

# APPENDIX K: ESTIMATING USE LEVELS

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This appendix was created in response to comments on the Draft EIS to explain how estimated use levels in the EIS were calculated.

## I. Lees Ferry Alternatives

For the Lees Ferry to Diamond Creek alternatives (Alternatives A – H), calculations were based upon a database containing details of every trip that launched from Lees Ferry between 1998 and 2003.

**Current Conditions:** Calculations began with Alternative A (Current Conditions). Existing condition values for Alternative A were determined by averaging actual monthly use for the trips within the database. Separate monthly averages (to allow seasonal comparisons) and separate daily or per-trip averages (where applicable) were determined for each of the four key trip types:

- Non-Motorized Commercial Trips
- Motorized Commercial Trips
- Small Noncommercial Trips – Noncommercial trips of 1 to 8 people
- Large Noncommercial Trips – Noncommercial trips of 9 to 16

For each of the four trip types, the following values were calculated from the actual trips in the database:

- Total and Average Trips Launching
- Total and Average Lees Ferry Passengers (not including guides or other crew)
- Total and Average Passenger User-days (not including guides or other crew)
- Total and Average Crew User-days (includes guides and other crew)
- Average Trip Length
- Passenger Exchange Rates (both for passengers coming in and going out) at Phantom Ranch, Whitmore and any other location
- Trips at One Time (TAOTs) and People at One Time (PAOTs)

**Alternatives B – H:** A range of alternatives was developed for the EIS in large part by setting separate limits for each of the following variables for each type of trip (see the descriptions of the alternatives in Chapter 2):

- Maximum Launches per day
- Group Size Limits (including guides and other crew)
- User Day Limits (excluding guides and other crew)
- Maximum and Minimum Trip Length Limits from Lees Ferry to Diamond Creek
- Whitmore Exchange Limits – Limits as to how many commercial passengers would be allowed to join and to exit trips at Whitmore

To estimate the use level values for Alternatives B – H, the above limits for each alternative were then applied to the actual trips in the 1998 – 2003 database. For example, if the alternative had a maximum trip length limit less than the actual trip length in the database, the trip length for that trip would be decreased to the maximum for that alternative. Thus, a noncommercial trip that

launched on February 11, 1999 which actually spent 30 days to Diamond Creek (i.e., the maximum winter trip length in Alternative A) would have its trip length reduced to the new winter maximum of 25 days in Alternative H.

Similar adjustments were made to group size so that the actual trip data in the database conformed to the limits for each alternative for each trip type. Once the trips in the database were adjusted to fit within the limits for the variables in each alternative, the new trip lists were then used to calculate separate monthly averages (and seasonal or daily averages where applicable) for group size and trip length for each of the four key trip types. These monthly averages were then used to calculate the other values described above. For example, average trip length multiplied by average group size gives average user days per trip.

Estimating the distribution of commercial user days for time periods throughout the year involved first calculating the maximum user days possible, assuming that every trip in the schedule would launch, remain full for the duration of the trip, and would stay on the river as long as allowed. However, due to carrying capacity and impact considerations, the current commercial user day limit (or cap) of 115,500 user days was included in each alternative for the March – October time period (except in Alternative B where the maximum potential user days did not exceed 115,500). To stay within the user day limit, a ratio of the commercial user day limit (115,500) divided by the maximum possible commercial user days for each alternative was used within each time period of interest (e.g., seasons, days) to estimate user days, number of trips, and number of passengers. This method reduced the variables of use to fit within the user day limit evenly across the time periods that each trip type was allowed in the alternatives. During time periods (e.g., winter) when there was no user-day limit or when the limit was not reached (e.g. Alternative B), it is recognized that use will be less than the maximums, but the maximums were used because there was no basis for a specific amount of reduction.

In estimating total commercial passengers and trips, an important assumption was that commercial use would closely parallel what has happened over the past few years. Commercial outfitters have a long history of working within user day limits, thus not always launching the maximum number of trips allowed per day, and not always launching at the maximum group size or taking the maximum trip length. In fact, a variety of commercial trip types, group sizes, and trip lengths are currently offered within each major category, and such a variety is expected to continue under each alternative.

Noncommercial user days were estimated by multiplying the maximum total noncommercial launches by the average Lees Ferry passengers per trip, then multiplying this total by the average trip length.

Maximum Trips at One Time (TAOTs) were estimated by multiplying the maximum total launches per day by the average trip length, then adding to this total a measure of trip length flexibility (i.e., subtracting average trip length from maximum trip length limits to account for the increase in TAOTs that occurs when trips are longer than the average). This method of estimating TAOTs was checked against the actual trip data in Alternative A. People at One Time (PAOTs) were calculated by multiplying TAOTs by the average Lees Ferry passengers per trip.

The ratios of crew to passengers for each commercial trip type were adjusted to the group size limits of each alternative by dividing total crew user days (from the adjusted trip lists in the database) by average trip length (to Diamond Creek), then dividing that result by the total Lees Ferry passengers.

**Whitmore Passenger Exchanges:** The total number of passengers leaving river trips at Whitmore (i.e., passengers out) was calculated from the average percentage of total Lees Ferry passengers exchanging at Whitmore from 1998 to 2003. Using actual 1998-2003 trip data, an average of 60% of commercial motor passengers and 20% of commercial oar passengers exchanged at Whitmore. These percentages were calculated by dividing the total number of passengers leaving trips at Whitmore by the total number of passengers launching at Lees Ferry (for both commercial motor and oar trip types) and then taking the average for 1998-2003. These percentages were then multiplied with the Lees Ferry passenger estimates to determine the number of passengers exiting at Whitmore. For example, in Modified Alternative H, the Lees Ferry commercial passenger estimates of 8,639 for motor and 2,919 for oar trips were multiplied by the Whitmore out percentages, resulting in 5,715 commercial passengers out at Whitmore (i.e.,  $(8639 \times .593164) + (2919 \times .202491) = 5,715$ ). For the purposes of the Grand Canyon River Trip Simulator Model and user-day and passenger calculations for Alternatives D through Modified H, the NPS assumed a 7-day trip length minimum for commercial motorized trips from Lees Ferry to Diamond Creek, which is the most common commercial motorized trip length (see Visitor Use and Experience Section 3.4.2.1.2.1). The reduction of estimated Lees Ferry commercial passengers from Alternative A (current condition) to the Modified Alternative H is primarily due to this assumption. Similar calculations were used to estimate the total number of passengers joining river trips at Whitmore.

In Modified Alternative H, existing commercial exchange rates are grandfathered in; that is, each commercial company would continue to be allowed to exchange the same average percentage that they currently exchange. For example, if a company has been exchanging at Whitmore an average of 20% of its total Lees Ferry passengers, they would continue to be allowed to exchange 20% of their total Lees Ferry passengers up to the current number of passengers that company exchanges. If a company currently has no Whitmore exchanges or is bought out by another entity, then that company would not be allowed Whitmore exchanges.

**Calculating and Testing the Final EIS Values:** During the public review of the Draft EIS, questions and comments were received concerning how the values in the Draft EIS were calculated and questioning the totals. As a result, the NPS re-examined the methodology and datasets used for the Draft EIS. A separate set of calculation spreadsheets were put together for this test, with a concerted effort to find any errors or inconsistencies in the Draft EIS data and calculations. When the NPS compared key values in these new spreadsheets against the Draft EIS spreadsheets, all the key values were within a few percent of the Draft EIS values, and the NPS determined that these small differences would not affect the results of the impacts analyses. Values for the Modified Alternative H in the Final EIS were also examined. From this analysis, the NPS determined that there was no need to revise all of the spreadsheets used in the Draft EIS and to re-analyze all of the alternatives using new values in the Final EIS. Therefore, the calculations for the Draft EIS remain unchanged in the Final EIS, except in the case of Modified

Alternative H where limits for the input variables were updated and new calculations were needed. All values were re-checked to ensure they were reasonable.

## **II. Lower Gorge Alternatives**

In contrast to the detailed data on trips between Lees Ferry and Diamond Creek, statistics for trips in the Lower Gorge (Diamond Creek to Lake Mead) are often incomplete or lacking. Thus, estimating use based upon an extensive database of past behavior, such as was done for the Lees Ferry alternatives, was not an option for the Lower Gorge alternatives. Because of this, peak use scenarios were used to analyze the alternatives for the Lower Gorge, in which all of the trips allowed in each alternative were considered to launch at full capacity. It is recognized that some amount less than this would probably occur, but there is not enough data on which to base a specific estimate of how much less would be likely.