

Supplemental Materials

Table S1. Characteristics of Grand Canyon National Park backpackers by symptom status, April-June 2022

	n (%)	
	Cases	Well persons
Total	31	453
Age, Yrs., Median, (IQR)	40 (30-52)	52 (39-63)
Gender		
Female	12 (39)	133 (29)
Male	19 (61)	310 (68)
Nonbinary	0 (—)	2 (<1)
Did Not Specify	0 (—)	8 (2)
Race		
White	29 (94)	413 (91)
Asian, NH/OPI, or Other	2 (6)	25 (6)
Did Not Specify	0 (—)	15 (3)
Ethnicity		
Hispanic or Latino	3 (10)	18 (4)
Not Hispanic or Latino	27 (87)	409 (90)
Did not specify	1 (3)	26 (6)
National Park User Type		
Guide/Park Employee	1 (3)	12 (3)
Park visitor	30 (97)	440 (97)
Trip Duration		
1 Night	2 (6)	53 (12)
2-3 Nights	8 (26)	188 (42)
4-6 Nights	18 (58)	163 (36)
≥7 Nights	3 (10)	48 (11)
Illness Characteristics		
Symptom Onset		
≤24 Hrs. Before Trip Began	3 (10)	
During Trip	16 (51)	
≤3 Days After Trip End	12 (39)	
Symptom Duration, Hrs., Median (IQR)	24 (12 - 72)	
Diarrhea	25 (81)	
Nausea	18 (58)	
Vomiting	17 (55)	
Fatigue	16 (52)	
Stomach Cramps	16 (52)	
Chills	13 (42)	
Muscle Aches	8 (26)	
Headache	8 (26)	
Fever	7 (23)	

NH/OPI, Native Hawaiian and other Pacific Islander.

Table S2. Reported behaviors among Colorado River rafters by age group, Grand Canyon National Park April–June 2022

	Age Group* n (%)			
	18-39 years	40-59 years	60-82 years	p-value [†]
Hand Hygiene (Before Snacks)				
Soap and Water	62 (31)	91 (44)	121 (48)	0.001
Sanitizer, Wipes, or Water	89 (45)	67 (33)	69 (27)	
None	46 (23)	47 (23)	62 (25)	
Sharing Dishes				
Yes	151 (74)	116 (55)	103 (38)	<0.001
No	52 (26)	95 (45)	170 (62)	
Contact with Other Groups				
Yes	136 (70)	132 (64)	123 (46)	<0.001
No	57 (30)	75 (36)	145 (54)	
Contact with Ill Persons				
Yes	59 (31)	66 (32)	92 (34)	0.68
No	134 (69)	141 (68)	176 (66)	
Swimming				
Yes	172 (86)	163 (78)	208 (77)	0.044
No	28 (14)	46 (22)	61 (23)	
Swallowing Untreated Water				
Yes	45 (23)	32 (15)	30 (11)	0.004
No	155 (77)	177 (85)	240 (89)	
Rafter Type				
Guide	22 (10)	15 (6)	1 (<1)	<0.001
Passenger	206 (90)	217 (94)	293 (>99)	
Trip Type				
Commercial	62 (27)	78 (34)	145 (49)	<0.001
Private	166 (73)	154 (66)	149 (51)	

*Not all passengers reported their age.

†Chi-Square.

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Table S3. Hazard ratio estimates from a Cox proportional hazards model comparing rates of acute gastroenteritis among Colorado River rafters (excluding age group), Grand Canyon National Park April-May 2022

Predictor	Unadjusted HR	Adjusted HR (Model)	p-value
Contact with Known Ill Persons	4.30 (2.96 – 6.24)	3.46 (2.36 – 5.07)	<0.001
Handwashing (Before Snacks) *			
Inadequate Hand Hygiene [†]	0.78 (0.52 – 1.18)	1.86 (1.18 – 2.91)	0.007
No Hand Hygiene	0.69 (0.43 – 1.13)	1.23 (0.75 – 2.02)	0.407
Shared Dishes or Utensils	0.75 (0.52 – 1.07)	1.51 (1.01 – 2.24)	0.042
May Trip Launch Month [§]	10.82 (1.21 – 52.96)	2.19 (0.33 – 14.44)	0.416
Private Raft [¶]	0.12 (0.08 – 0.17)	0.13 (0.08 – 0.20)	<0.001

HR, hazard ratio.

*Reference group is using soap and water for handwashing.

[†]Alcohol-based hand sanitizer only, wipes, or only water.

[§]April was used as the reference group of trip launch month as commercial operating season began April 1, 2022.

[¶]Reference group was commercial rafters.

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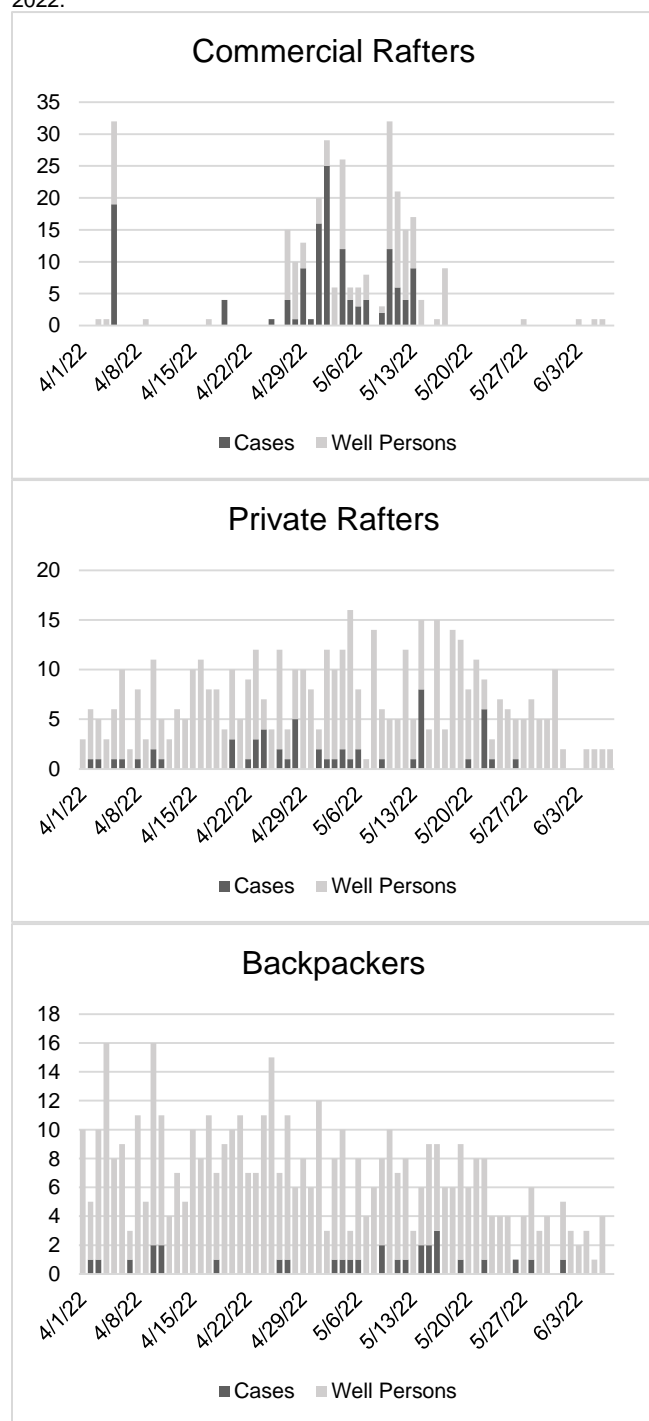
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Figure S1. Map of the Colorado River rafting route from launch point (Lees Ferry) to disembarkation point (Pearce Ferry), Grand Canyon National Park April–June 2022.



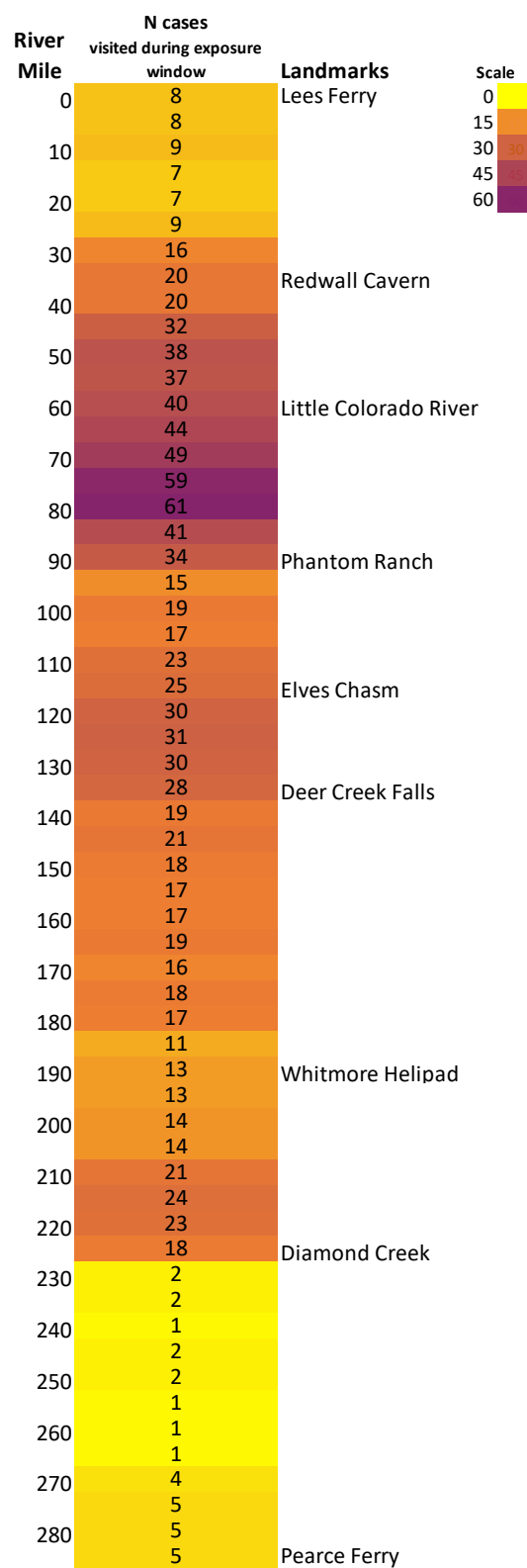
Data source(s): Bureau of Land Management, Arizona, USGS, EPA, NPS, Esri, CGIAR, HERE, Garmin, FAO, NOAA

Figure S2. Distribution of survey participants by trip type, trip start date, and case status, Grand Canyon National Park April–June 2022.



Acute Gastroenteritis Outbreak in a National Park

Figure S3. Distribution of potential case exposure locations among Colorado River rafters, where exposure window is defined as two days prior to symptom onset, Grand Canyon National Park April–June 2022.



Supplemental Methods: Survey

The following survey includes branch and skip logic, therefore some of the questions may appear out of numerical order.

GRCA River User and Backcountry Visitor Survey

Q1 This is a survey from Coconino County Health and Human Services, the National Park Service, and Centers for Disease Control and Prevention. The survey takes only 10 minutes or less.

As you may know, there have been reports of gastrointestinal illnesses among river users and backcountry campers in Grand Canyon National Park. We are working to determine what might have caused the outbreak to prevent future outbreaks. Your input is important, even if you DID NOT get sick. When we compare ill people to people who weren't ill - this helps us narrow the possibilities of what caused the illnesses and support people enjoying the parks and staying healthy. The information you share in this survey will be kept private and stored securely.

THANK YOU for you participation and support in our investigation.

Q2 Do you agree to complete this survey?

☐ Yes (1)

☐ No (2)

Q3 First and Last Name

Q4 Phone number (if non-US number, please enter at end of survey in final comments).

Q5 Preferred email

Q6 City, State you reside in:

Q7 Age at time of trip start, when you began your activity enter Grand Canyon National Park (in years):

Display This Question: If Age at time of trip start, when you began your activity enter Grand Canyon National Park (in years): Text Response is Less Than 18

Q8 First and Last name of Parent or Guardian (you were less than 18 years old at the start of the trip)

Q9 What day did your trip start? Please enter as mm/dd/yyyy

Q10 What day did your trip end? Please enter as mm/dd/yyyy

526 Q11 What is your race? Select all that apply.

527 ☐ White or Caucasian (1)

528 ☐ Black or African American (2)

529 ☐ Asian, Pacific Islander, or Native Hawaiian (3)

530 ☐ Native American, American Indian, or Alaska Native (4)

531 ☐ Other (specify) (5)

532

533 Q12 What is your ethnicity?

534 ☐ Hispanic or Latino (1)

535 ☐ Not Hispanic or Latino (2)

536

537 Q13 What is your gender?

538 ☐ Male (1)

539 ☐ Female (2)

540 ☐ Non-binary / third gender (3)

541 ☐ Other (specify) (4)

542

543 Q14 Are you a:

544 ☐ Park visitor (including rafters, hikers) (1)

545 ☐ Concession employee, contractors, partners (e.g. outfitters, guides) (2)

546 ☐ Park employee or park volunteer (3)

547 ☐ Other (specify) (4)

548

549 *Display This Question: If Are you a: = Concession employee, contractors, partners (e.g.*
550 *outfitters, guides)*

551

552 Q15 You have indicated that you are a \${Q14/ChoiceDescription/2}. What is the name of the
553 company you work for?

554

555 Q16 Did any friends or family come with you on this trip?

556 ☐ Yes (1)557 ☐ No (2)

558

559 *Display This Question: If Did any friends or family come with you on this trip? = Yes*

560

561 Q17 You have indicated that friends or family came with you on this trip. How many people
562 total were in your party, including yourself?

563

564 Q110 Did you experience vomiting or diarrhea (3 or more loose stools in 24 hours):

565 ☐ In the 24 hours before the trip began (1)566 ☐ During the trip (2)567 ☐ In the 7 days following the trip end (4)568 ☐ I did not experience vomiting or diarrhea during any of these time frames. (5)

569

570 Q113 All questions referring to your trip are asking about your rafting, hiking, or backcountry
571 camping trip into the Grand Canyon on trails or on the river, specifically.

572

573 Q25 What type of activity did you participate in?

574 ☐ Hiking or backpacking (1)575 ☐ Private rafting trip (2)576 ☐ Commercial rafting trip (e.g. a company led and outfitted the whole trip) (3)577 ☐ Park-sponsored/work-related trip (4)578 ☐ Other (specify) (5)

579

580 *Display This Question: If What type of activity did you participate in? = Commercial rafting trip*
581 *(e.g. a company led and outfitted the whole trip)*

582

583 Q115 What is the name of the company you rafted with?

584

585 Q31 How did you arrive to the start of this trip/activity?

586 ☐ Bus or van (1)

587 ☐ Private vehicle (2)

588 ☐ Helicopter or plane (3)

589 ☐ Other (specify) (4)

590

591 *Display This Question: If How did you arrive to the start of this trip/activity? = Bus or van*

592 *Or How did you arrive to the start of this trip/activity? = Helicopter or plane*

593

594 Q32 Please list the name of the company you used for transportation.

595

596 Q33 How did you depart from the end of this trip/activity?

597 ☐ Bus or van (1)

598 ☐ Private vehicle (2)

599 ☐ Helicopter or plane (3)

600 ☐ Other (4)

601 ☐ Medical evacuation (5)

602

603 *Display This Question: If How did you depart from the end of this trip/activity? = Bus or van*

604 *Or How did you depart from the end of this trip/activity? = Helicopter or plane*

605

606 Q34 Please list the name of the company you used for transportation.

607

608 *Display This Question: If How did you depart from the end of this trip/activity? = Medical*

609 *evacuation*

610

611 Q112 What date were you medically evacuated? Please put in as mm/dd/yyyy.

612

613 *Display This Question: If How did you depart from the end of this trip/activity? = Medical*

614 *evacuation*

615

616 Q101 Please describe your medical evacuation including date and reason for evacuation.

617

618 *Display This Question: If How did you depart from the end of this trip/activity? = Medical*

619 *evacuation*

620

621 Q102 Please list the name of the hospital or medical provider you visited after medical
622 evacuation.
623

624 Q46 Did you buy any food at the stops along your trip in the Grand Canyon, from starting point
625 to end?

626 ☐ Yes (1)

627 ☐ No (2)
628

629 *Display This Question: If Did you buy any food at the stops along your trip in the Grand*
630 *Canyon, from starting point to end? = Yes*
631

632 Q46 You indicated that you bought food at a stop along your trip. Where did you buy food?
633 Please describe the stop and the vendor.
634

635 *Display This Question: If Did you buy any food at the stops along your trip in the Grand*
636 *Canyon, from starting point to end? = Yes*
637

638 Q47 Please describe what you purchased.
639

640 Q48 Did you fill your water container(s) at the start of your trip?

641 ☐ Yes (1)

642 ☐ No (2)
643

644 *Display This Question: If Did you fill your water container(s) at the start of your trip? = Yes*
645

646 Q49 Where did you fill your water container(s) at the start of the trip?
647

648 Q50 Did you refill your water container(s) at any stop (outside of your boat's drinking water, if
649 rafting)?

650 ☐ Yes (1)

651 ☐ No (2)
652

653 *Display This Question: If Did you refill your water container(s) at any stop (outside of your*
654 *boat's drinking water, if raf... = Yes*
655

656 Q51 Where did you refill your water container(s)?

657 ☐ Spigot (e.g., boat beach water hydrant or hydrant at Lees Ferry) (1)

658 ☐ River (2)

659 ☐ Side creek, spring, waterfall (3)

660 ☐ Other (specify) (4)

661

662 *Display This Question: If Did you refill your water container(s) at any stop (outside of your*
663 *boat's drinking water, if raf... = Yes*

664

665 Q52 How did you process your water? Please select all that apply.

666 ☐ Filter (1)

667 ☐ Chlorinate, bleach, or iodine (2)

668 ☐ UV light (3)

669 ☐ Boiling (4)

670 ☐ Other (specify) (5)

671 ☐ None (6)

672

673 *Display This Question: If How did you process your water? Please select all that apply. = Filter*

674

675 Q53 Please describe the filter you used.

676

677 *Display This Question: If How did you process your water? Please select all that apply. =*
678 *Chlorinate, bleach, or iodine*

679

680 Q54 Please describe the chlorine, bleach, or iodine treatment you used.

681

682 *Display This Question: If How did you process your water? Please select all that apply. = UV*
683 *light*

684

685 Q55 Please describe the UV light treatment you used.

686

687 *Display This Question: If How did you process your water? Please select all that apply. =*
688 *Boiling*

689

690 Q56 Please describe the boiling procedure you used.

691

692 Q57 Did you drink water from Lees Ferry (water not filtered on the boat, if rafting)?

693 ☐ Yes (1)

694 ☐ No (2)

695 ☐ I did not visit Lees Ferry (3)

696

697 *Display This Question: If Did you drink water from Lees Ferry (water not filtered on the boat, if*
698 *rafting)? = Yes*

699

700 Q104 Where did you drink water from at Lees Ferry?

701 ☐ Spigot (e.g., boat beach water hydrant or hydrant at Lees Ferry) (1)

702 ☐ River (2)

703 ☐ Water fountain (3)

704 ☐ Other (specify) (4)

705

706 Q58 Did you drink water from Phantom Ranch/Pipe Creek (water not filtered on the boat, if
707 rafting) such spigots at the campground, boat beach, etc?

708 ☐ Yes (1)

709 ☐ No (2)

710 ☐ I did not visit Phantom Ranch (Pipe Creek) (3)

711

712 *Display This Question: If Did you drink water from Phantom Ranch/Pipe Creek (water not*
713 *filtered on the boat, if rafting) su... = Yes*

714

715 Q105 Where did you drink water from at Phantom Ranch?

716 ☐ Spigot (1)

717 ☐ River (2)

718 ☐ Water fountain (3)

719 ☐ Other (specify) (4)

720

721 Q59 Did you use a toilet during your trip? (Does not include the groover or toilet supplied for
722 rafting trips)

723 ☐ Yes (1)

724 ☐ No (2)

725
726 *Display This Question: If Did you use a toilet during your trip? (Does not include the groover or*
727 *toilet supplied for rafti... = Yes*

728
729 Q60 Where did you use a toilet? Please select all that apply.

730 ☐ Phantom Ranch camping ground (1)

731 ☐ Southern Rim facilities (2)

732 ☐ Bright Angel Trail toilets (3)

733 ☐ Composting/vault toilet in back country (4)

734 ☐ Other (specify) (5)

735
736 *Display This Question: If Where did you use a toilet? Please select all that apply. = Southern*
737 *Rim facilities*

738
739 Q61 Please describe the location of the toilet you used at the Southern Rim facilities

740
741 *Display This Question: If Where did you use a toilet? Please select all that apply. = Bright Angel*
742 *Trail toilets*

743
744 Q62 Please describe the location of the toilet you used on Bright Angel Trail

745
746 *Display This Question: If Where did you use a toilet? Please select all that apply. =*
747 *Composting/vault toilet in back country*

748
749 Q63 Please describe the location of the composting/vault toilet in back country you used.

750
751 Q64 Did you share your drinking water bottle/cup with anyone else during your trip (including
752 with a friend or family member)?

753 ☐ Yes (1)

754 ☐ No (2)

755 Q67 Did you share your utensils/plates with or prepare a plate of food for someone else during
756 your trip (such as with a friend or family member)?

757 ☐ Yes (1)

758 ☐ No (2)

759

760 Q68 Did you participate in preparing meals?

761 ☐ Yes (1)

762 ☐ No (2)

763

764 Q69 Did you participate in doing dishes?

765 ☐ Yes (1)

766 ☐ No (2)

767

768 Q71 Did you brush your teeth with water?

769 ☐ Yes (1)

770 ☐ No (2)

771

772 *Display This Question: If Did you brush your teeth with water? = Yes*

773

774 Q72 What water did you use to brush your teeth?

775 ☐ River water (1)

776 ☐ Bottled water (2)

777 ☐ Spigot water (3)

778 ☐ Treated water (4)

779

780 Q74 Think back to the following meals and please respond with how you cleaned your hands a
781 majority of the time.

782

783 Q73 Breakfast

784 ☐ Soap and water only (1)

785 ☐ Hand sanitizer only (2)

786 ☐ Soap and water, followed with hand sanitizer (3)

787 ☐ Hand wipes (4)

788 ☐ Rinse with river water (5)

789 ☐ Other (specify) (6)

790 ☐ Did not wash hands (7)

791 ☐ Did not eat this meal (8)

792

793 Q75 Lunch

794 ☐ Soap and water only (1)

795 ☐ Hand sanitizer only (2)

796 ☐ Soap and water, followed with hand sanitizer (3)

797 ☐ Hand wipes (4)

798 ☐ Rinse with river water (5)

799 ☐ Other (specify) (6)

800 ☐ Did not wash hands (7)

801 ☐ Did not eat this meal (8)

802

803 Q76 Dinner

804 ☐ Soap and water only (1)

805 ☐ Hand sanitizer only (2)

806 ☐ Soap and water, followed with hand sanitizer (3)

807 ☐ Hand wipes (4)

808 ☐ Rinse with river water (5)

809 ☐ Other (specify) (6)

810 ☐ Did not wash hands (7)

811 ☐ Did not eat this meal (8)

812

813 Q77 Snacks

814 ☐ Soap and water only (1)

815 ☐ Hand sanitizer only (2)

816 ☐ Soap and water, followed with hand sanitizer (3)

817 ☐ Hand wipes (4)

818 ☐ Rinse with river water (5)

819 ☐ Other (specify) (6)

820 ☐ Did not wash hands (7)

821 ☐ Did not eat this meal (8)

822

823 Q82 Please describe your hand hygiene techniques when in the back country (hiking, visiting
824 waterfalls) excluding meal times? (Please select what you did a majority of the time)

825 ☐ Soap and water only (1)

826 ☐ Hand sanitizer only (2)

827 ☐ Soap and water, followed with hand sanitizer (3)

828 ☐ Hand wipes (4)

829 ☐ Rinse with river water (5)

830 ☐ Other (specify) (6)

831 Q83 Please describe your hand hygiene techniques when using backcountry toilet (e.g.
832 composting toilet or vault) that does not have running water? (Please select what you did a
833 majority of the time)

834 ☐ Soap and water only (1)

835 ☐ Hand sanitizer only (2)

836 ☐ Soap and water, followed with hand sanitizer (3)

837 ☐ Hand wipes (4)

838 ☐ Rinse with river water (5)

839 ☐ Other (specify) (6)

840

841 Q78 Did you interact with any animals or animal feces while on the trip (e.g., while trying to
842 remove feces from shoes or camping gear?

843 ☐ Yes (1)

844 ☐ No (2)

845

846 *Display This Question: If Did you interact with any animals or animal feces while on the trip*
847 *(e.g., while trying to remove... = Yes*

848

849 Q79 You indicated direct contact with an animal or animal feces, please describe.

850

851 Q92 These questions are for hikers and backcountry campers only.

852

853 Q41 Where did your trip begin?

854

855 Q42 Where did your trip end?

856

857 Q43 Please describe your backcountry camping or hiking route.

858

859 *Display This Question: If Loop all: Do you have additional overnight locations to report for*
860 *your backcountry camping trip? != No*

861

862 Q94 Please answer the following questions regarding where you camped each night. These
863 questions will be repeated as needed.

864

865 *Display This Question: If Loop all: Do you have additional overnight locations to report for*
866 *your backcountry camping trip? != No*

867

868 Q96 Describe the name of the campground or location of backcountry site where you camped
869 overnight.

870

871 *Display This Question: If Loop all: Do you have additional overnight locations to report for*
872 *your backcountry camping trip? != No*

873
874 Q95 What is the date range that you stayed at this stop? Please report as mm/dd/yyyy-
875 mm/dd/yyyy

876
877 *Display This Question: If Loop all: Do you have additional overnight locations to report for*
878 *your backcountry camping trip? != No*

879
880 Q97 Do you have additional overnight locations to report for your backcountry camping trip?

881 ☐ Yes (1)

882 ☐ No (2)

883
884 *Display This Question: If Loop all: Do you have additional party members to report? != No*

885
886 Q89 You have indicated that you were hiking or backcountry camping. Please list the contact
887 information for any additional hikers or backcountry campers below for public health outreach.
888 You may leave it blank if you traveled solo.

889
890 *Display This Question: If Loop all: Do you have additional party members to report? != No*

891
892 Q90 First and Last Name

893
894 *Display This Question: If Loop all: Do you have additional party members to report? != No*

895
896 Q91 Phone Number

897
898 *Display This Question: If Loop all: Do you have additional party members to report? != No*

899
900 Q92 Email Address

901
902 *Display This Question: If Loop all: Do you have additional party members to report? != No*

903
904 Q103 Do you have additional party members to report?

905 ☐ Yes (1)

906 ☐ No (2)

907
908
909 Q111 We are now going to ask you more detailed questions about if you were ill or not. Thank
910 you in advance if this is a repeat for any forms your completed related to your illness.

911
912 Q18 Did you feel ill:

913 ☐ In the 24 hours before the trip began (1)

914 ☐ During the trip (2)

915 ☐ In the 7 days following the trip end (4)

916 ☐ I did not feel ill in any of these time frames. (5)

917

918 *Display This Question: If Did you feel ill: = In the 24 hours before the trip began; Or Did you*
919 *feel ill: = During the trip; Or Did you feel ill: = In the 7 days following the trip end*

920

921 Q19 Please select all symptoms you experienced when ill.

922 ☐ Vomiting (1)

923 ☐ Diarrhea (3 or more loose stools in 24 hours) (2)

924 ☐ Blood in stool (3)

925 ☐ Nausea (4)

926 ☐ Stomach cramps (5)

927 ☐ Difficulty swallowing (6)

928 ☐ Fever (7)

929 ☐ Jaundice (yellow skin or eyes) (8)

930 ☐ Sweat or chills (9)

931 ☐ Fatigue (10)

932 ☐ Muscle aches (11)

933 ☐ Headache (12)

934 ☐ Sore throat (13)

935 ☐ Difficulty breathing (14)

936 ☐ Paralysis (15)

937 ☐ Difficulty speaking (16)

938 ☐ Hives (17)

939 ☐ Metallic taste (18)

940 ☐ Numbness or tingling (19)

941 ☐ Blurred vision (20)

942 ☐ Constipation (21)

943 ☐ Burning in mouth (22)

944 ☐ General weakness (23)

945 ☐ Other (specify) (24)

946

947 *Display This Question: If Did you feel ill: = In the 24 hours before the trip began; Or Did you*
 948 *feel ill: = During the trip; Or Did you feel ill: = In the 7 days following the trip end*

949

950 Q20 When did your first symptom start? Please list as mm/dd/yyyy

951

952 *Display This Question: If Did you feel ill: = In the 24 hours before the trip began; Or Did you*
 953 *feel ill: = During the trip; Or Did you feel ill: = In the 7 days following the trip end*

954

955 Q24 Where were you located on your trip when your symptoms began? (e.g., hotel, mile 110,
 956 Phantom Ranch, Bright Angel Trail, etc)

957

958 *Display This Question: If Did you feel ill: = In the 24 hours before the trip began; Or Did you*
 959 *feel ill: = During the trip; Or Did you feel ill: = In the 7 days following the trip end*

960 Q21 What was your first symptom?

961 ☐ Vomiting (1)

962 ☐ Diarrhea (3 or more loose stools in 24 hours) (2)

963 ☐ Blood in stool (3)

964 ☐ Nausea (4)

- 965 ☐ Stomach cramps (5)
- 966 ☐ Difficulty swallowing (6)
- 967 ☐ Fever (7)
- 968 ☐ Jaundice (yellow skin or eyes) (8)
- 969 ☐ Sweat or chills (9)
- 970 ☐ Fatigue (10)
- 971 ☐ Muscle aches (11)
- 972 ☐ Headache (12)
- 973 ☐ Sore throat (13)
- 974 ☐ Difficulty breathing (14)
- 975 ☐ Paralysis (15)
- 976 ☐ Difficulty speaking (16)
- 977 ☐ Hives (17)
- 978 ☐ Metallic taste (18)
- 979 ☐ Numbness or tingling (19)
- 980 ☐ Blurred vision (20)
- 981 ☐ Constipation (21)
- 982 ☐ Burning in mouth (22)
- 983 ☐ General weakness (23)

984

985 *Display This Question: If Please select all symptoms you experienced when ill. = Vomiting; Or*

986 *Please select all symptoms you experienced when ill. = Diarrhea (3 or more loose stools in 24*

987 *hours)*

988

989 Q99 If you experienced vomiting or diarrhea (3 or more loose stools in 24 hours), what date did
990 that begin? Please enter as mm/dd/yyyy

991
992 *Display This Question: If Did you feel ill: = In the 24 hours before the trip began; Or Did you*
993 *feel ill: = During the trip; Or Did you feel ill: = In the 7 days following the trip end*

994
995 Q22 How long did your symptoms last? Please answer in hours.

996
997 *Display This Question: If Did you feel ill: = In the 24 hours before the trip began; Or Did you*
998 *feel ill: = During the trip; Or Did you feel ill: = In the 7 days following the trip end*

999
1000 Q23 When did your symptoms end? Please list as mm/dd/yyyy

1001
1002 *Display This Question: If Did you feel ill: = In the 24 hours before the trip began; And Did you*
1003 *feel ill: = During the trip; And Did you feel ill: = In the 7 days following the trip end*

1004
1005 Q100 Did you seek medical care for your illness?

1006 ☐ Yes (1)

1007 ☐ No (2)

1008
1009 *Display This Question: If Did you seek medical care for your illness? = Yes*

1010
1011 Q108 Please list the name of the healthcare provider (e.g., hospital, medical office, or clinician)
1012 where you sought medical care. Please supply address and phone number, if available.

1013
1014 Q87 Are you willing to be contacted by public health for additional follow up?

1015 ☐ Yes (1)

1016 ☐ No (2)

1017
1018 *Display This Question: If Are you willing to be contacted by public health for additional follow*
1019 *up? = Yes*

1020
1021 Q103 Please list your best contact information for follow up.

1022
1023 *Display This Question: If Did you experience vomiting or diarrhea (3 or more loose stools in 24*
1024 *hours): = During the trip; Or Did you experience vomiting or diarrhea (3 or more loose stools*
1025 *in 24 hours): = In the 7 days following the trip end*

1026
1027 Q114 If your trip ended within the last 7 days, are you willing to submit a stool specimen to
1028 public health for testing?

1029 ☐ Yes (1)

1030 ☐ No (2)

1031 ☐ N/A (my trip ended further in the past or I was not ill) (3)

1032

1033 Q88 Please share any comments (any additional information you would like to share about your
1034 illness or trip).

1035

1036 Q104 Thank you for your participation in this interview or survey. If you have any additional
1037 questions, please contact publichealthprogram@nps.gov.

1038

1039 *Display This Question: If What type of activity did you participate in? = Commercial rafting trip*
1040 *(e.g. a company led and outfitted the whole trip)*

1041

1042 Q26 What is the name of the company you used to participate in the commercial rafting trip:

1043

1044 *Display This Question: If What type of activity did you participate in? = Commercial rafting trip*
1045 *(e.g. a company led and outfitted the whole trip)*

1046

1047 Q27 What type of commercial rafting trip did you participate in?

1048 ☐ Row (1)

1049 ☐ Motor (2)

1050

1051 *Display This Question: If What type of activity did you participate in? = Commercial rafting trip*
1052 *(e.g. a company led and outfitted the whole trip)*

1053

1054 Q28 Did you join or leave the commercial rafting trip via an exchange?

1055 ☐ Yes (1)

1056 ☐ No (2)

1057

1058 *Display This Question: If Did you join or leave the commercial rafting trip via an exchange? =*
1059 *Yes*

1060

1061 Q29 If you did join or leave a trip via an exchange, please list the location of your exchange.

1062

1063 *Display This Question: If Did you join or leave the commercial rafting trip via an exchange? =*
1064 *Yes*

1065

1066 Q30 What date did you exchange? Please list as mm/dd/yyyy

1067

1068 *Display This Question: If What type of activity did you participate in? = Private rafting trip; Or*
1069 *What type of activity did you participate in? = Commercial rafting trip (e.g. a company led and*

1070 *outfitted the whole trip); Or What type of activity did you participate in? = Park-*
1071 *sponsored/work-related trip*

1072
1073 Q35 Where did your rafting trip begin?

1074 ☐ Lees Ferry (1)

1075 ☐ Phantom Ranch (Pipe Creek) (2)

1076 ☐ Diamond Creek (3)

1077 ☐ Whitemore helipad (4)

1078 ☐ Other (specify) (5)

1079
1080 *Display This Question: If What type of activity did you participate in? = Private rafting trip; Or*
1081 *What type of activity did you participate in? = Commercial rafting trip (e.g. a company led and*
1082 *outfitted the whole trip); Or What type of activity did you participate in? = Park-*
1083 *sponsored/work-related trip*

1084
1085 Q36 Where did your rafting trip end?

1086 ☐ Pearce Ferry (1)

1087 ☐ Phantom Ranch (Pipe Creek) (2)

1088 ☐ Diamond Creek (3)

1089 ☐ Whitemore helipad (4)

1090 ☐ Other (specify) (5)

1091
1092 *Display This Question: If What type of activity did you participate in? = Private rafting trip; Or*
1093 *What type of activity did you participate in? = Commercial rafting trip (e.g. a company led and*
1094 *outfitted the whole trip); Or What type of activity did you participate in? = Park-*
1095 *sponsored/work-related trip*

1096
1097 Q37 Did you have any interactions with persons who were not members of your rafting trip?

1098 ☐ Yes (1)

1099 ☐ No (2)

1100

1101 *Display This Question: If Did you have any interactions with persons who were not members of*
 1102 *your rafting trip? = Yes*

1103
 1104 Q38 If yes, please describe the interaction:

1105
 1106 *Display This Question: If What type of activity did you participate in? = Private rafting trip; Or*
 1107 *What type of activity did you participate in? = Commercial rafting trip (e.g. a company led and*
 1108 *outfitted the whole trip); Or What type of activity did you participate in? = Park-*
 1109 *sponsored/work-related trip*

1110
 1111 Q39 Did you have any interactions with ill, suspected ill, or symptomatic persons during your
 1112 trip?

1113 ☐ Yes (1)

1114 ☐ No (2)

1115
 1116 *Display This Question: If Did you have any interactions with ill, suspected ill, or symptomatic*
 1117 *persons during your trip? = Yes*

1118
 1119 Q40 If yes, please describe the interaction with an ill person:

1120
 1121 Q80 Did you swim or submerge your head in water at camp?

1122 ☐ Yes (1)

1123 ☐ No (2)

1124
 1125 *Display This Question: If Did you swim or submerge your head in water at camp? = Yes*

1126
 1127 Q84 Please describe these experiences, particularly if you saw another group, observed potential
 1128 dirty water, or other significant memories. List where, when, and multiple dates/locations if
 1129 needed.

1130
 1131 Q85 Did you swallow untreated river water or any of the water at the recreational (e.g.,
 1132 swimming, waterfall tour) or camping stops?

1133 ☐ Yes (1)

1134 ☐ No (2)

1135
 1136 *Display This Question: If Did you swallow untreated river water or any of the water at the*
 1137 *recreational (e.g., swimming, wa... = Yes*

1138
 1139 Q86 Please describe where and when. List multiple dates (mm/dd/yyyy) and location if needed.

