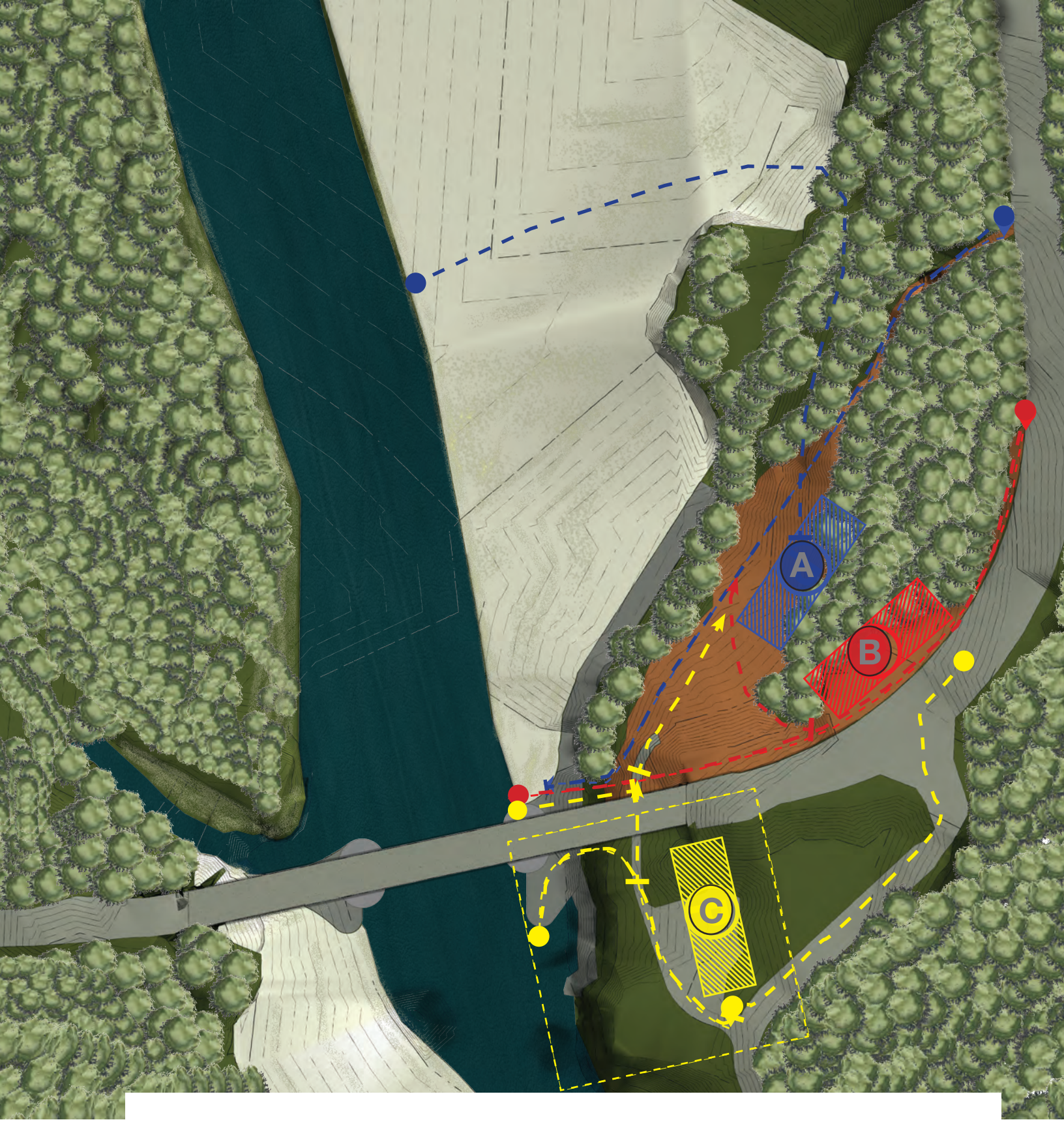
This site requires new infrastructure. The parking area to the bridge abutment is very steep and requires modification in order for the public to safely access the river. Additionally, the grade of the slope between Highway 101 and the parking area is also steep, requiring modification to provide a safe transition off of the highway.

Option B:
Under Option B, vehicles will access the site directly off of Highway 101 via an existing wayside pullout. Parking will be available at an informal parking area that currently exists on the side of Highway 101 inside the road's curve. From here, visitors will be able to access the river either at the new bridge abutment or via the old boat ramp.

The distance from the parking area to put-in at the bridge abutment under Option B is approximately 500 feet. Via the old boat ramp, the river is approximately ½ mile away, and includes ¼ of a mile over debris and sediment on former reservoir bottom lands.

Option C:
Under Option C, vehicles will access the site off of Olympic Hot Springs Road. Unlike Options A and B, where parking is located on the north side of the Highway 101 curve, parking at this location will be available on the south side. From here, visitors will be able to access the river at the new bridge abutment via a river trail, or the old boat ramp. The distance from the parking area to the put-in at the bridge abutment under Option C is approximately 200 feet. Similar to Options A and B, an access trail to the river via the old boat ramp is approximately ½ mile away, and includes ¼ of a mile over debris and sediment on former reservoir bottom lands.

Access to the put in will follow gradual slopes from the parking areas to the river. The path to the put in will follow the construction access developed in support of building the bridge. Possible adjustments to the slope might be needed to support safe pedestrian access but we assume that minimal infrastructure would be needed."



The opportunities and constraints diagram describes three options for developing river access within the boundaries of the new Elwha River Bridge reconstruction project. Each option addresses the location of the parking, the distance from the parking to the river, and the type of access and level of development needed to support a desired user experience.

Option C Prefered Alternative

The desired experience at this site is to provide river access for paddlers while providing opportunities for visitors to experience and interpret the ecology and history of the river. In developing river access within the confines of the new Highway 101 Bridge construction project, Option C is the best option to meet the program elements identified through the River Access Planning Framework while meeting the desired user experience.

Option C is the ideal alternative because:

- It provides an opportunity to develop a river access site for river runners while providing day users with access for passive recreation within a contained site;
- The parking area is 200 feet from the river, which is an ideal distance for paddlers and rafters;
- Drivers access the site from Olympic Hot Springs Road, which is a safer alternative than Highway 101;
- The site's slope between the parking area and the river is gradual, requiring less infrastructure than Options A and B.

More specifically, **Option C** could involve two small parking areas, connected by a trail, located on the terrace above the river. These parking areas would be screened with vegetation to limit visibility of vehicles from the river. Staging areas at the edge of the parking would allow paddlers to unload their gear. A trail would lead from the parking lots to the river via a landscaped grade adjacent to the bridge or natural steps down to the river's edge. For any future option at the site, an ideal put-in and take-out would utilize the existing gravel shoreline located upstream from the proposed bridge abutment or an alternative site downstream of the bridge abutment. Ideally, an eddy will protect the access site.

Site Progam

1. Lower Primary Parking Area
2. Upper Secondary Parking and Maintenance Area
3. Paddler Staging Area
4. Gravel Beach upstream
5. River Eddy and Put in
6. River Access Trail from Parking Areas
7. Vegetation Enhancement Areas