

# Review of Recreational Uses and Associated Flow Needs Along the Main-stem of Los Angeles River



 COUNCIL FOR  
WATERSHED HEALTH



Photo courtesy of Peter Bennett



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## **EXECUTIVE SUMMARY**

The California State Water Board's Recycled Water Policy State Water Board supports and encourages the sustainable use of recycled water to promote conservation of water resources. The policy requires that recycled water used also consider potential effects on beneficial uses, and if necessary, establish flow requirements to support those beneficial uses, including municipal, recreational, industrial, and ecological uses. In much of the State, treated wastewater is released into local streams. Reuse and recycling of treated wastewater can result in a reduction in stream flow. Wastewater dischargers that want to reduce stream flow for reuse and recycling must obtain approval from the State Water Board prior to reducing wastewater discharges. A key step toward obtaining approval is to demonstrate that the reduced discharge will largely not affect fish, wildlife, or other public trust resources, such as recreation.

The need to better understand and establish flow requirements has come to the forefront along the Los Angeles (LA) River. The City of Burbank filed a petition for flow reduction for the purposes of water reuse. As a result, the State Water Boards supported the development of technical tools and approaches that define ecologically protective flows and the flow criteria that sustain specific species, habitats, and beneficial uses. The need for an environmental analysis led to the development of the Los Angeles River Flow Study (Flow Study), a science-based approach for assessing flow needs. The ultimate outcome of the Flow Study is to provide technically sound recommendations and flow alternatives to the Water Boards.

This review is focused on understanding recreational uses that occur along the main-stem of the River and the associated flow needs. We found that the Los Angeles River hosts diverse recreational uses in both the hard bottom and the soft-bottom reaches of the River. The Los Angeles Regional Water Board's 2014 Recreational Use Assessment report (RECUR) completed the most comprehensive assessment of recreational uses along the River, and the findings of those assessments are still largely accurate. Interviews with recreational experts and the use of publicly available data sources have helped refine some flow targets and have highlighted additional uses like scooting, art, photography, educational activities, and wildlife viewing, which were not accounted for in the 2014 report.

As part of the flow study, we interviewed recreational experts about the recreational uses that occur along each reach (Figure 1) of the River and the flow needs for each recreational use. Generally, we found that recreational experts could easily identify indicators for each use, though indicators were not always related to flow. However, they had difficulty in identifying the targets that support each use.

Based on interviews with recreational experts, a subset of recreational activities can only occur in low flow conditions. For example, low flow velocities are required to sustain horseback riding that occurs in channel in reach 3. Low water depths are necessary for community events and unofficial gatherings that occur within the river channel in reach 2. However, water depths ranging from 6 - 36 inches are needed to sustain activities such as, wading (a restricted use), boating, and fishing activities. It is important to note that

fishing experts had difficulty in identifying the flow targets that were important to sustaining the species that are now found along the Los Angeles River and targets for native fish species were provided instead. Although the Los Angeles River is not currently designated for cold water beneficial uses, the State Water Board and the stakeholder group are interested in exploring opportunities for these uses to be supported in the future; including targets for native species will support these considerations. Path uses, or the activities that occur on the levy, like running, walking, biking, dog walking, and scooting, are not affected by flows unless they become dangerously high during storm events where inundation of the bike path may occur, or use is otherwise restricted by Los Angeles County closure of the bike path. According to recreational experts, most recreational activities, with the exception of kayaking, would not be affected by reduced flows.

Experts also noted that flows are important to sustaining aesthetics of the River and aesthetic uses, like photography. Though experts had difficulty in identifying flow targets, they thought water depth was the most important indicator for these uses. Based on the analysis of social media data, there was an increased likelihood of photography (which we deemed an aesthetic use) with increased flows.



Figure 1. Los Angeles River Reaches. Accessibility and water depth classifications based on 2008 LA River Kayak Expedition data (RECUR, 2014).



## **OVERVIEW AND METHODS**

### **Recruiting Participants**

The Council for Watershed Health (CWH) compiled a participant list using an existing stakeholder list from previous planning efforts and internal staff expertise of the organizations engaging on recreational issues. The participant list of 196 individuals was filtered to include non-profit organizations, government entities, community leaders, and local businesses that had missions or programs focused on at least two of the following:

- River access
- Active transit
- Recreation
- River revitalization or rehabilitation
- Community engagement and education

On March 19, 2019, an e-mail invitation was sent out to 52 individuals that fit the participant criteria. For the purposes of this study, we considered selected individuals recreational experts. Recreational experts were sent a summary document about the Los Angeles River Flow Study and the objectives of the recreational group interview. Experts also received an Institutional Review Board (IRB) study consent form and were asked to fill-out a preliminary survey. The survey requested that experts note any additional participants that should be invited to participate in the group interview (known as snowball sampling). Participants that were identified by other experts were invited to participate.

Preliminary survey questions focused on the recreational activities their organizations led, the location where those activities took place, whether recreational activities would be affected by changes in flow, and their availability for a group interview. A total of 18 people responded, 7 (the majority) were available for the April 9 meeting date, and 3 were unavailable during all proposed dates.

Participants that were unavailable for the April 9, 2019 group interview or were underrepresented in the group interview were contacted for a phone interview. The participants that were interviewed over the phone were familiar with fishing, horseback riding, and biking activities along the River. Phone interviews ranged from 1 - 1.5 hours, depending on the participant's capacity and interests.

### **Capturing Uses, Indicators, and Targets**

During the group interview, participants were given background information about each reach including channel morphology, access, and a map of each reach of the River. Participants were asked to review a list of recreational uses for each reach of the Los Angeles River, compiled from previously published reports. Participants then helped update recreational use and identified the indicators and targets for each recreational use, guided by a series of open-ended questions. After a group discussion, the indicators and targets that the group highlighted as being important to sustaining given recreational uses were ranked. This exercise was repeated for each reach of the River, though participants

quickly recognized that the indicators and targets for one of the soft bottom reaches were similar for other soft bottom reaches. The same was true for the hard-bottom reaches. The original intent of the exercise was to have participants rank flow targets when there was disagreement among experts. Since participants struggled to identify targets or only identified a single target, we did not conduct a ranking exercise for most recreational uses.

During the phone interview, participants were asked the same questions as group interview participants. They also reviewed and commented on the indicators and targets that had been captured during the group interview and completed a ranking exercise similar to group interview participants. Unlike the group interview, the phone interviews first focused on the uses and reaches that participants were most familiar with. This was done to accommodate the time constraints of each participant.

Notes or audio recordings were taken during the interviews. The audio recordings were analyzed for themes of discussion and the recurrence, intensity, and the extent of agreement for each topic/theme. Main themes of discussion were also noted during phone-interviews.

### **Social Media Data**

Data was collected and analyzed from the photo sharing social platform, Instagram. Due to updated privacy settings, Instagram data is no longer readily accessible via an automated programming interface (API). Due to the unexpected delay in Instagram granting access to user data via the API, data was collected manually instead. Data collection was limited to 2017 and 2018 due to practical constraints. The photos and captions of geotagged photos along the Los Angeles River were analyzed for content and the recreational uses that were captured or described were tallied. Each social media entry was then joined to the closest Los Angeles County Department of Public Works (DPW) or USGS flow gauge using the date of posting and the location tagged in each post.



## RESULTS AND CONCLUSION

### Agreement between Data Sources

The most popular uses along the Los Angeles River are walking (walking use were grouped with running, jogging, and dog walking activities), biking, and art/photography. The popularity of each use varied depending on the data source. Walking was the activity that was most commonly pictured or described in social media posts, while observational counts along the River found that biking was the most popular use followed by walking/running<sup>1</sup>. Social media data did a better job of capturing the occurrence of art and photography uses that occur along the River. Those activities were largely missed by the RECUR reports and by the expert interviews.

**Table 1. Summary of recreational uses by Los Angeles River reach, according to social media posts from 2017 to 2018.**

	Post	Kayaking	Educational	Community Events	Fishing	Horseback Riding	Wildlife Viewing	Art and Photography	Swimming/Wading	Biking	Walking/Running
Reach 1	156	24	6	6	12	0	18	60	0	12	18
Reach 2	143	0	0	0	0	0	18	19	0	18	88
Reach 3	878	41	52	27	55	22	71	154	0	131	325
Reach 4	236	0	22	21	0	6	28	47	0	18	94
Reach 5	108	20	4	0	0	4	36	28	0	4	12
Reach 6	2	0	0	0	0	0	1	1	0	0	0
<b>Total</b>	<b>1523</b>	<b>85</b>	<b>84</b>	<b>54</b>	<b>67</b>	<b>32</b>	<b>172</b>	<b>309</b>	<b>0</b>	<b>183</b>	<b>537</b>

Social media data was limited in capturing some recreational uses. Fishing uses were poorly documented by social media post. According to social media posts, fishing only occurred in reaches 1 and 3. At the time that the RECUR report was published, fishing was only observed in reach 3 of the River while survey respondents reported that they had observed fishing along reaches 1 through 3. Recreational experts confirmed that fishing is only dependable along the soft bottom sections of reach 1, 3, 4, and 5. Fishing is occasionally observed along reach 2 but is not dependable due to high flows limiting the establishment of fish populations.

Social media data also did a poor job of documenting unofficial uses. Unofficial uses are restricted uses, and they include wading, swimming, and kayaking outside of the recreational zone (which may be designated beneficial uses for other reaches of the River). The populations that engage in these activities may be less likely to post on social media or have some hesitancy in publicly posting restricted activities. Experts noted that they rarely observe unofficial uses occurring along the River, though some unofficial uses are more common in some reaches. For example, wading is more commonly seen in reaches 3 and 5.

<sup>1</sup> LARWQCB. 2014. Recreational Use Reassessment (RECUR) of the Engineered Channels of the Los Angeles River Watershed. Report.

## Flow Relationships: Publicly Available Data

Based on social media and flow gauge data, there was a significant relationship between the likelihood of use and flow volumes for photography and educational activities. In all reaches, the likelihood of photography occurring increased by 96% for each unit increase in flow (cfs). This pattern was consistent with group interview responses where experts noted that flow made the River more picturesque and that visitors were drawn to the River to observe its extreme flows in what they termed, “flow gawking.” In contrast, the likelihood of educational activities occurring decreased by 2.88 for each unit increase in flow.

**Table 2. Results of a logistic regression exploring the relationship between the occurrence of each recreational use and flow. Results for other recreational uses are not presented because they were not statistically significant.**

Use	Reach	Odds Ratio	P-value
Art/photography	All	0.96	0.02
Educational	All	-2.88	0.05

The range of water volumes during the days that recreational uses occurred is summarized in Table 3. While researchers have cautioned that this approach is not the best way to understand flow needs and that a survey or interview approach is preferred<sup>2</sup>, recreational experts often had a hard time identifying the targets and values that can help bound the minimum water volume required for a use to occur. The minimum volume does not, however, help us understand the quality of the recreational experience at these volumes. The minimum volumes noted using social media data are lower than were observed during the 2008 kayak expedition, which took place during a drought year. The lowest flow level during the 2008 kayak expedition near reach 3 was 127 CFS (0.87 ft) and 66.0 CFS (0.45 ft) in reach 5, locations where boating uses are the most popular.

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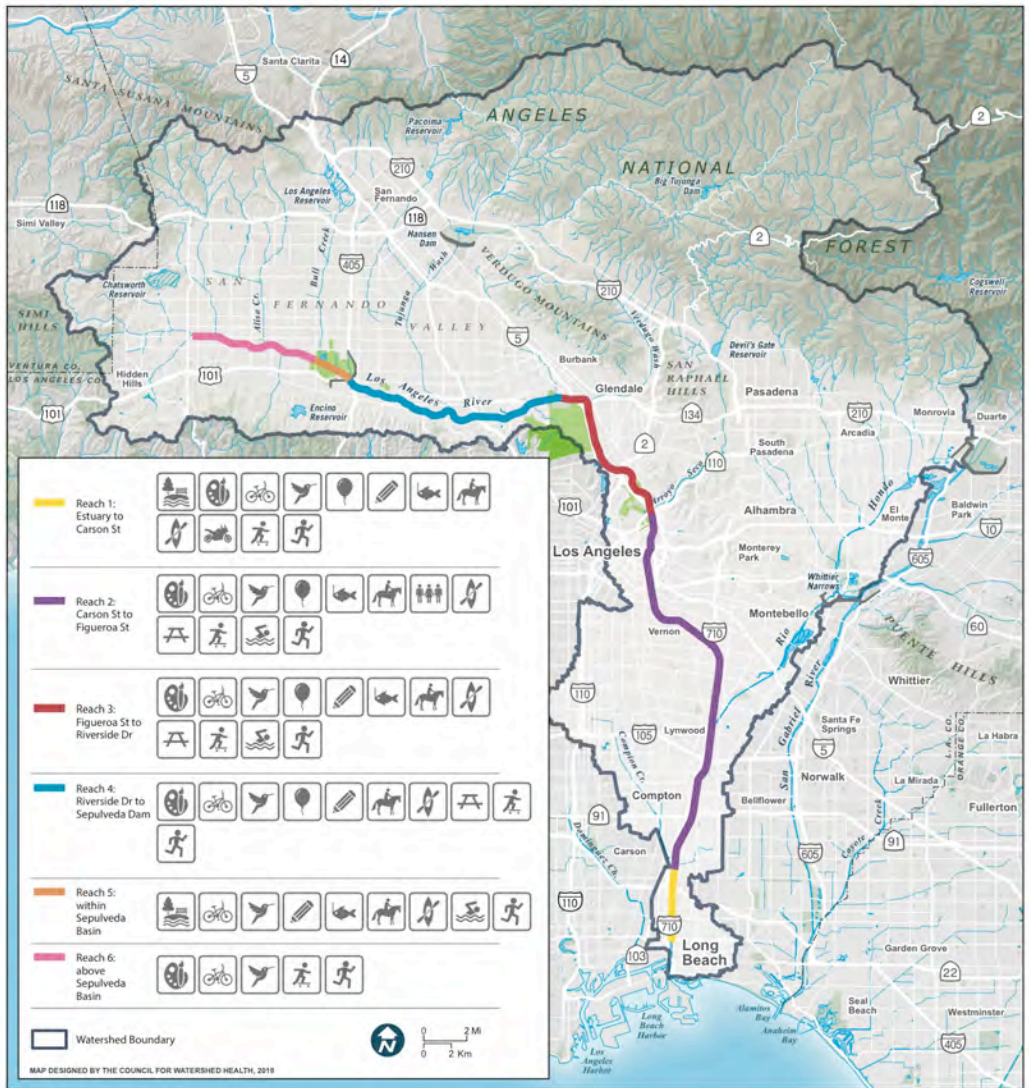
<sup>2</sup> Whittaker, D., Shelby, B., Jackson, W., Beschta, R., 1993. Instream flows for recreation: a handbook on concepts and research methods. US Department of Interior, National Park Service, Rivers and Trails Conservation Program, Cooperative Park Studies Unit, Oregon State University, National Park Service, Water Resource Division.

**Table 3. Range of flow conditions observed for recreational uses. Geotagged social media posts were joined to the nearest LACDPW flow gauge based on location and the date of the post. Note that these do not represent flow criteria and the listed recreational uses may still occur above or below the listed flows.**

<b>Recreational Use</b>	<b>Seasonality</b>	<b>Min (CFS)</b>	<b>Median (CFS)</b>	<b>Max (CFS)</b>	<b>Mean (CFS)</b>
<b>Boating</b>	Spring to early fall	41.2	49.0	144.0	75.0
<b>Fishing</b>	Winter, spring, summer, most popular in summer	37.4	55.1	144.0	73.0
<b>Biking</b>	Year-round, most popular in early fall	35.7	71.7	2100.0	136.0
<b>Wildlife Viewing</b>	Year-round, most popular in summer	22.9	63.6	1880.0	117.1
<b>Educational</b>	Spring, summer, fall, most popular in the summer	37.4	51.7	144.0	61.3
<b>Art/Photography</b>	Year-round	28.2	68.8	3140.0	195.3
<b>Community Events</b>	Spring and summer	43.0	53.4	519.0	92.8
<b>Horseback Riding</b>	Year-round, most popular in summer	41.7	57.9	917.0	199.1
<b>Walking</b>	Year-round, most popular in early fall	30.8	66.2	3140.0	142.3

## **APPENDIX A: GROUP INTERVIEW SUMMARY**

Interviews with recreational experts were helpful in better understanding the recreational uses that occur along the River, the aesthetic and personal values related to the River, and the ways in which recreational uses are intertwined with many other aspects of the River that are not related to flow (Table 4). We found that the main-stem of the Los Angeles River host a diversity of recreational uses (Figure 1) in both the naturalized soft-bottom and the hard bottom reaches. While some uses, such as aesthetic uses, were newly identified through expert interviews, many of the uses that were captured in the 2014 RECUR report were still accurate.



**RECREATIONAL USES**

- |  |                               |  |                        |  |                     |  |                             |
|--|-------------------------------|--|------------------------|--|---------------------|--|-----------------------------|
|  | Aesthetic Enjoyment           |  | Community Event        |  | Horseback Riding    |  | Picnicking                  |
|  | Art**                         |  | Educational Activities |  | Informal Gatherings |  | Skateboarding               |
|  | Biking                        |  | Fishing                |  | Kayaking            |  | Swimming/Wading             |
|  | Birdwatching/Wildlife Viewing |  | Hiking                 |  | Motorcycle Riding   |  | Walking/Jogging/Dog Walking |

\*\* (filmmaking, photography, performance art, painting)

**Figure 2. Summary of recreational uses that occur along each reach of the Los Angeles River. Recreational uses listed in the RECUR report were reviewed and confirmed by recreational experts.**

Generally, experts could easily identify indicators that were important to each use but had a difficult time defining flow targets. When pressed for targets, experts felt uncertain

about assigning numerical values, noting that some field-truthing or consultation with other experts would be required. Experts suggested that biologists should be consulted to define the flow targets for birding and fishing, the Los Angeles County Department of Public Works would best define the volume of water that is contained within the low flow channel for in channel uses, and DPW could best identify the volume at which the bike path becomes inaccessible due to storm flows.

Experts recognized that the indicators and targets that were described for a cement bottom reach would apply for other cement bottom reaches. Thus, the indicators and targets for recreational uses were similar for reaches 2, 4, and 6. Similarly, the indicators and targets for uses that occurred in the soft bottom reaches would largely, with some small modifications, apply to another soft bottom reach (reach 1 near Willow St., reach 3, and reach 5). Participants also grouped uses that occur adjacent to the River channel, such as running, walking, dog-walking, biking, skateboarding, and scooting, into “path uses.” The indicators and targets for the activities that occur on the bike path/on top of the levy were presumed to be the same for all activities. Many of these uses also occur in-channel along sections of the River that are easily accessible, cement bottomed, and where flow is largely confined to the low-flowchannel.

Experts thought that water quality was an important indicator for all recreational uses and indicated that the volume of water that now flows along the River helps to dilute contaminants. Though recreational experts could not identify a volume that would help in maintaining water quality, they thought there needed to be enough water volume so that smell, excessive algal growth, and bio-accumulating contaminants would not cause nuisance or harm to people or wildlife. The potential effects of salts, specific conductance or TDS from natural groundwater discharge were not considered.

The group noted that many people visit the Los Angeles River to appreciate its aesthetic value. Participants recognized that there was aesthetic value and aesthetic uses related to a large, imposing, concrete channel, though, as noted by experts, use of these areas of the River may be borne out of necessity due to a lack of other nearby park spaces. Along reach 1, 2, and 3, experts thought that aesthetics of the River and aesthetic uses (such as photography) were tied to the presence of wildlife and the conditions that support the species that are present.

Safety and access were common and frequent themes of discussion. Those discussions were often focused on indicators and needs outside the scope of this study, such as the need for better signage, the need for better communication and information about the flow velocities in the channel, and the importance of channel access and designs that ensure that conditions are safe for visitors.

Recreational experts were asked about potential future uses along each reach of the River. While there are plans for crossings and riverside parks, experts did not expect uses along the Los Angeles River to change, but rather for there to be more visitors to the River engaging in the activities that already occur. There are discussions about designing sections of the River to encourage in channel summer use along reach 2. Preliminary

designs include allowing wading and kayaking along this reach. Those activities, though rare, have already been documented in those reaches<sup>3</sup>.

**Table 4. Topics identified by recreational experts during the group interview and individual interviews. The recurrence of each topic, the number of participants that brought up each topic, and the intensity (use of emotional language, hyperbole, or superlatives) were tallied from recordings and interview notes.**

Topic	Recurrence	# of participants	Intensity	Reach	Activity
Public Safety (lighting, signage, flows, water quality, and water volume)	16	4	No	2,3	Biking, Kayaking, Wading
Difficulty in defining flow targets- identified targets are best guesses	13	3	No	1,2,3,5	Biking, Aesthetics, Kayak, Birding, Fishing
Enforcement and recreational uses/ unofficial uses	10	6	No	1,2,3	Biking, Wading, Kayaking, Fishing
Water quality as important to all recreational uses	10	4	Yes	All	All
Aesthetics of River is related to presence of wildlife (birding focus)	7	5	Yes	1,2,3	Wildlife, Aesthetics
Park space and ecology along some sections of the River are poor but people still drawn to the River and they use the River as a park space	7	4	No	2	Not specified
Dynamic nature of the River and heterogeneity within River reaches	6	3	No	3	Kayaking
Designing sites or control structures along the River to better host recreational uses	8	3	No	2, 3	Kayaking and Aesthetic Uses

<sup>3</sup> LARWQCB. 2014. Recreational Use Reassessment (RECUR) of the Engineered Channels of the Los Angeles River Watershed. Report.



Need the flow that is there now or more	6	3	No	3	Kayaking, birding
Negative descriptions of the River	6	5	Yes	2	Not specified
Ecology is important aspect of recreation	5	3	No	3	Photography, Art, Kayaking
Access to the River and appropriateness of sites for recreation	5	5	No	2,5	Kayak, Wading
Flood Protection	5	4	Yes	1,3	Path uses
Limitations of only discussing flow when discussing recreational use	4	2	No	Not specified	Not specified
There is a relationship between flow and aesthetics	4	3	Yes	1, 2	Photography
Water quality along the River is not that bad	4	4	No	2,3	Fishing
Unique ecological nature of Arroyo Seco and Verdugo Wash	4	2	No	3	Not specified
Homelessness near the River as a deterrent for recreational use	3	2	No	1,3	Not specified
Too much water in the River	3	2	No	2,3	Horseback riding, Fishing
Experts should define flow targets	3	2	No	Not specified	Fishing, Biking, Community uses
Diurnal variability in uses along the River	3	2	No	Not specified	Not specified
Parks are important, bring people to the River	3	2	No	3	Path Uses

Aesthetic of River related to concrete and scale of infrastructure	2	2	No	1,2	Aesthetics
Reducing flow has no impact to aesthetics	2	2	Yes	2,3	Aesthetics, Horseback riding
Limited availability of real time flow data – need for better and more gauges	3	2	No	All reaches except Sepulveda Basin	Kayaking
Seasonality of flow needs for recreation- Flows are needed in summer	2	2	No	Not specified	Not specified

## Summary of Reach 1 Uses

**Table 5. Summary of recreational uses along Reach 1 of the Los Angeles River. Uses that were added by recreational experts are in yellow, uses that were removed by interviewees are crossed out, uses that were not already captured and were identified in social media posts are in green, and uses that interviewees noted as rare are in a gray. Uses that occur both in-channel and adjacent to the channel are in orange.**

In Channel	Adjacent
Kayaking	<del>Skateboarding</del>
Wading	Walking/Running/Dog-walking
Fishing	Biking
Motorcycle Riding	Horseback Riding
	Art /Photography
	Scooting
	Wildlife Viewing
	Stand-up paddle boarding (future)
	Educational Activities
	Aesthetic Enjoyment
	Community Events

Participants described this area as unique because of the tidal influence at Willow St., the use of the area by shorebirds, and channel features that include rip rap and some soft bottom sections. Participants agreed with all previously surveyed uses but noted that skateboarding was no longer common along this reach. Participants added art, photography, wildlife viewing (birding focused), and scooting to the list of recreational uses. Using social media data, we found that community events and educational activities also occur along this reach. Paddle boarding was noted as a potential future use.

Though many projects, like greenbelts and river front parks, were identified along this reach as part of the Lower Los Angeles River Revitalization Plan, they are not expected

to introduce new recreational uses along this reach. They may, however, increase the popularity of existing recreational uses.

## **Summary of Indicators and Targets - Reach 2**

According to recreational experts, reach 2 is a completely channelized, but popular, section of the River. Since this section of the river is adjacent to populous areas that lack open space, the reach hosts a diverse set of recreational uses. Experts agreed with all previously surveyed uses and added picnicking, walking (in-channel), informal gatherings (exercising, flying kites, and family gatherings), and community events. Social media posts confirmed that educational activities also occur along this reach.

There are many future projects along this reach of the River that were identified in the Lower Los Angeles River Revitalization Plan<sup>4</sup>. The preliminary design for a subset of those projects would increase access to and interaction with the River. As a result, the popularity of wading and kayaking may increase along this reach.

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<sup>4</sup> The Lower Los Angeles River Revitalization Plan. <https://lowerlariver.org/#thePlan>

**Table 6. Summary of recreational uses along reach 2 of the Los Angeles River. Uses that were added by recreational experts are in yellow, uses that were removed by experts are crossed out, uses that were not already captured and were identified in social media posts are in green, and uses that interviewees noted as rare are in a gray. Uses that occur both in-channel and adjacent to the channel are in orange.**

In-channel	Adjacent
Kayaking	Walking
Wading (future use)	Biking
Fishing	Skateboarding
Walking	Horseback Riding
Community-events	Informal Gatherings
	Picnicking
	Educational Activities
	Wildlife Viewing
	Art/Photography

### Summary of Indicators and Targets - Reach 3

Reach 3 is a section of the River that is popular for recreational activities. Experts noted the area near the confluence with the Arroyo Seco is different than the rest of the reach because this area has a tall vertical box channel that reduces river access. In the soft bottom sections, experts agreed with all previously surveyed uses and added art and photography to the list of uses. Social media data confirms all uses, with the exception of swimming and skateboarding. Social media users also posted educational uses along this reach of the River. These uses were not noted by recreational experts or in the RECUR report.

**Table 7. Summary of recreational uses along reach 3 of the Los Angeles River. Uses that were added by recreational experts are in yellow, uses that were removed by experts are crossed out, uses that were not already captured and were identified in social media posts are in green, and uses that interviewees noted as rare are in a gray. Uses that occur both in-channel and adjacent to the channel are in orange.**

In-channel	Adjacent
Kayaking	Art or Photography
Fishing	Walking/Jogging/Dog-walking
Wading	Biking
Swimming	Picnicking
	Skateboarding
	Wildlife Viewing
	Educational Activities
	Horseback Riding
	Community Event

### Summary of Indicators and Targets - Reach 4

Participants agreed with all previously surveyed uses and added horseback riding, picnicking, art, and wildlife viewing. Social media users also posted educational activities and community events along this reach of the River. These uses were not captured during the group interview or in the RECUR report.

**Table 8. Summary of recreational uses along reach 4 of the Los Angeles River. Uses that were added by recreational experts are in yellow, uses that were removed by experts are crossed out, uses that were not already captured and were identified in social media posts are in green, and uses that interviewees noted as rare are in a gray. Uses that occur both in-channel and adjacent to the channel are in orange.**

In-channel	Adjacent
Boating	Picnicking
	Wildlife viewing
	Walking/Jogging/Dog-Walking
	Biking
	Skateboarding
	Horseback Riding
	Art/Photography
	Educational Activities
	Community Events

### Summary of Indicators and Targets - Reach 5

Participants agreed with all uses surveyed by the RECUR report and added art, photography, aesthetic enjoyment, and skateboarding. Social media users also posted educational activities along this reach of the River, this use was not captured during the group interview or in the RECUR report.



**Table 9. Summary of recreational uses along reach 5 of the Los Angeles River. Uses that were added by recreational experts are in yellow, uses that were removed by experts are crossed out, uses that were not already captured and were identified in social media posts are in green, and uses that interviewees noted as rare are in a gray. Uses that occur both in-channel and adjacent to the channel are in orange.**

In-channel	Adjacent
Fishing	Walking/Jogging/Dog-walking
Kayaking	Biking
Swimming	Aesthetic Enjoyment
Wading	Horseback Riding
	Wildlife Viewing
	Educational Activities
	Art/Photography
	Skateboarding

### **Summary of Indicators and Targets - Reach 6**

Participants agreed with all uses surveyed by the RECUR report and added skateboarding. There are no in-channel uses along this reach. Social media data was sparse but users posted educational activities and wildlife viewing along this reach of the River. These uses were not captured by group interview participants or the RECUR report.

**Table 10. Summary of recreational uses along reach 6 of the Los Angeles River. Uses that were added by recreational experts are in yellow, uses that were removed by experts are crossed out, uses that were not already captured and were identified in social media posts are in green, and uses that interviewees noted as rare are in a gray. Uses that occur both in-channel and adjacent to the channel are in orange.**

In-channel	Adjacent
	Walking/Jogging/Dog-walking
	Skateboarding
	Art/Photography
	Wildlife Viewing
	Biking

## Recreational Indicators and Targets - Summary

### Wildlife Viewing

**Table 11. Indicators and targets for wildlife viewing uses in soft bottom and cement bottom reaches. Indicators with the highest ranking are highlighted. For most indicators, participants gave one or no specific target.**

	Indicator	Average Rank	Stdev	Target	Kendall's W
Bird and Wildlife Viewing- Soft Bottom	Spring flows	2.00	1.15	Unknown, generally described as presence of spring flow	0.08
	% Algae cover	2.50	1.97	Unknown	
	Temperature	3.00	.	Unknown	
	Water Depth	3.57	0.98	Both shallow (2-6 inches) and deep (24-36 inches) areas	
	Flow Velocity	4.29	1.25	Unknown	
	% Water area	5.33	0.52	Water should cover 50% of channel	
	Habitat Complexity	6.57	0.53	Unknown- - Narratively described as diversity of flow habitats (pools, riffles, fast/slow water)	
Bird and Wildlife Viewing- Hard Bottom	% Algae Cover	2.00	0.82	Unknown	0.08
	Spring Flows	2.43	1.62	Unknown	
	Water Depth	2.90	1.18	Unknown	
	Substrate	3.14	0.90	Presence of sediment islands and 25-40% channel cover by rocky substrate.	

Wildlife viewing is a recreational use that occurs yearlong. When describing wildlife viewing, recreational experts were largely focused on bird life, particularly along the cement bottom portions of the River. Substrate and habitat complexity were the most important indicators to sustaining wildlife viewing along the River. The flow related indicators varied from soft bottom to hard bottom reaches, whereby depth was the most important along hard bottom areas, and the percent of the channel area that was composed of water was most important in the soft. The cement bottom indicators and targets are largely focused on reach 1, along sections of the River near the Willow Street Bridge that are bordered by riprap. Experts noted that along reach 2, spring flows and algae for foraging become more important to sustaining wildlife. For most indicators, participants gave one or no specific target. There was poor agreement in the rankings among recreational experts.

**Table 12. Indicators and targets for path uses. The indicator with the highest ranking is highlighted. For most indicators, participants gave one or no specific target.**

	Indicator	Average Rank	Stdev	Target	Kendall's W	Notes
Path Activities- All River Reaches	Volume	1.57	0.79	Below 150,000 CFS or flood capacity of channel	0.05	Participants noted that path activities are not associated with flow.
	Flow Velocity	1.86	0.69	8-9 MPH		
	Depth	2.57	0.79	Unknown		

Recreational experts largely agreed that path activities, those that take place on the levy including biking, walking, running, scooting, and dog-walking, were not affected by flow. Flows were only important during storm events when dangerously high flows could inundate the bike path. Many path uses also occur within the river channel, the indicators and targets for those activities are described in community uses. There was some disagreement in the rankings among recreational experts, but based on average ranking, depth was the most important indicator.

**Table 13. Indicators and targets for aesthetic uses. Indicators with the highest ranking are highlighted. For most indicators, participants gave one or no specific target.**

	Indicator	Average Rank	Stdev	Target	Kendall's W
Aesthetic-Hard Bottom	Birding Indicators	4.20	1.60	Aesthetic value is associated with the presence of wildlife. See wildlife viewing indicators.	0.02
	Flow velocity	3.43	0.90	Flow that ensures that there are no vector control issues, specific target is unknown	
	Depth	3.14	0.83	1.5 inches of water in channel bottom or low flow channel	
	Presence of Water	2.57	1.05	Presence	
	Exposed Bank	1.43	0.73	80-90% of bank exposed	
Aesthetic-Soft Bottom	Depth	3.67	1.03	Unknown	0.02
	Flow velocity	3.50	1.05	Unknown	
	Birding indicators	3.00	2.00	Aesthetic value is associated with the presence of wildlife and birds	
	Water Quality	2.00	0.89	Unknown	
	Exposed Bank	1.83	1.17	Unknown	

Aesthetic uses of the River occur year-round in both the soft bottom and cement bottom portions of the River and are tied to admiring the scale of the flood infrastructure, storm flows, and the presence of wildlife. Some aesthetic uses include photography and art. Recreational experts thought that flows were important to sustaining aesthetic uses along the River. The most important indicator in the soft bottom portions of the River is depth. The most important indicators in the hard bottom portions are the presence of wildlife and flow velocities. There was poor agreement among experts in the ranking of indicators.

**Table 14. Indicators and targets for community uses. Indicators with the highest ranking are highlighted. For most indicators, participants gave one or no specific target.**

	Indicator	Mean	Stdev	Target	Kendall's W
Community Events and Unofficial Gatherings, Community Uses	Flow Velocity	1.17	0.41	Flow target unknown. Narratively described as flows that are low enough to be fully contained in the low flow channel	0.14
	Water Depth-Max	1.83	0.41	Depth target unknown. Narratively described as a depth of water that is low enough to be contained in the low flow channel	

Community events, like the South East Los Angeles (SELA) Arts Festival, and unofficial uses (like gatherings and in-channel exercise) occur within the River channel. Unofficial uses occur year-round, except during storm events, while official community events, like SELA Arts Festival, only take place during the summer. Recreational experts thought that reduced flows are important to sustaining these recreational activities and that water depth and flow velocities need to be fully contained within the low flow channel.

**Table 15. Indicators and targets for wading use. The indicator with the highest ranking is highlighted. For most indicators, participants gave one or no specific target.**

	Indicator	Average Rank	Stdev	Target	Notes	Kendall W
Wading- Soft Bottom	Level Surface	2.83	1.94	Unknown	Slipping hazard noted with sloped or slick surfaces	0.01
	Access	3.00	1.87	Unknown	Gentle slope entering and exiting River is important	
	Water Quality	3.50	1.05	Unknown	Smell and algae listed as concerns	
	Substrate	3.67	1.97	Unknown	Dominance of sand and fine substrates to avoid slipping and rough surfaces	
	Flow Velocity	4.00	1.41	Unknown	Described as "gentle flows"	
	Depth	4.17	1.94	18 inches	Depth of water to reach the knee	

Wading occurs in the spring and summer along many reaches of the Los Angeles River. According to experts, wading is rare and dangerous along the hard bottom reaches. In the soft bottom portions of the River, depth and velocity are the most important indicators for sustaining this use. Recreational experts did not differentiate between wading and swimming, particularly because swimming is rare along the River. There was poor agreement among experts in the ranking of wading indicators.

**Table 16. Indicators and targets for the kayaking/boating use. Indicators with the highest ranking are highlighted. For most indicators, participants only gave one target, and there was no disagreement within the group. However, in reach 5, one participant noted that 6 inches of water depth was conducive to good kayaking conditions. This depth is lower than the 18 inches required along the Glendale Narrows.**

	Indicator	Average Rank	Standard Deviation	Target	Notes	Kendall's W
Boating- Hard Bottom	Flow Velocity	1.50	0.84	Unknown		0.06
	Water Quality	2.33	0.82	Unknown	Smell and algal blooms listed as principal concern	
	Access	2.67	1.21	Unknown	Sub-indicators related to safety of users in entering and exiting the River	
	Depth	3.50	0.84	6" poor, 18" good, 25" optimal	Depth required also depends on vessel and weight of the person. Targets are best estimates.	
Boating- Soft Bottom	% Veg Cover	2.33	1.97	Unknown	15% poor, 30% good	0.07
	Substrate	3.33	2.42	Unknown	Sandy substrate ensure that users to not fall or slip. Currently the river has some sharp pieces of cement along the channel bottom. These sharp substrates can create dangerous conditions for users.	
	Proximity to vegetation	3.60	1.82	Unknown	Boating near vegetation and a vegetative buffer important to recreational uses	
	Water Quality	3.83	1.33	Unknown	Algae and smell listed as main concerns	
	Flow Velocity	4.17	1.47	Unknown	According to experts, the range of flow velocities observed during the summer do not affect boating activities.	
	Access	4.83	1.17	Unknown	Sub-indicators related to safety of users in entering and exiting the River	
	Depth	6.40	1.95	6" poor, 18" good, 25" optimal	Given the complexity of the channel bottom, experts thought that the depth indicator should be applied to the most elevated sections of the River. Depth required also depends on vessel and weight of the person. Targets are best estimates	



Boating along the River largely occurs during the summer months (from Memorial Day to the end of September). Depth is an important indicator for sustaining boating along the Los Angeles River in both soft bottom and cement bottom sections. One expert noted that the reaches currently lack the flow that would host optimal conditions for boating.

Though experts expressed uncertainty and difficulty in defining targets, particularly given the complexity and heterogeneity of the soft bottom portions of the River, there was strong agreement regarding the targets that were selected. Experts noted that there was only a single gauge that provided real time data for the River, the USGS gauge at the Sepulveda Basin, and that estimated flow targets were educated guesses based on the limited data that is available. One expert also noted that conditions were poor for kayaking at volumes that exceeded 2,000 CFS at the Sepulveda Basin.

Experts noted that boating is best in the afternoon, when releases from Publically Owned Treatment Works (POTW) provide enough water for kayaking and worse in the mornings when POTW releases are reduced. Since the Sepulveda Basin is relatively flat compared to the Glendale Narrows, one expert thought that 6 inches of water along this reach would be sufficient to support kayaking. Not all experts agreed.

**Table 17. Indicators and targets for fishing uses. The indicators with the highest ranking are highlighted. For most indicators, experts had difficulty in defining targets for the species currently found along the channelized portions of the River and thought biologists could better estimate flow targets. The targets listed are for trout, which, according to fishing experts, would suit a larger assemblage of fish species including the potential for future use by coldwater species**

	Indicator	Average Rank	Stdev	Target	Notes
Fishing- Hard	Volume	1.86	1.07	20 CFS (trout)	
	Water Quality	2	0.93	Unknown, DO and nutrients identified as important to sustaining fish populations	
	Flow Velocity	2	-	Max of 6 ft/s for trout, 2-3 ft/s for people to comfortably wade	Suggested by fishing expert after the group interview and was ranked most important.
	Depth	2.29	1.18	Minimum of 12 inches, 36 is maximum depth that anglers can comfortably wade	
Fishing Soft	Spring Flow	2	1.15	Unknown	
	Algae Cover	2.5	1.97	Unknown	
	Depth	3.57	0.98	Minimum of 12 inches, 36 is maximum depth that anglers can comfortably wade	
	Water Area	3.67	2.64	Unknown	
	Contaminant Level	3.67	0.82	Unknown- concern is bio-accumulating contaminants that cause harm to wildlife and people	
	Water Quality	4.17	3.31	Unknown, nutrients and DO is concern	
	Flow Velocity	4.29	1.25	2-3 ft/s is safest for anglers	
	%Vegetative Cover	5.33	0.52	Unknown	
	Temperature	6.14	1.95	60-65° F for trout	
	Habitat Complexity	6.57	0.53	Unknown- narratively described as varying depths, velocities, riffles, pools, runs, fast/slow water	

Fishing occurs year round, except during storm events, but is more common during the recreational season that spans from Memorial Day to late September. Fishing is limited to the soft bottom portions of the Los Angeles River. According to fishing experts, fish are occasionally seen in the fully channelized portions of the River, but the lack of channel complexity that helps create flow refugia would make it unlikely that these areas are able to sustain fish populations and regular fishing activities. Popular locations for fishing are the Sepulveda Dam and the soft bottom portions of the River that occur from Forest Lawn (reach 4) to the Arroyo Seco (reach 3), and the soft bottom areas near Willow Street.

There were several non-flow related indicators that were important to fishing uses including habitat complexity and vegetative cover. The important flow related indicators were temperature and velocity in the soft bottom portions and depth in the cement bottom areas.

Fishing experts were not present at the group interview, so the indicators varied considerably between the group interview and individual interviews. As a result, Kendall’s coefficient of concordance could not be calculated. One of the fishing experts added resting pool depth, slope, and active channel width to the list of indicators along the soft-bottom areas. This expert ranked volume and depth as the most important indicators in the soft bottom sections, and ranked volume and velocity as the most important indicators along the hard bottom sections. Fishing experts noted that reduced flows would not negatively affect fishing activities but that a depth of at least 12 inches is necessary to sustain fishing activities.

Generally, experts had difficulty in identifying flow targets for the recreational fishing use and suggested that biologist define appropriate flow targets. The fish specific targets that are described in Table 17 are for trout and not the species that are commonly found along the main-stem of the Los Angeles River.

**Table 18. Indicators and targets for horseback riding. The indicator with the highest ranking is highlighted. For most indicators, experts had difficulty in defining targets. Unlike other uses, horseback riding experts (n=2) perfectly agreed on the indicators and the ranking of those indicators.**

Indicator	Average Ranking	Stdev	Target	Notes
Flow Velocity	3	0	Unknown	
Depth	2	0	Unknown	
Volume	1	0	34,700 CFS along reach 3, unknown in other reaches	Reach 3 of the river has reduced flood capacity. This target is for horseback riding that occurs adjacent to the River. The volume target is unknown for all other locations.

Horseback riding along the River occurs year round except during storm events. In reach 2, the equestrian trail is on the toe of the slope of the River channel, opposite of the River. Horseback riders have no contact with the River along this reach unless they are accessing underpasses as crossings.

Originally, horseback riding was grouped with path uses because experts thought that horseback riding was largely unaffected by flows unless they were on the bike path during a large storm. However, horseback riding occurs both in-channel and adjacent to the channel along reach 3, near Griffith Park. Since some horseback riders will ride in-channel in reach 3, the targets for velocity, depth, and volume would be lower along this reach of the River.

The most important flow indicator for sustaining horseback riding activities was flow velocity. Experts could not identify a velocity target, neither along trails nor in-channel. Though the experts that were interviewed for this use were most familiar with a single reach, experts were in perfect agreement regarding the rankings across reaches.