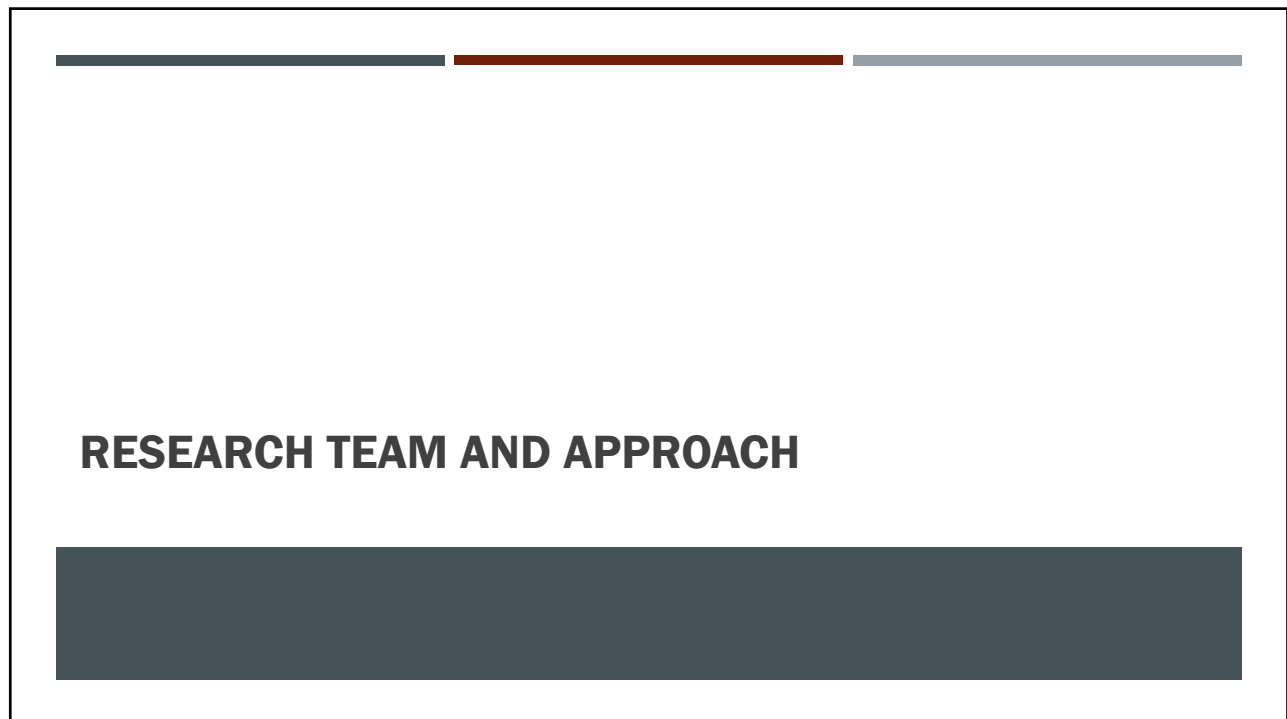




1



2

RESEARCH TEAM

- Department of Business Administration
 - Jason Carter, Ph.D., Assistant Professor of Business Administration, Chair of Business Administration
- Department of Natural Sciences
 - Amanda Masino, Ph.D., Associate Professor of Biology, Chair of Natural Sciences
 - Wenxian Tan, Ph.D., Assistant Professor of Biology
- School of Business and Technology
 - Rohan Thompson, Ph.D., Associate Professor of Business Administration, Dean of the School of Business and Technology



3

GUIDING QUESTIONS

- What is the carrying capacity of Lady Bird Lake?
- What data are needed to assess the carrying capacity of Lady Bird Lake, for this study and for future monitoring?
- How can PARD manage carrying capacity and address capacity-related challenges to Lady Bird Lake?



4

CARRYING CAPACITY

- **Recreational carrying capacity** - the number of watercraft on a body of water or level of shoreline development of a body of water that can be supported without ill effects on users, water, and environment.
- **Ecological carrying capacity** - the number of organisms that can be supported in a specific environment without deleterious ecological consequences.
- **Spatial or facility carrying capacity** – level of resource usage that maintains sufficient physical space for safe watercraft operations, water access, and parking.
- **Experiential or social carrying capacity** – level of resource usage that preserves positive user experience and limits user perception of crowding.



5

DATA COLLECTION

- Watercraft census via drone and ground-based counts
- Parking lot census
- Lake user survey
- Stakeholder interviews
- Environmental justice analysis
- Shoreline habitat assessment
- Water quality testing
- Existing City data: Austin Lake Index data, algal testing data, and previous studies conducted by Watershed Protection Department (WPD); concessionaire data, violations data from Parks and Recreation Department (PARC).



6

RESULTS

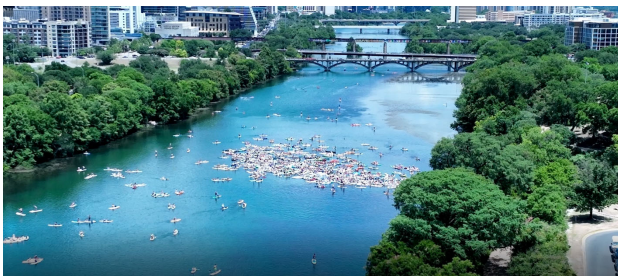
7

WATERCRAFT CENSUS

- Target recreational boat density for kayaks/canoes is **1-1.3 acres/boat** (NYSOPR 2001; Warren and Rea 1989)
- LBL average boat density calculated from aerial counts on 5/29 (Sunday, Memorial Day weekend), 6/18 (Saturday, non-holiday), and 7/2 (Saturday, July 4 weekend) ranged from **0.40-0.67 acres/boat**, meaning that density exceeded recommended targets on these days.
- LBL average boat density on 6/17 (weekday) was **2.34 acres/boat**, within target density.

8

WATERCRAFT CENSUS

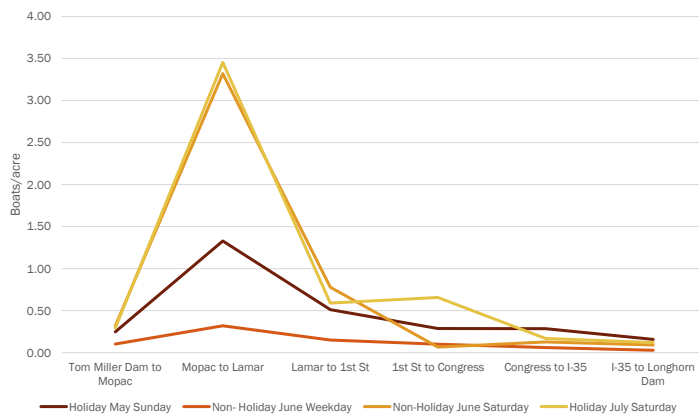


Date	Lake region	Boat count	Acres/ boat
6/17/2022 (Friday)	Tom Miller Dam to Mopac	38	2.20
	Mopac to Lamar	70	0.78
	Lamar to 1 st St	19	1.78
	1 st St to Congress	6	2.57
	Congress to I-35	17	4.31
	I-35 to Longhorn Dam	20	8.89
	Lady Bird Lake Total	188	2.34
7/2/2022 (Saturday)	Tom Miller Dam to Mopac	109	0.77
	Mopac to Lamar	756	0.07
	Lamar to 1 st St	75	0.45
	1 st St to Congress	39	0.40
	Congress to I-35	47	1.56
	I-35 to Longhorn Dam	84	2.12
	Lady Bird Lake Total	1110	0.40



9

WATERCRAFT CENSUS

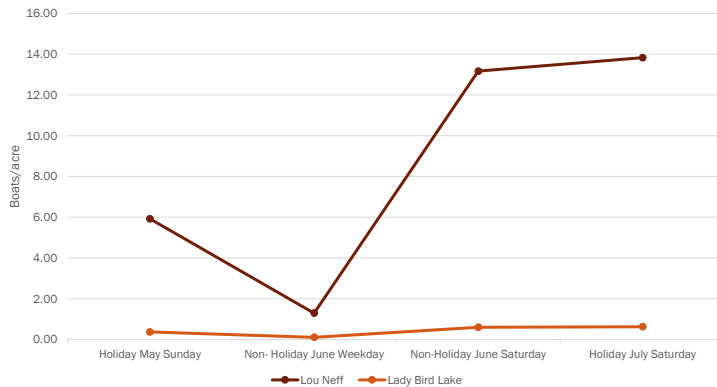


- On all days, density was highest in the Mopac to Lamar segment of Lady Bird Lake
- On all days, density was lowest in the I-35 to Longhorn Dam segment of Lady Bird Lake



10

WATERCRAFT CENSUS



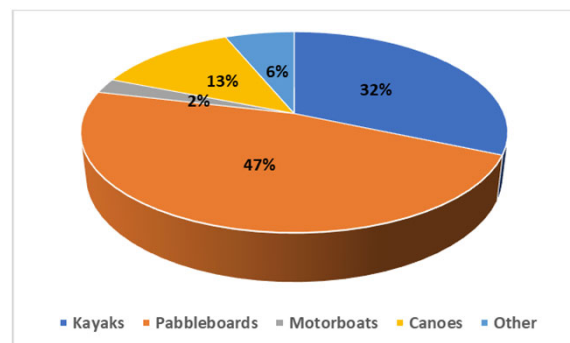
- Minimally mobile boats at Lou Neff Point comprised 54-61% of the craft in the Mopac to Lamar segment.
- The watercraft density in this “flotilla” was 12-22 times higher than the average density of the entire lake.



11

WATERCRAFT CENSUS

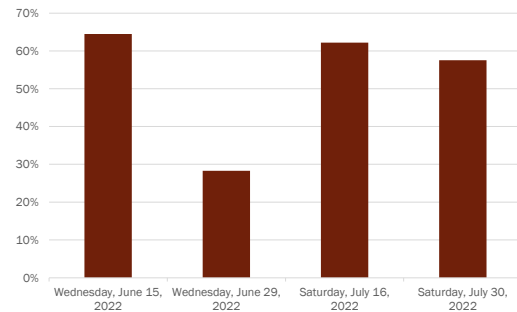
- Ground based counts were used to confirm watercraft type and investigate weekday density.
- 150 separate counts were taken from six observation points: Texas Rowing Center boat ramp, Lamar Bridge, Congress Bridge, Holiday Inn Boat Ramp, Epic SUP boat ramp, and Festival Beach boat ramp.
 - 115 counts were taken on weekdays, 22 on Saturdays, and 13 on Sundays.
- Overall density was 1.91 acres/boat, reflecting more counts taken on lighter use days.



12

PARKING LOT CENSUS

- A total of 841 parking lot spaces were observed in 20 lots.
 - Six lots East of I-35 (239 spaces)
 - Three lots around Barton Creek (140 spaces)
 - 16 lots between Mopac and First street (456 spaces).
- The average parking lot usage rate over all four counts was 53%, or 447 vehicles occupying spaces.
- The lot count was a sampling of lots and did not include street parking or unmarked parking areas, such as the gravel lot off Lou Neff Road.



13

LAKE USER SURVEY

- An online survey was used to assess the experiences and perceptions of Lady Bird Lake users.
 - 13 items about user experience
 - 11 items about concerns and threats to the lake
 - 3 questions specific to business owners
 - 3 open-ended responses
 - 9 demographic questions
- The bilingual (Spanish/English) survey was distributed via current concessionaires, outdoor recreation groups, education groups, community groups, student groups, PARD and the Texas Parks and Wildlife Department.
- Survey participation was incentivized with a gift card drawing.



14

SURVEY RESPONDENT PROFILE

Race/Ethnicity	Number	Percentage
African American/Black	28	4.5%
Alaskan Native	3	0.5%
American Indian	28	4.5%
Asian American	10	1.6%
Hispanic/Latinx	33	5.3%
MENA	1	0.2%
More than One Race	65	10.5%
Native Hawaiian	2	0.3%
Non-Hispanic White	426	68.5%
Other	5	0.8%
Decline to Answer	21	3.4%
Total	622	100.0%

Gender Identity	Number	Percentage
Female	250	40.2%
Male	297	47.7%
Nonbinary	8	1.3%
Transgender	12	1.9%
Other	2	0.3%
Decline to Answer	15	2.4%
Total	584	100.0%

Veteran Status	Number	Percentage
No	439	75.2%
Yes	119	20.4%
Decline to Answer	26	4.5%
Total	584	100.0%

Disability Status	Number	Percentage
No	473	81.0%
Yes	93	15.9%
Decline to Answer	18	3.1%
Total	584	100.0%

- By race/ethnicity, most survey respondents were Non-Hispanic White (68.5%).
 - The City of Austin population is 8.93% Asian, 6.86% Black, 32.48% Hispanic/Latinx, and 3.87% multiracial.
- By gender, most survey respondents were males (47.7%).
- Respondents include more veterans and persons with disabilities than expected based on City demographics.

n = 622



15

SURVEY RESPONDENT PROFILE

Employment Status	Number	Percentage
Employed full-time	404	70.3%
Employed part-time	81	14.1%
Retired	56	9.7%
Student	17	3.0%
Unemployed	17	3.0%
Decline to Answer	0	0.0%
Total	575	100.0%

Annual Household Income	Number	Percentage
Less than \$10,000	4	0.7%
\$10,000 to \$19,999	15	2.6%
\$20,000 to \$29,999	39	6.7%
\$30,000 to \$39,999	43	7.4%
\$40,000 to \$49,999	45	7.7%
\$50,000 to \$74,999	98	16.8%
\$75,000 to \$99,999	123	21.1%
\$100,000 to \$199,999	118	20.2%
More than \$200,000	44	7.5%
Decline to Answer	54	9.3%
Total	583	100.0%

Housing Situation	Number	Percentage
Own a home/apt/condo	382	65.4%
Rent a home/apt/condo	159	27.2%
Stay with someone	31	5.3%
Unhoused	2	0.3%
Decline to Answer	10	1.7%
Total	584	100.0%

- Most respondents (70.3%) were employed full time.
- 65.7% of the respondents make at least \$50,000 annually, while 17.3% make less than \$40,000.
- Most respondents (65.4%) own their place of residence.

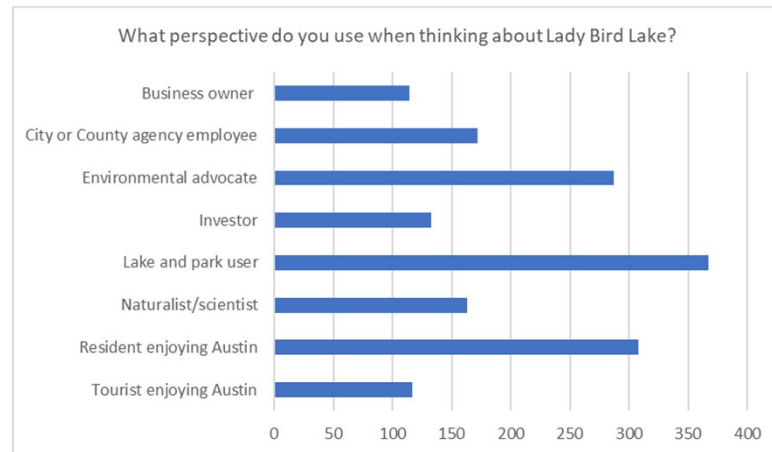
n = 622



16

SURVEY RESPONDENT PROFILE

- 77.8% of respondents brought a specialized perspective to the survey.
- 140 out of 622 only applied the more generic perspectives of lake and park user, resident enjoying Austin, and/or tourist enjoying Austin.

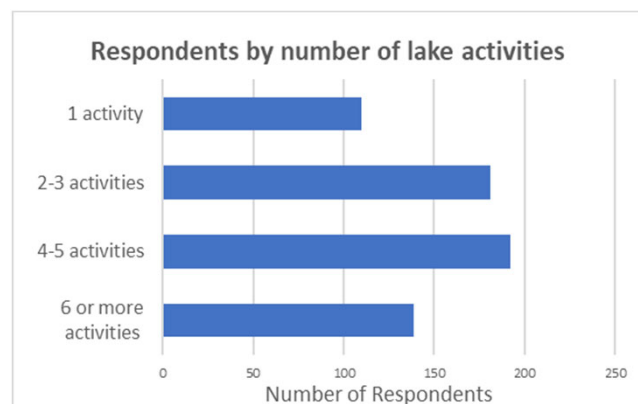
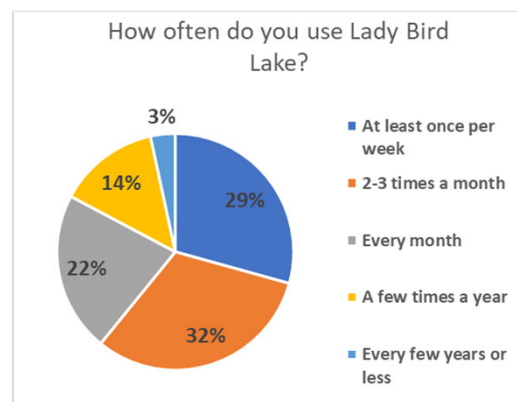


n = 622



17

SURVEY RESPONSES: USE PATTERNS



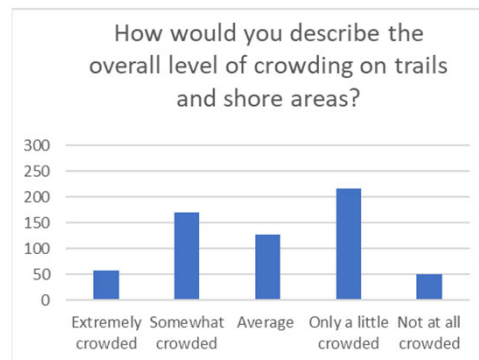
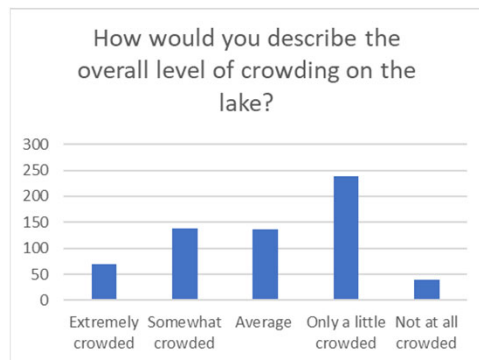
- 88.6% of respondents participated in 2 or more activities at Lady Bird Lake. The most frequently reported activity was walking/hiking, with 256 of 622 indicating that they participated in this activity, closely followed by kayaking, relaxing outdoors, cycling, and dog-related activities.

n = 622



18

SURVEY RESPONSES: CROWDING



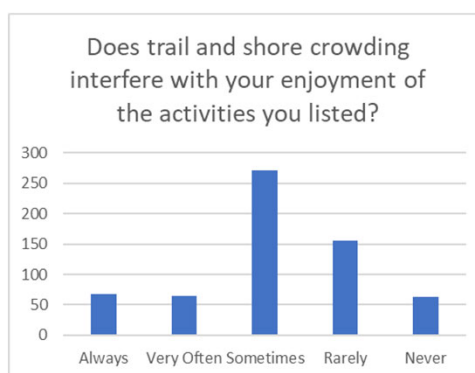
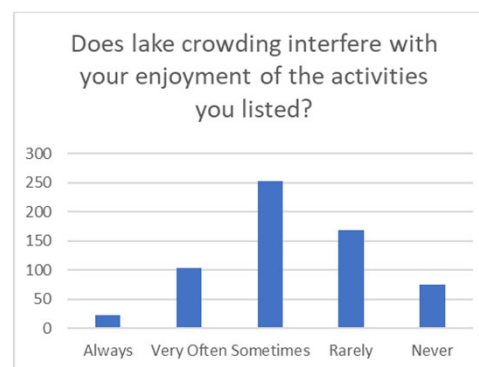
- 33.3% of respondents characterized the lake as extremely or somewhat crowded while 36.5% characterized the shore and trail in this way.
- 42.9% characterized the lake and 44.9% characterized the shore and trails as only a little crowded or not at all crowded.

n = 622



19

SURVEY RESPONSES: CROWDING



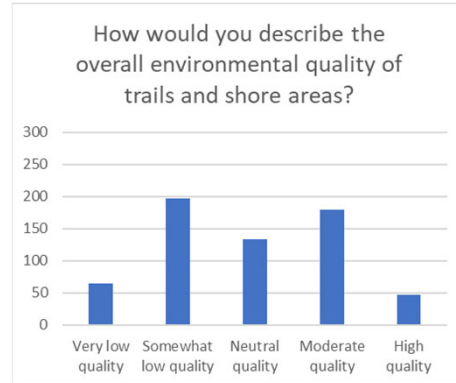
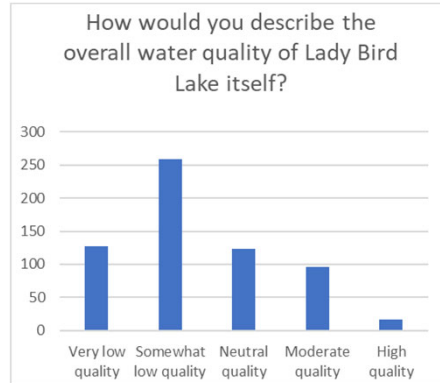
- 61.4% experienced a loss of enjoyment due to lake crowding at least some of the time.
- 60% experienced a loss of enjoyment due to shore and trail crowding at least some of the time.

n = 622



20

SURVEY RESPONSES: WATER AND ENVIRONMENTAL QUALITY



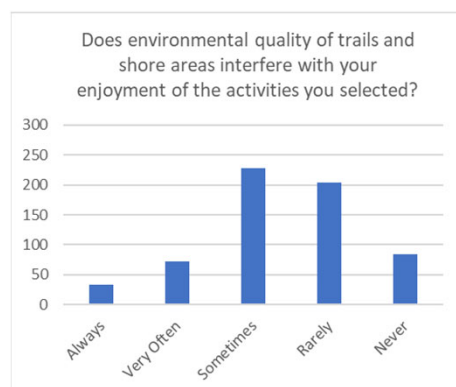
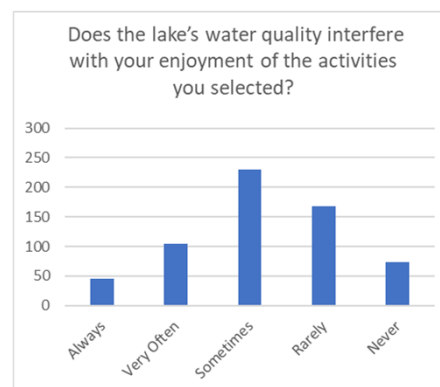
- 2.7% of respondents believe the overall water quality level in Lady Bird Lake is high, while 62.1% find it to be very low or somewhat low quality.
- 7.5% of respondents rated the environmental quality of trails and shore areas as high, while 42.0% rate it very low or somewhat low quality.

n = 622



21

SURVEY RESPONSES: WATER AND ENVIRONMENTAL QUALITY



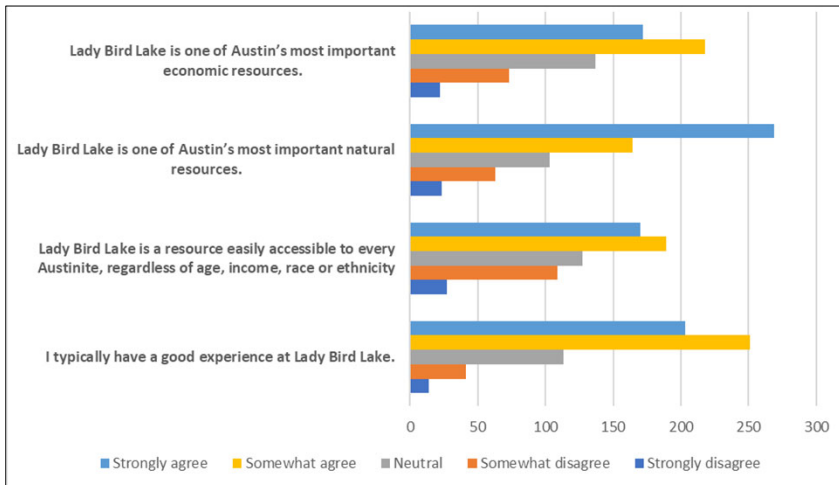
- 61.1% experienced a loss of enjoyment due to water quality at least some of the time.
- 53.7% experienced a loss of enjoyment due to trail and shore quality at least some of the time.

n = 622



22

SURVEY RESPONSES: GENERAL PERCEPTIONS



69.6% either strongly or somewhat agreed

21.8% somewhat or strongly disagreed

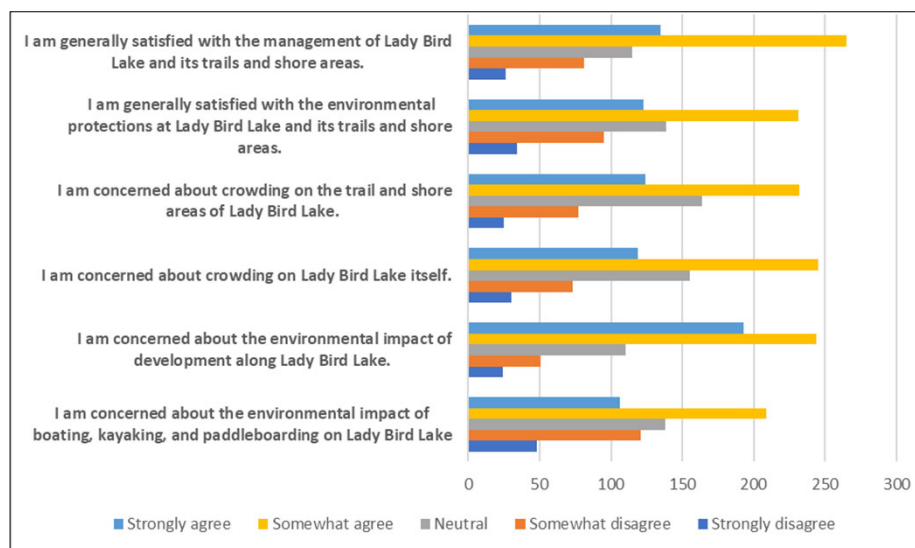
73.0% either strongly or somewhat agreed

n = 622



23

SURVEY RESPONSES: MANAGEMENT AND CONCERNS



n = 622



24

SURVEY RESPONSES: MANAGEMENT AND CONCERNS

- 63.4% of respondents somewhat or strongly agreed with the statement “I am generally satisfied with the management of Lady Bird Lake and its trails and shore areas”
- 56.9% of respondents somewhat or strongly agreed with “I am generally satisfied with the environmental protections at Lady Bird Lake and its trails and shore areas.”
- 70.3% are strongly or somewhat concerned with the environmental impact of development, 58.5% with lake crowding, and 57.2% with trail crowding.



25

SURVEY RESPONSES: CURRENT PROBLEMS

How much of a problem is each of the following at Lady Bird Lake?

	Water Quality	Algal Blooms	Litter/Trash	Environ. Quality	Degraded Habitat
Critical problem	21.4%	23.0%	19.1%	19.3%	17.7%
Significant problem	34.7%	34.6%	32.2%	31.8%	30.7%
Average problem	27.8%	26.2%	32.0%	31.7%	32.2%
Small problem	12.2%	12.2%	13.8%	13.0%	14.3%
Not a problem	3.9%	4.0%	2.9%	4.2%	5.1%

- Highest concern problems: water quality (3.75), algal blooms (3.6), litter/trash (3.51), environmental quality (3.49), and degraded habitat (3.41) [scale of 1-5]
- Lowest concern problems: boat congestion, costly amenities, and noise
- Other problems: crowding, few access points, inadequate parking, loose dogs, personal safety, poor compliance, property crime, water level changes.

n = 622



26

SURVEY RESPONSES: FUTURE THREATS

How do you rate each of the following potential threats to Lady Bird Lake over the five years?

	Pollution	Population Growth	Environ. Degradation	Water Scarcity	Overuse
Critical threat	25.7%	25.2%	23.2%	25.2%	18.5%
Significant threat	34.6%	32.5%	33.3%	30.5%	31.0%
Average threat	24.9%	27.0%	28.5%	27.7%	29.3%
Small threat	11.3%	12.1%	10.9%	12.1%	15.6%
Not a threat	3.5%	3.2%	4.2%	4.5%	5.6%

- Highest concern threats: pollution (3.68), population growth (3.64), environmental degradation (3.60), water scarcity (3.60), and overuse (3.41) [scale of 1-5]
- Lowest concern threat: lack of economic opportunity
- Other threats: climate change, inappropriate zoning, increased costs, lack of compliance

n = 622



27

SURVEY RESPONSES: FUTURE THREATS

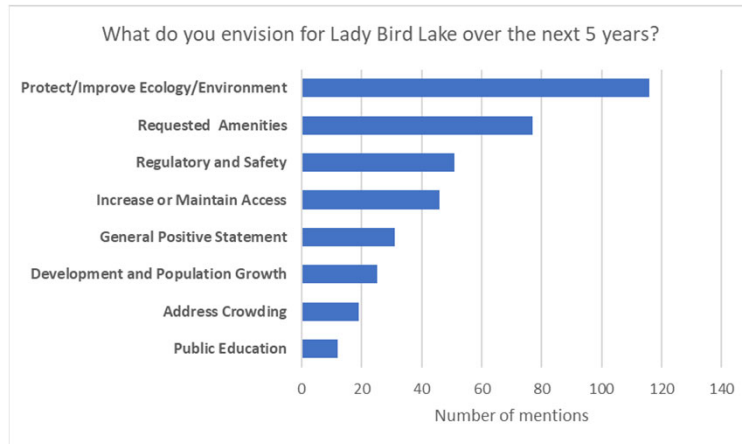
- 94% of those surveyed thought that at least one of the activities listed threatened Lady Bird Lake over the next five years.
- % of respondents rating each a critical or significant threat
 - 60.3% Pollution
 - , followed closely by population growth (57.7%), environmental degradation (56.4%), water scarcity (55.8%), and overuse (49.5%). Lost economic opportunity was rated as the least threatening, with 12% deeming it not a threat and 35.4% considering it a critical or significant threat.

n = 622



28

SURVEY RESPONSES: OPEN-ENDED ITEMS



- 114 mentions of ecology/environmental protection (reduce trash/pollution, maintain/increase green space, improve/maintain water quality)
- 77 mentions of amenities (requests for trail improvements/widening, separation of bike and pedestrian traffic, parking, lighting, volunteer activities)
- 51 mentions of safety and regulatory concerns (more patrols, maintaining regulations)
- 46 mentions of maintaining or increasing access (increasing trail connectivity, increasing diversity)

n = 234



29

INTERVIEWS

- **23 interview subjects**
 - By gender: 10 females and 13 males
 - By race/ethnicity: one Asian, three Black, five Hispanic/Latinx, and 13 White. (1 declined to identify.)
 - By perspective: four business owners, seven whose work involves the outdoors, two credentialed environmental experts, and four PARD staff (non-exclusive categories)
- **13 questions**
 - 2 questions to identify positive and negative attributes of the lake
 - 11 questions to share perspectives on access points, diversity, environmental concerns (if any), economic/development concerns (if any), lake capacity, and safety.
 - 2 additional questions for business owners about business pressures



30

INTERVIEWS: OVERALL SENTIMENT

- Overall tone of the subject's response for each topic was summarized as positive (or not concerned), negative (or concerned), or mixed.
- 20 of 23 subjects had environmental concerns
- 15 of 23 subjects had access point concerns
- 13 of 23 subjects had safety concerns
- Development-related topics yielded the most mixed responses.
- The most negative language was used when discussing safety (-46.8), environment (-30.8), and development (-20.8).

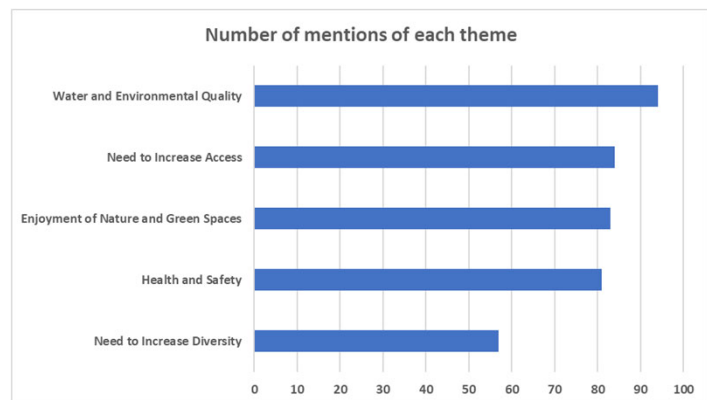
	Count of Subjects		
	Positive Sentiment/ Not Concerned	Negative Sentiment/ Concerned	Mixed Response
Access Points	7	15	1
Capacity	4	10	7
Development	3	7	12
Diversity	4	11	7
Environment	1	20	2
Safety	3	13	8



31

INTERVIEWS: THEMATIC ANALYSIS

- Water and Environmental Quality
 - Poor Water Quality, Declining Water Quality, Environmental Protection
- Need to Increase Access
 - Too Few Access Points, Informal Access Points, Access Points can be Damaging
- Enjoyment of Trails and Green Spaces
 - Trails are Appreciated, Very Enjoyable Scenery, Being in Nature is Important
- Health and Safety
 - Possible Health Problems, Lack of Safety Measure, Littering/Trash is Common
- Need to Increase Diversity
 - Current Lack of Diversity, Diversity is Needed



32

INTERVIEWS: WATER AND ENVIRONMENTAL QUALITY

The city needs to help develop an environmental ethos to rally people to help protect water quality – not just at the lake itself but also the whole watershed. We may need this water if we ever get in dire straits.

If development happens, then set aside some parts as parkland, and make sure environmental and water quality standards are met. We need education for people using the lake to know that it is a fragile ecosystem, and the city needs to improve the water quality to attract younger and more diverse individuals.

I am not an expert but the water seems very nasty. I remember about 10 years ago, the water looked better, but it seems to be getting worse. I am very concerned about what the lake water will look like in another 10 years.



33

INTERVIEWS: NEED TO INCREASE ACCESS

There are not enough access points to the lake, which causes people to develop their own access points. The shoreline is nicely vegetated so when people create their own access points, it destroys some of the beauty. Perhaps the city should consider developing more access points and it make illegal to enter the lake at points that are not designated by them.

The lack of access points prohibits people with disabilities from accessing the lake and its trails. It's almost as though the lake is only for those who are 100%, and I don't think that is fair.

There are not a lot of formal access points. The lack of formal access points is causing degradation. I have lived here in Austin for 47 years and I have seen the improvements of Lady Bird Lake, but I have also seen the degradation caused by lack of access points.



34

INTERVIEWS: ENJOYMENT OF NATURE AND GREEN SPACES

I enjoy the trails at Lady Bird Lake. Sometimes I just go to see the wildlife or stare at the water. When my friends come to visit me from out of town, they always ask to walk the trails. The city of Austin must do everything to protect the trails from trash and other things that could destroy the natural beauty.

The fact is that you don't get to see the true beauty of Austin unless you are on the water. This is the true part of Austin, the authentic part. When you are surrounded by nature, trees, the herons. The trail is always clean, accessible. You can enjoy it several different ways. It's a way to explore Austin to experience true nature and what Austin is about. The true beauty of Austin

It is beautiful and well-maintained and it feels like you are within an awesome area of Austin and it is not stressful.



35

INTERVIEWS: HEALTH AND SAFETY

The biggest concern is runoff/sewage from the city going into the lake. When it rains, it's like a toilet flushing everything into the Lake. Also, people are inconsiderate with the littering, throwing trash. Trash from encampments – drug paraphernalia, shopping carts, camps. Decriminalizing homelessness brought a big influx. [...] We should be aware of the health and safety issue.

Flotillas are concerning, to have massive groups of people tied up together. [...] It makes it hard to see someone in distress and also makes it hard to find someone who has gone under.

Toxic algae is concerning to me and my students, also a lot to pet owners. It's just disconcerting to many. People aren't allowed to swim and this is also disconcerting. It is not 100% physically safe even if it is beautiful.



36

INTERVIEWS: NEED TO INCREASE DIVERSITY

I would love to have more diversity in the area, whatever gets put out there – diverse businesses will bring more people of color into the space. That seems to be what is lacking. [...] would love spaces that include more cultural events.

I don't think the lake usage represents the demographics of the city. To encourage more minorities to use the lake, we must educate them on safety of the lake and the benefits of using the lake. Also, add signs, art or other things that make them feel welcomed.

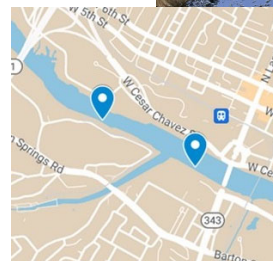
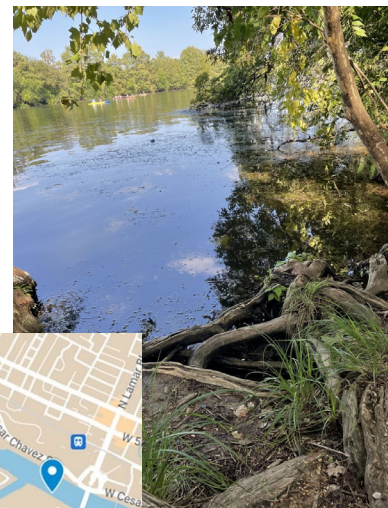
Certain places are less diverse. Other areas that are more open are more diverse. The historical legacy of the eastern side is being more diverse. They are very different geographically too. People drive to different parts of the lake to get to the amenities they want and the way the lake is managed differently on east and west contributes.



37

WATER QUALITY TESTING

- Samples were collected upstream and downstream of Lou Neff Point, an area of high boat congestion, before, during, and after a peak use period in August and during a holiday weekend in September.
- This area also will reflect input of urban runoff via Barton Creek.
- Sample values were compared to a baseline sample collected off Red Bud Isle and to average values from the Red Bud Isle samples collected by WPD.



38

WATER QUALITY TESTING

- 19 parameters analyzed did not exhibit significant variation from our Red Bud Isle baseline and, when applicable, Austin Lake Index values:
- Bromide, calcium, chloride, fluoride, magnesium, manganese, sodium, ortho-phosphate (as P), nitrite (as N), sulfate, bicarbonate, hydroxide, silica (as SiO₂), specific conductance, total alkalinity, total dissolved solids (TDS), total hardness, and pH.
- Overall water quality is fair-good.
- Measures for Nitrate (as N), Pheophytin-A, and *E. coli* exceeded baseline, potentially reflecting impacts of congestion. More testing is needed.

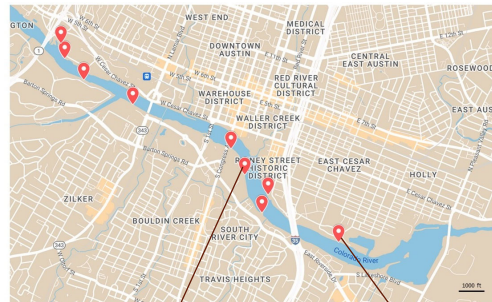
Nitrate (as N) (mg/L)	Pheophytin-A (ug/L)	<i>E. coli</i> (MPN/ 100mL)	Sample
0.0208	0.876	8.52	Pre-Peak Upstream
0.0683	1.65	1	Pre-Peak Downstream
0.0981	1.5	nd	Peak Upstream
0.11	4.23	nd	Peak Downstream
0.112	4.82	22.8	Post-Peak Upstream
0.254	2.4	81.3	Post-Peak Downstream
0.0424	5.23	138	Holiday Upstream
0.0911	6.66	222	Holiday Downstream
0.0133	<0.500	3.06	Red Bud Baseline
-	0.649	8.71	ALI Baseline



39

HABITAT ASSESSMENT

- Habitat quality was assessed for ten shoreline sites using the Austin Lake Index methodology developed by the Watershed Protection Department.
- Shoreline and riparian zones were assessed for
 - Substrate type and abundance
 - Vegetation type and abundance
 - Slope bank angle (shoreline only)
 - Human –built structures
 - The abundance values were multiplied by a ranking factor and summed for a site-specific score.
- Sites were selected to examine high use areas.



40

HABITAT ASSESSMENT

Habitat Assessment Scores (Scale 0-100)

Site	South 1	South 2	South 3	South 4	South 5	North 1	North 2	North 3	North 4	Dock Site
Shoreline Score	79.1	83.5	61.3	71.9	92.2	76.3	76.3	79.4	65.2	19.4
Riparian Score	18.8	25.0	37.5	37.5	37.5	43.8	43.8	41.7	50.0	0.0

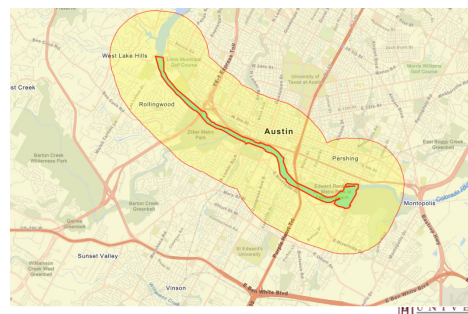
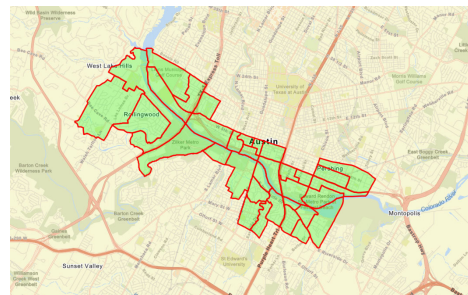
- The average shoreline habitat score for the nine informal access points assessed was 76.1 on a scale of 0-100, with a range of 61.2 to 92.2. This score reflects erosion and human traffic in these areas.
- The average riparian zone score for the nine informal access points assessed was 37.3 on a scale of 0-100, with a range of 18.6 to 50.0.
 - We did not note invasives at any abundance over 10% at any of the sites. We did note barren ground at many sites at abundance of 10% and up, which reduced this score considerably.



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ENVIRONMENTAL JUSTICE ANALYSIS

- EJ Screen was used to explore demographic differences between the population residing near Lady Bird Lake west of I-35 and those residing near the lake east of I-35.
- The population considered “near the lake” was determined by delineating the 0.25-, 0.5-, and one-mile zones extending from the shoreline of the lake in any direction, and by combining the census block groups whose perimeters fell within 0.25 miles of the shoreline.
- Environmental parameters were also compared.



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ENVIRONMENTAL JUSTICE ANALYSIS

- East of I-35 and West of I-35 differ notably with respect to % people of color, % low income, % limited English speaking, and % with less than a high school education.

	0.25 mile radius		.5 mile		1 mile		Census Block	
	East of I-35	West of I-35	East of I-35	West of I-35	East of I-35	West of I-35	East of I-35	West of I-35
Population	5709	14070	18094	24299	41698	56158	12391	25407
Area (sq. miles)	1.360	2.950	2.770	5.810	6.730	12.670	2.03	7
People of Color	50%	29%	57%	28%	55%	30%	41%	25%
Low Income	31%	16%	38%	14%	38%	18%	45%	15%
Unemployment Rate	2%	2%	3%	2%	2%	3%	25%	2%
Limited English Speaking	5%	2%	6%	2%	7%	2%	5%	3%
< High School Education	8%	3%	11%	3%	12%	5%	10%	3%
Under Age 5	1%	3%	3%	3%	4%	4%	12%	3%
Over Age 64	5%	11%	7%	12%	7%	11%	4%	11%
Demographic Index	41%	22%	47%	21%	46%	24%	41%	20%

- Comparison of environmental exposures across 12 parameters were comparable between east and west sectors of the lake.

- Traffic proximity was 1.5-2.5 times higher for the population living in the West sector.



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UNLICENSED VENDOR ACTIVITY

- Unlicensed vendors represent a pressure on lake capacity whose impact is not well quantified.
- PARD staff compiled information on at least nine unlicensed vendors utilizing parkland for lake access in 2021 and 2022.
 - Five of these vendors were also noted in social media advertisements compiled by the research team.
 - Two vendors who could not be identified by name
 - One vendors was associated with the aggregated “brotila” that assembles at the mouth of Barton Creek.
 - One vendor deploys craft that use battery-powered motors to reach speeds of up to 25 mph. Regulations limit the capacity of motorized craft on Lady Bird Lake to 5 horsepower (approx. 4-10 mph).
 - One vendor runs night cruises, another situation that represents potential additional hazard.
- Enhanced enforcement will be needed to mitigate the safety and environmental issues caused by these unpermitted activities.



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IMPLICATIONS

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DO CURRENT USE PATTERNS AT LBL EXCEED CARRYING CAPACITY?

- The recreational carrying capacity of Lady Bird Lake was exceeded on sampled peak (weekend days). On those days, the average whole lake boat density was 0.5 acres/boat, or about twice as congested as target density.
- In the most heavily used segments of the lake on peak days, the boat density is 0.075 acres/boat or 13X more congested than the target density.
- The whole lake boat density on non-peak days (weekdays) is well within the carrying capacity at 2.34 acres/boat.
- More data are needed to fully address the ecological carrying capacity of the lake, though the results of water quality testing and user feedback indicate reasons for concern.
 - *E. coli* bacterial counts were elevated around the area of highest lake congestion both during and after peak use periods.
 - An algal growth indicator was also elevated in this area during and after peak use.
 - Habitat assessments indicated concern for erosion in more trafficked areas.

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DO CURRENT USE PATTERNS AT LBL EXCEED CARRYING CAPACITY?

- Mixed results were obtained relevant to spatial or facility-based carrying capacity.
 - Parking census data for selected lots indicated good parking availability.
 - However, concerns about inadequate parking and, more broadly, concerns about crowding and access were frequently referenced in interviews and evident from survey results. 49.1% of survey respondents considered inadequate parking a significant or critical concern.
- Experiential/social carrying capacity of the lake is being exceeded for many survey and interview respondents.
 - 58.5% of survey respondents expressed strong or moderate concern with lake crowding, and 57.2% with trail crowding.
 - 61.4% of survey respondents experienced a loss of enjoyment due to lake crowding at least some of the time.
 - Interview subjects also commonly expressed concern about the effects of crowding on congestion on the lake.



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CONTEXT AND RECOMMENDATIONS

- It is important to contextualize these results in the face of anticipated challenges to the resilience of the lake, including population growth, climate change, and increased watershed pressures.
- While carrying capacity is not being exceeded every day by every definition, the results in this report highlight the need for proactive intervention and increased monitoring, both to address current patterns of crowding and mitigate the impact of increased human pressure on the lake.
- These interventions can also help to address the other lake-related concerns raised by stakeholders in the interviews and surveys.



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ACTION AREAS

1

Reduce Congestion

- Focus on Mopac-First segment, particularly the mouth of Barton Creek
- Add more formal access points, especially East
- Focus on amenities that spread usage and increase diversity
- Consider labeling/badge system for licensed vendors' watercraft (but not personal craft)

2

Increase Connectivity

- Connect the Butler Trail system to other trails and parks
- Coordinate trail expansion with diverse educational and community programs
- Link trail connectivity to transit connectivity

3

Enhance Programming

- Offer programs outside of the congested zones
- Implement culturally relevant programming
- Promote safety and environmental protection efforts.

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ACTION AREAS

4

Enhance Public Education

- Water safety and boating etiquette education, including signage
- Trash reduction education (ex: bag campaign)
- Watershed protection and water quality protection education

5

Increase Diversity

- Develop/share a diversity in the outdoors toolkit/educational resource
- Support culturally relevant programming and outdoors education
- Partner with organizations or businesses led by people of color
- Implement training for PARD and collect/track metrics

6

Leverage Volunteers and Interns

- Leverage goodwill into expanding volunteer programs.
- Broaden volunteer roles (invasive species, lake ambassadors)
- Explore corporate volunteer programs and diversify volunteers

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ACTION AREAS

7

Increase Environmental Monitoring

- Expand monitoring of accumulative pollutants (microplastics)
- Expand monitoring to include shore/vulnerable areas
- Implement perturbation analysis and/or continuous monitoring

Increase Environmental Monitoring cont'd

- Explore DNA-based methods for biodiversity analysis
- Standardize/collate citizen science data
- Enhance WPD expertise with additional resources

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Leverage Volunteers and Interns

- Leverage goodwill into expanding volunteer programs.
- Broaden volunteer roles (invasive species, lake ambassadors)
- Explore corporate volunteer programs and diversify volunteers

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QUESTIONS? CONTACT

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Thank you to PARD and WPD for providing their assistance and expertise!

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